

ADVANTAGE LINE ENDTRUCK

***PARTS & MAINTENANCE
MANUAL***



10200 JACKSBORO HWY., FORT WORTH, TEXAS 76135

PH: (817) 237-7700 FAX: (817) 237-2777

WEBSITE: WWW.ACEWORLDCOMPANIES.COM

REGISTERED ISO 9001 COMPANY

It is important that all persons operating or servicing this equipment be familiar with the instructions & information contained in this manual for their own safety & protection as well as for other workers and equipment.

ADVANTAGE LINE ENDTRUCK
TOP RUNNING & UNDERHUNG
FIXED AXLES

PARTS & MAINTENANCE
MANUAL



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UNDER RUNNING ENDTRUCKS DESCRIPTION

ADVANTAGE SERIES:

Ace World Companies designs and manufactures one size of under running Advantage endtrucks(6") suitable for single beam and double beam under running bridges as well as patented track applications. These under running endtrucks consist of a structural frame, drive wheel I assembly, idler wheel assembly, drive assembly and energy absorbing bumpers and safely drop bars.

The structural frame is made from a 500 Grade B bolted together with yoke plates at the ends and reinforced beam mounting plate located at the center where the user attaches the bridge beam.

The wheel assemblies consist of pairs of single flanged wheels designed following the stringent criteria in the latest CMAA specifications which dictates the width of the running surface versus the allowable wheel load. **Ace World Companies under running single flanged wheels** are designed to run on either standard "S" beams with tapered flanges or wide flange beams with flat flanges. Each truck has one pair of idler wheels and one pair of drive wheels. The drive wheel and idler wheel are identical except the drive wheel has the drive gear cut into the wheel flange. The bearings are supported on machined axles and are adjustable in the field to suit the runway beam flange width. The axle is supported by a compression fit collar welded to the tube frame. This arrangement gives a well balanced support base which prevents the axle from bending or twisting.

The drive assembly consists of a totally enclosed oil bath gear reducer and motor mounted to the drive axle plate via a machined mounting adapter. The drive assembly supports the drive pinion shaft on one end and a machined flange bearing supports the drive pinion shaft on the other end. This arrangement assures pinion and gear alignment without needing to adjust or shim anything..

NOTE:

Motors and gear reducers are covered in the end section of this manual. Please refer to the appropriate motor/reducer section for the type drive provided.

UNDER RUNNING ENDTRUCKS INSTALLATION

ADVANTAGE SERIES:

The wheel assemblies can be removed while the crane is on the runway. To accomplish removal of either the drive wheel assembly or an idler wheel assembly, follow the steps below:

- 1) Move the empty trolley hoist to the opposite end of bridge.

WARNING!

Disconnect and lock out the power source feeding the crane mainline or other power source. Injury or death to personnel will result if this precaution is not followed.

- 2) If a drive wheel assembly is being removed, first remove the drive assembly by removing the bolt at the end of the pinion drive shaft. Then remove the four bolts holding the drive assembly to the endtruck frame. Be careful, at this point, the drive will rotate freely on the pinion shaft. Carefully slide the drive off the pinion shaft and secure. Disconnect the wires to the drive if no sure way of securing the drive after it is removed from the pinion shaft is found and lower drive to the ground.
- 3) Remove the bolts holding the bearing capsule to the frame. Carefully while supporting the pinion shaft weight, pull the bearing capsule from the truck frame. The pinion shaft can now be lowered to the ground.

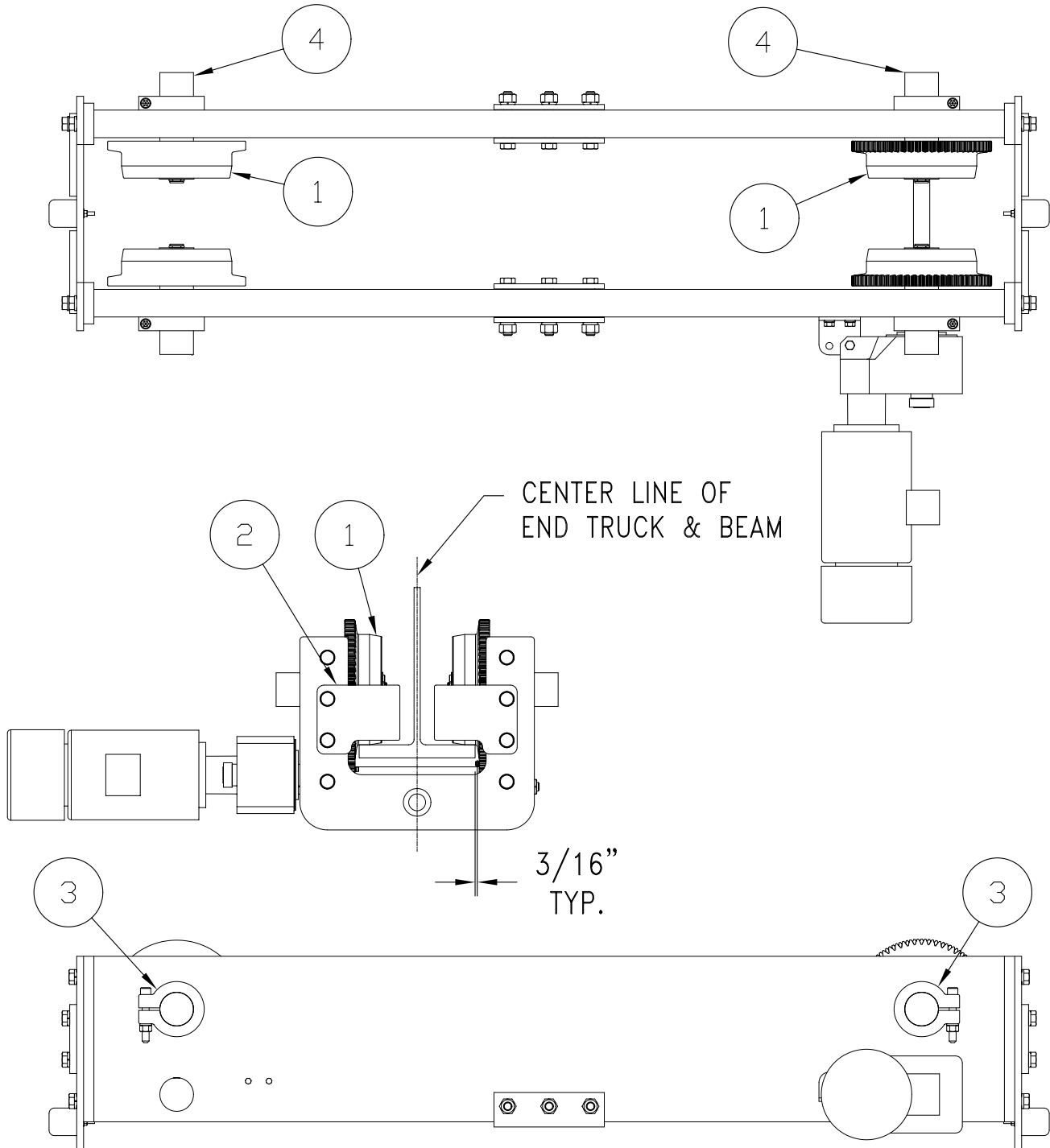
The above two steps do not need to be done if an idler wheel is being removed.

- 4) Remove the safety drop bar in front of the wheel assembly to be removed.
- 5) Using a suitable jack, jack up the end of the endtruck to take any dead weight from the wheel. The wheel should spin freely on the axle.
- 6) Remove the bolts holding the axle keeper plate to the frame. With the keeper or suitable wrench handle, turn the axle to back the axle out of the threaded truck frame. As the wheel contacts the inside of the truck frame, reach inside the frame and hold into the wheel while the axle is completely backed out of the frame. The wheel can now be removed out the front of the truck.

WARNING!

The wheel is not retained to the axle. Be careful while turning the axle out of the frame that the wheel does not come off the axle and fall to the ground.

USB Under Running End Truck Installation Guide



ADVANTAGE UNDER RUNNING END TRUCK INSTALLATION GUIDE

(WITH THE END TRUCK ON THE GROUND OR IN AN ACCESSIBLE LOCATION)

1. Begin by removing all end truck wheels (ref. Balloon 1) by sliding them off the end of their shafts.
2. Remove all drop lugs (ref. Balloon 2). (Drop lug fasteners are 5/8" hex head bolts).
3. Loosen all axle keeper fasteners (ref. Balloon 3) and remove all axles (ref. Balloon 4) from the end truck. (Axle keeper fasteners are 1/2" socket head cap screws).

(THE END TRUCK IS NOW READY FOR POSITIONING BELOW THE RUNWAY BEAM)

4. Raise the end truck into place below the runway beam.
NOTE: The centerline of the end truck **must** be in line with the centerline of the beam.
5. Replace all but one drop lug on each end truck. Tighten all 5/8" hex head bolts to 125 FT-LBS torque.
6. Roll or lower one wheel into place in the corner of the end truck with a missing drop lug. Replace one axle in the end truck, with the wheel in place, so that the shoulder of the axle is flush up against the wheel bearing. Replace the drop lug for that corner of the end truck and tighten both 5/8" hex head bolts to 125 FT-LBS torque.
7. Remove one drop lug from the corner of the end truck with a missing wheel.
8. Repeat STEPS 6 & 7 until all wheels have been replaced.
9. With the end truck centered on the runway beam, position all wheels, by adjusting the axle, so that on each side there is approximately a 3/16" gap between the wheel flange and the edge of the beam.
10. Once the wheels are positioned properly, tighten all axle keeper 1/2" socket head cap screws to 100-125 FT-LBS torque.
11. Finally, loosen the screws on the drive pinion torque lock bushings (ref. Balloon 5) and position all pinions so that the outside faces of the pinions are aligned with the outside faces of the drive wheel. After positioning, tighten all torque lock bushing screws (alternating screws in clockwise fashion every couple turns) to lock pinions onto shaft.
12. Lubricate gear wheels and pinions. (See page 4 for Lubricant Details)

UNDER RUNNING ENDTRUCKS REMOVAL

ADVANTAGE SERIES:

The wheel assemblies can be removed while the crane is on the runway. To accomplish removal of the idler wheel assembly, steps 2 and 3 are not necessary.

1. Move the empty trolley hoist to the opposite end of the bridge.

WARNING!

Disconnect and lock out the power source feeding the crane mainline or other power source. Injury or death to personnel will result if this precaution is not followed.

Jack Shaft Removal:

2. If a drive wheel assembly is being removed, first remove the drive assembly by removing the split collar at the end of the pinion drive shaft. Remove the bolt connecting the torque arm to the structure. At this point the drive can rotate freely on the pinion shaft. Carefully slide the drive off the pinion shaft and secure. Drive can be lowered if wires are disconnected. Mark wires for re-assembly.
3. Remove Split collar on side without drive shaft. Loosen QD bushing so that pinion gears slide loosely on shaft. Slide the pinion shaft out and secure or lower to the floor. Be careful that loose hardware (bearings, QD bushings, etc.) does not fall. Secure hardware with drive pinion.

Wheel Removal:

4. Remove the drop bar in front of the wheel assembly which will be removed.
5. Using a suitable jack, jack up the end of the end truck to take any dead weight from the wheel. The wheel should spin freely on the axle.
6. Remove the retaining ring at the end of the axle (closest to girder.)
7. Loosen Split Collar bolt. Shaft should move freely in the axial direction. Slide the wheel out. It might be necessary to slide out the axle so that the wheel can be removed.
8. If axle is being replaced, remove it as well.

REPAIR OF THE WHEEL ASSEMBLY

Repair of the wheel assemblies is limited to replacement of the components. Inspect the wheel gear and running surface of the wheels for wear. If the bearings need to be replaced, they must be replaced in pairs. Remember, the wheel bearings are sealed and can not be lubricated by the user. The bearings are put into the wheels with a light press fit and held secure by a snap ring; inspect the drive pinions for wear. While the unit is disassembled, it is a good time to clean the old grease from the pinions and wheel gear and re-grease.

Installation of the under running wheel assemblies follows the reverse of the removal outlined above.

ASSEMBLY OF ENDTRUCK:

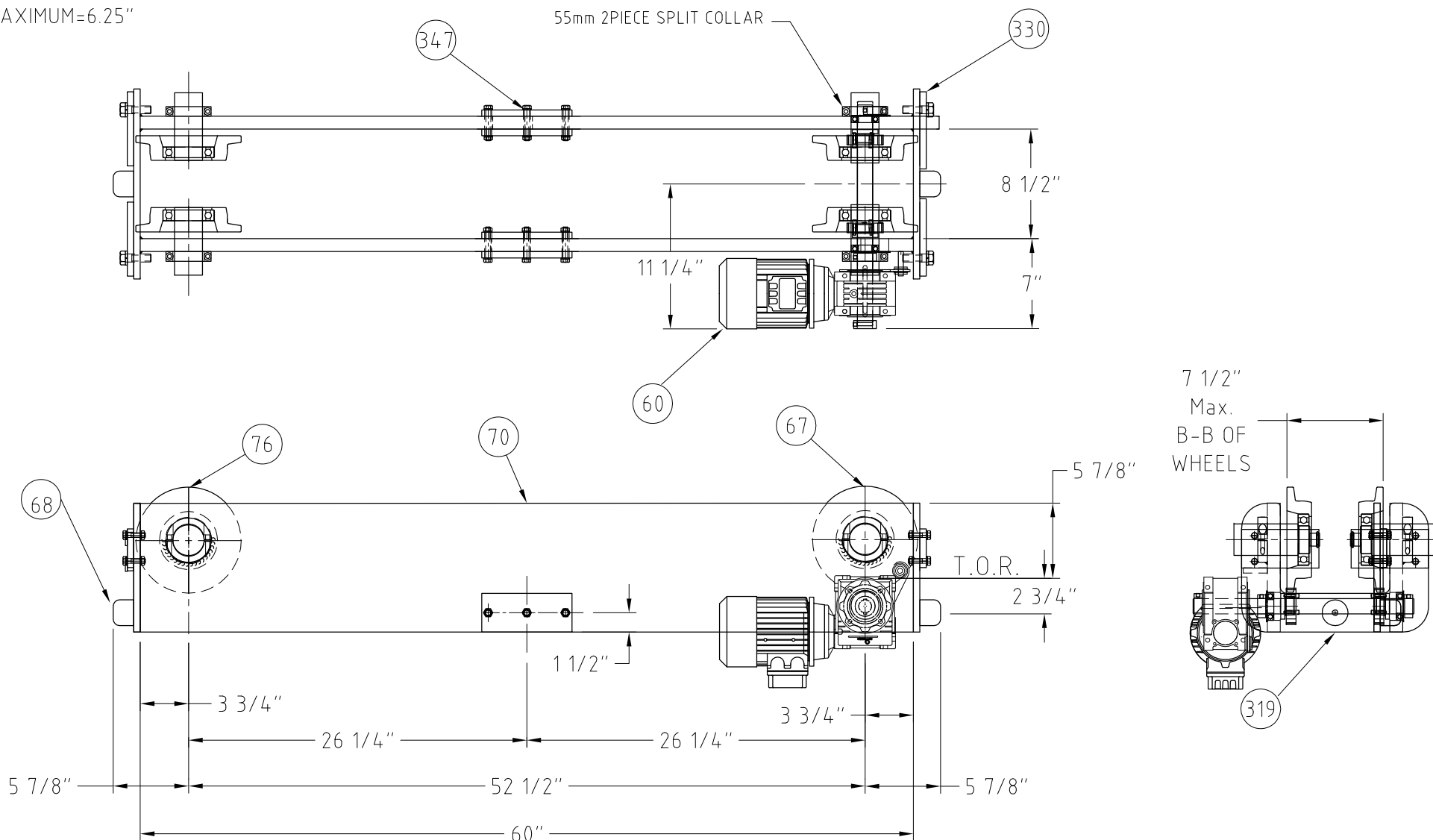
WARNING!

Be sure the crane power source is still locked out. Failure to insure this will result in injury or death to personnel.

1. Clean the inner race of the bearings and apply a thin film of oil. With the truck frame still jacked up, put the wheel and bearing assembly back into the end of the truck frame and align with the axle hole.
2. Clean the truck frame axle and axle hole. Apply a thin film of oil or grease to the axle and axle hole.
3. Install snap ring that will be between the wheel and the truck frame.
4. Insert axle into frame. You might have to slide the axle until the snap ring makes contact with the frame.
5. Slide wheel assembly onto axle and secure with retaining ring.
6. Once all wheels have been installed, adjust the wheel locations to allow 1/8" clearance between the wheel flange and the beam flange.
7. Make sure the wheels are centered by measuring the distance from the axle to the structure.
8. Re-install the safety drop bar and tighten the bolts.
9. Re-install the pinion drive shaft if removed. Engage the pinions with the wheel gears. Install the bearing capsule and bearing and tighten the bolts. Be sure the pinion drive shaft is pushed fully into the bearing capsule. Be sure the pinions align with the wheel gear and adjust if required by loosening the set screws and sliding the pinions so they are centered to the wheel gears. Check the pinion shaft key for the drive assembly.
10. Install the split collar on the end of the pinion shaft and secure. Recheck alignment of the pinions with the wheel gears and adjust if required. There should be some backlash between the pinions and wheel gears.
11. Remove the jack and lower the truck and wheel assembly to the runway beam. Again check all the alignment and bolt tightness

12. Restore power to the crane and test operation fully before listing a load or putting the crane back into operation.

NOTE: BEAM FLANGE WIDTH
 MINIMUM=3.25"
 MAXIMUM=6.25"



SHOWN RIGHT HAND

1	6/26/09	CHANGED MOTOR POSITION
REV.	DATE	DESCRIPTION

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CUSTOMER: _____ PO NUMBER: _____

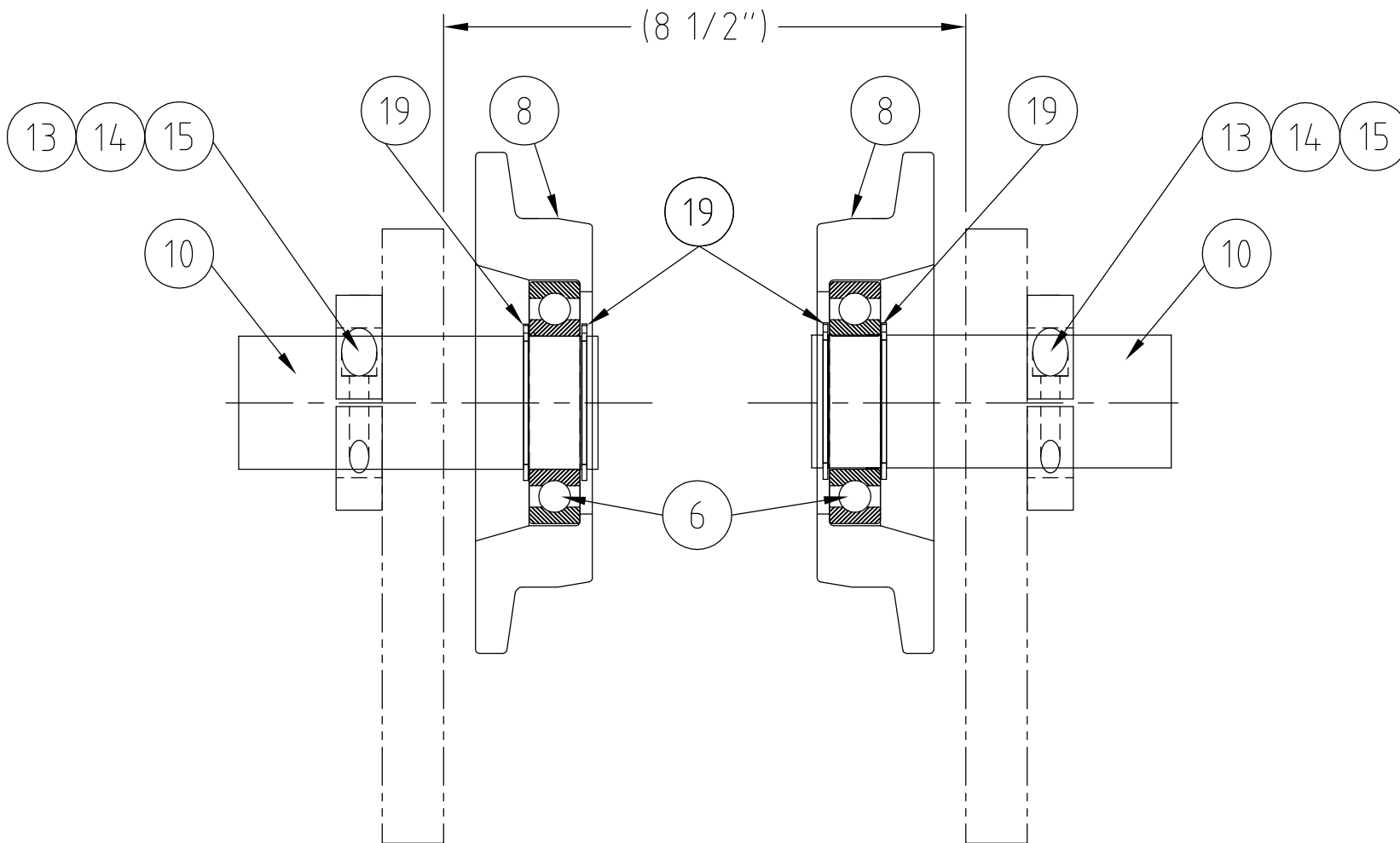
DRAWN BY: GHR CHECKED BY: _____ APR: _____

DRAWING TITLE
 AU52500, 100 FPM, 2 @ 1/2 HP
 6" DIA. WHL, 52.5" W.B., 12,000 AWL

QTY. () ENDTRUCK(S).
 QTY. () PAIR(S); ASSEMBLE ONE ENDTRUCK AS SHOWN & ONE OPPOSITE HAND PER PAIR.

DATE: 5/30/08	QTY:	ITEM: 69
SCALE: NTS		
FILE:		
PART NO. 100002-0000	JOB NO.	

APPROVED _____
 NOT APPROVED _____
 APPROVED AS NOTED _____
 BY: _____
 DATE: _____



ITEM	QTY.	DESCRIPTION	WEIGHT	P/N	LENGTH
19	4	RETAINING RING,EXT SHAFT DIA 2-1/8"		107202	
15	4	NUT, 5/16"-24		106318	
14	4	LOCKWASHER, 5/16"		100610	
13	4	CAP SCREW, 5/16"-24		106317	7/8"
10	2	AXLE, 6" & 8" DIA. UH WHEELS		100002-0810	
8	2	IDLER WHEEL, 6" DIA. SINGLE FLANGE		100002-0940	
6	2	BEARING, 6211-2RS1		103523	

TOLERANCES UNLESS OTHERWISE SPECIFIED	
METRIC	ENGLISH
.X ±.5mm	.X ±.05
.XX ±.10mm	.XX ±.015
.XXX ±.01mm	.XXX ±.005
	.XXXX ±.0005
ANGULAR ± 0° 30'	
LINEAR FRACTIONAL ± 1/16"	
HOLES FRACTIONAL ± 1/32"	
HEAT TREATMENT Rockwell ±4 Brinell ±15	

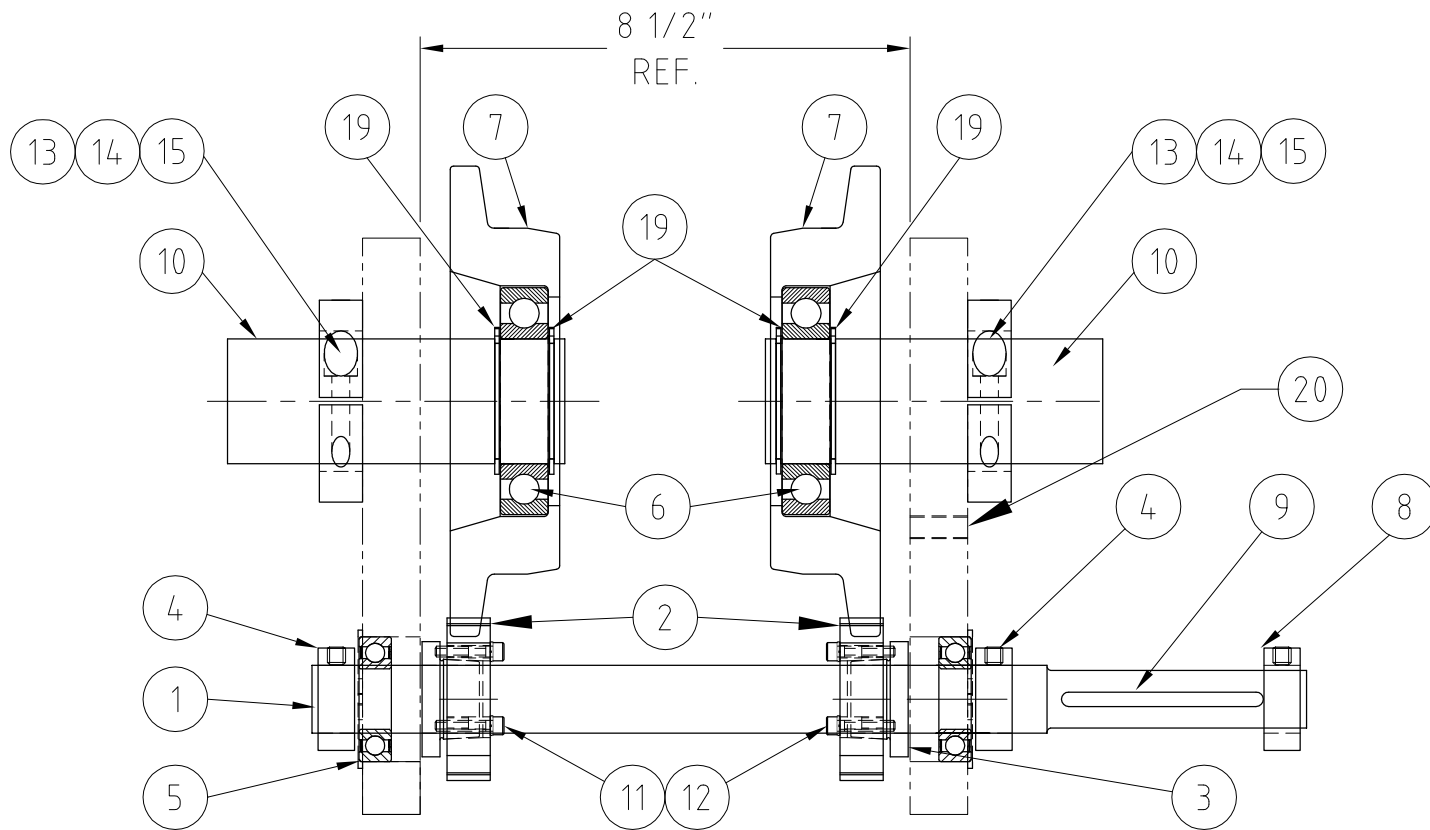
REV.	DATE	DESCRIPTION
1	05/03/07	SEE DCN 05.03.2007.2

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DRAWN BY: GHR	CHECKED BY:	APR:	DATE: 03/14/07	QTY:	ITEM: 76
DRAWING TITLE			SCALE: NTS		
6" DIA. - IDLER ,AV, U.H.			FILE:		
IDLER WHEEL ASSY, 1"X10" FLAT BAR			PART NO. 100002-0760	JOB NO.	



20	1	T-ARM MOUNTING HOLE 3/8-16, FOR BOLT, LOCK WASHER, NUT		100401	2 1/2"
19	4	RETAINING RING, EXT SHAFT DIA 2-1/8"		107202	
15	4	NUT, 5/16"-24		106318	
14	4	LOCKWASHER, 5/16"		100610	
13	4	CAP SCREW, 5/16"-24		106317	7/8"
12	6	LOCKWASHER, #10		105117	
11	6	CAP SCREW, #10-24		105116	1 1/4"
10	2	55mm AXLE, 6" DIA. AA WHEELS		100002-0810	
9	1	KEY, 1/4" SQ		106316	3 1/2"
8	1	SHAFT COLLAR, 25MM HALF		106319	
7	2	DRIVE WHEEL, AA 6" DIA. SINGLE FLANGE		100002-0780	
6	2	BEARING, 6211-2RS1		103523	
5	2	BEARING, 6006-2RS1, w/ SNAP RING		104677	
4	2	SHAFT COLLAR, 30mm w/ SET SCREW		105112	
3	2	QD BUSHING, SIZE JA, (30mm w/o KEY)		105111	
2	2	PINION, 6" WHEELS (for QD bushing)		105139	
1	1	JACK SHAFT (30mm), 6" DIA. UH		100002-14.40	17-1/4"

TOLERANCES
UNLESS OTHERWISE SPECIFIED

METRIC	ENGLISH
X ± 5mm	.X ± .05
.XX ± .10mm	.XX ± .015
.XXX ± .01mm	.XXX ± .005
	.XXXX ± .0005
ANGULAR ± 0° 30'	
LINEAR FRACTIONAL ± 1/16"	
HOLES FRACTIONAL ± 1/32"	

1 05/03/07 SEE DCN 05.03.2007.2

REV. DATE DESCRIPTION

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ITEM QTY. DESCRIPTION WEIGHT P/N LENGTH

DRAWN BY: GHR CHECKED BY: APR. DATE: 03/14/07 QTY: ITEM: 67

DRAWING TITLE: SCALE: NTS FILE: PART NO. 100002-0670 JOB NO.

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6" DIA. -DRIVE, AV,U.H.
DRIVE WHEEL ASSY, 1"X10" FLAT BAR

TOP RUNNING FIXED AXLE ENDTRUCKS DESCRIPTION

Ace World Companies designs and manufactures 6", Advantage fixed axle top running endtrucks suitable for light duty single & double girder cranes. These fixed axle top running tube endtrucks consist of a structural tube frame, drive wheel assembly, idler wheel assembly, energy absorbing bumpers, rail sweeps and drive assembly.

The structural tube frame is made from ASTM A500 Grade B tubing with internal diaphragms welded inside the tube just behind each wheel assembly. The endtruck tube is completely welded before the bored holes for the fixed axles are machined on a horizontal boring mill. This process insures parallel axle alignment.

The wheel assemblies consist of identical alloy steel machined drive and idler wheels with the only difference being the width of one flange on the drive wheel where the wheel gear is cut into the flange. Each wheel is fitted with two sealed deep groove ball bearings designed to provide the required bearing life as specified in CMAA standards. The bearings are supported by machined alloy axles fitted through the bored axle holes in the tube. Retaining Rings on the axle keep the wheel centered in the tube.

The drive assembly consists of a worm gear.

NOTE

Motors and gear reducers are covered in the end section of this manual. Please refer to the appropriate motor/reducer section for the type drive provided.

TOP RUNNING FIXED AXLE ENDTRUCKS WHEEL ASSEMBLY REMOVAL

The wheel assemblies can be removed while the crane is on the runway. To accomplish removal of either the drive wheel assembly or an idler wheel assembly, follow the steps below:

- 1) Move the empty trolley hoist to the opposite end of the bridge.

WARNING!

Disconnect and lock out the power source feeding the crane main-line or other power source. Injury or death to personnel will result if this precaution is not followed.

- 2) If a drive wheel assembly is being removed, first remove the drive assembly by removing the four bolts holding the drive assembly to the truck tube. Be careful, at this point, the drive is very heavy. Slowly pull the drive assembly away from the truck frame and secure it. If the drive cannot be secured on the Rail, disconnect (and label) all wires and lower the drive assembly to the ground.
- 3) Using a suitable jack, jack up the end of the truck behind the wheel being removed just enough so the wheel will spin freely on the axle.
- 4) Remove the bolts holding the keeper plate to the truck frame.
- 5) With a hammer and block of wood, drive the axle through the wheel assembly towards the outside of the span. Once the axle has been driven through the first tube wall, it will be ready for removal.
- 6) Pull the axle free of the truck frame. Jack the truck frame higher so the wheel can be slid out the bottom of the truck frame.

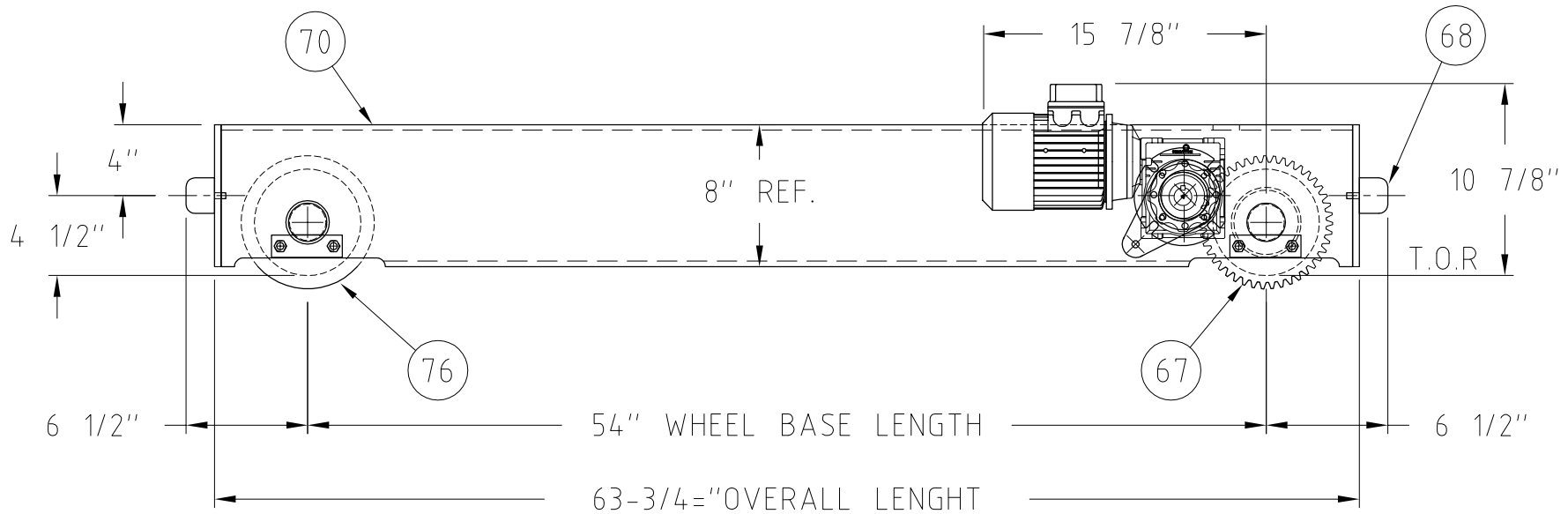
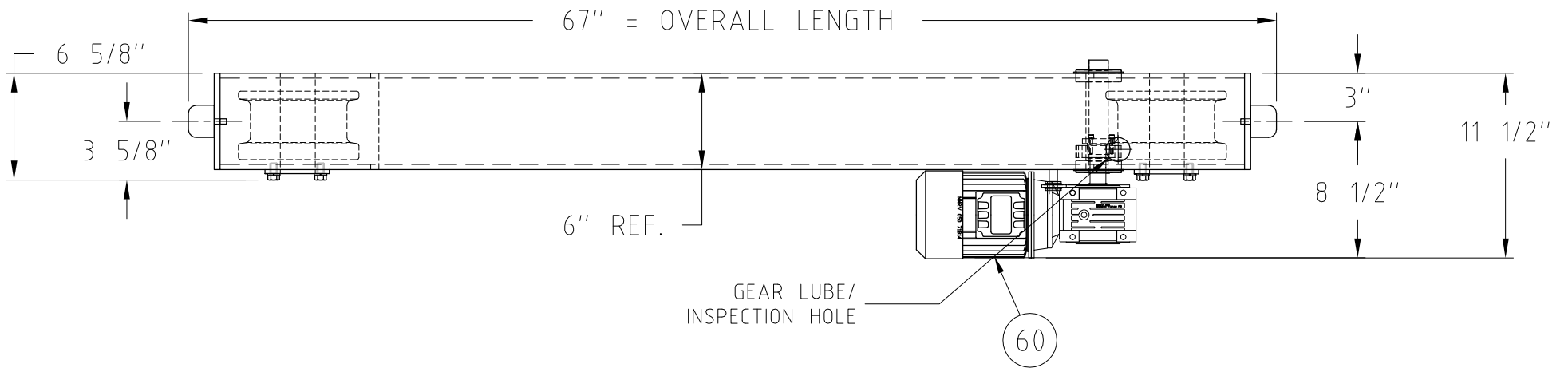
TOP RUNNING FIXED AXLE ENDTRUCKS WHEEL INSTALLATION


WARNING!

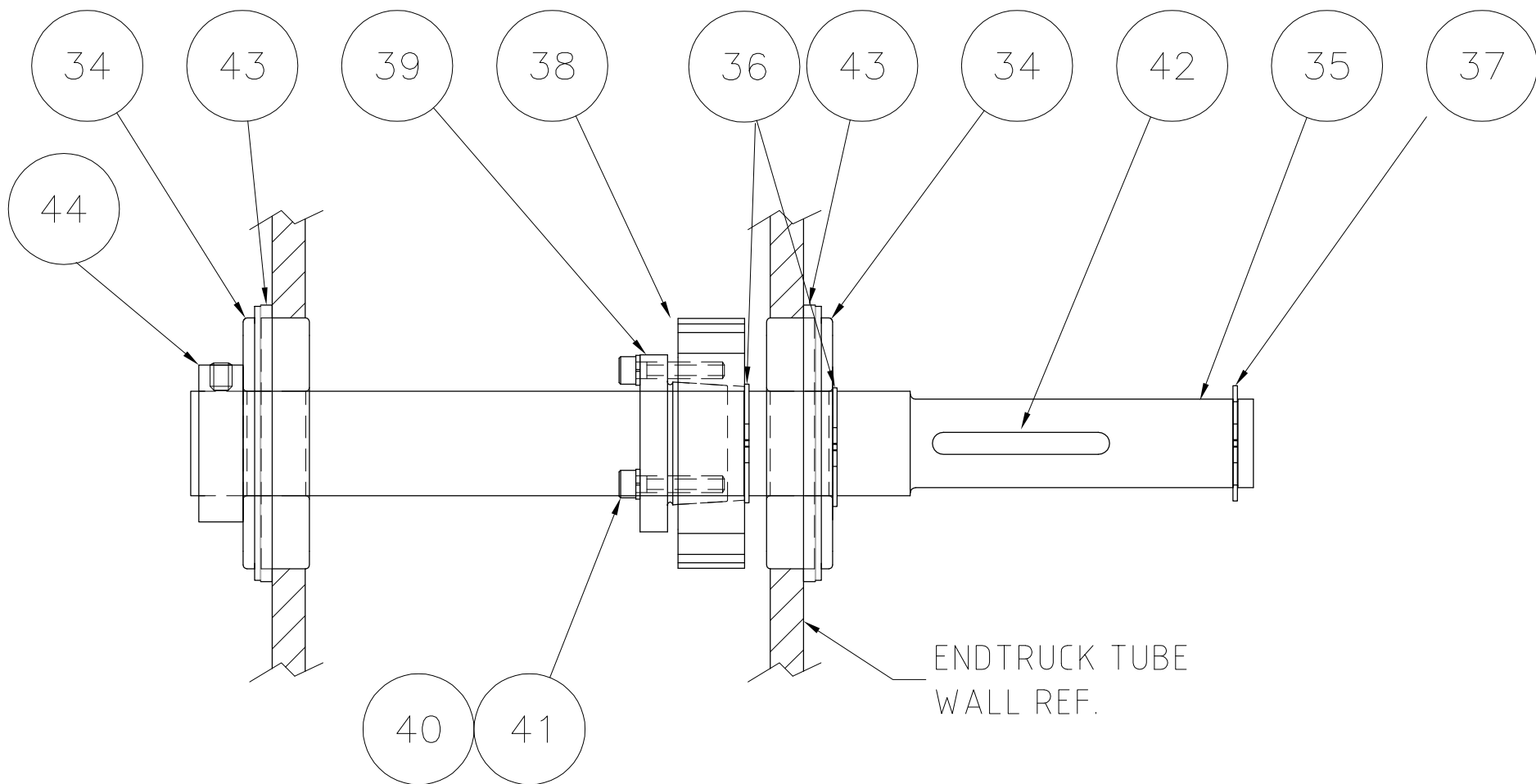
Be sure the crane power source is still locked out. Failure to insure this will result in injury or death to personnel.

- 1) Clean all components. Clean the inner race of the bearings and apply a thin film of oil. With the truck frame still jacked up, put the wheel and bearing assembly back into the end of the truck frame and align with the axle hole.
- 2) Clean the truck frame axle holes and apply a thin coat of grease.
- 3) Lower the truck frame so the wheel bearings inner bore aligns with the axle holes.
Slide the axle into the wheel and secure the Assembly using the Retaining Rings.
- 4) Install the axle from the outside of span, starting with the end with the keeper plate slot. The keeper plate slot should be flush with the truck frame.
- 5) Reinstall the keeper plate and bolts and tighten.
- 6) Check the drive pinion for wear and replace if required. Reinstall the drive assembly insuring the pinion engages with the wheel gear. Install and tighten the drive assembly bolts. Rewire the motor if the wires were removed.
- 7) Lower the truck frame so the wheel contacts the rail. Remove the jack and wheel chocks.
- 8) **Be sure lubrication has been applied to the pinion & gear on wheel.**
Inspect the alignment of the pinion and wheel gear through the inspection hole on top of the truck frame. Adjust pinion location if required. This is accomplished by removing the drive assembly and adjusting location of pinion on the motor shaft.
- 9) Restore power to the crane and test operation fully before lifting a load or putting crane back into operation.

SHOWN IN RIGHT HAND SIDE



REV.	DATE	DESCRIPTION	CUSTOMER:	PO NUMBER:	<input type="checkbox"/> QTY. () ENDTRUCK(S). <input type="checkbox"/> QTY. () PAIR(S): ASSEMBLE ONE ENDTRUCK AS SHOWN & ONE OPPOSITE HAND PER PAIR.			APPROVED _____
<small>THIS DWG IS PROPERTY OF ACE WORLD COMPANIES (AWC) AND CONTAINS PROPRIETARY INFORMATION WHICH MAY NOT BE COPIED OR REPRODUCED WITHOUT PRIOR WRITTEN CONSENT FROM AWC.</small>					DATE: 03/10/08	QTY:	ITEM: 69	NOT APPROVED _____
 10200 JACKSBORO HWY. FORT WORTH, TX 76135 PHONE 817.237.7700 FAX 817.237.2777 ACEWORLDCOMPANIES.COM			DRAWN BY: GHR	CHECKED BY:	APR:			APPROVED AS NOTED _____
DRAWING TITLE ADVANTAGE TR , 100 FPM, 2 @ .5 HP 6" DIA. WHL., FIXED AXLE, 54" W.B.					SCALE: NTS			BY: _____
					FILE: 200222-0000			DATE: _____
					PART NO. 200222-0000	JOB NO.		



44	1	Collar, Clamp, One Piece, 1.18" Bore		105112-00	
43	2	Spacer Ring, F/6306 Brg., 10qa.		105295-00	
42	1	KEY, 8mm x 5mm		103528-00	3"
41	3	LOCKWASHER, #10		105117-00	
40	3	CAP SCREW, #10-24		105116-00	1 1/4"
39	1	QD BUSHING		105111-00	
38	1	PINION, 15 TOOTH, for QD BUSHING		105139-0000	
37	1	SNAP RING, EXTERNAL, SH100		104463-00	
36	2	SNAP RING, EXTERNAL, SH118		104945-00	
35	1	Shaft, Drive, Mtv NMRV50, Fixed Axle		100281-0000	12"
34	2	BEARING, DBL. SEALED w/SNAP RING		105239-00	

TOLERANCES
UNLESS OTHERWISE SPECIFIED

METRIC	ENGLISH
X ± 5mm	.X ± .05
.XX ± .10mm	.XX ± .015
.XXX ± .01mm	.XXX ± .005
	.XXXX ± .0005
ANGULAR ± 0° 30'	
LINEAR FRACTIONAL ± 1/16"	
HOLES FRACTIONAL ± 1/32"	

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ITEM	QTY.	DESCRIPTION	WEIGHT	P/N	LENGTH
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PART NO.		100282-0000		JOB NO.	

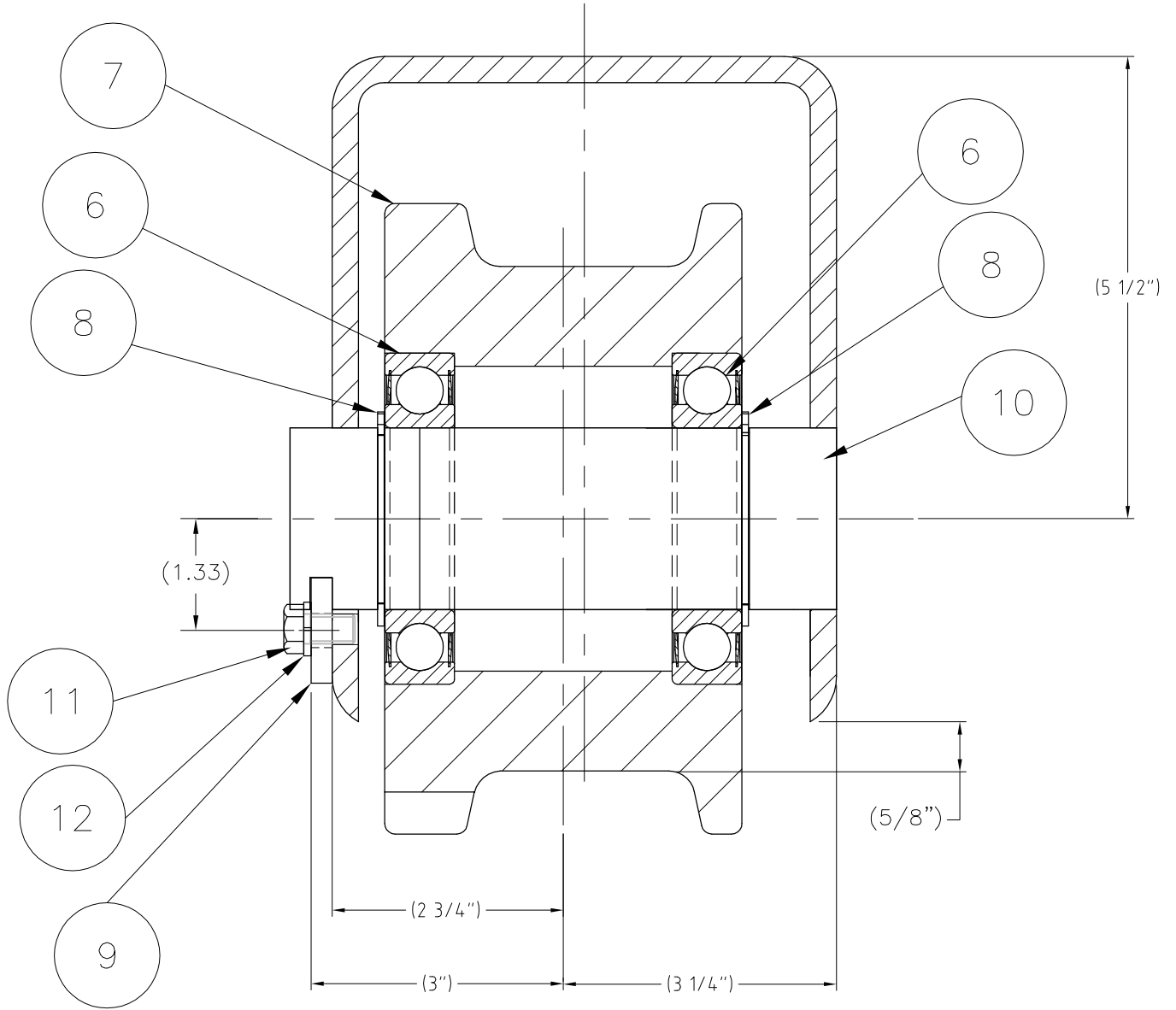


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MTV NMRV50, FIXED AXLE DRIVE
PINION AND SHAFT ASSEMBLY

TOLERANCES
UNLESS OTHERWISE SPECIFIED

METRIC	ENGLISH
X ±.5mm	X ±.05
.XX ±.10mm	.XX ±.015
.XXX ±.01mm	.XXX ±.005
	.XXXX ±.0005
ANGULAR ± 0° 30'	
LINEAR FRACTIONAL ± 1/16"	
HOLES FRACTIONAL ± 1/32"	
HEAT TREATMENT Rockwell ±4 Brinell ±15	
FGE10.01 Rev. 1 1/14/99	



12	4	LOCKWASHER, 3/8"		100611-00	
11	4	HEX BOLT, 3/8"-16		100110-00	3/4"
10	1	AXLE		100000-0790	6.50"
9	2	AXLE KEEPER		100000-0410	4"
8	2	RETAINING RING, EXT SHAFT DIA 2-1/8"		107202-00	
7	1	IDLER WHEEL, 6"DIA. x 4 3/4" WIDE, 325 BHN		100000-0780	
6	2	BEARING, 6211-2RS1		103523-00	
ITEM	QTY.	DESCRIPTION	WEIGHT	P/N:	LENGTH
DRAWN BY: GHR			CHECKED BY:	APR:	DATE: 03/15/08
DRAWING TITLE			SCALE: NTS		QTY:
6"DIA. x 4 1/4" - FIXED AXLE DRIVE			MACOLA 100000-0670		ITEM: 67
WHEEL ASSY (325 BHN) - 8x6 TUBE			PART NO. 100000-0670		JOB NO.

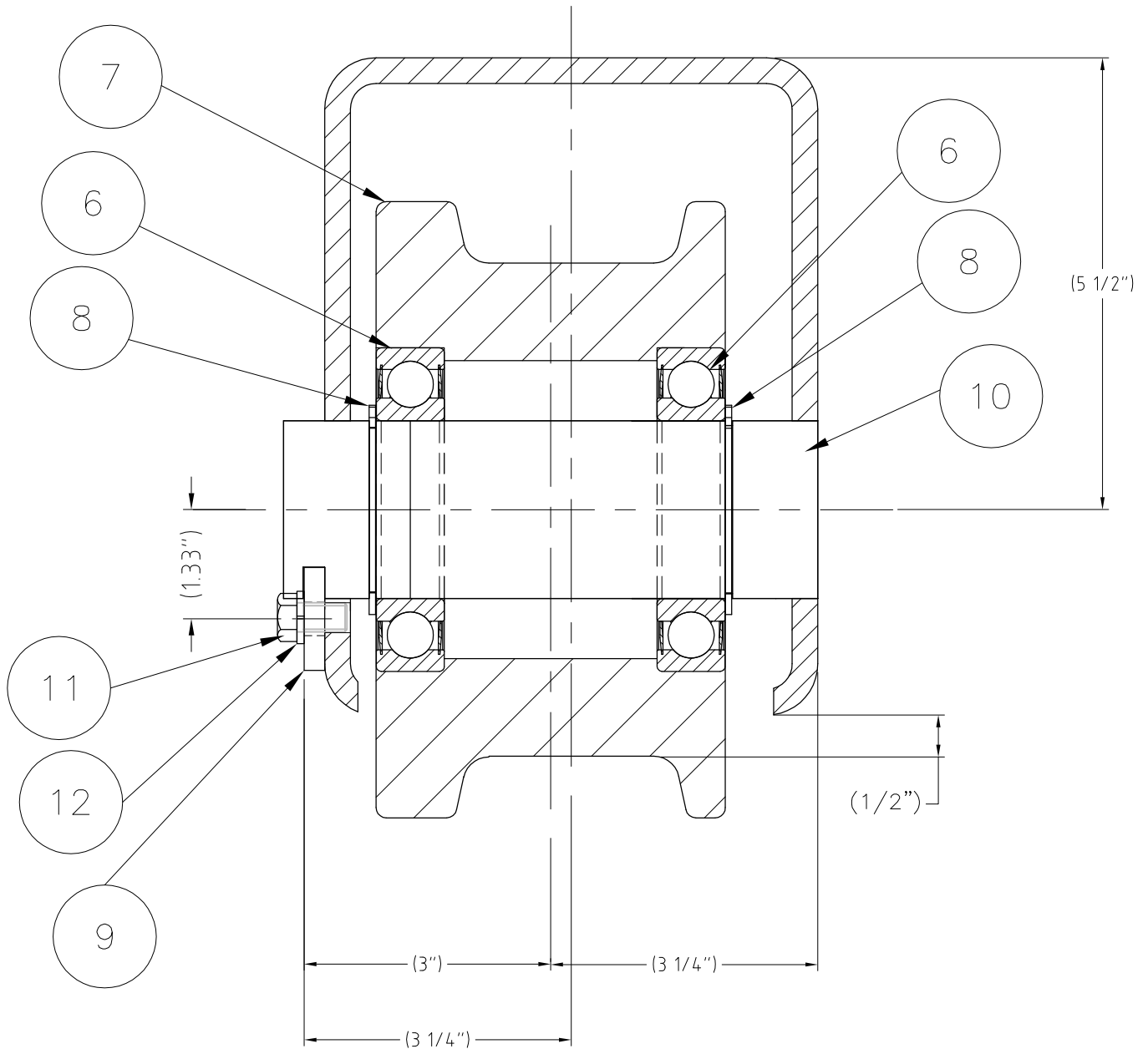
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TOLERANCES
UNLESS OTHERWISE SPECIFIED

METRIC	ENGLISH
X ±.5mm	X ±.05
.XX ±.10mm	.XX ±.015
.XXX ±.01mm	.XXX ±.005
ANGULAR ± 0° 30'	.XXXX ±.0005
LINEAR FRACTIONAL ± 1/16"	HEAT TREATMENT
HOLES FRACTIONAL ± 1/32"	Rockwell ±4
	Brinell ±15
	FGE10.01 Rev. 1 1/14/99



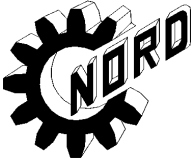
ITEM	QTY.	DESCRIPTION	WEIGHT	P/N:	LENGTH
12	4	LOCKWASHER, 3/8"		100611	
11	4	HEX BOLT, 3/8"-16		100110	3/4"
10	1	AXLE		100000-0810	6-1/2"
9	2	AXLE KEEPER		100000-0410	4"
8	2	RETAINING RING, EXT SHAFT DIA 2-1/8"		107202	
7	1	IDLER WHEEL, 6"DIA. x 4 3/4" WIDE, 325 BHN		100000-0940	
6	2	BEARING, 6211-2RS1		103523	

REV.	DATE	DESCRIPTION
THIS DWG IS PROPERTY OF ACE WORLD COMPANIES (AWC) AND CONTAINS PROPRIETARY INFORMATION WHICH MAY NOT BE COPIED OR REPRODUCED WITHOUT PRIOR WRITTEN CONSENT FROM AWC.		

DRAWN BY: GHR	CHECKED BY:	APR.:	DATE: 03/12/07	QTY:	ITEM:
DRAWING TITLE			SCALE: NTS	76	
6"DIA. x 4 1/4" - FIXED AXLE IDLER WHEEL ASSY (325 BHN) - 8x6 TUBE			FILE: 100000-0760		
			PART NO. 100000-0760	JOB NO.	



10200 JACKSBORO HWY.
FORT WORTH, TX 76135
PHONE 817.237.7700
FAX 817.237.2777
ACEWORLDCOMPANIES.COM



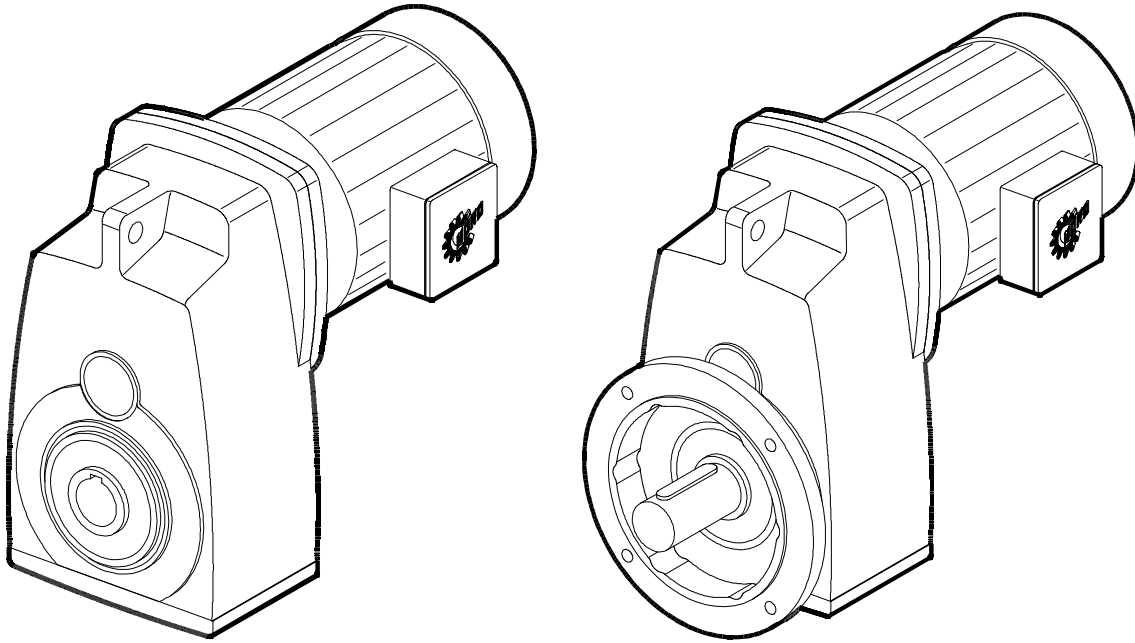
UNICASE® Shaft Mount Gearboxes Installation and Maintenance Instructions

BIM 1020

USA

CDN

Retain These Safety Instructions For Future Use



INSPECTION OF UNIT

Thoroughly inspect the equipment for any shipping and handling damage before accepting shipment from the freight company. If any of the goods called for in the bill of lading or express receipt are damaged or the quantity is short, do not accept until the freight or express agent makes an appropriate notation on your freight bill or express receipt. If any concealed loss or damage is discovered later, notify your freight carrier or express agent at once and request him to make an inspection. We will be very happy to assist you in collecting claims for loss or damage during shipment; however, this willingness on our part does not remove the transportation company's responsibility in reimbursing you for collection of claims or replacement of material. Claims for loss or damage in shipment must not be deducted from the NORD Gear invoice, nor should payment of the NORD Gear invoice be withheld awaiting adjustment of such claims, as the carrier guarantees safe delivery.

If considerable damage has been incurred and the situation is urgent, contact the nearest NORD Gear Sales Office for assistance. Please keep a written record of all communications.

RECORD NAMEPLATE DATA

Locate the gear reducer nameplate and record all nameplate data for future reference.

SK _____ S/N _____

RATIO _____ MAX TORQUE _____ RPM _____ MTG. POS _____

STORAGE

PROPER STORAGE UNTIL INSTALLED

Keep unit in a dry, temperature controlled area. If stored other than said, long term storage methods must be applied to the unit including complete fill with lubricant. Protect machined surfaces and rotate shafts periodically. Prior to putting unit into service, drain lubricant and refill to proper level as determined by the mounting position.

PROPER HANDLING OF THE UNIT

Exercise care to prevent damage to the unit when moving. Lift only at designed lifting points. Do not attach other machinery and lift by the unit lifting points. The lifting points are to be used to lift the unit only. Insure that adequate safety measures are taken to protect personnel during transportation. Protect the mounting surface from damage.

COUPLING ALIGNMENT

Shaft couplings should be installed according to the coupling manufacturer's recommendations for gap, angular and parallel alignment. In many installations, it is necessary to allow for thermal and mechanical shaft movement when determining shaft alignment. The coupling manufacturer's recommendations should be followed.

AXIAL DISPLACEMENT

The gap between shaft ends should be the same as the specified coupling gap unless overhung mounting of the coupling hub is specified. The coupling gap and shaft gap must be sufficient to accommodate any anticipated thermal or mechanical axial movement.

ANGULAR ALIGNMENT

Insert a spacer or shim stock equal to the required coupling gap between the coupling hub faces and measure the clearance using feeler gauges. Repeat this at the same depth at 90-degree intervals to determine the amount of angular misalignment.

PARALLEL ALIGNMENT

Mount a dial indicator to one coupling hub, and rotate this hub, sweeping the outside diameter of the other hub. The parallel misalignment is equal to one-half of the total indicator reading. Another method is to rest a straight edge squarely on the outside diameter of the hubs at 90-degree intervals and measure any gaps with feeler gauges. The maximum gap measurement is the parallel misalignment.

CHECKING ALIGNMENT

After both angular and parallel alignments are within specified limits, tighten all foundation bolts securely and repeat the above procedure to check alignment. If any of the specified limits for alignment are exceeded, realign the coupling.

SPROCKET OR SHEAVE ALIGNMENT

Align the sheaves or sprockets square and parallel by placing a straight edge across their faces. Alignment of bushed sheaves and sprockets should be checked after bushings have been tightened. Check horizontal shaft alignment by placing a level vertically against the face of the sheave or sprocket. Adjust belt or chain tension per the manufacturer's specified procedure.

OUTBOARD PINION ALIGNMENT

Align the pinion by adjusting the gear tooth clearance according to the manufacturer's recommendations and checking for acceptable outboard pinion tooth contact. The foundation bolts may have to be loosened and the unit moved slightly to obtain this contact. When the unit is moved to correct tooth contact, the prime mover should be realigned.

RECHECK ALIGNMENT

After a period of operation, recheck alignment and adjust as required.

1. Properly install unit on a rigid foundation
 - adequately supported
 - securely bolted into place
 - leveled so as not to distort the gear case
2. Properly install couplings suitable for the application and connected equipment.
3. Ensure accurate alignment with other equipment.
4. Furnish and install adequate machinery guards as needed to protect operating personnel and as required by the applicable standards of the Occupational Safety and Health Administration (OSHA), and by other applicable safety regulations;
5. Ensure that driving equipment is running in the correct direction before coupling to reducers with backstops (designed to operate only in a specific direction) or machinery designed to operate only in one direction.

CHANGES IN PERFORMANCE SPECIFICATIONS

Owner has the responsibility to consult with NORD GEAR if such items such as applied loads, operating speeds or other operating conditions have changed.



WARNING:

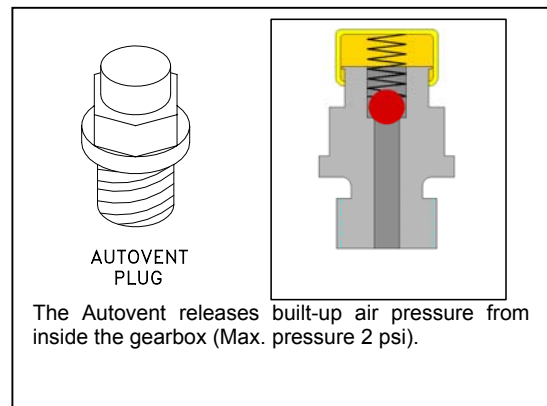
LOCK OUT POWER before any maintenance is performed. Make absolutely sure that no voltage is applied while work is being done on the gearbox.

START-UP

1. Ensure that switches, alarms, heaters, coolers and other safety and protection devices are installed and operational for their intended purpose.
2. Verify that the installed mounting position is the same as the nametag mounting position. If not, adjust the oil level accordingly and relocate the vent plug, fill plug and drain plug according to the mounting position. See following.

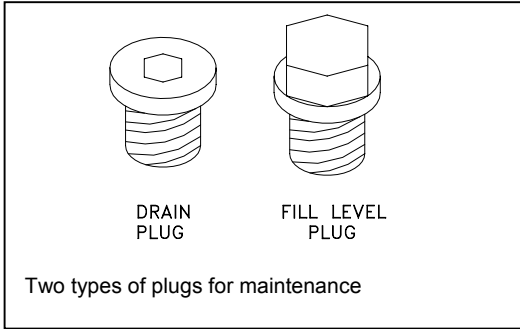
AUTOVENT PLUG

The Autovent plug is brass in color and will be located at the highest point on the gearbox. It operates like a check-valve to allow the reducer to relieve internal pressure while preventing lubricant contamination during cooling. A spring presses a ball or plunger against a machined orifice until pressure exceeds 2 psi. Above 2 psi the air is allowed to escape depressurizing the gearcase. When internal pressure drops below 2 psi, the autovent re-seals closing the unit to the outside environment. After shutdown, the reducer cools along with the air inside the reducer. The unit will temporarily maintain a slight vacuum until normalization occurs. NORD Gear supplies an Autovent as a standard feature.



FILL LEVEL & DRAIN PLUGS

The drain plugs are metric socket head cap screws. They will be located at the lowest part of the gearbox for ease of draining. The fill level plug is a hex head cap screw. It will be located between the Autovent and drain plug. Both types of plugs will have gaskets included to prevent oil from leaking.



LUBRICANT

All NORD reducers are shipped from the factory properly filled with lubricant and all plugs are installed according to the mounting position given on the reducer nametag. Acceptable oil fill level is within 1/2 inch of the bottom of the fill plug threads.

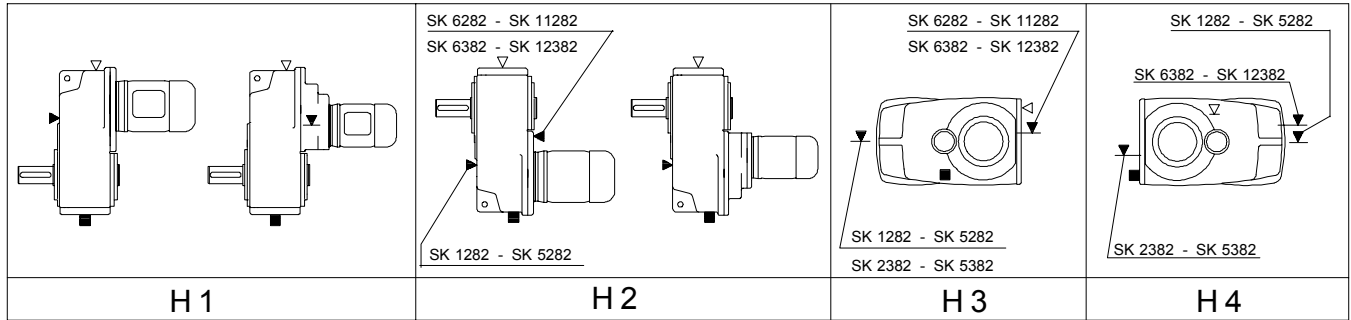
OPERATION AND MAINTENANCE CHECKLIST

1. Operate the equipment as it was intended to be operated
2. Do not overload.
3. Run at correct speed.
4. Maintain lubricant in good condition and at proper level.
5. Dispose of used lubricant in accordance with applicable laws and regulations.
6. Apply proper maintenance to attached equipment at prescribed intervals recommended by the manufacturer.
7. Perform periodic maintenance of the gear drive as recommended by NORD.

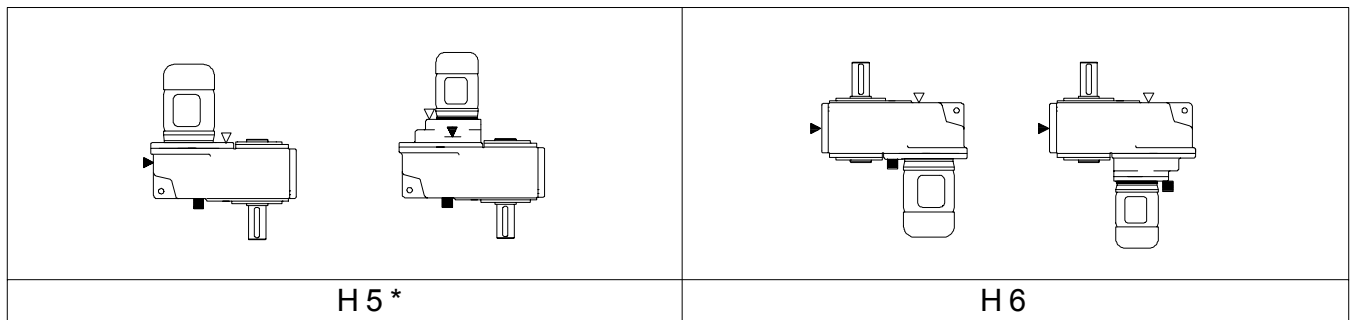
MOUNTING POSITIONS

These charts detail the mounting positions for horizontal and vertical mounting. The Autovent, oil fill plug and drain plug are indicated on each mounting position picture. The factory set mounting position and plug locations match that shown on the gearbox nametag. For mounting orientations other than shown consult NORD Gear.

Horizontal position



Vertical position



Symbols:



* Mounting position H5 with lubricant expansion unit recommended

SK0182NB & SK1382NB have no vent or drain plugs. They are filled with synthetic oil so the units are "Lubed for Life".

MAINTENANCE

Mineral lubricant should be changed every 10,000 service hours or after two years. For synthetic oils, the lube should be changed every 20,000 service hours or after four years. In case of extreme operating (e.g. high humidity, aggressive environment or large temperature variations), shorter intervals between changes are recommended.







OIL SPECIFICATIONS

NORD supplies all reducers filled with oil from the factory. Consult the sticker adjacent to the fill plug to determine the type of lubricant installed at the factory. Standard lubricant is ISO VG220 mineral-based oil. However, some units have special lubricants designed to operate in certain environments or to extend the service life of the lubricant. If in doubt about which lubricant is needed, contact NORD Gear.

STANDARD OIL – ISO VG220

Ambient Temperature	Formulation
20 to 104°F (-5 to 40°C)	Mineral

TYPICAL OILS

Viscosity ISO NLGI	Formulation	Service Temperature Range						
VG 460	Conventional Mineral	20°C to +50°C 68F to +122°F	Mobilgear 634	Omala 460	7EP	Klüberoil GEM 1-460	Energol GR-XP 460	Tribol 1100/460
	Synthetic PAO	-30°C to +80°C -22°F to +176°F	Mobil SHC 634	Omala 460 HD	Isolube EP 460	Klübersynth EG 4-460	N/A	Tribol 1510/460
VG 320	Conventional Mineral	0°C to +30°C 32°F to +86°F	Mobilgear 632	Omala 320	6EP	Klüberoil GEM 1-320	Energol GR-XP 320	Tribol 1100/320
	Synthetic PAO	-35°C to +80°C -31°F to +176°F	Mobil SHC 632	Omala 320 HD	Isolube EP 460	Klübersynth EG 4-320	N/A	Tribol 1510/320
VG 220	Conventional Mineral	-5°C to +40°C +20°F to +104°F	Mobilgear 630	Omala 220	5EP	Klüberoil GEM 1-220	Energol GR-XP 220	Tribol 1100/220
	Synthetic PAO	-34°C to +80°C -30°F to +176°F	Mobil SHC 630	Omala 220 HD	Isolube EP 220	Klübersynth EG 4-220	N/A	Tribol 1510/220
VG 150 & VG 100	Conventional Mineral	-15°C to +25°C 5°F to +77°F	Mobilgear 629	Omala 100	4EP	Klüberoil GEM 1-150	Energol GR-XP 100	Tribol 1100/100
	Synthetic PAO	-37°C to +10°C -35°F to +50°F	Mobil SHC 629	Omala 150 HD	Isolube EP 150	Klübersynth EG 4-150	N/A	N/A
VG 68	Conventional Mineral	-15°C to +25°C 5°F to +77°F	Mobilgear 626	Omala 68	2EP	Klüberoil GEM 1-68	Energol GR-XP 68	Tribol 1100/68
	Synthetic PAO	-40°C to +10°C -40°F to +50°F	Mobil SHC 626	N/A	Isolube EP 68	N/A	N/A	N/A
VG 32	Synthetic PAO	-40°C to +10°C -40°F to +50°F	Mobil SHC 624	N/A	N/A	Klüber-Summit HySyn FG-32	N/A	N/A

PAO = Poly Alpha Olefin

SPECIAL PURPOSE LUBRICANTS

Ambient Temperature	Formulation	Manufacturer	Oil Brand Name
20 to 104°F (-5 to 40°C)	Food Grade Oil - Synthetic	Chevron	FM ISO 220
20 to 104°F (-5 to 40°C)	Food Grade Oil - Synthetic	OilJAX	Magnaplate 85W140-FG
5 to 125°F (-20 to 50°C)	Fluid Grease	Mobil	Mobilux EP023
-30 to 140°F (-35 to 60°C)	Fluid Grease - Synthetic	Mobil	Mobilith SHC 007
-30 to 140°F (-35 to 60°C)	Fluid Grease - Synthetic	Shell	Albida LC

STANDARD BEARING GREASE – NLGI 2EP Lithium

Ambient Temperature	Formulation
-20 to 140°F (-30 to 60°C)	Mineral

OPTIONAL BEARING GREASES

Ambient Temperature	Formulation	Manufacturer	Grease Brand Name
-40 to 230°F (-40 to 110°C)	Synthetic	Shell	Aeroshell 6
-40 to 230°F (-40 to 110°C)	Food Grade - Synthetic	Lubriplate	SFL1

LUBRICANT CAPACITY

Each reducer has the oil level and oil quantity adjusted according to the mounting position shown in the tables. When replacing the oil, consult the tables below to determine the proper amount of oil to be installed according to the reducer size and mounting position. Note that this is approximate and the final level will be adjusted when the reducer is installed. Acceptable oil fill level is within 1/2 inch of the bottom of the fill plug threads.

LUBRICATION CAPACITY - SHAFT MOUNT 'CLINCHER' GEARBOXES

		MOUNTING POSITION					
		Horizontal				Vertical	
		H1	H2	H3	H4	H5	H6
SK 0182NB	quarts	0.42	0.63	0.53	0.53	0.58	0.58
	liters	0.40	0.60	0.50	0.50	0.55	0.55
SK0282NB	quarts	0.74	0.85	0.95	0.95	1.16	1.06
	liters	0.70	0.80	0.90	0.90	1.10	1.00
SK 1282	quarts	0.95	0.95	1.00	1.00	1.27	1.37
	liters	0.90	0.90	0.95	0.95	1.20	1.30
SK 2282	quarts	1.74	2.01	1.90	1.90	2.11	2.54
	liters	1.65	1.90	1.80	1.80	2.00	2.40
SK 3282	quarts	3.33	3.44	3.33	3.33	4.33	4.33
	liters	3.15	3.25	3.15	3.15	4.10	4.10
SK 4282	quarts	4.97	5.02	4.97	4.97	5.71	6.45
	liters	4.70	4.75	4.70	4.70	5.40	6.10
SK 5282	quarts	7.93	7.93	7.61	7.61	9.30	9.30
	liters	7.50	7.50	7.20	7.20	8.80	8.80
SK 6282	quarts	18.0	12.7	14.8	10.6	18.5	14.8
	liters	17.0	12.0	14.0	10.0	17.5	14.0
SK 7282	quarts	26.4	21.1	22.2	16.9	28.5	22.2
	liters	25	20	21	16	27	21
SK 8282	quarts	39.1	31.7	32.8	32.8	43.3	34.9
	liters	37	30	31	31	41	33
SK 9282	quarts	78.2	58.1	62.4	72.9	76.1	74.0
	liters	74	55	59	69	72	70
SK 10282	quarts	95	42	87	63	95	95
	liters	90	40	82	60	90	90
SK 11282	quarts	174	153	148	106	206	169
	liters	165	145	140	100	195	160

		MOUNTING POSITION					
		Horizontal				Vertical	
		H1	H2	H3	H4	H5	H6
SK 1382NB	quarts	1.37	1.48	2.01	2.11	2.22	2.43
	liters	1.30	1.40	1.90	2.00	2.10	2.30
SK 2382	quarts	1.80	2.01	1.59	1.59	3.28	2.75
	liters	1.70	1.90	1.50	1.50	3.10	2.60
SK 3382	quarts	4.33	3.49	3.49	3.49	5.92	4.33
	liters	4.10	3.30	3.30	3.30	5.60	4.10
SK 4382	quarts	6.24	5.18	5.18	5.18	8.77	7.19
	liters	5.90	4.90	4.90	4.90	8.30	6.80
SK 5382	quarts	13.21	7.08	8.77	8.77	14.80	12.68
	liters	12.50	6.70	8.30	8.30	14.00	12.00
SK 6382	quarts	17.4	10.1	13.2	14.8	19.0	13.7
	liters	16.5	9.6	12.5	14.0	18.0	13.0
SK 7382	quarts	23.3	16.9	20.1	24.3	26.4	21.1
	liters	22	16	19	23	25	20
SK 8382	quarts	35.9	26.4	31.7	37.0	40.2	33.8
	liters	34	25	30	35	38	32
SK 9382	quarts	77.2	47.6	63.4	68.7	78.2	74.0
	liters	73	45	60	65	74	70
SK 10382	quarts	90	77	85	85	93	93
	liters	85	73	80	80	88	88
SK 11382	quarts	169	148	143	164	222	164
	liters	160	140	135	155	210	155
SK 12382	quarts	169	148	143	164	222	164
	liters	160	140	135	155	210	155

Note: Filling quantities are approximate figures. Oil level must be checked according to oil level plug after final installation. Acceptable oil fill level is within 1/2 inch of the bottom of the fill plug threads. For mounting angles not shown, consult factory.

TROUBLE SHOOTING

PROBLEM WITH THE REDUCER		POSSIBLE CAUSES	SUGGESTED REMEDY
Runs Hot	Overloading	Load exceeds the capacity of the reducer	Check rated capacity of reducer, replace with unit of sufficient capacity or reduce load
	Improper lubrication	Insufficient lubrication	Check lubricant level and adjust up to recommended levels
		Excessive lubrication	Check lubricant level and adjust down to recommended levels
		Wrong lubrication	Flush out and refill with correct lubricant as recommended
Runs Noisy	Loose foundation bolts	Weak mounting structure	Inspect mounting of reducer. Tighten loose bolts and/ or reinforce mounting and structure
		Loose hold down bolts	Tighten bolts
	Worn RV Disc	Overloading unit may result in damage to disc	Disassemble and replace disc. Recheck rated capacity of reducer.
	Failure of Bearings	May be due to lack of lubricant	Replace bearing. Clean and flush reducer and fill with recommended lubricant.
		Overload	Check rated capacity of reducer.
Insufficient Lubricant	Level of lubricant in the reducer not properly maintained.	Check lubricant level and adjust to factory recommended level.	
Output Shaft Does Not Turn	Internal parts are broken	Overloading of reducer can cause damage.	Replace broken parts. Check rated capacity of reducer.
		Key missing or sheared off on input shaft.	Replace key.
		Coupling loose or disconnected.	Properly align reducer and coupling. Tighten coupling.
Oil Leakage	Worn Seals	Caused by dirt or grit entering seal.	Replace seals. Autovent may be clogged. Replace or clean.
		Overfilled reducer.	Check lubricant level and adjust to recommended level.
		Autovent clogged.	Clean or replace, being sure to prevent any dirt from falling into the reducer.
		Improper mounting position, such as wall or ceiling mount of horizontal reducer.	Check mounting position. Name tag & verify with mounting chart in manual.

NORD Gear Corporation

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MIDWEST

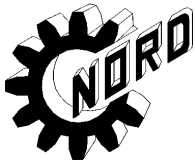
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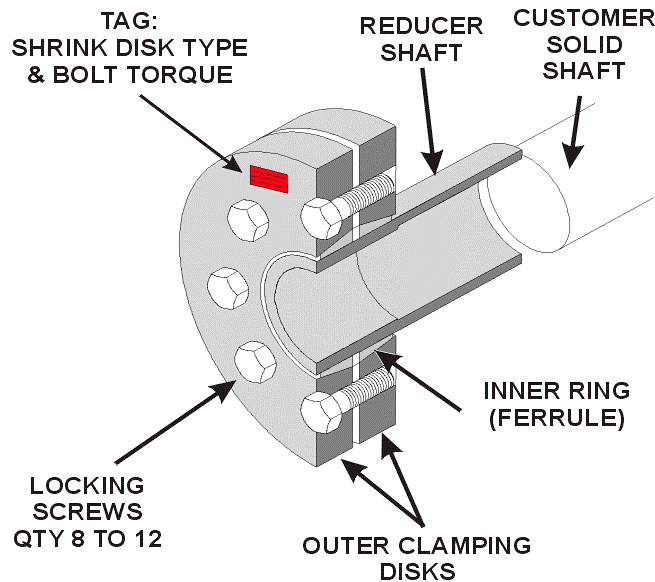
Hollow Shrink Disc Shaft Installation and Maintenance Instructions

BIM 1001

USA

CDN

Retain These Safety Instructions For Future Use



Installation Instructions:

1. Mating shaft tolerances are normally tighter for shrink discs due to the gripping forces needed. Customer shaft diameter has to be machined according to ISO h6 or f6 tolerances (f6 easier to machine but lower gripping forces as shown in catalog). Refer to Table 1 for h6 and f6 tolerances for customer shafts.
2. Remove transportation spacers (if provided) located between outer collars. Do not take the unit apart.
3. Lightly tighten locking screws until most play between outer collars and the conical inner ring (ferrule) is eliminated. You must be able to easily turn the ferrule with your fingers.
4. Lightly lubricate the bore of the ferrule, with grease, for easier mounting onto outside diameter of the reducer hollow shaft.
5. Slide the shrink-disc onto hollow shaft.
6. Wipe the reducer bore and the mating solid shaft clean of any lubricants and dirt. Only use solvent if the parts feel oily to the touch after wiping with a clean rag.
7. Slide the reducer onto the solid shaft until it is about half way through.
8. Lubricate the remaining portion of the solid shaft with a #2 grease, where it will be inserted into the hollow shaft.
9. Tighten the locking screws in a circular pattern. Refer to Table 2 for tightening torques. Initially, tighten locking screws finger tight to position outer collars. Then tighten 1/4

to 1/2 turn at a time until specified tightening torque (per table) is reached.

10. Continue tightening each bolt at rated torque until no further rotation is seen. This assures the shrink disc is fully seated.



Warning:

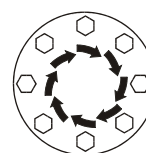
The surface area between the hollow shaft and the solid shaft must be free of lubricant or the connection may slip in service.



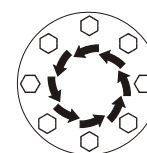
Warning:

Always tighten in a circular pattern. Never tighten bolts in a star pattern or connection may slip in service.

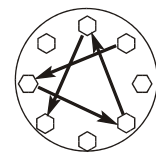
BOLT TIGHTENING PATTERN



CLOCKWISE
CIRCULAR
PATTERN
RIGHT



COUNTER
CLOCKWISE
CIRCULAR
PATTERN
RIGHT



STAR
PATTERN
WRONG

Customer shaft diameter tolerance with Shrink Disc fit h6

Metric (mm)

- $\leq \varnothing 18 = +0.000/-0.011$
- $> \varnothing 18 \leq \varnothing 30 = +0.000/-0.013$
- $> \varnothing 30 \leq \varnothing 50 = +0.000/-0.016$

- $> \varnothing 50 \leq \varnothing 80 = +0.000/-0.019$
- $> \varnothing 80 \leq \varnothing 120 = +0.000/-0.022$
- $> \varnothing 120 \leq \varnothing 180 = +0.000/-0.025$

Inch

- $\leq \varnothing 0.750 = +0.0000/-0.0004$
- $> \varnothing 0.750 \leq \varnothing 1.125 = +0.0000/-0.0005$
- $> \varnothing 1.125 \leq \varnothing 2.000 = +0.0000/-0.0006$
- $> \varnothing 2.000 \leq \varnothing 3.000 = +0.0000/-0.0007$
- $> \varnothing 3.000 \leq \varnothing 4.750 = +0.0000/-0.0008$
- $> \varnothing 4.750 \leq \varnothing 7.000 = +0.0000/-0.0010$

Shaft finish to be 125 micro inches or smoother.

Customer shaft diameter tolerance with Shrink Disc fit f6 (looser fit)

Metric (mm)

- $\leq \varnothing 18 = -0.016/-0.024$
- $> \varnothing 18 \leq \varnothing 30 = -0.020/-0.029$
- $> \varnothing 30 \leq \varnothing 50 = -0.025/-0.036$
- $> \varnothing 50 \leq \varnothing 80 = -0.030/-0.043$
- $> \varnothing 80 \leq \varnothing 120 = -0.036/-0.051$
- $> \varnothing 120 \leq \varnothing 180 = -0.043/-0.061$

Inch

- $\leq \varnothing 0.750 = -0.0006/-0.0011$
- $> \varnothing 0.750 \leq \varnothing 1.125 = -0.0008/-0.0013$
- $> \varnothing 1.125 \leq \varnothing 2.000 = -0.0010/-0.0016$
- $> \varnothing 2.000 \leq \varnothing 3.000 = -0.0012/-0.0019$
- $> \varnothing 3.000 \leq \varnothing 4.750 = -0.0014/-0.0023$
- $> \varnothing 4.750 \leq \varnothing 7.000 = -0.0017/-0.0027$

Shaft finish to be 125 micro inches or smoother

Tightening Torques for Locking Screws

Shrink Disk Type	Bore Size Inches (mm)	Locking Screws (Bolts)		
		Qty	Size	Torque in-lbs (Nm)
SNxx/35V	0.9375 – 1.000 (24 - 26)	8	M5X25	60 (7)
SNxx/40V	1.125 - 1.250 (28 - 32)	8	M6X35	110 (12)
SNxx/46V	1.3125 - 1.4375 (34 - 36)	10	M6X35	110 (12)
SNxx/55V	1.5625 - 1.75 (40 - 45)	8	M8X40	270 (30)
SNxx/62V	1.875 - 2.0625 (48 - 52)	10	M8X40	270 (30)
SNxx/76V	2.1875 - 2.5625 (55 - 65)	10	M10X50	520 (59)
SNxx/90V	2.5625 - 2.9375 (65 - 75)	10	M12X70	885 (100)
SNxx/108V	2.9375 - 3.375 (75 - 85)	12	M12X70	885 (100)
SNxx/128V	3.750 - 4.125 (95 - 105)	8	M16X70	2,210 (250)
SNxx/138V	4.125 - 4.500 (105 - 115)	8	M16X70	2,210 (250)
SNxx/158V	4.500 - 5.125 (115 - 130)	12	M16X80	2,210 (250)
SNxx/185V	5.3125 - 5.875 (135 - 150)	12	M16X80	2,210 (250)
SNxx/210V	6.250 (160)	12	M16X80	4,340 (490)
SNxx/230V	6.3125 - 7.500 (160 - 190)	12	M20X100	4,340 (490)

Maintenance

Shrink disks are maintenance free.

Removal

- Loosen locking screws in circular pattern as they were tightened, by approximately 1/4 to 1/2 turn at a time until finger tight. Do not remove locking screws completely.
- Loosen the outer collars from the tapered inner ring. This may require tapping the bolts with a soft faced hammer or prying lightly between the outer collars.
- Remove hollow-shaft reducer from solid shaft.

Preparation for Re-Use:

- Disassemble and thoroughly clean all parts. Wire brush to remove any excessive rust or dirt.
- Lubricate the taper of the outer collars and of the inner ring with Molycote G-Rapid plus (product of Dow Corning) or equivalent.
- Grease screw threads and head contact area with multipurpose grease.

NORD Gear Corporation

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NORD Gear Limited

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MIDWEST

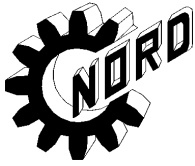
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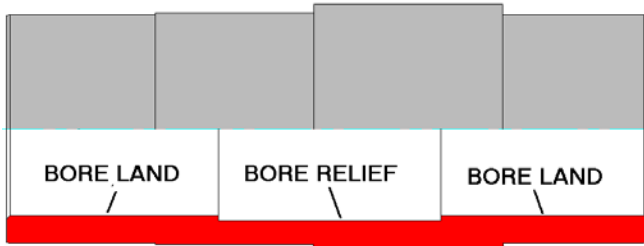
Hollow Keyed Shaft & Fixing Element Installation and Maintenance Instructions

BIM 1002

USA

CDN

Retain These Safety Instructions For Future Use



CAUTION:

For hollow bore reducers designed to use rectangular keys, the mating solid shaft must be made to mating rectangular dimensions. Otherwise the supplied keys will not fit properly. **Not doing so may cause the hollow shaft or the key to fail.**

CAUTION:

Key(s) must engage the full land length at each end of the hollow bore shaft. **Not doing so may cause the hollow shaft or the key to fail.**

Basic Design

Nord uses a tight tolerance ISO 286 class H7 for its hollow bore shafts. And, recommends a close fit of mating components to prevent excessive free play that might lead to failure. Straightness, roundness, and diameter tolerance variations of both shafts combined with the low clearance between would make installation difficult without special design features to compensate.

A relief area is cut in the center section of the hollow bore. In most cases, Nord furnishes 2 short keys instead of a single long key. The bore relief and break of the keys are done as design features to ease assembly of the solid shaft. If a key supplied by others is used, it must engage the full land length at each end of the hollow bore shaft.

Assembly

Before assembly, lubricate the hollow bore lands and the solid (male) shaft diameter with anti-seize compound (preferred), assembly paste or at a minimum, use a #2 grease. Anti-seize compounds are available from many manufacturers such as Loctite, Kluber, etc. This will aid installation of the reducer. But more importantly, the lubricant will aid removal should it be required at a later date.

After installation, a bead of silicone or grease around both ends of the hollow bore and solid shaft intersections will help prevent moisture from wicking down the shaft and corroding the two together.

Design of Mating Connection

Tolerance of Customer shaft with keyseat (in)	
0.625 – 1.500	+0.0000 / -0.0020
1.525 – 2.500	+0.0000 / -0.0030
2.625 – 7.000	+0.0000 / -0.0040

Shaft finish to be 125µ inches or smoother

Key Dimensions

Most keyed sizes use standard square keys and some units use rectangular keys (refer to the catalog for details). If the reducer shaft uses a rectangular key the mating, solid (male) shaft must be made to rectangular key dimensions. For dimensions of the mating male shaft keyway, see ANSI B17.1 or a general engineering text such as the "Machinery's Handbook". The male shaft should be made with a Class 2, transitional fit (slightly loose to slightly tight). If the key fit is tight at assembly it may require hand fitting of the keys (i.e. light filing of the key sides).

Keys in the female shaft are designed to be a low clearance. This is to allow for easier assembly with the mating male shaft, without allowing too much clearance that may work loose during use.

Preventing Axial Movement

Due to the slight oscillations inherent in any rotating shaft, Nord offers an optional "fixing element kit". This is a method to prevent the reducer from "walking out" of position. The kit includes all of the necessary parts to secure the shaft by using a tapped hole in the end of the mating male shaft. Refer to Nord's Constant Speeds catalog for dimensions in the fixing element section.

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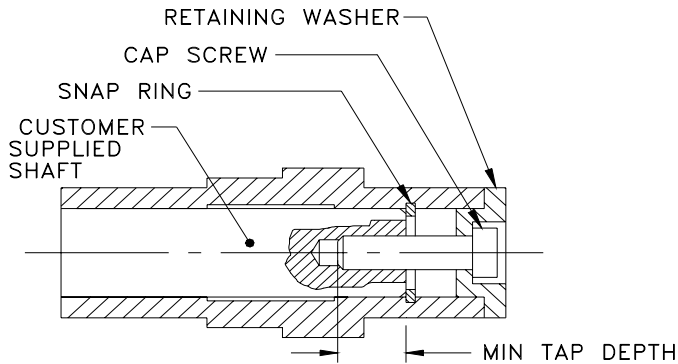
CANADA

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Fax 905-796-8130

Optional Fixing Element Kit

The fixing element kit is used to prevent axial movement of the reducer during operation. A bolt and special washer tension the solid (male) shaft against a snap ring inside the hollow bore or a shoulder on the male shaft at the entry end of the bore. A plastic cover (not available with all sizes) seals the fixing element bolt. A bead of silicon, or grease applied between the hollow shaft end and the retaining washer will help prevent moisture wicking down the shaft and corroding the shafts together.

Kits are designed to fit multiple of bore sizes and may contain more than one bolt and/or snap ring. Use most appropriate parts and discard remaining components. Only one bolt, snap ring, retaining washer, and plastic cover are required per reducer. See Table for allowable thrust load ratings on the snap rings.



Bolt Tightening

If the "Customer Supplied Solid Shaft" is pulled up against the "Snap Ring" as shown in the figure above, then the shaft retaining screw labeled "Cap Screw" should be tightened lightly snug. The screw should also be secured with a thread-locking compound to prevent the screw from backing out. Be careful not to over tighten the retaining "Cap Screw" or the snap ring may be pulled out of its seating groove.

If the "Customer Supplied Solid Shaft" is shouldered and pulled up against the end of the hollow shaft and not the "Snap Ring," then the shaft retaining "Cap Screw" should be tightened to standard torque as recommended by bolt manufacturers based on the bolt grade and materials.



CAUTION:

Maximum Edge Break on the solid (male) shaft must not exceed the value shown, otherwise the thrust capacity of the snap ring will be reduced.

Shaft Bore inch	Max. Thrust on Snap Ring † lbs [N]	Bolt Size	Max. Edge Break on Solid Shaft †	
			Radius inch	Chamfer Inch
5/8	710 [3,158]	10 - 32	0.027	0.021
3/4	1,460 [6,494]	1/4 - 20	0.032	0.025
13/16	3,700 [16,458]	1/4 - 20	0.047	0.036
1	2,800 [12,455]	3/8 - 16	0.042	0.034
1-1/4	3,900 [17,348]	7/16 - 14	0.047	0.036
1-3/16	3700 [16458]	7/16 - 14	0.047	0.036
1-3/8	5050 [22463]	5/8 - 11	0.048	0.038
1-7/16	5500 [24465]	5/8 - 11	0.048	0.038
1-1/2	6000 [26689]	5/8 - 11	0.048	0.038
1-5/8	6900 [30693]	5/8 - 11	0.064	0.05
1-3/4	8050 [35808]	5/8 - 11	0.064	0.05
1-13/16	8450 [37587]	5/8 - 11	0.064	0.05
1-15/16	9700 [43148]	5/8 - 11	0.064	0.05
2	10300 [45816]	5/8 - 11	0.064	0.05
2-1/16	10850 [48263]	5/8 - 11	0.078	0.062
2-3/8	14300 [63609]	3/4 - 10	0.078	0.062
2-7/16	14900 [66278]	3/4 - 10	0.078	0.062
2-3/4	19200 [85405]	3/4 - 10	0.092	0.074
2-15/16	19500 [86740]	3/4 - 10	0.092	0.074
3-3/16	25000 [111205]	3/4 - 10	0.104	0.083
3-1/4	27000 [120101]	3/4 - 10	0.104	0.083
3-15/16	39300 [174814]	7/8 - 9	0.124	0.099
4	40700 [181042]	7/8 - 9	0.128	0.102
4-1/16	41000 [182376]	7/8 - 9	0.128	0.102
4-3/8	44600 [198390]	7/8 - 9	0.154	0.123
4-3/4	49000 [217962]	7/8 - 9	0.154	0.123

† Maximum edge break must be equal or less than shown.

BRAKE MOTOR INFORMATION

Ace motors are three phase totally enclosed motors incorporating an electromagnetic spring-set disc brake. Motor load is stopped automatically when power is turned off, ensuring a precise stop and quick braking action. Brake activation is obtained without axial sliding of the shaft and is specifically engineered to provide years of worry free performance.

Ace brake motors have been designed to be used with lifting and translating machinery. The integral brake design utilizes an asbestos free brake disc, with a high coefficient of friction. All Ace brake motors have a power-off manual release for convenience and use in the case of power loss.

Ace brake motors incorporate either a NEMA or IEC Design B, totally enclosed motor platform, utilizing a Class H insulation system (inverter rated), providing superior motor protection against voltage spikes induced by variable frequency drives.

Motors are available from stock in both 4 pole (1800 RPM) and 6 pole (1200 RPM) designs, and are available from 3/4 HP thru 10 HP.

All Ace brake motors have Klaxon style motor protectors, and can be modified (upon request) to meet specific environmental requirements.

U.L., CSA, ISO Standards and Approvals.

Underwrites Laboratories, Inc.

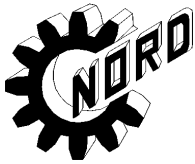
1. U.L recognized Class H insulation system. File #E55555, Guide Number OBJY2.
2. U.L. recognized protector winding combinations. File #E57955. Guide Number XEWWR2.

Canadian Standards Association

1. CSA Report Number L33543, Guide Number 260-0-0.
2. CSA Report Number LR62104.

ISO Quality Certification

Design and Manufacturing Facility, ISO 9001, Certificate Number RvC #93-102.
EN29001, BS5750: Part I and ANSI/ASQC Q91-19 ISO9002 Certificate Number RvC #93-090.



Motor Brakes Installation and Maintenance Instructions

BIM 1090

USA

CDN

Retain These Safety Instructions for Future Use

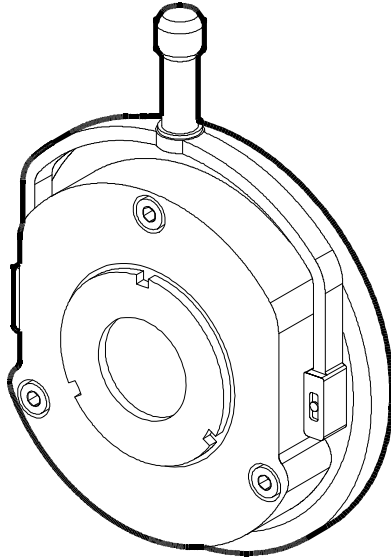


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Safety Notice

This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment.

Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electric Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury.

This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by NORD Gear. If you have a question about a procedure or are uncertain about any detail, DO NOT PROCEED. Please contact your NORD distributor for more information or clarification.



WARNING:

LOCK OUT POWER BEFORE ANY MAINTENANCE IS PERFORMED. MAKE ABSOLUTELY SURE THAT NO VOLTAGE IS APPLIED WHILE WORK IS BEING DONE ON THE GEARBOX. READ SAFETY INSTRUCTIONS PRIOR TO ANY WORK DONE ON THE MOTOR.



DANGER:

THE USER IS RESPONSIBLE FOR CONFORMING TO THE NATIONAL ELECTRIC CODE AND ALL OTHER APPLICABLE LOCAL CODES. WIRING PRACTICES, GROUNDING DISCONNECTS AND OVERCURRENT PROTECTION, ARE OF PARTICULAR IMPORTANCE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN SEVERE BODILY INJURY OR LOSS OF LIFE.

GENERAL DESCRIPTION

BRAKES

General

NORD brakes are “spring set”. When power is removed from the brake, the brake will automatically set to hold the load. NORD brakes are DC voltage brakes and in most instances are supplied with a motor mounted brake rectifier for easy connections to AC power. AC power is taken directly from the power line or from the terminal block of the motor and converted to DC by the supplied rectifier in the terminal box. **If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier separately from the motor power.**

When the brake is de-energized (Power Off), the braking springs exert a force against the anchor plate, which prevents the brake rotor from rotating. When the brake coil is energized (Power On), a magnetic field builds and pulls the anchor plate across the air gap to the brake casing, which frees the brake rotor and allows the motor shaft to rotate.

NORD Gear typically use brakes manufactured by Precima and Mayr. The Mayr brake is used mainly on the 20Nm and some of the 400-1200Nm sizes. For questions regarding brake manufacturer, please contact NORD Gear.

RECTIFIERS

General

The DC power required to energize the brake is not available in most applications. AC power is available in all applications since it is required to power the motor. The rectifier converts the available AC voltage to the DC voltage needed to power the brake.

Features

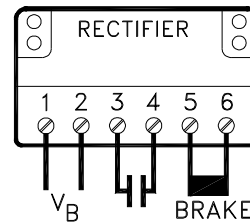
- Individual power supply for each motor.
- Compact size; mounted inside motor terminal box.
- Multiple voltage options
- Solid state bridge rectifier
- Integral protection against transient voltage spikes
- Half wave rectifier:
DC voltage is 45% of the applied AC voltage
- Full wave rectifier:
DC voltage is 90% of the applied AC voltage

Standard Rectifiers

As standard, NORD integral gearmotors with a DC brake include a rectifier mounted in the motor terminal box to supply DC power to the brake. The rectifier can be wired for switching either the AC power source or the DC voltage supply (output). Wiring the DC switching gives the fastest reaction (de-energize – brake engage – stopping) time. If AC switching is used, the source power can be attached to the motor brake terminals. Tapping into the motor terminals gives the slowest de-energize time (stopping), due to the collapsing time of the motor magnetic field.

Terminals

- 1 & 2 Brake system connection AC voltage
- 3 & 4 Switch contact or jumper (for DC switching)
- 5 & 6 Connection brake coil



Special Function Rectifiers & Current Sensing Relays

NORD offers special function rectifiers (Option FR) which provide improved brake performance. Refer to “BIM 1095 FR Brake Rectifier” for more information.

Another way of improving brake performance is using NORD’s current sensing relay (Option IR). It requires no external wiring and screws into the spare side hole of the conduit box. Refer to “BIM 1092 IR Relay” for more information.

RECTIFIER PART NUMBERS & RATINGS

Part #	Color	Style	Input Voltage	Output Current	Temp
19141000	Black	Full-wave	110-230 VAC ± 10%	2A	-10°C to 80°C
19141010	Yellow	Half-wave	230-480 VAC ± 10%	2A	-10°C to 80°C
19141020	Grey	Half-wave	500-575 VAC ± 10%	2A	-10°C to 80°C



Cautions

- **Brake torque** - The brake torque is measured with a mean friction radius of the brake pad surface with a circumferential speed of 1m/sec (197 fpm).
- **Brake torque tolerance** - For different applications and operating conditions, brake torque can vary from +40/-20% compared to the rated brake torque.
- **Hoisting (lifting/lowering) applications** - must have the brake wired for fast response (DC-switching)
- **Initial operation & wear-in period** - In new condition, the brake will have a reduced torque of up to 30%. In order to achieve full rated brake torque, a short run-in period is required. The run in time will vary depending on system loads.

MAINTENANCE – PRECIMA BRAKES

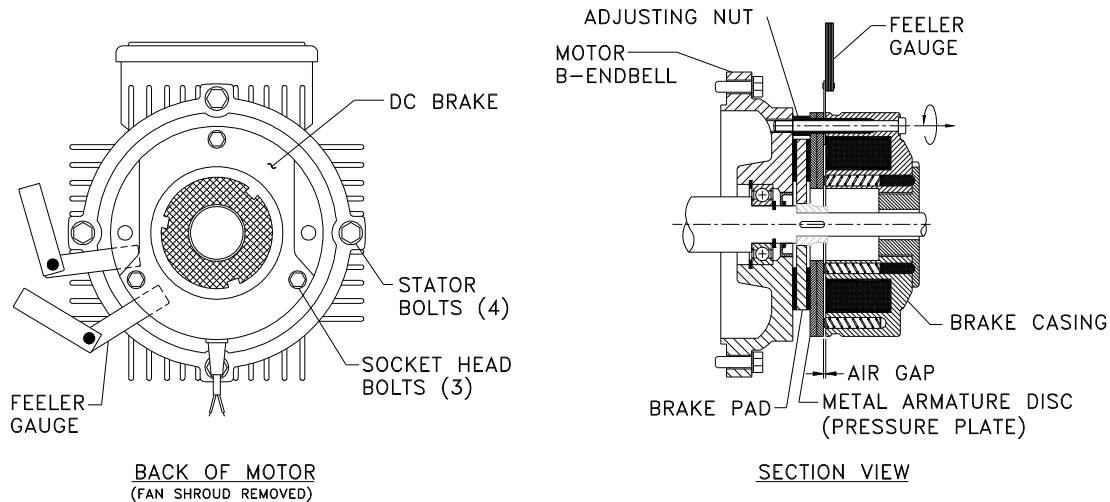
General

In order to get maximum life out of the brake, the air gap must be set properly and checked at regular intervals. As the brake wears and decreases in thickness, the air gap will increase. If the air gap is too large, the brake coil may not have enough magnetic force to pull the metal armature disc across the gap and the brake rotor will drag. Refer to the table below for maximum air gap allowance and minimum brake pad thickness.

Brake Air Gap Adjustment:

When a complete brake motor is supplied by NORD, the air gap is already set at the factory. If the brake is ordered as a part, the air gap must be set at the time of assembly. **All brake air gap adjustments must be made with the brake assembled onto the motor and power off (Brake Engaged).** If the brake has an optional hand release (Option HL), refer to page 9 for additional instructions.

While checking the air gap, measure the gap around the socket head cap screws as shown in the picture below.



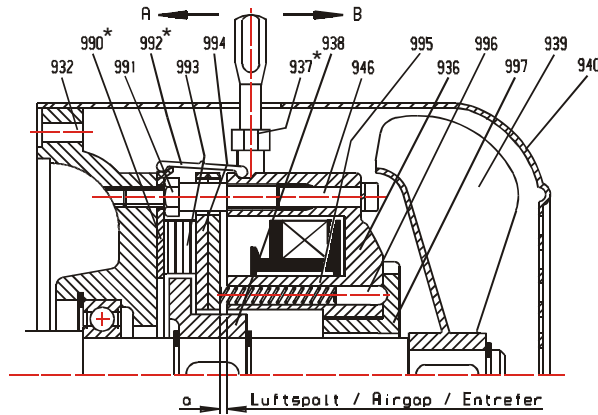
- Loosen the socket head cap screw that attaches the brake to the motor B-endbell.
- Depending if the air gap needs to be increased/decreased, turn the adjusting nut accordingly. A quarter or half turn is usually sufficient for adjusting purposes.
- After adjusting the nut, tighten the socket head cap screw back onto the brake.
- Measure the air gap for spacing - Repeat process to achieve recommended setting.

Size	Rated Torque lb-ft [Nm]	Power of Brake Coil W	Air Gap Setting in [mm]	Max Air Gap Before Re-Adjustment in [mm]	Minimum Rotor (Brake Pad) Thickness in [mm]
5	3.75 [5]	22	0.008 [0.2]	0.031 [0.8]	0.177 [4.5]
10	7.5 [10]	28	0.008 [0.2]	0.031 [0.8]	0.217 [5.5]
20	16 [20]	34	0.012 [0.3]	0.031 [0.8]	0.301 [7.6]
40	30 [40]	42	0.012 [0.3]	0.035 [0.9]	0.374 [9.5]
60	44 [60]	50	0.012 [0.3]	0.039 [1.0]	0.453 [11.5]
100	75 [100]	64	0.016 [0.4]	0.043 [1.1]	0.492 [12.5]
150	110 [150]	76	0.016 [0.4]	0.043 [1.1]	0.571 [14.5]
250	188 [250]	100	0.019 [0.5]	0.047 [1.2]	0.650 [16.5]

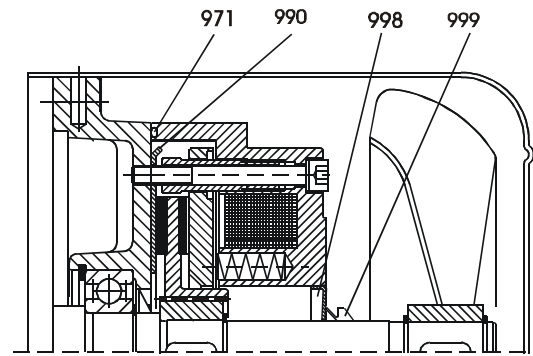
Rubber Dust Boot (Option SR)

The optional rubber dust boot protects the brake from dusty/sandy debris from reaching the brake pad. However, it also keeps the brake dust from getting out. Regular maintenance must be done to the brake to remove the brake dust. The amount of brake dust accumulated will vary with the brake size and application.

PARTS LIST – PRECIMA BRAKES



Normal Design, Enclosure IP55
with following options:
RG – Stainless Steel Disc (Item 990)
SR – Dust Boot-includes Option RG (Item 992)
HL – Hand Release (Item 937)



Optional Brake with optional IP66 enclosure

932 Non-drive endshield
936 Brake coil
937 Manual brake lever – optional
938 Brake hub
939 Fan
940 Fan cover
946 Fixing screw
971 O-ring - optional
990 Friction plate - optional
991 Setting bolt

992 Dust protection ring¹⁾ – optional
993 Brake disc
994 Anchor plate
995 Spring
996 Pressure plate adjustment**
997 Adjustable ring **
998 Bushing/seal - optional
999 V-ring - optional

¹⁾ Not available for 400N, and 800 Nm.

** Only for brakes that are 5 Nm to 40 Nm

BRAKE PAD REPLACEMENT – PRECIMA BRAKES

LIST OF TOOLS

Following are a list of tools to remove the brake:

- Screw drivers – Philips & Flat (to remove the fan cover)
- External snap ring pliers (to remove fan retaining snap ring)
- Large screw drive or a small pry bar (to pop off the fan)
- Metric sockets & T-handles and open-end wrenches



IMPORTANT

Ensure that the reducer load is supported. Removal of the brake will let the load free fall, which may cause injury. Disconnect the power from the motor.

PROCEDURE

When the brake pad is worn to the minimum thickness as shown in the chart on page 5, the pad should be replaced to maintain the proper operation. To replace the pad:

- Remove the 4 bolts to remove the fan cover
- If the brake has a hand release, this can be removed by unscrewing.
- Remove the fan cover and note the position of the hand release slot if applicable.
- Remove the snap ring holding the cooling fan.
- Carefully remove the cooling fan, key and second snap ring.
- If the brake is equipped with a dust boot, remove it.
- Remove the 3 socket head cap screws holding the brake coil to the motor end-bell.
- Remove the brake coil, noting the hand release and power cable locations.
- The brake pad will now slide off the hub holding it on the shaft.
- Clean the brake, install the pad and reassemble.

NOTE: Upon reassembly, the brake air gap setting must be checked and adjusted if needed, as noted in MAINTENANCE.

PRECIMA BRAKE REPLACEMENT PARTS				
BRAKE SIZE	BRAKE DISC (PAD) [ITEM 993]	HANDLE [ITEM 937]	STAINLESS DISC [ITEM 990]	DUST BOOT [ITEM 992]
5 NM	19120042	19150042	19130042	19110042
10NM	19120082	19150082	19130082	19110082
20NM ¹⁾	19120162	19150162	19130162	19110162
40NM ²⁾	19120322	19150322	19130322	19110402
40NM ³⁾	19120402	19150322	19130322	19110402
60NM	19120602	19150602	19130602	19110602
100NM	19120802	19150802	19130802	19110802
150NM	19121502	19151502	19131502	19111502
250NM	19122402	19152402	19132500	19112502
400NM	Call Factory	Call Factory	Call Factory	Call Factory
800NM	Call Factory	Call Factory	Call Factory	Call Factory

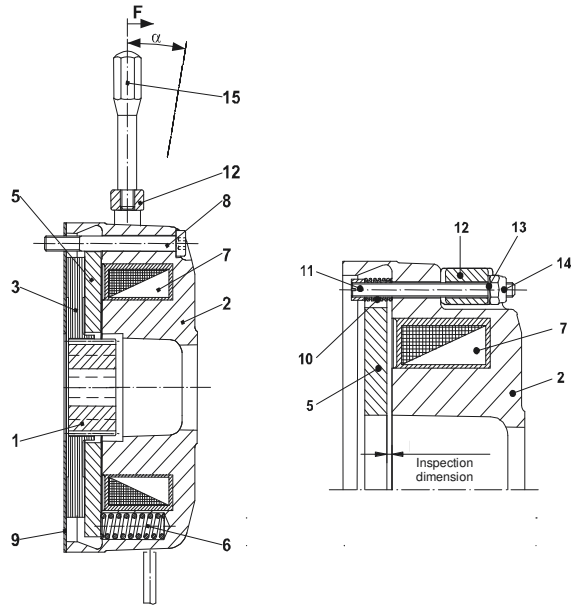
1) Alternate-Special order only. Standard brake is by Mayr – see page 7.

2) 90 and 100 frame motors with spline style hub.

3) 112 frame motor with hex style hub

MAINTENANCE – MAYR BRAKES (10 - 20Nm)

1. Gear hub
2. Coil carrier complete with coil (7)
3. Rotor
5. Armature disc
6. Helical spring (torque)
7. Coil
8. Fixing screw
9. Friction disc
10. Helical spring (hand release)
11. Threaded bolt
12. Lever
13. Washer
14. Hexagon nut
15. Hand release bar
16. Shoulder screw



This style brake needs very little maintenance while it is in operation. The air gap does not need to be adjusted. It is pre-set at the factory and is self adjusting for the life of the brake rotor pad. When the brake is not operation properly, the rotor pad may need to be replaced. The brake coil will have to be removed to check the brake pad thickness.

Size	Rated torque	Power of Brake Coil	Minimum Rotor Thickness (brake pad)
10	7.4 lb-ft / 10 Nm	33 Watts	0.20" / 5.2 mm
20	16 lb-ft / 20 Nm	43 Watts	0.27" / 6.8 mm

BRAKE PAD REPLACEMENT

LIST OF TOOLS

Following are a list of tools to remove the brake:

- Screw drivers – Philips & Flat (to remove the fan cover)
- External snap ring pliers (to remove fan retaining snap ring)
- Large screw drive or a small pry bar (to pop off the fan)
- Metric sockets & T-handles and open-end wrenches



IMPORTANT

Ensure that the reducer load is supported. Removal of the brake will let the load free fall, which may cause injury. Disconnect the power from the motor.

PROCEDURE

- Remove the 4 bolts to remove the fan cover.
- If the brake has a hand release, it can be removed by unscrewing it.
- Remove the fan cover and note the position of the hand release slot if applicable.
- Remove the snap ring holding the cooling fan in place.
- Carefully remove the fan, key and second snap ring.
- Remove the 3 socket head cap screws holding the brake coil to the motor endbell.
- Remove the brake coil, noting the hand release and power cable locations.
- The brake pad will now slide off the hub holding it on the shaft.
- Clean the brake coil, replace the pad, and reassemble.

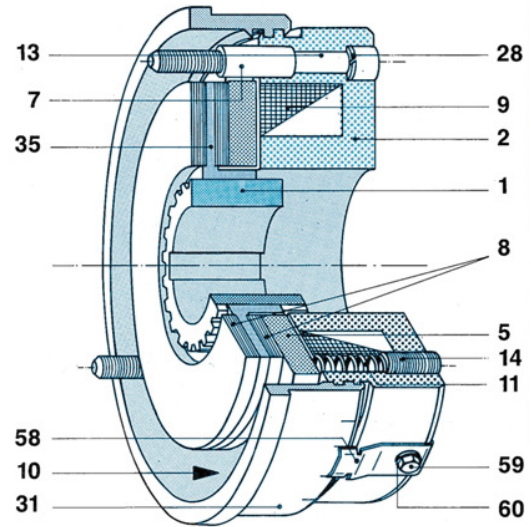
NOTE: The air gap is self adjusting and can not be measured with the brake assembled. To check the proper operation, apply pressure to the hand release lever and turn the motor by hand to check for free rotation.

MAYR BRAKE REPLACEMENT PARTS								
BRAKE SIZE	Complete Brake Part Number (Includes Brake Disc)					BRAKE DISC (PAD) [ITEM 3]	HANDLE [ITEM 15]	STAINLESS DISC [ITEM 9]
	24VDC	105VDC	180VDC	205VDC	250VDC			
10NM	N/A	N/A	N/A	19021934	N/A	19120084	19150074	N/A
20NM	19030224	19030924	19031904	19031924 ¹⁾	19032524	19120164	19150164	19130164

1) Standard NORD brake

MAINTENANCE - MAYR BRAKES (400 - 800Nm)

1. Gear hub
2. Coil body complete with coil (9) and guide bushes (7)
5. Armature disc
7. Guide bush
8. Friction lining
9. Coil
10. Anchor Plate
11. Helical spring
13. Fixing screw
14. Set screw
28. Spring washer
31. Threaded distance ring open
35. Rotor with friction linings (8)
58. Lock washer
59. Locking screw
60. Spring washer



This style brake may need the air gap adjusted or have the pad replaced. Both procedures are listed below.

Brake Size	Rated Torque	Power of Brake Coil	Minimum Rotor Thickness (Brake pad)	Air Gap Setting
400	300 lb-ft / 400 Nm	134 Watts	0.53" / 13.5 mm	0.015" / 0.4 mm
800	600 lb-ft / 800 Nm	196 Watts	0.79" / 20 mm	0.020" / 0.5 mm

LIST OF TOOLS

Following are a list of tools to remove the brake:

- Screw drivers – Philips & Flat (to remove the fan cover)
- External snap ring pliers (to remove fan retaining snap ring)
- Large screw drive or a small pry bar (to pop off the fan)
- Metric sockets & T-handles and open-end wrenches



IMPORTANT

Ensure that the reducer load is supported. Removal of the brake will let the load free fall, which may cause injury. Disconnect the power from the motor.

PROCEDURE FOR CHECKING AND ADJUSTING THE AIR GAP

- Remove the 4 bolts to remove the fan cover.
- Remove the fan cover.
- Remove a plug from the threaded distance ring (31) and measure the air gap with a feeler gauge. If the distance is larger than 0.012"/0.3mm over the nominal setting listed in the table, the air gap should be adjusted.
- Loosen the fixing screws (13)
- Loosen the locking screw (59) and lock washer (60).
- Turn the threaded distance ring counterclockwise to decrease the air gap. One graduation on the stamped scale corresponds with .004"/0.1mm.
- Tighten the fixing and clamp screws and recheck the air gap.
- If the air gap is within specifications, reassemble the fan cover.

PROCEDURE FOR REPLACING THE BRAKE ROTOR PAD

- Remove fan cover and snap ring.
- Carefully remove the fan, key and second snap ring.
- Remove the 3 socket head cap screws holding the brake coil to the motor endbell.
- Remove the brake coil.
- The brake pad will now slide off the hub holding it on the shaft.
- Clean the brake coil, replace the pad, and reassemble.

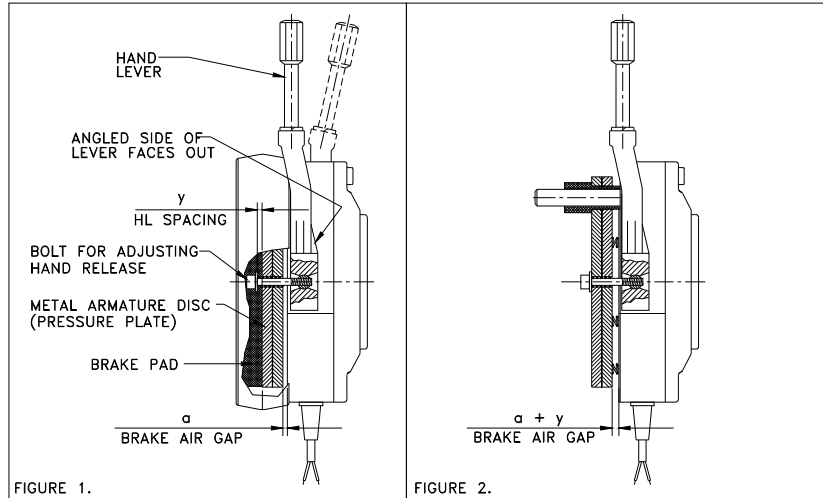
NOTE: Check the air gap per the above procedure.

MAYR BRAKE REPLACEMENT PARTS		
BRAKE SIZE	BRAKE DISC (PAD)	HANDLE
400NM	19124004	19154002
800NM	Call Factory	Call Factory

HAND RELEASE BRAKE AIR GAP SETTING

When a complete brake motor is supplied by NORD, the brake air gap and hand release lever spacing are already set from the factory. Only the brake air gap will need to be adjusted for maintenance (Precima Brakes). Refer to the brake air gap setting on page 4. Thread adhesive is applied to the hand release adjusting bolt so it will not lose the setting. The spacing for the hand release can be checked only with the brake assembled onto the brake B-endbell. If the spacing needs to be adjusted, remove the brake from the motor B-endbell and the adjusting bolt will be accessible. Refer to Figure 1. ***20Nm Mayr brake air gaps do not need adjustment.**

If the brake is sent by itself from the factory, the brake air gap and hand release lever spacing must be set. If the air gap is set less than recommended, the brake will lose holding force prematurely. If very little air gap is set, the brake will not engage. Setting the brake air gap must be done with the brake removed from the motor. The "new" brake air gap value will be the sum of the brake air gap value and the hand release spacing value. After the gap has been set, assemble the brake onto the motor and measure both the brake air gap and hand release spacing with a feeler gauge. Refer to Figure 2.

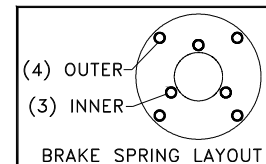


BRAKE SIZE									
	5	10	20*	40	60	100	150	250	400
y	0.040" 1 mm	0.040" 1 mm	0.040" 1 mm	0.040" 1 mm	0.040" 1 mm	0.047" 1.2 mm	0.047" 1.2 mm	0.059" 1.5 mm	0.059" 1.5 mm

* Mayr Brake Hand Release: Tighten hand lever bolts snug and then back off by 2 turns.

ADJUSTING BRAKE TORQUE

The table below shows the rated torque of brakes as springs are removed (7, 5 or 3 springs). The springs are placed in such a way where there are three centers and four outer springs. The four outer springs are the ones that are removed for decreasing the torque. When decreasing the torque, remove springs opposite of each other to prevent uneven brake wear.



TORQUE ADJUSTMENT SPECIFICATIONS

Brake Size	Rated Torque			Ring Nut Torque Adjustment	
	(full torque) lb-ft [Nm]	lb-ft [Nm]	lb-ft [Nm]	Torque Reduction Per Click Lb-ft [Nm]	Minimum Brake Torque Available lb-ft [Nm]
	7-springs	5-springs	3-springs		
5	3.7 [5]	2.6 [3.5]	1.5 [2.0]	0.15 [0.2]	0.9 [1.2]
10	7.4 [10]	5.18 [7.0]	3 [4.0]	0.15 [0.2]	1.8 [2.4]
20 ¹⁾	15 [20]	N/A	N/A	0.81 [1.1]	7.5 [10.0]
20 ²⁾	15 [20]	10.3 [14]	6 [8]	0.22 [0.3]	3.6 [4.8]
40	30 [40]	20.72 [28]	12.58 [17]	0.74 [1.0]	8.5 [11.4]
60	44 [60]	32 [43]	19 [25]	Does not include a ring nut	
100	74 [100]	52 [70]	31 [41]	Does not include a ring nut	
150	111 [150]	79 [106]	48 [65]	Does not include a ring nut	
	8-springs	6-springs	4-springs		
250	184 [250]	138 [186]	92 [124]	Does not include a ring nut	
400	295 [400]	221 [298]	148 [200]	Does not include a ring nut	
800	600 [800]	442 [596]	296 [400]	Does not include a ring nut	

1) Standard Stock MAYR Brake 2) Special Order PRECIMA Brake



MOTORS

Standard efficiency, 1.15 Service factor
 Inverter duty, TEFC
 Synchronous speed 1800rpm @ 60Hz, 4-pole
 Voltages: 230/460 & 332/575 – 60Hz, Three-phase
 Continuous Duty, 40°C Ambient, up to 3300ft Elevation
 Class B temperature rise, Class F insulation



Frame Size	HP	kW	n _n Full Load rpm	Full-load current I _n			I _a /I _n %	Code Letter	T _n lb-in	T _a /T _n	T _k /T _n	pf	Eff. %	J _m Inertia lb-ft ²
				230V A	460V A	575V A								
63S/4	0.16	0.12	1700	0.88	0.44	0.35	300	H	5.93	2.7	3.5	0.66	52	0.00499
63L/4	0.25	0.18	1680	1.12	0.56	0.45	300	G	9.38	2.3	2.5	0.72	57	0.00665
71S/4	0.33	0.25	1710	1.56	0.78	0.62	340	H	12.3	2.3	3.0	0.64	63	0.0133
71L/4	0.50	0.37	1720	1.90	0.95	0.76	400	G	18.3	2.2	2.7	0.69	71	0.0173
80S/4	0.75	0.55	1710	2.70	1.35	1.08	400	H	27.6	2.0	2.3	0.71	72	0.0304
80L/4 **	1.0	0.75	1650	3.65	1.83	-	280	D	38.2	2.1	2.2	0.64	70	0.0623
90S/4 **	1.5	1.1	1660	4.83	2.42	-	320	D	57.0	2.6	2.5	0.68	73	0.0887
90L/4 **	2.0	1.5	1660	6.33	3.17	-	340	D	75.9	2.5	2.4	0.70	74	0.1182
100L/4 **	3.0	2.2	1700	9.04	4.52	-	350	D	111	2.2	2.5	0.70	75	0.1699
100L/40 **	5.0	3.7	1725	15.2	7.62	-	510	G	183	2.7	3.1	0.75	81	0.2831
132S/4 **	7.5	5.5	1730	19.8	9.91	-	380	C	273	2.2	2.6	0.71	85	0.8796
132M/4 **	10	7.5	1730	25.7	12.9	-	440	E	364	2.7	3.0	0.73	87	1.197
160M/4 *	15	11	1760	36.8	18.4	-	820	K	537	2.8	3.3	0.85	89	1.187
160L/4 *	20	15	1760	49	24.5	-	800	J	716	2.8	3.3	0.86	89	1.661
180M/4 *	25	18.5	1750	60	30.0	-	740	H	900	2.6	3.0	0.87	89	3.085
180L/4 *	30	22	1755	71	35.5	-	800	J	1080	2.9	3.3	0.87	90	3.560
200L/4 *	40	30	1755	91	45	-	580	F	1440	2.6	2.6	0.89	92	10.68
225S/4 *	50	37	1755	124	62	-	670	H	1800	2.2	2.2	0.83	91	13.29
225M/4 *	60	45	1760	143	71	-	700	H	2150	2.8	2.8	0.86	91	16.85
250M/4 *	75	55	1760	170	85	-	700	H	2690	2.6	2.6	0.89	90	19.93
280S/4 *	100	75	1770	223	111	-	670	G	3560	2.6	2.6	0.87	91	37.02
280M/4 *	125	90	1775	290	145	-	650	G	4440	2.6	2.6	0.86	91	42.71
315S/4 *	150	110	1775	345	173	-	750	H	5330	3.1	3.1	0.87	90	80.68
315M/40 *	200	150	1775	445	223	-	750	H	7100	3.2	3.2	0.86	93	125.8

* - Underwriter Laboratories Recognition - pending

** - Carries the CE mark

Abbreviations

- n_n - Full-load speed
- I_n - Full-load current
- I_a/I_n - Locked-rotor current ratio (percentage)
- T_n - Full-load torque
- T_a/T_n - Locked-rotor torque ratio
- T_k/T_n - Break-down torque ratio
- pf - Power factor
- Eff. - Nominal efficiency
- J_m - Motor inertia

CONNECTION DIAGRAMS

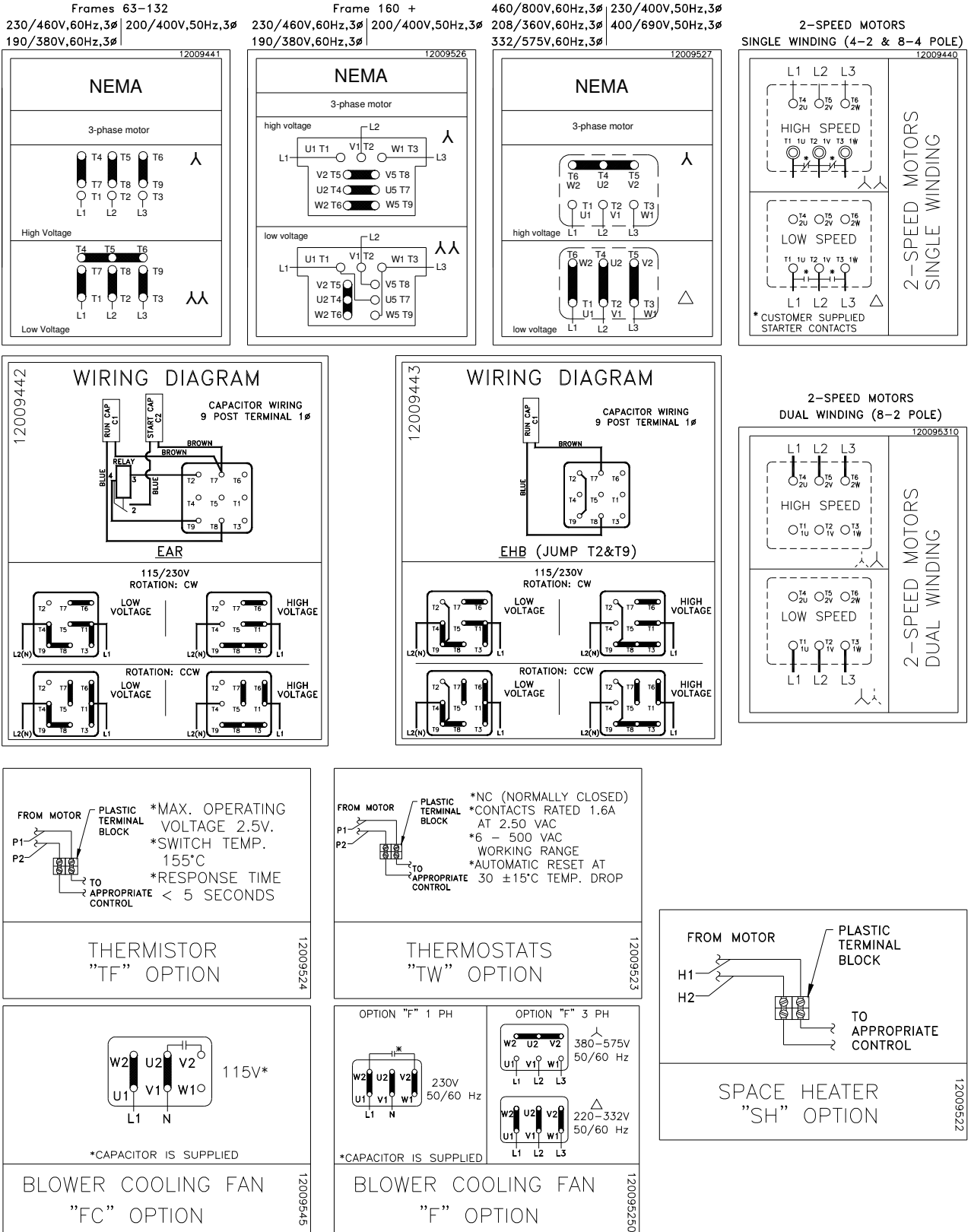


Figure 2. Motor Connection and Wiring Diagrams