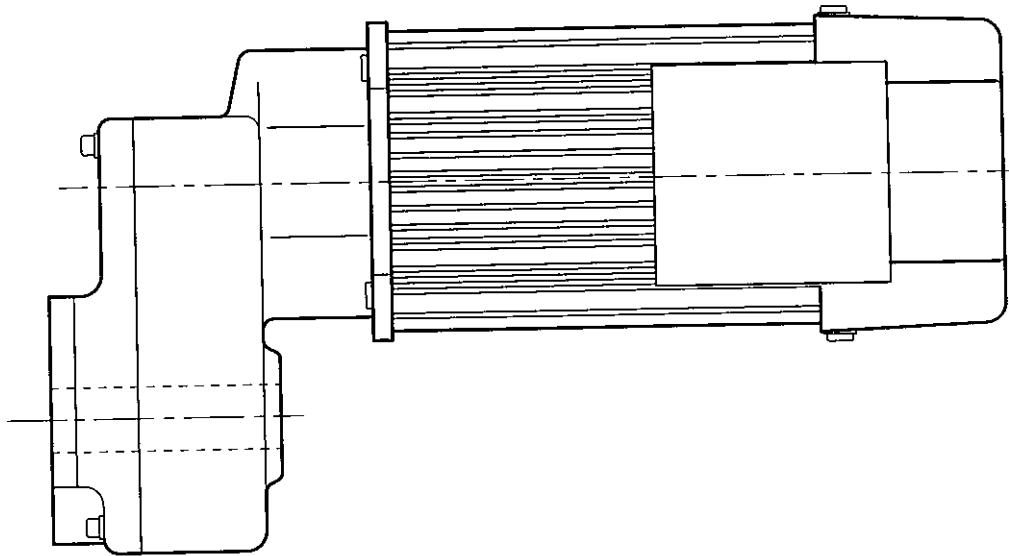


# TM DRIVES

Types TM3, TM4 and TM5



## INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

SERIAL NO.: \_\_\_\_\_



# R&M

MATERIALS HANDLING

## IMPORTANT

Read this manual before proceeding with the installation, operation, or maintenance of the product to ensure the safe and efficient use of the product.

It is strongly recommended that the personnel responsible for the operation, inspection, and maintenance of this product, read and follow the Safety Standard ANSI B30.-1993 (or current revised edition) covering Overhead Hoists (underhung) as promulgated by the American National Standards Institute and published by the American Society of Mechanical Engineers. Copies of this publication are available from the Society at United Engineering Center, 345 East 47th Street, New York, NY 10017.

If any instructions are unclear, contact the manufacturer or distributor of the product before attempting to install or use the product.

Manufactured by: R&M Materials Handling, Inc.  
4501 Gateway Blvd.  
Springfield, Ohio 45502  
Tel. (937) 328-5100  
Fax (937) 325-5319

# TABLE OF CONTENTS

<i>Section</i>	<i>Page</i>
<b>Foreword</b> .....	ii
<b>Authorized Stocking Parts Distributors</b> .....	iii
<b>1. Installation</b>	
General .....	1-1
Receiving and Storage .....	1-1
Location .....	1-1
Lubrication .....	1-1
Mounting Positions .....	1-1
Installation Hardware .....	1-1
Power Connection .....	1-1
<b>2. Initial Start-up</b>	
Proper Motor Rotation .....	2-1
Operation of Brake .....	2-1
<b>3. Maintenance</b>	
Gearcase Assembly .....	3-1
Motor/Pinion .....	3-1
Brake .....	3-1
Inspection/Preventative Maintenance Schedule .....	3-2
Recommended Lubricants & Capacities .....	3-2
Recommended Bolt Tightening Torque .....	3-2
Troubleshooting .....	3-3
<b>4. Spare Parts Identification, Replacement and Adjustment Instructions</b>	
Motor .....	4-1
Brake .....	4-3
NM340 Brake .....	4-3
NM311, 312, 313 Brakes .....	4-6
Gear Reducer .....	4-9
TM3 Double Reduction .....	4-9
TM3 Triple Reduction .....	4-10
TM4 Triple Reduction .....	4-11
TM5 Triple Reduction .....	4-12

## FOREWORD

This manual has been prepared to acquaint you with the procedures necessary for the installation, operation, and maintenance of the product you have purchased.

Proper installation is important to ultimate performance of this equipment. Careful study and adherence to the instructions will help assure safe, dependable operation. It is recommended that you keep this manual readily accessible in case of an emergency.

Information in this manual is subject to change without notice.

**STANDARD WARRANTY.** Consult R&M Materials Handling's current Sales Policy for a detailed definition of the product warranty support procedures. If you need a current copy, contact the Warranty Administrator at the factory.

**REPAIR or REPLACEMENT PARTS.** The Illustrated Parts Breakdown in this manual define the parts that are available for repair or replacement. In order to obtain parts, please proceed as follows:

- 1) Locate your nearest R&M Authorized Stocking Parts Distributor and provide the below details. A list of Authorized Stocking Parts Distributors is located on the following page of this manual for your convenience.
- 2) Locate the serial number on the product name plate. This must be provided to insure proper replacement parts.
- 3) Obtain the reference number / numbers from the illustrated parts breakdown for the part / parts that you need.
- 4) Define the quantity for each part.
- 5) Description.
- 6) Power Supply.
- 7) Provide ship to address. Specify street address not Post Office Box number.

A minimum charge of \$100 net is required on all orders.

# R&M MATERIALS HANDLING, INC. - STOCKING PARTS DISTRIBUTORS

5/18/98

ph: 1-937-328-5100  
fax: 1-937-325-5319

4501 Gateway Blvd.  
Springfield, Ohio 45502

	DISTRIBUTOR	address	city, state	zip code	area code	phone	fax
1	Continental Crane Serv	33681 Groesbeck Highway	Fraser MI	48026	810	294-7900	294-3811
2	Han-Tek, Inc.	100 Rawson Rd, Bldg 220	Victor NY	14564	716	924-2200	924-2328
3	Production Equipment	401 Liberty Street	Meriden CT	06450	203	235-5795	237-5391
4	R-M Crane, Inc.	2020 Riggs Road	Warren MI	48091	810	756-2222	756-5120
5	Stewart Eng. & Sales	2140 Aurora Avenue	Muskegon MI	49442	616	767-2140	767-2233
6	Zinter Handling, Inc.	4313 Route 50	Saratoga Springs NY	12866	518	583-0853	583-1063
7	Ace Industries	6295 McDonough Drive	Norcross GA	30093	770	441-0898	441-0326
8	DeShazo Crane Co.	190 Airpark Industrial Road	Alabaster AL	35007	205	664-2006	664-4987
9	Richardson Machine	634 Woodland Avenue	Birmingham AL	35211	205	785-5431	785-8008
10	Sterling Sales & Serv.	3212 East Kivett Drive	High Point NC	27260	910	454-3373	454-3391
11	Shannah Crane	12813 Flushing Meadow Drive	St. Louis MO	63131	314	965-2800	965-2839
12	UESCO Industries, Inc.	5908 West 118th Street	Worth IL	60482	708	385-7700	385-6889
13	Anchor Crane & Hoist	2020 East Grauwlyer Avenue	Irving TX	75061	972	438-5100	438-3428
14	Gaffey Inc (Tulsa)	6951 East 12th Street	Tulsa OK	74112	918	836-6827	835-1008
15	Proserv Crane & Eqpt.	842 Buschong	Houston TX	77039	281	987-8072	987-2953
16	Americrane & Hoist	13224 Enterprise Avenue	Cleveland OH	44135	216	267-6420	267-9131
17	Delta Crane	2748 Columbus Avenue	Springfield OH	45503	937	324-2229	324-8331
18	Foley Mat'l Handling	1 Virginia Crane Drive	Ashland VA	23005	804	798-1343	798-7843
19	Globe Electric	200 23rd Street	Pittsburgh PA	15215	412	781-2677	781-1812
20	Philadelphia Tramrail	2207 East Ontario Street	Philadelphia PA	19134	215	533-5100	533-8907
21	Repair Unlimited	1730 Rockwell Road	Abington PA	19001	215	657-3335	784-0343
22	Arrow Crane Hoist, Inc.	12714 Carmanita Road	Santa Fe Springs CA	90670	562	921-8328	921-9307
23	HOJ Engineering Co.	3960 South 500, West	Salt Lake City UT	84123	801	266-8881	261-2327
24	Washington Crane	1334 Thornton Avenue SW	Pacific WA	98047	253	863-6661	863-6667
25	Richards Wilcox	1415 Bonhill Road - Unit #6	Mississauga Ont	L5T-1R2	905	564-5446	564-5296
26	Rotator Products	570 Alden Road - Unit #6	Markham Ont	L3R-8N5	905	479-9841	479-9850

## SECTION 1 – INSTALLATION

### General

Your hoist trolley or crane endtruck is equipped with a TM type drive. To quickly identify the type drive installed on the equipment, a TM drive is shaft mounted with a hollow output bore. A TM drive consists of a gearbox, motor, and brake.

### Receiving and Storage

Inspect the drive immediately on receipt and verify that no damage has been caused during shipment. Check the ratings on the motor nameplate to ensure the information matches your specifications. Store drives in a dry location at room temperature.

### Location

Drive should operate where environment has an ambient temperature range of  $-4$  to  $104^{\circ}\text{F}$  ( $-20$  to  $40^{\circ}\text{C}$ ) and altitude does not exceed 3,280 feet (1000m) above sea level. Contact factory if conditions are more severe. The flow of cooling air to motor shall not be obstructed.

### Lubrication

Gearcases and motors are shipped from factory completely charged with lubrication. To avoid any potential damage from low oil or grease levels resulting from leakage during shipping/handling, all levels must be checked and oil or grease added where necessary. See Section 4 for Recommended Lubricants & Capacities.

### Mounting Position

Motor shaft shall be located either above or at the same level as the gear shaft. Never mount drive where motor shaft is below the gear shaft.

### Installation

To mount the drive to endtruck or trolley, use the following recommended procedures:

- Remove dirt or rust protection wax from mounting surface of endtruck or trolley.
- Lubricate drive shaft splines with grease.
- Install drive and tighten mounting bolts. (See Section 4 for recommended bolt tightening torques)
- If drive has been shipped with solid plug, replace it with a breather plug. Or if drive has a breather plug, remove the pin from the plug. This is to prevent oil leakage due to pressure build up.

### Power Connection

Make sure that power supply voltage is same as that shown on the motor nameplate. The power source and wires must be sized sufficiently to maintain the voltage at motor within 10% of nameplate rating and frequency within 5% of nameplate rating. Improper voltage maintenance can cause motor overheating or sluggishness, and inoperative motor brakes.

For wire sizes and electrical connections refer to National Electric Code - Article 430 and/or local area codes.



## SECTION 2 – INITIAL START-UP

CHECK THE FOLLOWING BEFORE PUTTING INTO SERVICE:

### Proper Motor Rotation

The direction of rotation of any three-phase A.C. motor can be changed by reversing any two leads of the three power lines feeding the motor. It is important to insure that the motor/s respond to the direction indicated on the push button insert being depressed.

### Operation of Brake

Check motor brake to insure that it is operating properly. The friction plate must turn freely when motor is energized. Refer to adjustment procedures for proper setup.

## SECTION 3 – MAINTENANCE

### **Gearcase Assembly**

Drive consists of precision cut gears and pinions, keyed or splined to steel shafts, supported on bearings. Gears and bearings operate in an oil-bath or semi-fluid grease and requires no additional lubrication. Under normal use, lubrication of gearcase is life-time rated. If the need for relubrication becomes necessary, see Lubrication Schedule and Recommended Lubricants for your drive.

It is recommended that the gearcase cover gasket be replaced whenever inspection or servicing of gearcase requires cover removal.



Fill gearcase to level with lubrication as recommended in Lubrication Schedule, this section, prior to putting drive back in service.

### **Motor/Pinion**

Standard motors are enclosed for protection against normal hazards of dust and moisture.

For TM5 drive type, motor pinion is pressed fit to the shaft of motor. Motor pinion must be replaced when motor replacement has been established. On replacement motor, pinion is fitted to shaft at factory.

For TM4 drive types, motor coupling slides onto shafts of motor and gears. Lubricate splines of coupling with grease before assembling motor to gear.

### **Brake**

The type of brake on motor may vary with the type of drive and size of motor. Pay careful attention to the type of brake on your drive motor before adjusting or servicing brake. Rectifier for brake is located in motor terminal box. Proper maintenance and adjustment of the motor brake is essential to the reliable operation of the drive. Heat is generated and wear occurs each time the motor is stopped. The brake life and serviceability will be greatly extended by adequate maintenance. The frequency of brake wear adjustment depends on the duty cycle. For brake adjustment, see Section 5.



### Inspection/Preventative Maintenance Schedule

The intervals between inspections will vary due to the wide range of applications, duty cycles, and environmental conditions encountered by the equipment. The following schedule lists *minimum* requirements, based on intermittent operation on an eight (8) hour day, five (5) days per week work schedule, under normal environmental conditions. If duty is heavier, or environment severe, inspections should be more frequent.

The operator should also bring to the attention of maintenance personnel any unusual operating conditions that occur between inspection periods, and *not* operate equipment until drive has been repaired and is functioning properly.

### INSPECTION/PREVENTATIVE MAINTENANCE SCHEDULE

Time Interval	Inspection Function
Start of each shift	<ul style="list-style-type: none"> <li>• Brake function – Test the brake in operation, by accelerating and braking.</li> </ul>
Monthly to Quarterly	<ul style="list-style-type: none"> <li>• Check for loose or broken connections.</li> <li>• Brake – Check that brake is clean and remove dust.</li> <li>• Check air gap with feeler gauge for proper air gap. Adjust as required. Refer to Section 5 for instructions.</li> </ul>
Annually	<ul style="list-style-type: none"> <li>• Check for loose bolts.</li> <li>• Check for oil leaks.</li> </ul>

### RECOMMENDED LUBRICANTS & CAPACITIES

Type of Lubricant	Type and Size of Drive	Capacity
MOBILUX EP 004 or Equivalent	TM2	13 fl. oz. (0.4 liter)
	TM3	13 fl. oz. (0.4 liter)
	TM4	30 fl. oz. (0.9 liter)
	TM5	40 fl. oz. (1.2 liter)

### RECOMMENDED BOLT TIGHTENING TORQUES

Gear Type	Bolts to Fasten Gear to Structure	Bolts to Fasten Motor to Gear
TM2	30 lb-ft (40 N.m)	7 lb-ft (8.5 N.m)
TM3	30 lb-ft (40 N.m)	7 lb-ft (8.5 N.m)
TM4	—	7 lb-ft (8.5 N.m)
TM5	—	7-3/4" Bolt Circle 15 lb-ft (20 N.m)
		8-15/16" Bolt Circle 30 lb-ft (40 N.m)

## TROUBLESHOOTING

PROBLEM	DIAGNOSIS	POTENTIAL SOLUTION
No traverse motion.	No power.  Brake not releasing.	Check connections.  Check adjustment. Check for loose connection. Check auxiliary contacts. Check voltage supply. Check rectifier.
Moves in wrong direction.	Phase reversal of three phase power supply.	Interchange any two of the three lead connections either at the power source or at the lead connections to the hoist.
Motor overheats.	Excessive load.  Incorrect voltage or frequency.  Wrong voltage.  Brake does not release.	Check weight of load.  Check for correct power supply. Voltage should be within 10% of nameplate rating.  Check current rating on motor nameplate against power supply. Check motor connections.  Check rectifier for proper voltage. Check resistance of brake coil. Check that coil is energizing and de-energizing. Check that armature disc moves freely. Check brake lining for wear and corrosion. Check air gap.





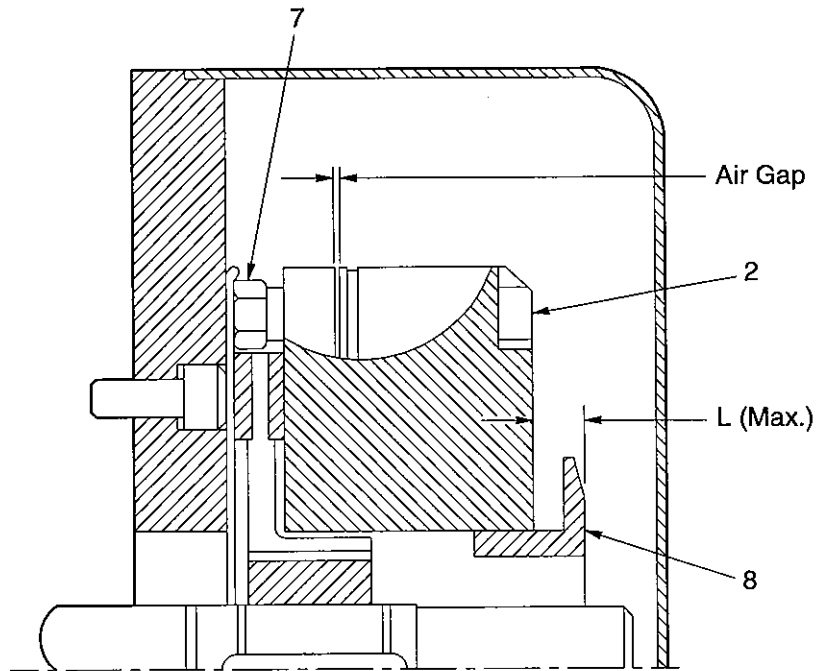


Brake Type Identification	Torque (lb-ft)	L Max (inch)	Torque reduction/step (lb-ft)	Nominal air gap (inch)	Maximum air gap (inch)
NM34002	3	0.24	0.074	0.008	0.020
NM34003	3	0.26	0.118	0.008	0.020
NM34003A	6.6	0.26	0.265	0.008	0.020
NM34004	12	0.33	0.443	0.008	0.020
NM34005	12	0.39	0.443	0.012	0.028
NM34005A	25	0.39	0.885	0.012	0.028

#### Installation of Brake

- Install friction plate. Friction plate must slide freely along shaft.
- Install magnet and anchor disc.
- Tighten mounting bolts.
- Adjust air gap.
- Connect wires.

**NM340 BRAKE**  
**SECTION 4 – ADJUSTMENT INSTRUCTIONS**



The brake is adjusted for proper torque when shipped from the factory and should not require adjustment in the field. If necessary, torque rating can be reduced by unscrewing torque adjustment ring (8) with a spanner tool. The torque adjustment ring has detent action with a torque reduction per step as indicated in chart below.

The air gap between the magnet and anchor plate will require adjustment from time to time, depending upon frequency of operation and wear of friction material. See chart below for proper air gap for your brake.

**To adjust the air gap**

- The air gap should be checked in 3 positions using feeler gauge.
- Loosen mounting bolts (2), rotate adjustment tubes (7) approximately 1/4 turn, retighten bolts (2) and re-measure air gap.
- Repeat this procedure with 1/4 turn intervals until the proper air gap is reached in each of 3 measuring positions.

HOIST **SERIAL NUMBER** AND PART **REFERENCE NUMBER** MUST BE PROVIDED WHEN ORDERING REPLACEMENT PARTS.





**NM311, 312, 313 BRAKE  
SECTION 4 – ADJUSTMENT INSTRUCTIONS**

The brake is adjusted for proper torque when shipped from the factory and should not require adjustment in the field. If necessary, torque rating can be reduced by removing springs or increased by adding springs. Refer to Page 5-8 of this section for spring arrangement.

The air gap between the magnet and armature disc will require adjustment from time to time, depending upon frequency of operation and wear of friction material. Adjust brake before air gap exceeds 0.035 in. (0.9 mm). See chart below for proper air gap for your brake.

**To adjust the air gap**

- The air gap should be checked in 3 positions using feeler gauge.
- Bend flap of locking device away from nut.
- Turn nut clockwise to decrease air gap. One (1) full turn of nut equals 0.039 in. (1 mm) of air gap. Adjusting nut must be turned at 60° intervals or 1/6 of full turn.
- Adjust air gap back to nominal. (See chart below)
- After air gap adjustment, bend one flap of locking device against nut to prevent loosening.

Brake Type Identification	Torque (lb-ft)	Nominal air gap	Maximum air gap
NM311	1.5	0.012 in. (0.3 mm)	0.035 in. (0.9 mm)
NM312	2	0.012 in. (0.3 mm)	0.035 in. (0.9 mm)
NM313	3	0.012 in. (0.3 mm)	0.035 in. (0.9 mm)

**Installation of Brake**

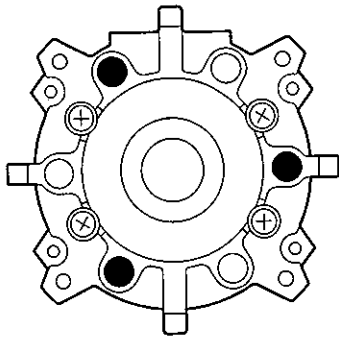
- Insert brake springs into end shield. Install armature disc and brake wheel together against brake springs.



Refer to Page 4-8 of this section for proper location of springs for your brake.

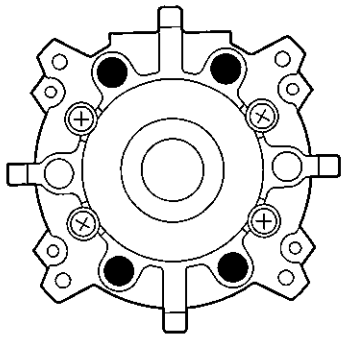
- Insert washer and tighten nut to adjust air gap.
- Insert locking device.
- Tighten mounting bolts.
- Connect wires.

**NM311, 312, 313 BRAKE**  
**SECTION 4 – SPARE PARTS IDENTIFICATION, REPLACEMENT**  
**AND ADJUSTMENT INSTRUCTIONS**



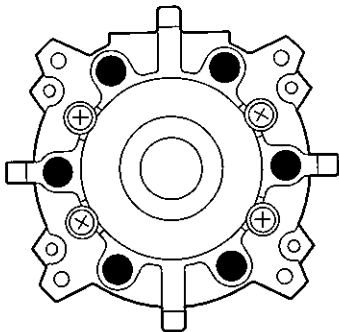
A

Braking torque 1.5 ft-lb (2 N.m)  
No. of springs: 3



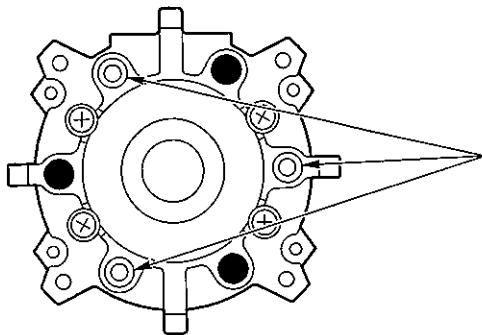
B

Braking torque 2.0 ft-lb (2.6 N.m)  
No. of springs: 4



C

Braking torque 3.0 ft-lb (4 N.m)  
No. of springs: 6



D

Braking torque 4.1 ft-lb (5.6 N.m)  
No. of springs: 6 + 3 = 9







