# Model 100 Winding Drum Dumbwaiter

# **Installation Manual**

DOC-0100

### Version 2.1

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# 1. Safety Information



The installation of Matot Drum Dumbwaiters should only be performed by qualified, experienced, and trained elevator installers. Working in the dumbwaiter hoistway and on dumbwaiter equipment can be hazardous. All Safety Rules associated with installing elevator type equipment must be followed at all times. Proper protective equipment must be used at all times.

Read this manual carefully. Be thoroughly familiar with all parts and procedures before attempting to install, maintain, or repair this equipment.

There are many design differences with Drum dumbwaiters. This manual does not reference every possible design scenario but does take you through the general steps of installation. In addition to this manual you will receive prints that are job specific. Please review all information included in the Installation package along with these procedures.

# 2. Introduction

The following instructions are a guide for installing the Matot Winding Drum Dumbwaiter.

When Details are referenced, they will usually be located on the pages following the instructions.

If anything is unclear, or you can't find what you are looking for, please do not hesitate to call us for assistance.

We appreciate your business, and as always, will do whatever it takes to supply you with the support needed.

Sincerely,

Scott Holat
Vice President,
Customer Service & Sales
Matot, Inc.

# 3. Product Information

A typical Drum Below dumbwaiter is shown below for reference, with key components labeled.



Figure 1 - Drum Below Dumbwaiter

# 4. Guide Rails

Installation begins with the guide rails. Position of all other equipment is determined from the rail position.

### 4.1 Verify hoistway dimensions

If the dumbwaiter travels through more than one floor, the smallest floor opening must be used in plumbing the hoistway.

### 4.1.1 Verify door placement

Find out from the Contractor or Builder exactly where the hoistway doors are to be placed. Also find out if door wall must coordinate with other building walls, as this could affect the entire hoistway. Contractor or Builder should provide benchmarks to indicate wall location and finished floor height.

### 4.1.2 Mark rail location

At the top landing, mark rail centerline that is parallel to the finished wall line. Refer to the **General Layout** for proper dimensions. Plumb the hoistway by using these centerlines and adjust centerlines according to conditions. Drop Plumb lines at rail centerline and mark off rail center at all floors. After the rail centerlines are determined installation may begin.

### 4.2 Install supporting tower (optional)

 $\sqrt{2}$  If this unit does not include a supporting tower skip to Section 4.3.

### 4.2.1 Review Tower Assembly Drawing

Before beginning the tower assembly, see the **Tower Assembly** and **General Layout** drawing included with each unit. If you do not have these drawings contact Matot. A sample tower assembly drawing, without the job-specific dimensions, is shown in Figure 2 – General Tower Assembly Drawing.

Matot supporting towers are constructed of tower sections (top, bottom and intermediate). These sections will be assembled in the field. Refer to the **Tower Assembly** drawing and **General Layout** drawing to determine the correct orientation and length of these sections.

See Figure 3 - Tower Assembly Components which shows how the components should be assembled in the field.

Guide Rails



Figure 2 – General Tower Assembly Drawing

Guide Rails



Figure 3 - Tower Assembly Components

#### 4.2.2 Assemble lower section

Start by assembling the lower section of the tower in the hoistway.

Attach the tower side bands to the lower tower angles using the 3/8" hardware provided. Be sure to orient the tower angles properly so that the lower section angles have the splice plate mounting holes located at the top of the lower sections (see the splice plate detail on the **Tower Assembly** drawing). Also be sure to orient the tower side bands correctly so that the center of the rail bracket holes matches the rail location as shown on the tower drawing and the **General Layout** drawing. Use the **Tower Assembly** drawing to locate the correct heights of the tower side bands.

Now attach the tower tie bands to the front and rear of the lower tower sections at the locations shown on the **Tower Assembly** drawing to complete the lower tower section.

#### 4.2.3 Install lower section

Move the first section of tower to its appropriate position in the hoistway. This is determined by the rail centerlines.

#### 4.2.4 Assemble intermediate tower sections

Now assemble and stack the intermediate sections on top of the lower sections using the tower splice plates to connect the tower sections. Intermediate tower sections should be 10' long and have splice mounting holes at each end of the sections. Refer to the **Tower Assembly** drawings for side band locations and tie band locations.

#### 4.2.5 Install tower stabilization angles

After a few tower sections are in place it may be necessary to plumb out and stabilize the tower before any additional sections are added. Tower to wall stabilization angles are provided which fasten the tower to the floor slabs and the top of the tower to the hoistway wall. See Figure 3 - Tower Assembly Components and Figure 4 - Tower Stabilization. Depending on the floor to floor height, some towers must be stabilized by anchoring to the hoistway walls between floors. Refer to the **Tower Assembly** drawing for stabilizer positions.



Figure 4 - Tower Stabilization

**NOTE:** Due to the wide range of construction used, Matot does not supply the fasteners required to attach the dumbwaiter to the building structure.

#### 4.2.6 Install other tower sections

Continue the stacking and plumbing process until the complete tower including the top section is installed.

#### 4.2.7 Install tower base angles

After the Tower is plumbed and in the correct position, the Tower base angles should be fastened to the floor using the appropriate anchors.

**Note:** The tower is supplied with tie bands on the front and rear sides of the tower. If the tie bands do not interfere with the installation of the doors, they may remain in place for extra stability. Otherwise, they can be removed and discarded once the tower stabilizer angles have been installed.

### 4.3 Install rail brackets

If you installed a supporting tower in the previous step, install the rail brackets to the tower side bands as shown in Figure 4 - Tower Stabilization.

For units without a supporting tower, mount each guide rail bracket at each floor, at intermediate locations if required, and near the top of the rail. Refer to **General Layout** and or Rail stacking diagram for bracket elevations. Brackets should be mounted using the appropriate fastener for the type of construction that is being used. Brackets should be level and center of the bracket should coincide with the rail centerlines determined in 4.1.2. See Figure 5 – Rail Bracket Assembly.



Figure 5 – Rail Bracket Assembly

One-piece brackets are to be mounted into the floor or pit surface at the base of the rail. See Figure 6 – Rail Base Mounting.



Figure 6 – Rail Base Mounting

### 4.4 Install guide rail and rail mounted devices

Remove coating from the guide surfaces. Re-coat with rail lubricant after installation.

Install first two sections of rail at the bottom of the hoistway. Attach rails to rail brackets with bolts and rail clips supplied. The top and bottom rail sections are typically marked, however, refer to **General Layout** and/or **Rail stacking diagram** to determine correct stacking of rail. Trail is stacked with the male end up.

Plumb rail and set distance between guide rails (DBG) to the required distance. Refer to **General Layout** for DBG.

After installing the first rail sections, proceed to Section 7 for Car installation. After car is installed, return to this section to continue installing rails.

Continue stacking rails on both sides of the hoistway per **General Layout** and **Rail Stack** drawing.

### 4.4.1 Drum Below Deflector Sheave Installation

# For a Drum Above machine, skip to Section 4.4.2.

Install the Overhead deflector sheave and the Slack Cable assembly to the top of the rails. Refer to the **General Layout** to determine which rail each assembly mounts to. The deflector assembly will bolt to the rail closest to the drum of the machine. On adjacent opening units the deflector assembly bolts between the rails. See Figure 7 - Drum Below Deflector and Slack Cable Device.



Figure 7 - Drum Below Deflector and Slack Cable Device

**NOTE:** Standard rail setup is shown, if you have an adjacent opening car or special rail design, additional details will be included in the Installation package for reference.

Install the rail spreader angle at the top of the rails. The top sections of rail have been predrilled for this angle. See Figure 8 - Drum Below Rail Spreader.



Figure 8 - Drum Below Rail Spreader

### 4.4.2 Drum Above Machine Mounting Angle Installation

For a Drum Below machine, skip this step.

If machine is supported by the rails, machine mounting angles will be provided. Some units that include a supporting tower will have provisions to mount the machine to the tower (channels or angles at top of tower). Mount the machine mounting angles to the rail with the bolts and rail clips supplied. See Figure 9 - Drum Above Machine Mounting Angles.



Figure 9 - Drum Above Machine Mounting Angles

## 5. Drive Machine

Installation instructions for the drive machine are different for Drum Above and Drum Below machines.

### 5.1 Drum Below Machine Installation



### 5.1.1 Anchor machine base

Fasten the machine to each guide rail. Refer to the **General Layout** for the correct machine orientation. Standard machines bolt to each guide rail and into the floor. Upright machines only require bolting to the rail. See Figure 10 - Drum Below Machine Placement.



Figure 10 - Drum Below Machine Placement

### 5.2 Drum Above Machine Installation



Figure 11 - Machine Mounting Angle

Install the car into the rail before mounting the machine. See Section 7.

Before machine is set in place, you may want to attach the hoist rope to the drum, see Section 9. It will be much easier to attach the hoist rope while the machine is on the floor.

#### 5.2.1 Install machine base

Installer is responsible for providing lifting apparatus to safely lift machine into place.

If it is not possible to lift the complete machine into place due to lifting or space constraints, it is acceptable to remove the motor and gearbox from the base and install the components separately.

Place the machine on top of the machine support angles and bolt into place. Refer to the **General Layout** for the correct machine orientation. See Figure 12 - Drum Above Machine Placement



Figure 12 - Drum Above Machine Placement

### 5.3 Solid Stop or Spring Buffer Installation

Unit is supplied with lower solid stops or spring buffers. If your unit has solid stops, they can be mounted at this time. If your unit has spring buffers, they should be mounted after the car is installed. Using bolts and T-rail clips supplied, mount the solid stops to the rail. Mount the top of the stops 6 inches below the lower door sill level. Sill level will be indicated on the **General Layout**.

See Figure 13 – Solid Stops, Figure 14 - Rail Mounted Spring Buffers, or Figure 15 - Floor Mounted Spring Buffers.

If your unit has an 8" pit, lower stops are not required.



Figure 13 – Solid Stops



Figure 14 - Rail Mounted Spring Buffers



Front View

Figure 15 - Floor Mounted Spring Buffers

# 6. Pre-Wired Duct (Optional)

If your unit is furnished with Matot's full Pre-wire package, it is recommended that the duct be installed at this time. The Pre-wire duct, (main riser), comes complete with rail mounting brackets. The duct sections are marked as to their position in the stack. Refer to the **Duct Stacking Layout** for the starting elevation of the duct, and to the **General Layout** for the correct placement of the duct. See Figure 16 – Duct Installation.



Figure 16 – Duct Installation

# 7. Car

The car should be installed after installing only the bottom sections of rail per Section 4. If all rails have been installed, at least one section of rail on one side must be removed. With the section removed the car may then be hoisted or lowered into the rail. After car installation, the removed rail section may be replaced.

### 7.1 Broken Cable Safety



The broken cable device has been set up for proper operation at the factory. It is critical that the safety not be disassembled.

Matot cannot ensure the proper functioning of the safety if it is disassembled in any fashion.



Figure 17 – Car before gate installation

**BROKEN CABLE SAFETY** 



Figure 18 – Car with gate installed

### 7.2 Lifting Car

Fasten rigging to angles on car top, not to the broken cable safety. It is also acceptable to use a section of wire rope running through car top sheaves to lift the car.



Lifting the car with the broken cable safety can damage the safety.

Using a suitable hoist point on building structure, lift car into hoistway.



Ensure hoist point and hoist equipment are rated for the weight of the car as shown in the **General Layout** drawing.

Lower car onto guide rails, sliding guide shoes over rails. If not lifting with rope through car top sheaves, manually disengage car top safety by rotating shaft above broken cable safety to allow rails to pass through safety device.

Car

### 8. Car Gate

Car gates are shipped fully assembled and ready to be mounted on the car.

### 8.1 Bi-parting Gate

The gate mounts to the car with four bolts, (two at the top and two at the bottom. See Figure 19 - Gate Installation. Remove the four bolts from the gate tie angles before trying to install.



Figure 19 - Gate Installation

If your car has opposite openings make sure you mount the front gate (marked) on the front side of the car (also marked).

Slide gate onto the face of the car and attach to the car using the four bolts removed in the previous step.

Mount the gate switch to the mounting bracket that is attached to the gate tie angle. If the switch is not mounted, a hazard exists, as a key element of the safety circuit will not function correctly. See Figure 20 – Gate Switch Installation.



Figure 20 – Gate Switch Installation

### 8.2 Slide-up Gate

The gate mounts to the car at four points. The top fastenings are through the top tie angles and down to the car top. The lower two fastenings are through the vertical leg of the lower tie angle and bolt into the face of the car platform. In the standard design, the counterweight guide tubes also bolt to the side of the car. Remove all mounting bolts before attempting to mount gate.

Move the gate near the car opening. The counterweight guide tubes must be removed in order to slide the gate onto the car.

Slide gate onto the face of the car and attach to the car at the top and bottom mounting points.

Re-attach the counterweight guide tubes to the gate tracks and bolt the tubes to the car using the mounting angles provided.

Mount the gate switch to the mounting bracket that is attached to the gate tie angle. If the switch is not mounted, a hazard exists, as a key element of the safety circuit will not function correctly. See Figure 20 – Gate Switch Installation.

# 9. Hoisting Cable Installation (Roping)

**If you do not have a power source available at this time,** it is recommended that you proceed to installing the hoistway doors. This will allow movement of the car, by chain fall, to each landing, which is required in order to properly set the doors.

### 9.1 Drum Below Rope Installation

Use this procedure for a unit with the machine mounted below the car.

Insert one end of the hoisting cable through the face of the drum. Hole in face of drum is drilled at factory. Then thread hoist cable through the hub of the drum. Terminate end of cable with cable clips supplied. See Figure 21 - Drum Below Rope Termination.

Pull cable back through holes until the termination point is against the hub of the drum. Put one- and one-half wraps of cable on the drum.



Note that the cable leaves the drum on the side closest to the hoistway wall.

Position the car so it is even with the finished sill height of the door at the lowest level. See **General Layout** for this dimension.

Bring cable up the hoistway and over the deflector sheave at the top. Then drop the cable down to the car.

Run the cable under the deflector sheave(s) on the car and then back up to the slack cable assembly.



Figure 21 - Drum Below Rope Termination

### 9.2 Drum Above Rope Installation

Use this procedure for a unit with the machine mounted above the car.

Insert one end of the hoisting cable through the face of the drum. Hole in face of drum is drilled at factory. Then thread hoist cable through the hub of the drum. Terminate end of cable with cable clips supplied. See Figure 22 - Drum Overhead Rope Termination.

Pull cable back through holes until the termination point is against the hub of the drum. Put one- and one-half wraps of cable on the drum.



Note that the cable leaves the drum on the side closest to the hoistway wall.

Position the car so it is even with the finished sill height of the door at the lowest level. See **General Layout** for this dimension.

Run the cable from the winding drum down to the car.

Run the cable under the deflector sheave on the car and then back up to the slack cable assembly.

### 9.3 Rope Termination

Tension the cable by hand and terminate the cable at the slack cable assembly using the clips supplied. Use at least two clips for each termination. Leave at least 3-3/4" of rope from thimble. Apply first clip one base width from dead end of rope. Apply second clip as near the thimble as possible.



Tighten nuts evenly to 7.5 ft-lbs. Keep the saddle of the clip on the live end of the cable (U-bolt over dead end).



Figure 22 - Drum Overhead Rope Termination



Figure 23 - Cable Drop, Drum Below



Figure 24 - Cable Drop, Drum Overhead

### 10. Hoistway Doors

### 10.1 Door position

Each door must be set at proper sill height, parallel with the car face, and with the sill and jambs aligned with the car. Refer to the **General Layout** for the proper setting distance (face of car to back of door jamb). See Figure 25 - Door Alignment.



Figure 25 - Door Alignment

Move door to correct landing. Doors are marked as to their position i.e.; 1st floor, 2nd floor, 2nd floor front etc. Refer to **General Layout** for door positioning. Doors are not always identical; some may have opposite hand Interlocks or other differences that preclude the doors from being substituted for each other.

### 10.2 Door mounting

Mount the top of the door using the door brackets supplied. These brackets attach to the hoistway wall to adjust and stabilize the top portion of the door. See Figure 26 - Door Brackets.

Hoistway Doors



Figure 26 - Door Brackets

Alternate methods of securing the top of the door are used when necessary. If a different method of mounting the door is used in your application, there will be supplemental drawings included in the Installation package.

Counter-height loading doors are supplied with foot mounting angles, which mount the bottom of the door to the floor slab. Doors with floor-loading sills are mounted into a sill pocket and grouted in place after the door is positioned correctly. Mount bottom of door to the floor after door is positioned correctly. See Figure 28 - Counter Height Loading Door and Figure 29 - Floor Loading Door.



Figure 27 – Floor Loading Door Sill Detail



Figure 28 - Counter Height Loading Door



MOUNTING METHOD IS THE SAME FOR FLOOR LOADING BI-PARTING DOORS. ONLY DIFFERENCE IS THE OMISSION OF THE CWT TUBES.

#### Figure 29 - Floor Loading Door

### 10.3 Finish hoistway walls

After doors are set into position the wall may be erected. Note that the doors must be attached to the hoistway walls.

Doors that are to be installed into masonry construction are furnished with masonry straps that must be laid into the mortar joints while the wall is being erected. See Figure 30 - Masonry Door Installation Detail.

Stud and drywall type construction requires the wall to be anchored to the angles that are welded to the door tracks. See Figure 31 - Drywall Door Installation Detail.

Coordinate the framing required for the access door with the Contractor. The access door requires an opening one-quarter inch larger than the nominal size of the door. Refer to the **General Layout** for the door size and location.

Hoistway Doors







Figure 31 - Drywall Door Installation Detail

### 10.4 Pushbutton and Emergency Release Installation

Pushbuttons and Emergency Releases may be framed into the wall or mounted to the door frame using the provided brackets. If mounted to the door frame, see Figure 32 - Emergency Release and Pushbutton Brackets (Optional).



Figure 32 - Emergency Release and Pushbutton Brackets (Optional)

The Emergency Release is used to override the hoistway door interlock to open the doors in case of emergency. The Emergency Release box and conduit is installed in the wall and connected to the door interlock as shown in Figure 33 - Emergency Release.



Figure 33 - Emergency Release Installation

# 11. Controller and Limit Switches

### 11.1 Install Controller

Determine location of controller. Refer to the General Layout for position.

If unit is Pre-wired, the Controller location shown on the prints must be used. If controller is relocated, the loom from the controller to the main riser will probably not be the correct length.

Mount Controller to wall as shown on prints.

### 11.2 Install Limit Switches

If this unit includes the full pre-wired package, skip to Section 12.

Refer to the **General Layout** installation notes and **rail or tower stack drawings** for orientation of the switches. Typical switch brackets fasten to the T-rail and are adjustable. See Figure 34 - Switch Bracket Installation.



Figure 34 - Switch Bracket Installation

Normal limit switch elevation typically matches the top of the car clear opening with the car at sill level. Refer to the **General Layout** and/or the rail stack drawing for this dimension. See Figure 35 - Limit Switch Elevation.



Bottom Floor Switches are shown. Switch position given is a starting point. Adjustments may be needed to stop car at landing level.

Figure 35 - Limit Switch Elevation

# 12. Travel Cable

Install hanger bracket to the guide rail 24 to 30 inches above the mid-point of car travel.

With the car at the lowest level, uncoil traveling cable, loop it under the car and up to the hanger bracket. Make a temporary attachment to the mounting post.



Check loop to make sure it is not twisted and eliminate any possible snagging points or obstructions.

Tie traveling cable to mounting post on hanger bracket as shown below. Allow enough cable to reach main riser or pre-wire duct before tying off. See Figure 36 - Travel Cable.



Figure 36 - Travel Cable

# 13. Completing Electrical Connections

Using the Electrical prints for reference, complete all of the electrical connections. All wiring connections should meet the applicable National Electric Code.

On pre-wired units, the Slack Cable device will connect to the top of the Duct, and the machine will connect to the bottom end of duct. Connections are made by removing the reducing washer that is split, pushing the plugs through the knock-outs, and then replacing the split reducing washer and tightening the fitting nut. The electrical connections are made in the duct using the plugs provided. Plugs are marked for reference. When mating the plugs make sure that the locking tabs engage.

On jobs where the controller is more than 6' away from the wiring duct, a wiring loom is provided with plugs only on one end. The plugs go into the wiring duct and the other end is wired into the terminal blocks in the control box. See Figure 37 - Remote Wiring Loom.

	WHITE PLUG			RE	D PL	JG
	WIRES 1-15			WIRE	ES 16	-30
Cable Wire#	1	2	3	16	17	18
Terminal Block#	N	Ν	CL2	22B	22C	200
	4	5	6	19	20	21
	CL2	0	0A	201	202	203
	7	8	9	22	23	24
	0B	0C	1	204	205	293
	10	11	12	25	26	27
	3	4	5	299		
	13	14	15	28	29	30
	6	22	22A			

MAIN CABLE AND TERMINAL BLOCK CORRELATION: The numbers shown are an example, see Job specific Hoistway Wiring Diagram for actual terminal block numbers.

#### Figure 37 - Remote Wiring Loom

Note: There are 15 position plugs at the top and bottom of the duct to dead end the main wiring loom and are not connected. It can be used to plug in the controller, if the controller is moved to a new location.

Before making any automatic runs, all electrical safety components should be checked for proper operation. This includes; final & normal limit switches, door interlocks, access door switch, slack cable switch and motor overload.

The slack cable switch has a manual reset button which will have to be set after the cable has been installed and tensioned.

Check all termination screws on the controller, they may vibrate loose during shipping.

# 14. Power Door with Belt Driven Operator

 $\checkmark$  If this unit includes manual doors, skip to Section 16.

Two different types of power door operators are used: belt driven and magnet clutch driven.

If this unit includes Magnet Clutch type power doors, skip to Section 15.

### 14.1 Description of Operation

Car gate and hoistway doors are individually driven by a gearmotor and belt drive actuator. Hoistway doors are driven by a pair of actuators, one on each side of the door. Car gate is driven by one centrally mounted actuator. A lifter connects the actuator to the door panel. See Figure 38 - Belt Drive Power Door, Figure 39 - Door Lifter Detail, and Figure 40 - Gearmotor Detail.

Gearmotors are 24VDC motors with 10:1 worm gear reducer and integral encoder. Each gearmotor has a digital controller to control speed and position. An open or close signal is sent to the motor controller from the main PLC when a user presses the door open or close pushbutton. A momentary button press opens the door. The close button must be held to close the gate and door.

Position is set relative to "home" position, which is the door closed position. Upon initial startup, doors will close automatically to set the home position.



Figure 38 - Belt Drive Power Door



Figure 39 - Door Lifter Detail



Figure 40 - Gearmotor Detail

Signal 1	Signal 2	Door Command
Low	Low	STOP
Low	High	Start Homing
High	Low	Close Door
High	High	Open Door

### 14.2 Belt Drive Power Door Installation

Connect hoistway wiring (power and control wires) and flex conduit from hoistway wiring duct to wiring box at door. See job wiring diagrams for connections.

Connect power gate wiring (power, control, and reversing edge wires) and flex conduit from car top box.

### 14.3 Belt Drive Power Door Troubleshooting Guide

Symptom	Action
Gate and door not moving	<ol> <li>Check 24V power supply in cabinet</li> <li>Check open and close outputs from PLC</li> <li>Check for signal from pushbuttons to PLC inputs using LED lights on PLC inputs. See electrical drawing for PLC input numbers for each pushbutton.</li> <li>Check manual operation - gate or door moves freely</li> </ol>

Power Door with Belt Driven Operator

Gate or Door moving, but not both	<ol> <li>Check for 24V power to motor and controller</li> <li>Check for open and close outputs from PLC</li> <li>Check manual operation - gate or door moves freely</li> </ol>
Gate or door not fully closing or opening	1. Check manual operation - gate or door moves freely

If you still need troubleshooting assistance after performing these checks, please call Matot.

# 15. Power Door with Magnet Clutch Operator

Proper adjustment of both mechanical and electrical components are critical in order to achieve proper and consistent operation of the magnet clutch type power gate & door system.

### 15.1 Magnet Clutch Power Door Adjustment

### 15.1.1 Gripper Adjustment

Set door grippers per Figure 42 - Gripper Adjustment.



\* AFTER CAR IS INSTALLED AND DOORS ARE SET, THE RUNNING CLEARANCE BETWEEN THE POWER GATE MAGNET AND THE DOOR GRIPPER MUST BE 1/2" TO 5/8". THE MOUNTING BRACKET FOR THE GRIPPER ASSEMBLY IS SLOTTED TO ALLOW FOR ADJUSTMENT.

#### Figure 42 - Gripper Adjustment

### 15.1.2 Magnet Switch Adjustment

Verify the Magnet switch "MLS" is adjusted per Figure 43 - MLS Switch Adjustment.



1) FOR PROPER OPERATION THE "MLS" SWITCH MAY NEED ADJUSTMENT.

- 2) WHEN MAGNET IS ENERGIZED THE PLATE OF THE DOOR GRIPPER WILL MOVE TOWARDS THE MAGNET. TYPICALLY THE BOTTOMOF THE PLATE WILL CONTACT THE MAGNET FIRST AND THEN THE TOP PORTION OF THE PLATE WILL COMPLETE IT'S MOVEMENT. WHEN THE PROXIMITY SWITCH SENSES THE PLATE THE GATE WILL START OPENING.
- 3) TO INSURE PROPER OPERATION, THE "MLS" SWITCH SHOULD BE SET TO SENSE THE PLATE WHEN THE TOP OF THE PLATE IS NO MORE THAN 1/8" FROM THE MAGNET. THE LED INDICATOR WILL LIGHT WHEN THE PLATE IS DETECTED.

#### Figure 43 - MLS Switch Adjustment

#### 15.1.3 Gate Speed Control

Set the Gate speed control at "5" or "6" (located in the Controller)

#### 15.1.4 "GOL" Switch Adjustment

Initiate a Door Open sequence and adjust, if necessary, the "GOL" switch. The switch should be set so that the gate opens about  $\frac{1}{2}$ " to 1" further than the hoistway door, i.e. 48" door opening, 49" gate opening. The door will reach its full open position and then the gripper plate will slide along the magnet face until the "GOL" limit is triggered. This is required in order to maintain an accurate and consistent closing of the gate and doors. Note: on Bi-parting equipment a  $\frac{1}{2}$ " of



movement on the "GOL" switch equals a 1" change in the gate open dimension. See Figure 44 - Power Door Switch Identification.



Figure 44 - Power Door Switch Identification

### 15.1.5 "GCL" Switch Adjustment

Initiate a Door Closed sequence and adjust, if necessary, the "GCL" switch so that the gate and door fully close. The door panels will close first and then the gate will close as the gripper plate slides along the magnet face until the gate fully closes. When properly adjusted, the doors will consistently close correctly. See Figure 44 - Power Door Switch Identification.

### 15.1.6 Reverse Voltage Adjustment

If the door gripper fails to fall away from the magnet after the gate is fully closed, check the reverse voltage supplied to the magnet. The voltage should be between 20 and 24 VDC. If the voltage is greater than 24 VDC then an adjustment must be made. This voltage can be adjusted via the adjustable resistor located in the controller.

### 15.2 Magnet Clutch Power Door Troubleshooting Guide

Problem	Action
Door gripper not attracted by gate magnet	<ol> <li>See 15.1.1 in adjustment procedures</li> <li>Verify magnet is energized</li> </ol>
Gate magnet picks gripper plate but gate & door do not open	<ol> <li>See 15.1.2 in adjustment procedures</li> <li>Verify that "MLS" switch has power</li> <li>Verify that "MLS" switch is functioning</li> <li>Verify that motor is being powered</li> </ol>
Gate motor is running but gate & door do not open	<ol> <li>Make sure manual clutch release is not engaged</li> <li>Check connection &amp; keyway at drive sprocket</li> </ol>
Gate starts to open before fully engaging door	1) See 15.1.2 in adjustment procedures
Gate & door not fully opening	1) See 15.1.4 in adjustment procedures
Gate & door not fully closing	1) See 15.1.5 in adjustment procedures
Gate & door close but motor is still running	<ol> <li>See 15.1.5 in adjustment procedures</li> <li>Verify "GCL" switch is operating</li> </ol>
Door & gate are not closing consistently	1) See steps 15.1.3 thru 15.1.5 in adjustment procedures
Gripper plate does not fall away from gate magnet after gate & door is closed	1) See 15.1.6 in adjustment procedures

# 16. Final Checks

- □ Verify that all wall bracket and/or rail brackets are in place and tight.
- □ Verify that all limit switches are functioning correctly.
- □ Verify that all door interlocks and access door switch are functioning correctly.
- □ Check cable terminations.
- □ Check for proper winding of cable on drums. Make sure drum cable guard to wire rope clearance is no more than 1/16".
- □ Check traveling cable to ensure a smooth loop. Check for any possible snag points.
- □ Check operation of slack cable device. Manually reset slack cable switch after testing.
- □ Check operation of car safety switch.

# 17. Troubleshooting

# 17.1 General System Troubleshooting Guide

Problem	Possible cause	Remedy
Dumbwaiter does not move when button is pushed	Hoistway or car door open Main line disconnect switch open Dumbwaiter on final limits Defective pushbutton Pushbutton wired incorrectly Motor overload tripped Control circuit fuses defective "Motor Run" timer tripped Power Gate & Door not adjusted correctly	Close door, check and/or replace contact switch Determine reason switch is open, remedy, close switch Determine cause of overtravel, remedy, manually reset Replace Check wiring and correct as needed Determine cause, remedy, reset at the controller Replace Determine reason timed out, remedy, reset timer See adjustment procedures
Dumbwaiter does not stop level with door still	Limit switches out of adjustment Limit switch cam out of adjustment Defective limit switches Level Magnet incorrectly located	Adjust limits Adjust cam for proper contact with switches Replace Adjust leveling magnet
Dumbwaiter stops at undetermined location	Broken cable device has set Slack cable switch tripped Obstruction in hoistway Motor overload tripped	Verify cause before resetting the safety Verify cause before resetting switch Remove obstruction Determine reason, remedy, reset overload
Noisy operation	Noisy bearing in overhead sheave Noisy bearing in car deflector Car rubbing in hoistway Noisy brake Noisy reducer	Lubricate or replace Lubricate or replace Check running clearances and make adjustments Adjust per instructions Remove brass pin in vent plug, or grease end bearings, or check oil level, or check for correct lubricant, replace if necessary

### 17.2 Controller Troubleshooting Guide

#### 17.2.1 Single Speed Dumbwaiter Controller Troubleshooting Guide

Note: See the job schematic for the specific input and output numbers

To run, PLC Inputs must be as follows:

- Power & Run Lights: ON
- Safety Circuit: ON
- Doors Closed: ON
- Contactor Monitoring: OFF
- If the unit is at a floor, the appropriate Floor Switch: ON

When a run command is given the following Outputs should turn on:

- "In-Use" Light
- Up or Down Relay
- ES Contactor
- Contactor Monitoring

When the car hits the Floor Switch, PLC Inputs/Outputs will change as follows:

- Floor Switch: ON
- Up or Down Relay: OFF
- ES Contactor: OFF
- Car Arrival Light & Chime: ON (Will remain on until the doors are opened or the car is called away.).
- The Contactor Monitoring Input: OFF
- After the Non-Interference Timer is done the "In-Use" Light will turn off.

Inputs 0 & 1 must both be on for the unit to work. If input 0 is off start with the Phase Relay; it is the big White relay with the output on light. It checks for under voltage and phase reversal. This light must be Green for the unit to work.

- If Phase Relay light is Red, adjust the voltage dial on the front to your incoming voltage with the power off.
- If the light is Amber, reverse L1 & L2 coming into the controller.

The Slack Cable Switch at the top of the Hoistway is a manual reset switch and needs to be reset once there is tension on the lift cable. The best way to find the problem is to check for 24 VDC to DC- from the points on the door & safety circuits. See the job schematic for the specific terminal block numbers.

#### 17.2.2 Dumbwaiter Controller with Motor Drive Set-Up/Inspection Run Instructions

Note: The Drive Parameters are preset for each job. The Drive must be in Remote to work. Using the Jog buttons on the drive will not bring in the ES & BR Contactors and the unit will not move.

- Note: See the job schematic for the specific input and output numbers
- Install jumpers for Safety Circuit, Door Closed and Locked Contacts.
- Install jumpers for normally closed contacts on Directional Limits. The inputs for the Top & Bottom Directional Limits and Top and Bottom Slowdown Limits must be off.
- Inspection Toggle switch should be set to off. The input is on for Automatic and off for Inspection.
- Jump from 100 to Inspection Up Input for up run and 100 to Inspection Down Input for down. See job Schematic for terminal block numbers.
- Jobs with Hall Access Operation may not have the Inspection inputs. On these jobs, Jump the Hall Access on and use the Hall Access Up and Down Inputs to run the unit.

To run the following Inputs to the PLC must be on:

- Safety Circuit
- Doors Closed
- Doors & Gate Closed (for jobs with power gates and doors)
- Doors Locked (for jobs with double contact interlocks)
- Drive Ready (OD)
- + Enable Output

When a run command is given:

- The Retiring Cam "RC" Will Energize (for jobs with double contact interlocks)
- The Door Lock Input will turn On.
- The Potential Contactor "ES" will Energize
- The Speed 2 output to Drive will Energize
- The Up or Down Relay will Energize
- The Brake Release Signal (BD) Input will turn On
- The Brake Contactor "BR" will Energize

#### 17.2.3 Dumbwaiter Controller with Motor Drive Automatic Run Information

#### Note: The Drive must be in Remote to work.

#### The Drive Parameters are preset for each job.

- See Inspection Run Instructions in Section 17.2.2 for Set-Up runs.
- Inspection Toggle switch should be set to on. The input is on for Automatic and off for Inspection.
- Complete all wiring prior to running on Automatic.
- Install Limit Switches per Rail Stack drawing. Note, for intermediate floors, the unit goes into slow speed after hitting the first floor switch it see's and stopping on the second.



Running up for a 2<sup>nd</sup> floor call it goes into slow after hitting the 2<sup>nd</sup> floor down stop switch and stops on the 2<sup>nd</sup> floor up stop switch. Running down for a 2<sup>nd</sup> floor call it goes into slow after hitting the 2<sup>nd</sup> floor up stop switch and stops on the 2<sup>nd</sup> floor down stop switch. They can be adjusted independently.

To run the following Inputs to the PLC must be on:

- Safety Circuit
- Doors Closed
- Doors & Gate Closed (for power gates and doors)
- Doors Locked (when required)
- Drive Ready (OD)
- + Enable Output

When a run command is given:

- The Retiring Cam "RC" Will Energize (when provided)
- The Door Lock Input will turn On.
- The Potential Contactor "ES" will Energize
- The Up or Down Relay will Energize
- Speed 2 to Drive (Speed 1 & 2 is High Speed, Speed 1 only is Leveling Speed)
- The Brake Release Signal (BD) Input will turn On
- The Brake Contactor "BR" will Energize

The following are drive parameters that may be adjusted. **Contact Matot before changing any parameter not listed here.** 

- To adjust the Leveling Speed, change Slow Speed #1202 in the drive (on open loop applications do no set below 300RPM).
- Inspect Speed #1203 is the Inspection Running Speed .
- High Speed #1204 is High Speed.
- To adjust the acceleration ramp, change Accel Time #2202 in the drive (do not set the acceleration to more than 4 seconds).
- To adjust the transition from high speed to slow speed, change Decel Time #2203 in the drive (the unit should reach a sustained slow speed before stopping, about 1 full drive sheave rotation).

# 18. Support

Please contact us at the phone numbers or email addresses below if you need assistance.

#### Table 1 - Support Points of Contact

Contact	Phone	Email	Contact for:
Technical Support	708-547-1888		Technical questions about your Matot equipment, including installation or troubleshooting
Sales	800-369-1070	sales@matot.com	New or existing orders
Parts	708-547-1888	customerservice@matot.com	Spare parts
General	708-547-1888		All other requests

# Appendix A: Glossary

#### Table 2 - Glossary

Term	Acronym	Definition
Distance Between Guides	D.B.G.	Distance between inside edges of guide rails (T-rail)
Door		Hoistway Door at each floor opening
Gate		Door attached to dumbwaiter car
General Layout	-	Job-specific drawings for the complete dumbwaiter unit. Also called Shop Drawings or Approval Drawings.
Rail Stack Drawings	-	Job-specific drawings showing dimensions and locations of the various rail pieces. Also shows limit switch locations.