

***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](http://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.***

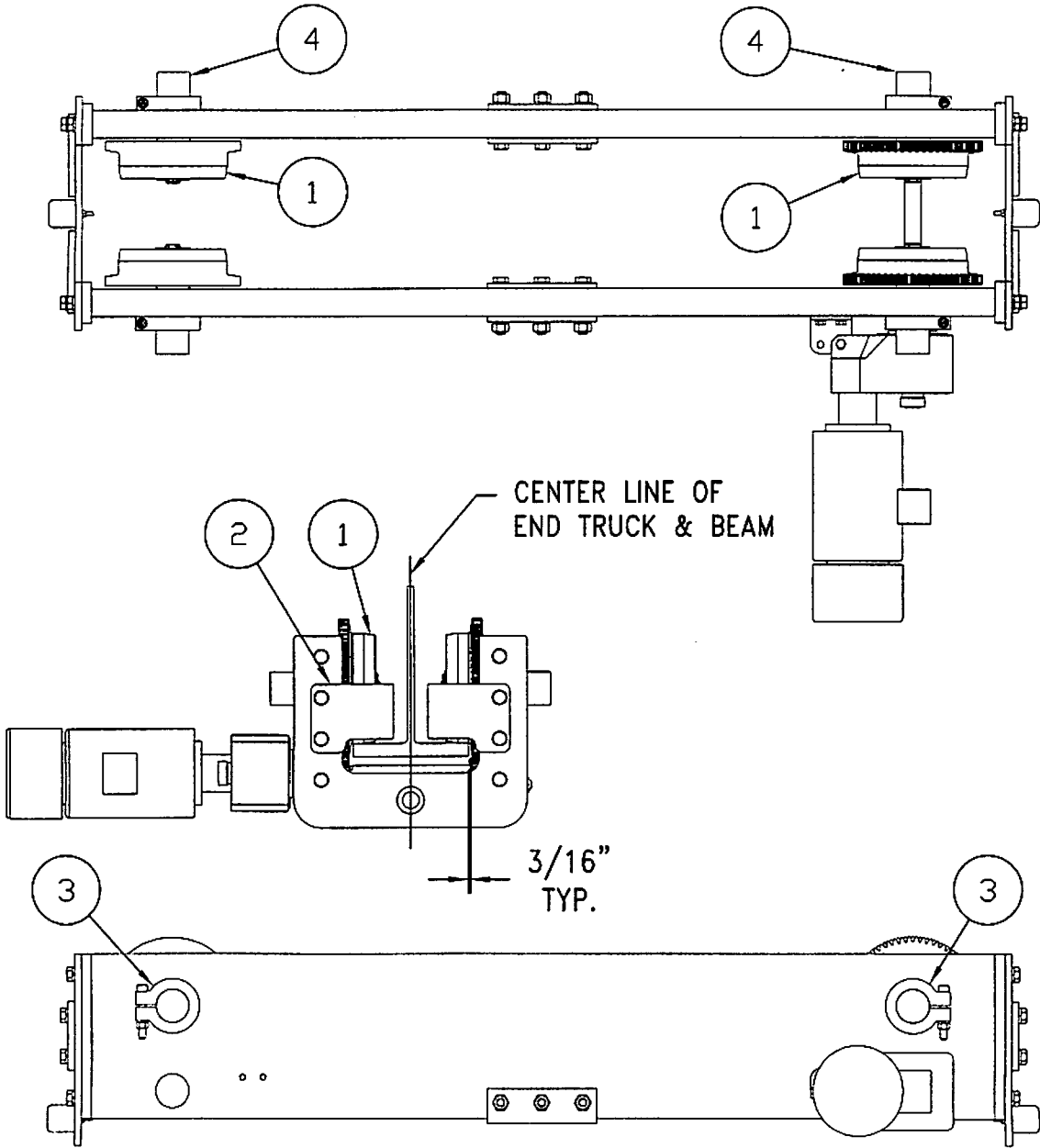
- 4) Remove the safety drop bar in front of the wheel assembly to be removed.
- 5) Using a suitable jack, jack up the end of the endtruck to take any dead weight from the wheel. The wheel should spin freely on the axle.
- 6) Remove the bolts holding the axle keeper plate to the frame. With the keeper 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.**

# ADVANTAGE

## 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:

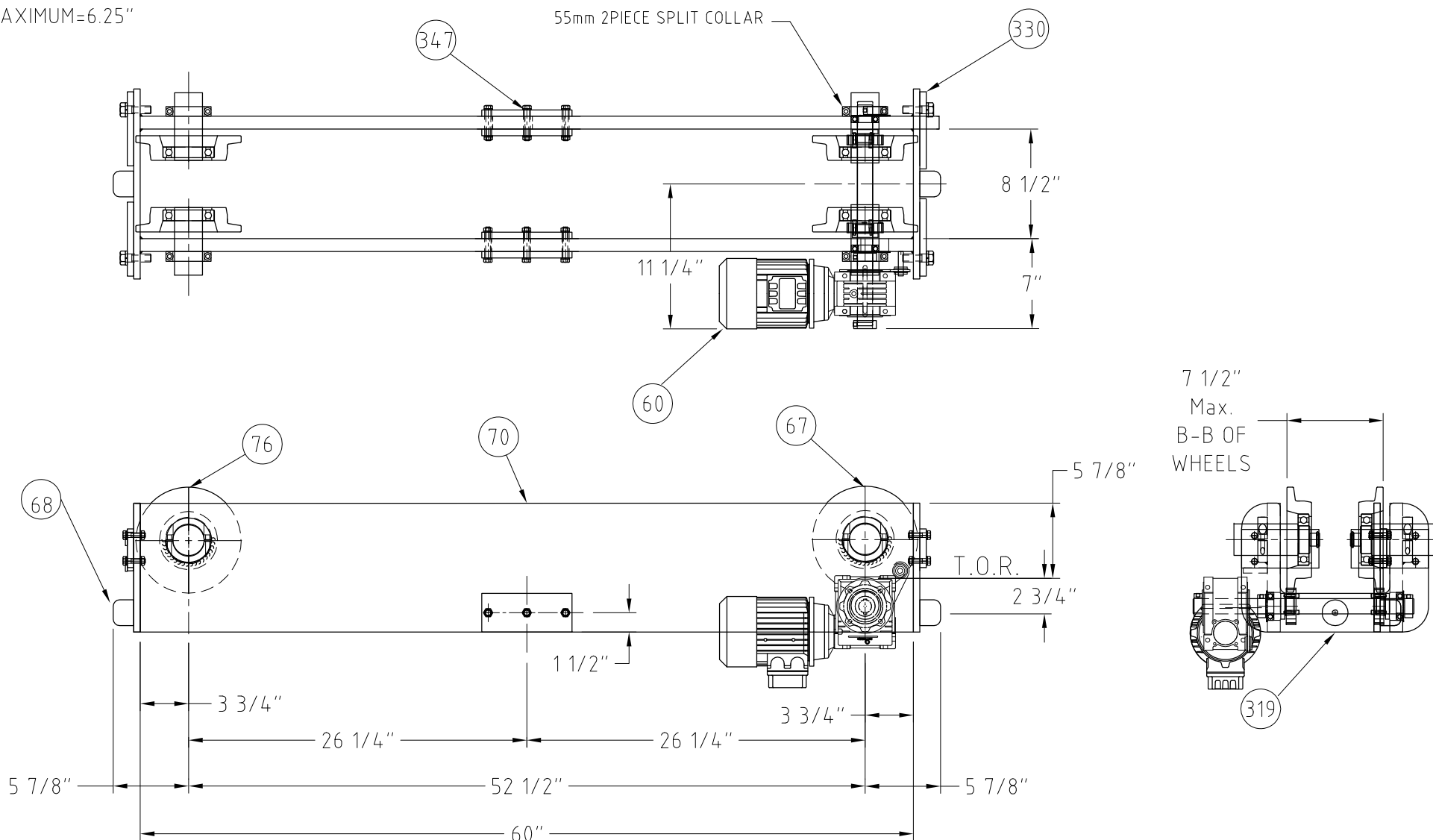
### WARNING!

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

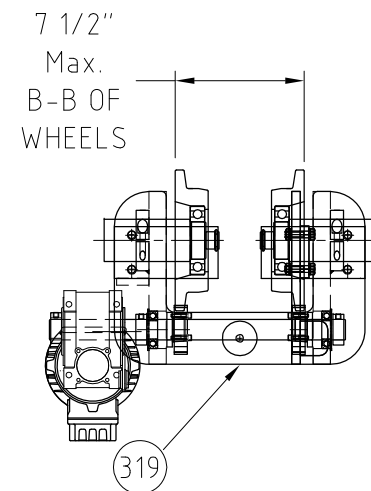
1. Clean the inner race of the bearings and apply a thin film of oil. With the truck frame still jacked up, put the wheel and bearing assembly back into the end of the truck frame and align with the axle hole.
2. Clean the truck frame axle and axle hole. Apply a thin film of oil or grease to the axle 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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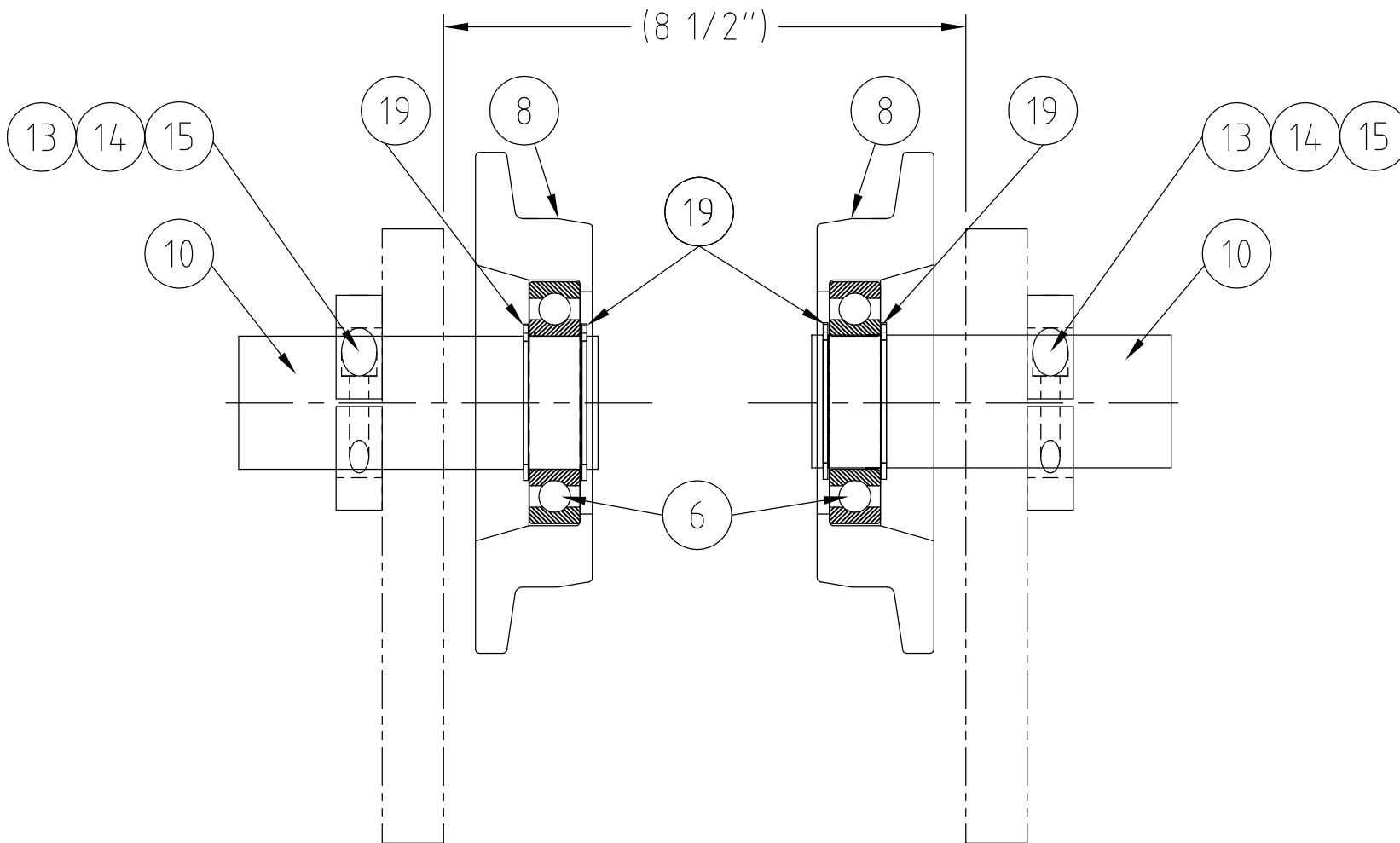
CUSTOMER: \_\_\_\_\_ PO NUMBER: \_\_\_\_\_

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

APPROVED \_\_\_\_\_  
 NOT APPROVED \_\_\_\_\_  
 APPROVED AS NOTED \_\_\_\_\_  
 BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_

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

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



| 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<br>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<br>Rockwell ±4<br>Brinell ±15 |              |

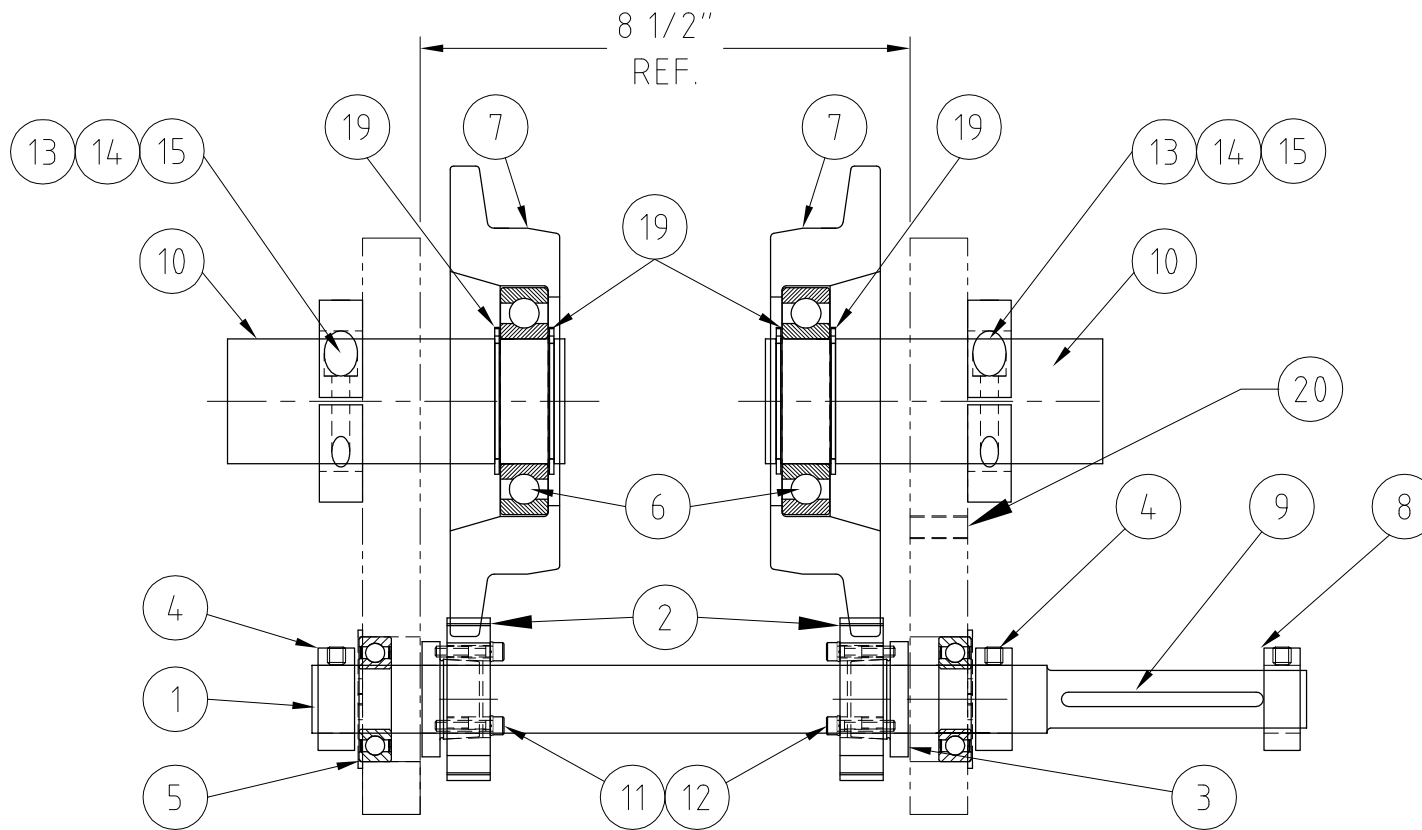
| REV. | DATE     | DESCRIPTION          |
|------|----------|----------------------|
| 1    | 05/03/07 | SEE DCN 05.03.2007.2 |

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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          |
|------|----------|----------------------|
| 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: |
| DRAWING TITLE: | 6" DIA. -DRIVE, AV,U.H.           |             |      | SCALE:  | NTS      | 67   |       |
|                | DRIVE WHEEL ASSY, 1"X10" FLAT BAR |             |      | FILE:   |          |      |       |
|                | PART NO. 100002-0670              |             |      | JOB NO. |          |      |       |

# 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.

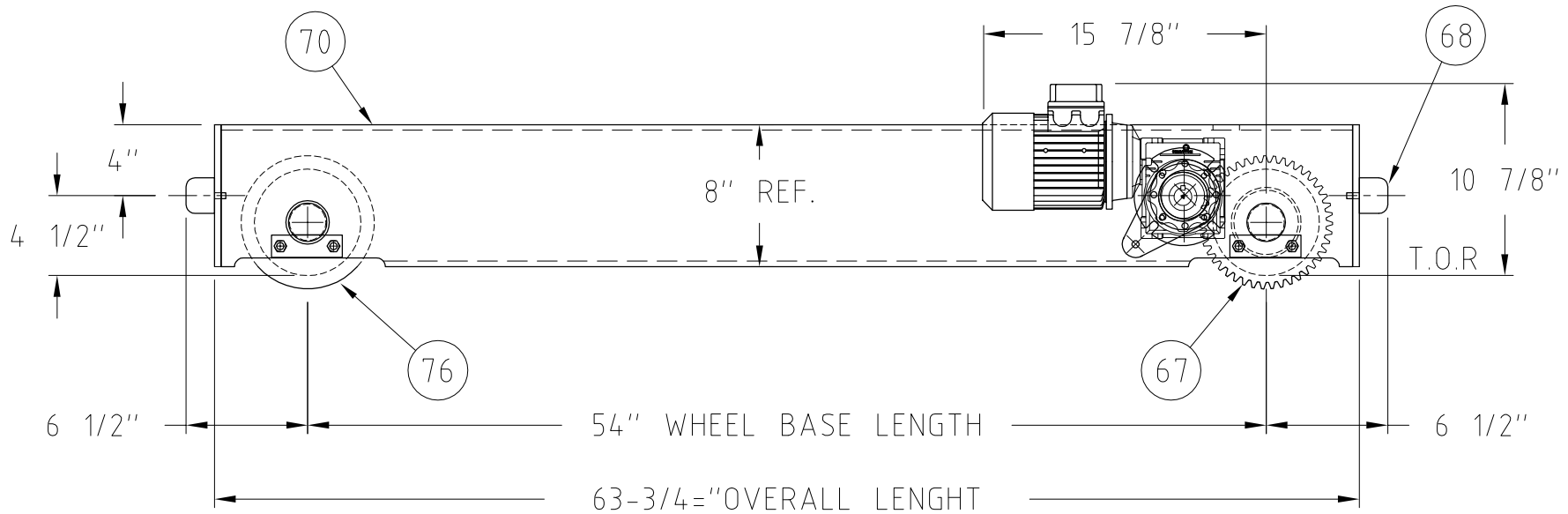
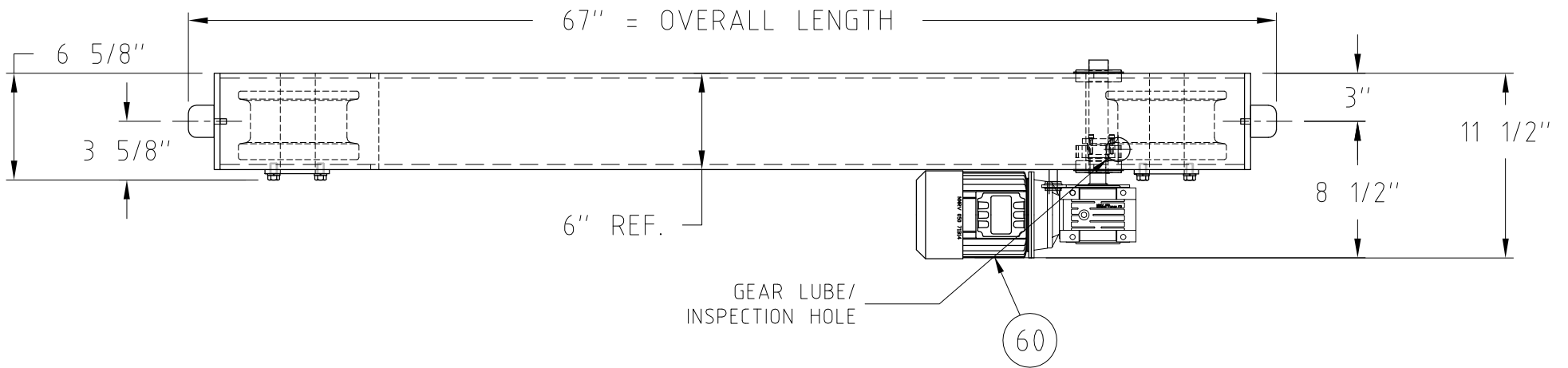
# TOP RUNNING FIXED AXLE ENDTRUCKS WHEEL INSTALLATION


## 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

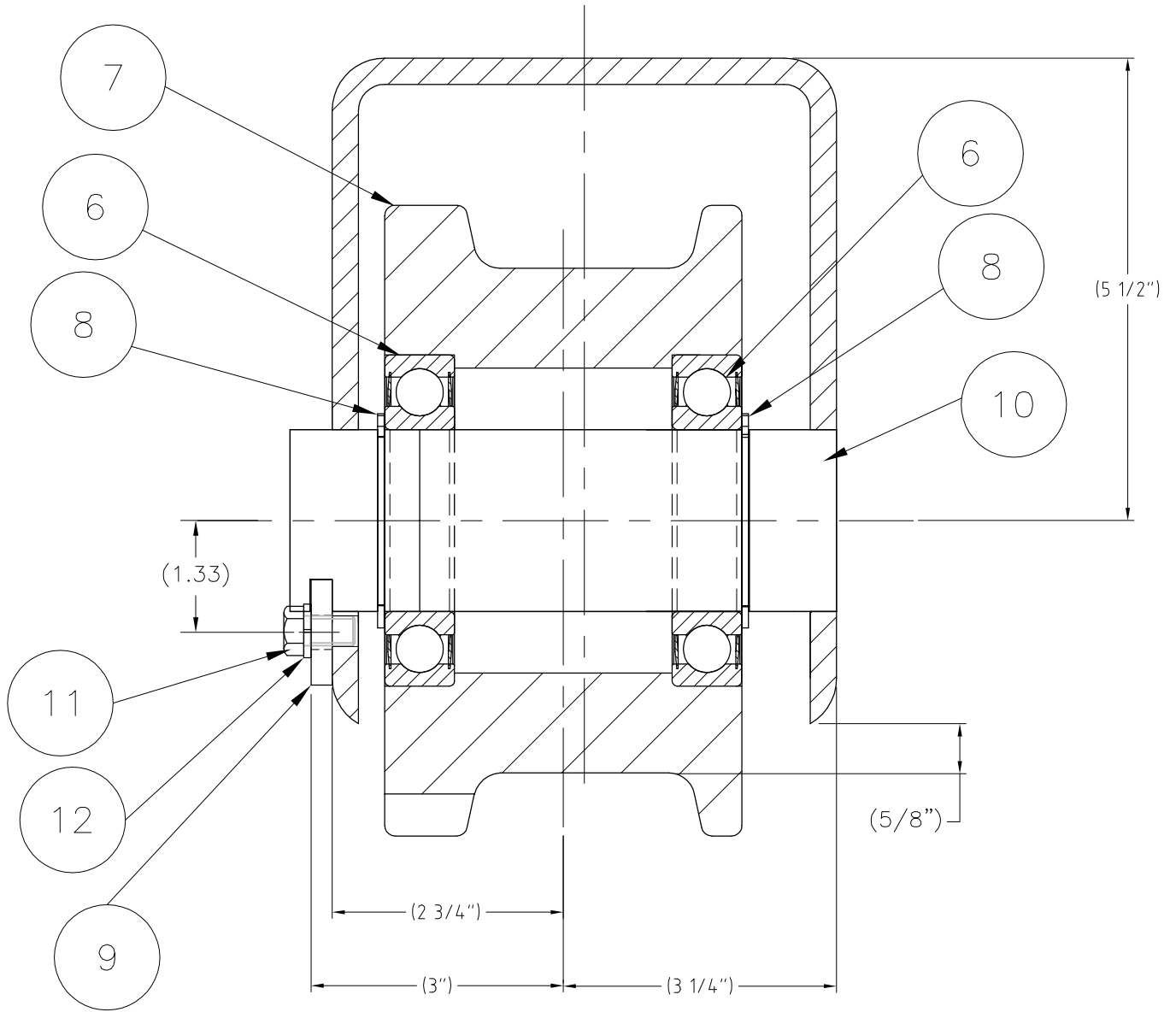



| REV.   | DATE | DESCRIPTION | CUSTOMER:     | PO NUMBER:  | <input type="checkbox"/> QTY. ( ) ENDTRUCK(S).<br><input type="checkbox"/> QTY. ( ) PAIR(S): ASSEMBLE ONE ENDTRUCK AS SHOWN & ONE OPPOSITE HAND PER PAIR. |         |          | APPROVED _____          |
|--|------|-------------|---------------|-------------|---|---------|----------|-------------------------|
| <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.<br>FORT WORTH, TX 76135<br>PHONE 817.237.7700<br>FAX 817.237.2777<br>ACEWORLDCOMPANIES.COM |      |             | DRAWN BY: GHR | CHECKED BY: | APR:  |         |          | APPROVED AS NOTED _____ |
| DRAWING TITLE<br>ADVANTAGE TR , 100 FPM, 2 @ .5 HP<br>6" DIA. WHL., FIXED AXLE, 54" W.B.   |      |             |               |             | SCALE: NTS  |         |          | BY: _____               |
|  |      |             |               |             | FILE: 200222-0000   |         |          | DATE: _____             |
|  |      |             |               |             | PART NO. 200222-0000  | JOB NO. |          |                         |

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<br>Rockwell ±4<br>Brinell ±15 |
| HOLES FRACTIONAL ± 1/32"  |  |

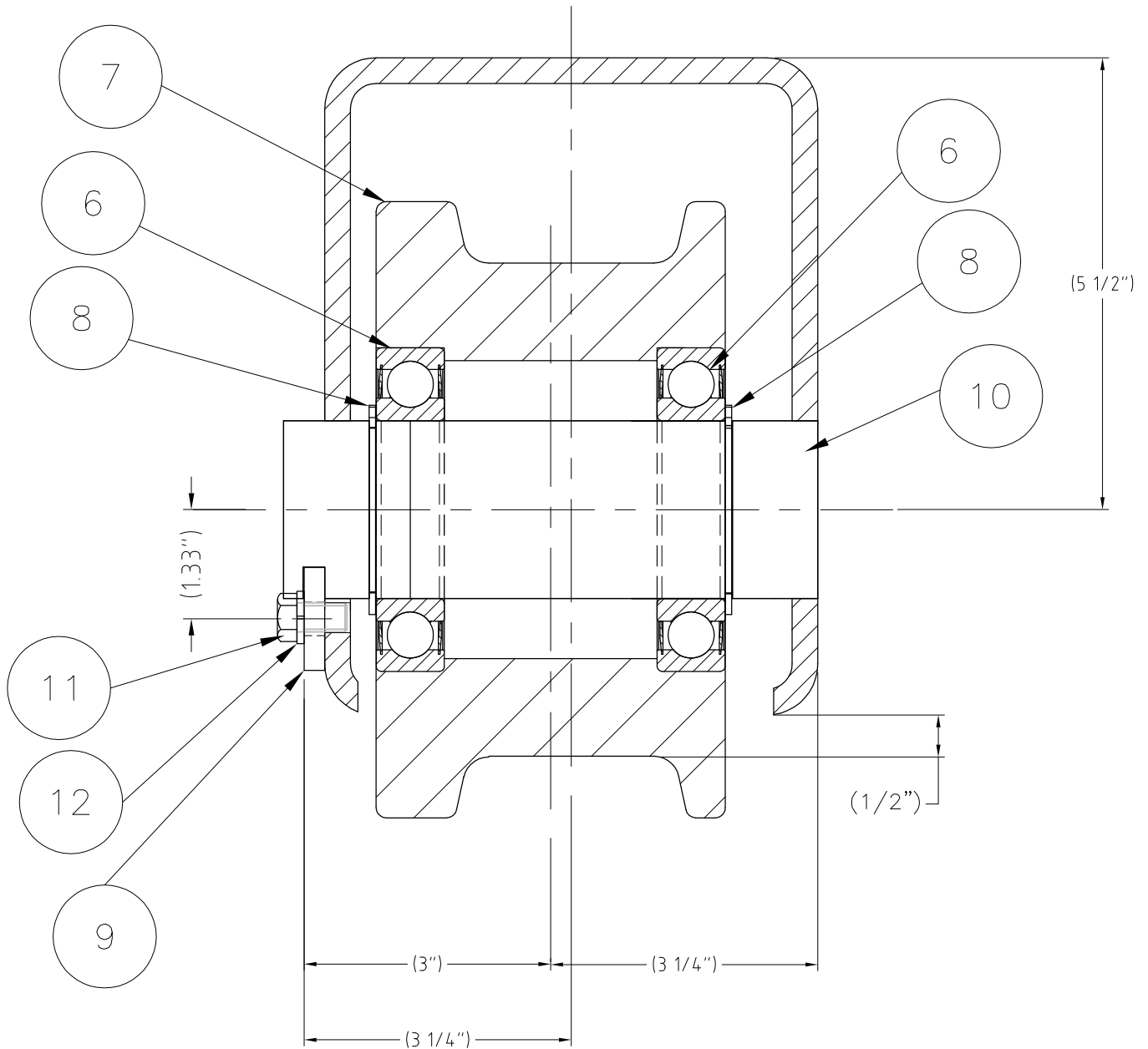
FGE10.01 Rev. 1 1/14/99



| 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   |                |                    |            |         |
| REV.  | DATE | DESCRIPTION                                | ITEM                           | QTY.        | DESCRIPTION    | WEIGHT             | P/N:       | LENGTH  |
| <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>                           |      |  |                                |             |                |                    |            |         |
|  <p>10200 JACKSBORO HWY.<br/>FORT WORTH, TX 76135<br/>PHONE 817.237.7700<br/>FAX 817.237.2777<br/>ACEWORLDCOMPANIES.COM</p> |      |  | DRAWN BY: GHR CHECKED BY: APR: |             | DATE: 03/15/08 |                    | QTY: ITEM: |         |
| DRAWING TITLE<br>6"DIA. x 4 1/4" - FIXED AXLE DRIVE<br>WHEEL ASSY (325 BHN) - 8x6 TUBE  |      |  |                                |             |                | SCALE: NTS         |            | 67      |
| PART NO. 100000-0670  |      |  |                                |             |                | MACOLA 100000-0670 |            | JOB NO. |

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<br>Rockwell ±4<br>Brinell ±15 |              |
| FGE10.01 Rev. 1 1/14/99                      |              |



|    |   |  |  |             |        |
|----|---|--|--|-------------|--------|
| 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. |      |             |

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



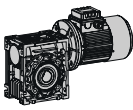
10200 JACKSBORO HWY.  
FORT WORTH, TX 76135  
PHONE 817.237.7700  
FAX 817.237.2777  
ACEWORLDCOMPANIES.COM



**MAINTENANCE AND OPERATING  
INSTRUCTIONS FOR WORM GEAR  
REDUCERS AND GEARMOTORS  
SERIES:**

**NMRV - MCV - NRV  
NMRV+NMRV  
PC+NMRV**





## Warehouse storage

When moving the unit, care should be taken to protect external parts from breakage or damage due to accidental knocks or falls.

If the unit is to be stored in a hostile atmosphere or for a long period of time (2/4 months), it is important to apply protective and waterproofing products to avoid deterioration of shafts and rubber parts.

Before starting up the unit, carry out the following checks:

Check the data shown on the name plate of the reduction unit and/or the electric motor;

Check for any leaks of lubricant

If possible, remove any traces of dirt from the shaft and from the areas around the oil seal.

If the oil seal is not immersed in the lubricant inside the assembly during particularly long storage periods (4/6 months) it is recommended that it should be replaced as the rubber might stick to the shaft or even have lost the elasticity it needs to work.

## Installation

**Example of a pulley mounted correctly on the slow shaft of a reduction unit**

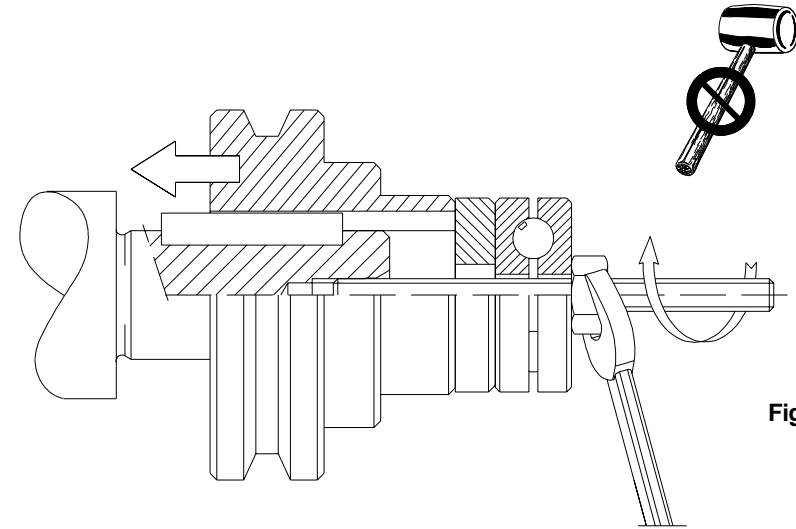


Fig. 1

## Installation

Particular care must be taken when installing drives, as this is often the source of damage and down time. Careful choice of the type of drive and mounting position can often avoid the need for protection of sensitive areas, particularly underneath the unit from oil leaks, however limited they may be.

- The machine must be firmly fastened in place in order to prevent any vibrations.
- Whenever possible, protect the reduction unit from direct sunlight and bad weather, especially when it is mounted on its vertical axis.
- Make sure the air intake on the fan side is unobstructed in order to ensure that the motor is correctly cooled.
- In the case of temperatures of  $< -5\text{ }^{\circ}\text{C}$  or  $> +40\text{ }^{\circ}\text{C}$ , contact Technical Assistance.
- If the motor is to be started very often under load, the use of a heat probe inserted into the motor is recommended.
- The various machine members (pulleys, gear wheels, couplings, etc.) must be mounted on the shafts using special threaded holes or other systems that ensure correct operation without risk of causing damage to the bearings or the external parts of the assemblies (fig.1).
- Lubricate the surfaces that come into contact in order to prevent oxidation or seizure.

**Correct and incorrect examples of pulleys mounted on the main shaft of a reduction unit.**

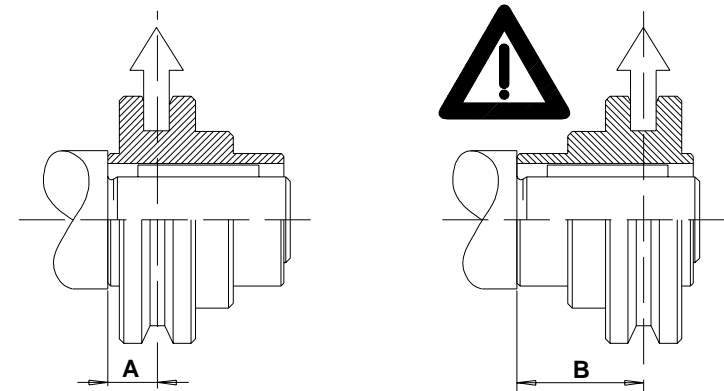
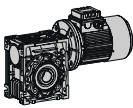


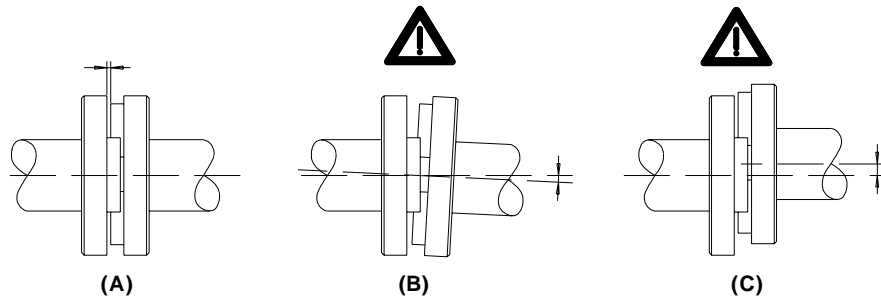
Fig. 2



## Installation

### Correct and incorrect examples of coupling connections

Fig. 3



The pulley must be mounted on the main shaft as close as possible to the shoulder so that it does not cause excessive radial load on the bearings (fig. 2). Great care must be taken when connecting the couplings to ensure that they are well aligned, so as not to cause excessive radial load on the bearings (fig.3). When it is applied, paint must never be used on rubber parts: oil seal, etc. It must never be applied to any breather holes in plugs if they are mounted on the unit. In the case of assemblies with oil plugs, remove the closed cap used for transport and fit it with the breather plug that is supplied with the reduction unit. When the assembly is supplied without a motor, the following precautions must be followed in order to ensure that connections are properly made

#### Mounting the motor on the pam B5/B14 flange

Check that the tolerance of the motor shaft and the motor flange comply with at least one 'normal' class of quality. Carefully clean off any trace of dirt or paint from the shaft, the centering diameter and the face of the flange. Carry out mounting operations making sure not to use force. If this is not possible, check the tolerance of the motor key and ensure that it is correctly fitted. Apply assembly grease to the shaft in order to prevent oxidation or seizure caused by contact.

Good quality motors should be used in order to ensure that the unit works correctly, without vibrations or noise.

Before mounting the unit on the machine, check that the principal shaft of the reduction unit rotates in the right direction.

*Use the oil window, if present, to check that the lubricant reaches the correct level required for the mounting position used.*

## Starting up

The unit should be started up gradually: do not immediately apply the maximum load the machine is able to take ; look for and correct any malfunction that may be caused by incorrect mounting.

Running-in is not essential for the reduction unit to run properly since modern construction techniques for the gears and castings, the extreme cleanliness of the internal parts, and the excellent qualities of the lubricants used, ensure that the internal parts receive a high degree of protection even during the first moments.

## Servicing

The high degree of finish of the internal parts ensures that the unit will work correctly with only a minimum amount of servicing

Generally speaking, the following rules should be followed: periodically check that the exterior of the assembly is clean, especially in the cooling areas; periodically check to see if there are any leaks, especially in the areas around the oil seals.

Assemblies that are lubricated for life and thus do not have any oil plugs do not require any special maintenance except as stated above.

For other assemblies, low maintenance is required with an oil change at 8/10,000 hours of use. The change of oil naturally depends on the type of environment and use to which the unit is put.

Apart from the normal maintenance rules given above, make sure the breather hole in the plug is clean and, using the oil window, periodically check that there is sufficient lubricant.

Should it be necessary to top up with lubricant, use the same type that is already in the reducer or one that is compatible with it.

In case of doubtful incompatibility between lubricants, we recommend you empty out the oil from the gearbox completely and, before refilling with new oil, wash out the unit to remove any residue.

When changing the oil, follow the previous instructions.

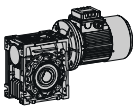
## Troubleshooting

If any problems should arise when starting the unit or during its first few hours of operation, contact the after sales service unit of Motovario.

The table shows a series of problems with a description of possible remedies.

It should be kept in mind however that the information given is for reference only, as all the drives manufactured by Motovario are thoroughly tested and checked before they leave the factory.

Please note that tampering with the assembly without prior authorization from Motovario immediately invalidates the warranty and often makes it impossible to ascertain the causes of a defect or malfunction.

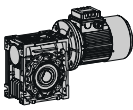


### Troubleshooting

| PROBLEMS  | CAUSES  | ACTION (1)  | ACTION (2)  |
|---|---|---|---|
| <i>The motor does not start.</i>  | Problems with power supply. Defective motor. Wrong size of motor.   | Check power supply.   | Replace electric motor.   |
| <i>Current absorbed by the motor is greater than shown on the data plate.</i> | Wrong size of motor.  | Check the application.  | Replace the electric motor and, if necessary, the reduction unit.           |
| <i>Temperature of the motor housing is very high.</i>                         | Defective motor. Wrong size of motor. Incorrect mounting of motor   | Check the application.  | Replace the electric motor and, if necessary, the reduction unit.           |
| <i>Temperature of the reduction unit housing is very high.</i>                | Wrong size of reduction unit. Mounting position does not comply with the order. Incorrect mounting of motor | Check the application.  | Correct the working conditions: mounting position and/or lubricant level.   |
| <i>Incorrect rotation speed of the main reducer unit shaft.</i>               | Incorrect reduction ratio. Incorrect polarity of motor.   | Check reduction ratio. Check polarity of motor.                     | Replace reduction unit and/or electric motor.                               |
| <i>Oil leak from oil seal.</i>  | Defective oil seal. Oil seal damaged during shipment. Defective motor shaft.                                | Replace the oil seal. Repair motor shaft (if possible).             | Replace the part or return the assembly to Motovario.                       |
| <i>Oil leak from joint.</i>   | Flat gasket or O-ring damaged.  | Replace damaged gasket or O-ring.                                   | Return the assembly to Motovario.   |
| <i>The main shaft rotates the wrong way.</i>                                  | Incorrect connection of the electric motor.   | Swap two phases of the motor supply.                                |   |
| <i>Intermittent noise from the gears.</i>                                     | Dents in the gear wheels.   | No practical problem if the noise has no effect on the application. | Return the assembly to Motovario if there is significant noise when loaded. |

### Troubleshooting

| PROBLEMS                                      | CAUSES   | ACTION (1)   | ACTION (2)  |
|---|--|--|---|
| <i>Intermittent noise from the gears.</i>     | Dirt inside the gearbox.   | No practical problem if the noise has no effect on the application.  | Return the assembly to Motovario if there is significant noise when loaded. |
| <i>Noise (whine) from the drive assembly.</i> | Bearings incorrectly adjusted. Gears with mesh errors. Insufficient lubricant. | Check correct quantity of lubricant.   | Return the assembly to Motovario.   |
| <i>Electric motor vibrates.</i>               | Misalignment of the assembly coupling.   | Check geometric tolerance of flange on electric motor. Check tolerance and geometry of key on motor shaft. | Replace electric motor.   |



## Critical applications

The performance given in the catalogue correspond to mounting position B3 or similar, ie. when the first stage is not entirely immersed in oil. For other mounting positions and/or particular input speeds, refer to the tables below that highlight different critical situations for each size of reduction unit.

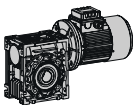
It is also necessary to take due consideration of and carefully assess the following applications by calling our Technical Service.

- As a speed increasing.
- Use in services that could be hazardous for people if the reduction unit fails.
- Applications with especially high inertia.
- Use as a lifting winch.
- Applications with high dynamic strain on the case of the reduction unit.
- In places with T° under -5°C or over 40°C.
- Use in chemically aggressive environments.
- Use in a salty environment.
- Mounting positions not envisaged in the catalogue.
- Use in radioactive environment.
- Use in environments with pressures other than atmospheric pressure
- Avoid applications where even partial immersion of the reduction unit is required.

| NMRV - MCV           | 025 | 030 | 040 | 050 | 063 | 075 | 090 | 105 | 110 | 130 | 150 |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| V5: 1500 < n1 < 3000 | -   | -   | -   | -   | -   | B   | B   | B   | B   | B   | B   |
| n1 > 3000            | B   | B   | B   | B   | B   | A   | A   | A   | A   | A   | A   |
| V6                   | B   | B   | B   | B   | B   | B   | B   | B   | B   | B   | B   |

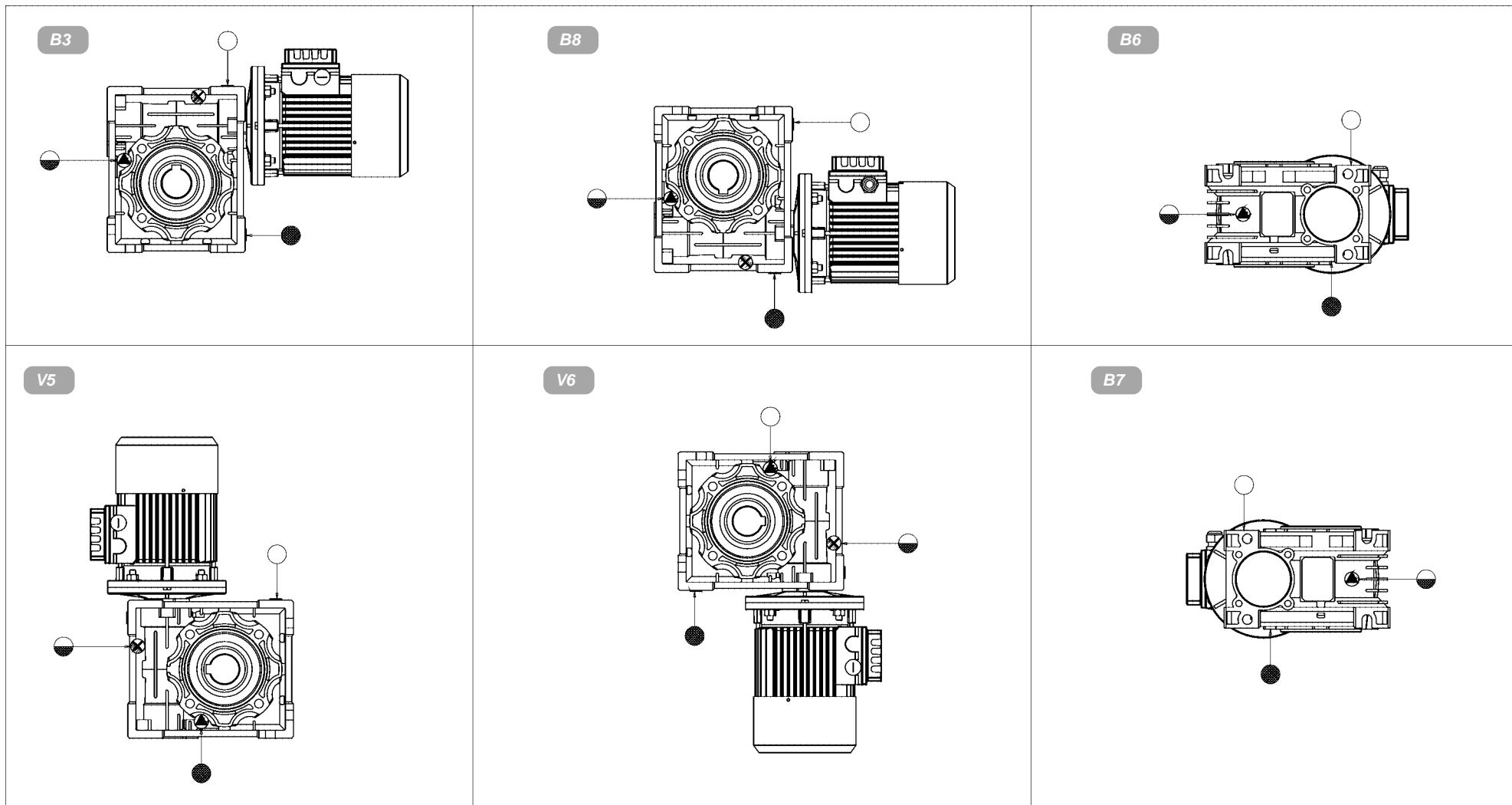
**A** - Application not recommended

**B** - Check the application and/or call our technical service

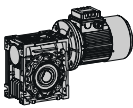


# Mounting position

025 ÷ 150



- Oil fill / breather plug
- ◐ Oil level plug
- Oil drain plug



## Lubrication

|                  | <b>NMRV 025 ÷ 105<br/>PC 063 ÷ 090</b> | <b>NMRV 110 ÷ 150</b> |                      |
|------------------|--|-----------------------|----------------------|
|                  | Synthetic oil                          | Mineral oil           |                      |
| <b>T°C</b>       | <b>(-25) ÷ (+50)</b>                   | <b>(-5) ÷ (+40)</b>   | <b>(-15) ÷ (+25)</b> |
| <b>ISO VG...</b> | <b>ISO VG320</b>                       | <b>ISO VG460</b>      | <b>ISO VG220</b>     |
| <b>AGIP</b>      | TELIUM VSF320                          | BLASIA 460            | BLASIA 220           |
| <b>SHELL</b>     | TIVELA OIL SC320                       | OMALA OIL460          | OMALA OIL220         |
| <b>ESSO</b>      | S220                                   | SPARTAN EP460         | SPARTAN EP220        |
| <b>MOBIL</b>     | GLYGOYLE 30                            | MOBILGEAR 634         | MOBILGEAR 630        |
| <b>CASTROL</b>   | ALPHASYN PG320                         | ALPHA MAX 460         | ALPHA MAX 220        |
| <b>BP</b>        | ENERGOL SG-XP320                       | ENERGOL GR-XP460      | ENERGOL GR-XP220     |

## Lubrication (PC)

- The pre-stage helical modules are supplied complete with life-long lubricant, synthetic oil, AGIP TELIUM VSF, and can therefore be mounted in all of the positions.
- Lubrication is separate from that of the worm reduction unit.
- The synthetic lubricant adopted by Motovario can be used in places with temperatures from -25°C to + 50°C.

| PC                                     | 063  | 071  | 080  | 090  |
|--|------|------|------|------|
| <b>B3 - B8<br/>B6 - B7<br/>V5 - V6</b> | 0,05 | 0,07 | 0,15 | 0,16 |

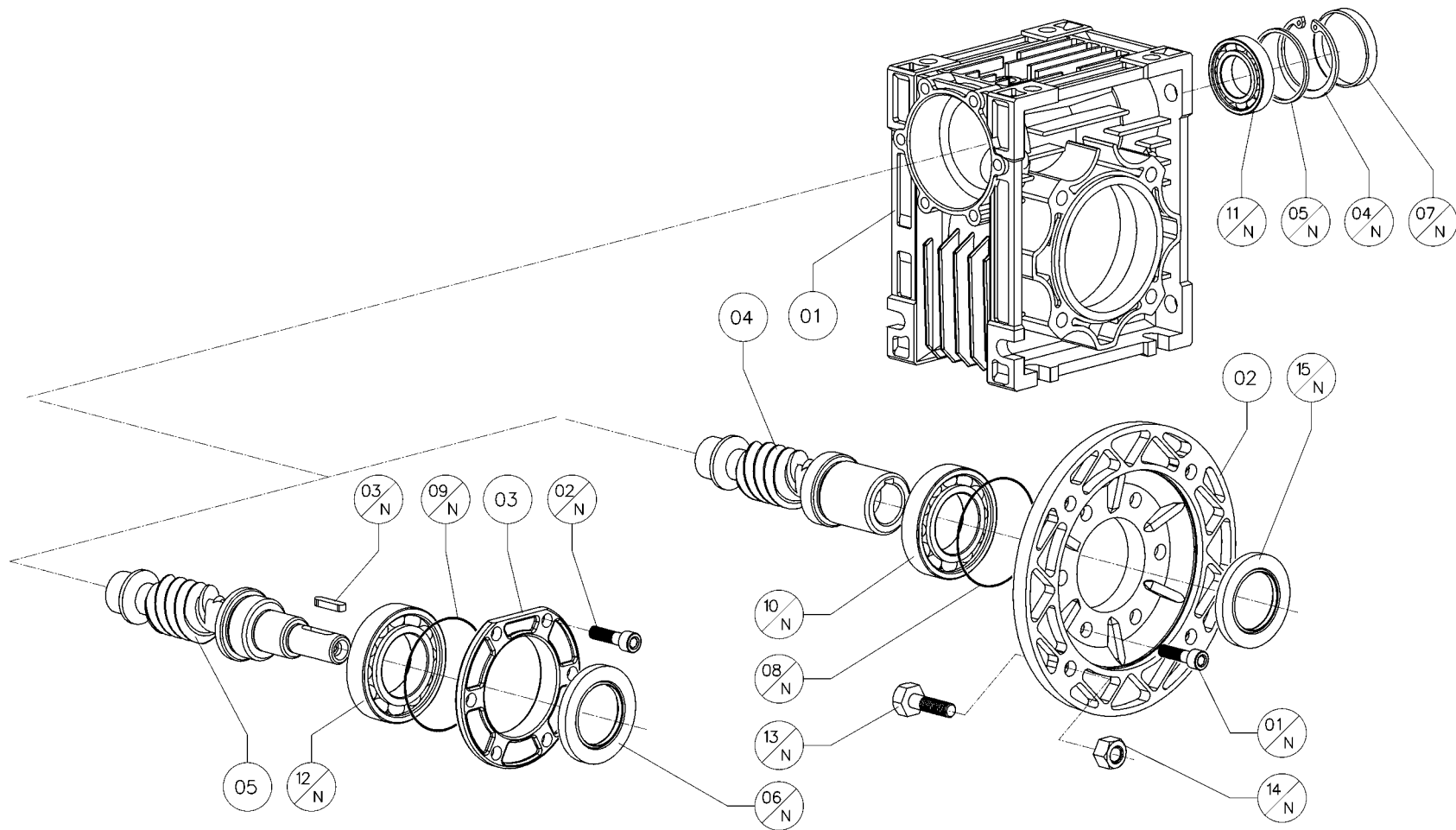
Quantity of oil in litres.

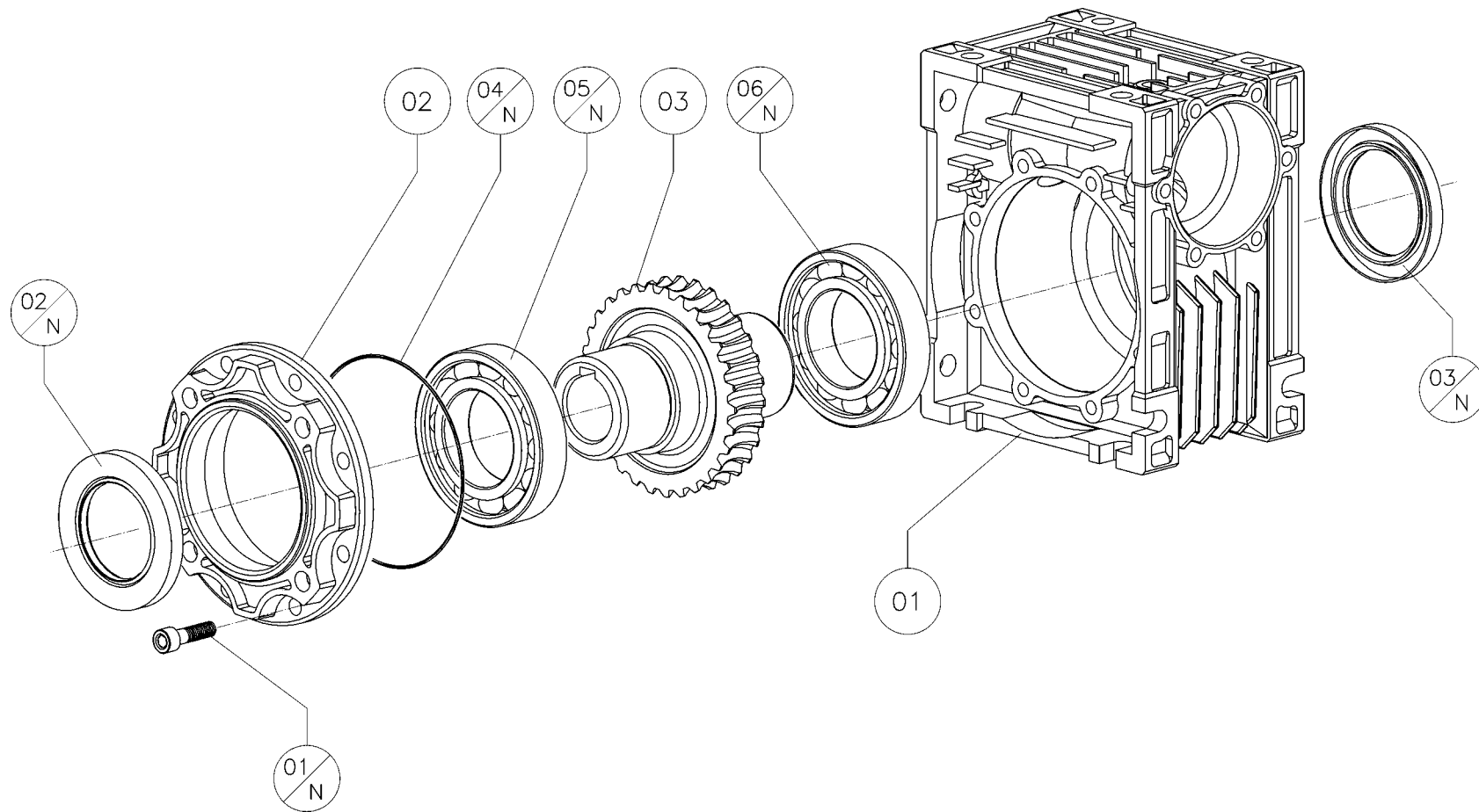
## Lubrication (NMRV - MCV - NRV)

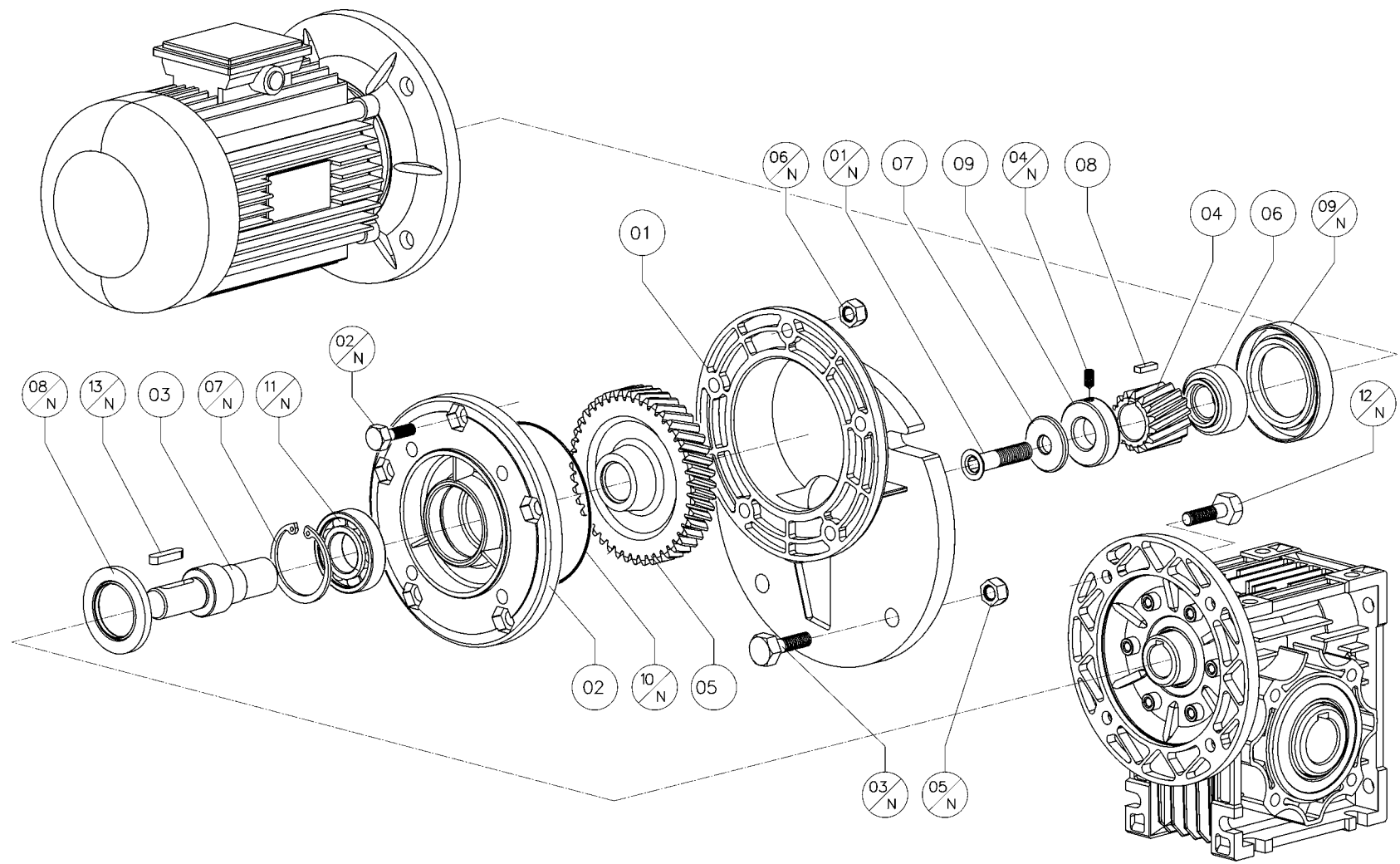
- Size 025 - 030 - 040 - 050 - 063 - 075 - 090 - 105 gear reducers come pre-filled with IP TELIUM VSF, a synthetic gear oil suitable for permanent lubrication. They can be mounted in any position. Only sizes 075 and 090 should not be installed in mounting positions V5 and V6 without prior consultation with our Technical Advise Service to determine optimal lubrication conditions.
- Size 110 and 130 gear reducers come pre-filled with IP MELLANA OIL 220, a mineral based gear oil.
- Always specify mounting position if different from B3 when ordering size 110 and 130 gear reducers.
- Size 110 and 130 gear reducers have oil filler, drain, and level plugs. After installation, replace the closed cap fitted for transport with the breather plug prior to operating the unit.
- The synthetic oil used by MOTOVARIO can operate in all ambient temperatures between - 25°C and +50°C.

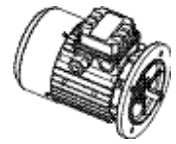
| NMRV         | 025  | 030  | 040  | 050  | 063 | 075  | 090 | 105 | 110 | 130 | 150 |
|--------------|------|------|------|------|-----|------|-----|-----|-----|-----|-----|
| <b>B3</b>    |      |      |      |      |     |      |     |     | 3   | 4,5 | 7   |
| <b>B8</b>    |      |      |      |      |     |      |     |     | 2,2 | 3,3 | 5,1 |
| <b>B6-B7</b> | 0,02 | 0,04 | 0,08 | 0,15 | 0,3 | 0,55 | 1   | 1,6 | 2,5 | 3,5 | 5,4 |
| <b>V5</b>    |      |      |      |      |     |      |     |     | 3   | 4,5 | 7   |
| <b>V6</b>    |      |      |      |      |     |      |     |     | 2,2 | 3,3 | 5,1 |

Quantity of oil in litres.









## Connections

### Terminal Board and Direction of Rotation

The connections on the terminal board and the direction of rotation conform to the requirements of the standard IEC34-8.

The direction of rotation is defined by observing the motor from the driven shaft side, not the fan side. The standard direction of rotation is clockwise. All standard motors are suitable for operation in both directions of rotation.

Connection diagrams are supplied inside the terminal board cover.

Three-phase asynchronous motors can operate counter-clockwise (opposite the standard direction) by switching the position of any two power supply leads. The motor warranty is immediately voided if the internal connections of the motor windings to the terminals on the terminal board are altered or changed in any way by the customer.

If the motor is designed for just one direction of rotation (see Backstop Device), this working direction is shown with an arrow on the fan cover.

### Connections – Series T

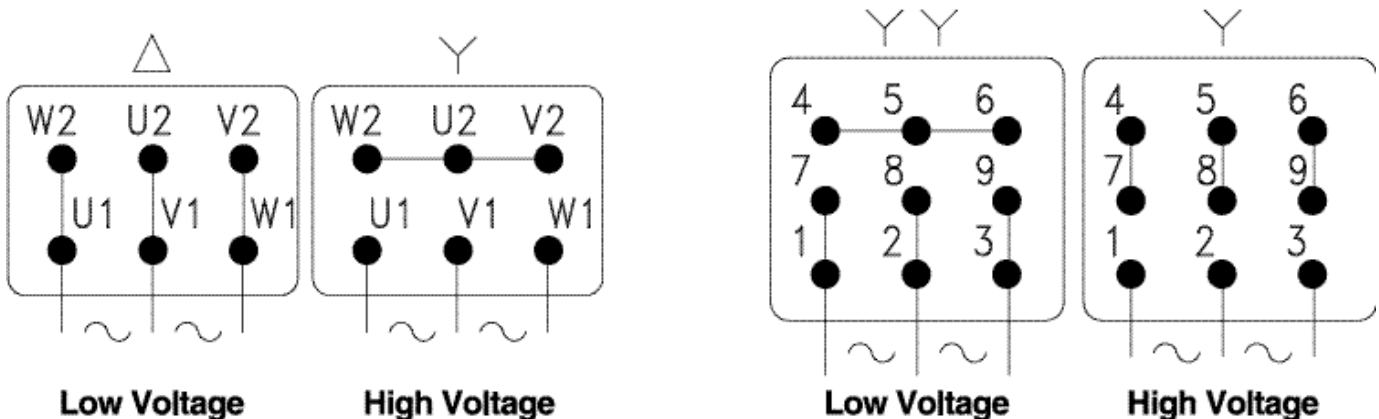
The technical data tables of this publication refer to standard three-phase asynchronous motors insulated in class F and in continuous service S1, supplied at the nominal voltage of 266/460V and nominal frequency 60Hz. The admitted tolerance for the voltage is  $\pm 10\%$  in accordance with the publication IEC38.

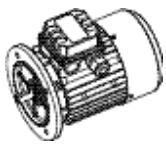
Connection diagrams are supplied inside the terminal board cover.

Conventional clockwise rotation is obtained by supplying power to the terminals U1-V1-W1. Counter-clockwise rotation is obtained by switching the position of any two power supply leads.

Special voltages are available by request (ex. motors 400/690V/50Hz for /Y connections) and/or YY/Y with 9 leads (ex. 208-230/460V/60Hz for US market).

When starting the motor through the standard / Y connection, please verify that the amount of torque needed to start the load is less than the starting torque value, typically about 1/3 of the nominal torque. If the starting torque value is less than the value needed to move the load, the motor will stall. In this instance, please use a higher power motor to ensure smooth operation of the application.





## Brake Motors

### Brake type MS

#### Operation

The MS brake is an AC electromagnetic, spring loaded brake that actuates when the power supply is off. When the brake is energized, the electromagnet releases pressure applied to the brake pads, allowing the motor to turn.

#### Power Supply

The brake is powered with 230/400V $\pm$ 10% Vac 50Hz, 230/460 $\pm$ 10% Vac 60Hz. Special voltages can be supplied by request. Power supply for TB-MS brake motor series can be internally connected to the motor power supply or independently supplied through a separate terminal board. Internally connected power to the brake is supplied as standard. Please specify when ordering if the power supply needs to be independent.

Independent brake power supply for motor sizes 63, 71 and 80 requires an oversize terminal box (please refer to dimension pages).

#### Specifications:

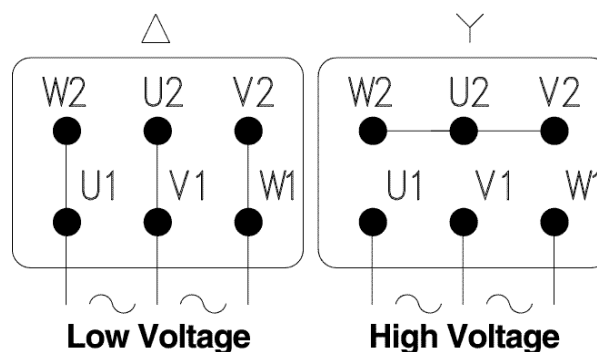
- Supply voltage 230/400V $\pm$ 10% 50Hz, 230/460 $\pm$ 10% Vac 60Hz
- Service S1, insulation class F
- Silent friction pads, with no asbestos, with double braking surface
- Steel brake disk attached with splined driving hub
- Steel driving hub with vibration-damping system
- Fixed braking torque in relation to the nominal motor torque (see  $M_B$  in the motor performance)

#### By Request:

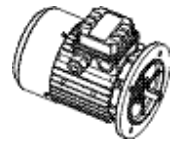
- Manual release lever with automatic return and removable hand lever. Useful for manual operation in case of voltage drop, power failure or during installation. Hand lever is parallel to the terminal box cover. Lever can be supplied in different positions depending on the application and by request. A small block can be supplied to keep the lever in release position during operation.
- Protection kit (cover + O-ring) can be supplied to prevent contamination from the surrounding environment and dust produced by friction pad wear.
- Drive shaft extension manufactured with hexagonal hole set (opposite of driven side) for manual rotation through right hexagonal key (6mm key IEC 63-90, 8mm IEC 100-112, 10mm key IEC 132, 12mm key IEC 160).
- Inox steel ring between motor shield and brake disk with anti-corrosion brake protection and treatments. For harsh environment applications (i.e. outdoor installations).
- Braking torque adjustable from 35% to 100% of  $M_{Bmax}$  through adjusting screws set into the brake body.
- Micro-switch to verify brake release and block.

#### Connections

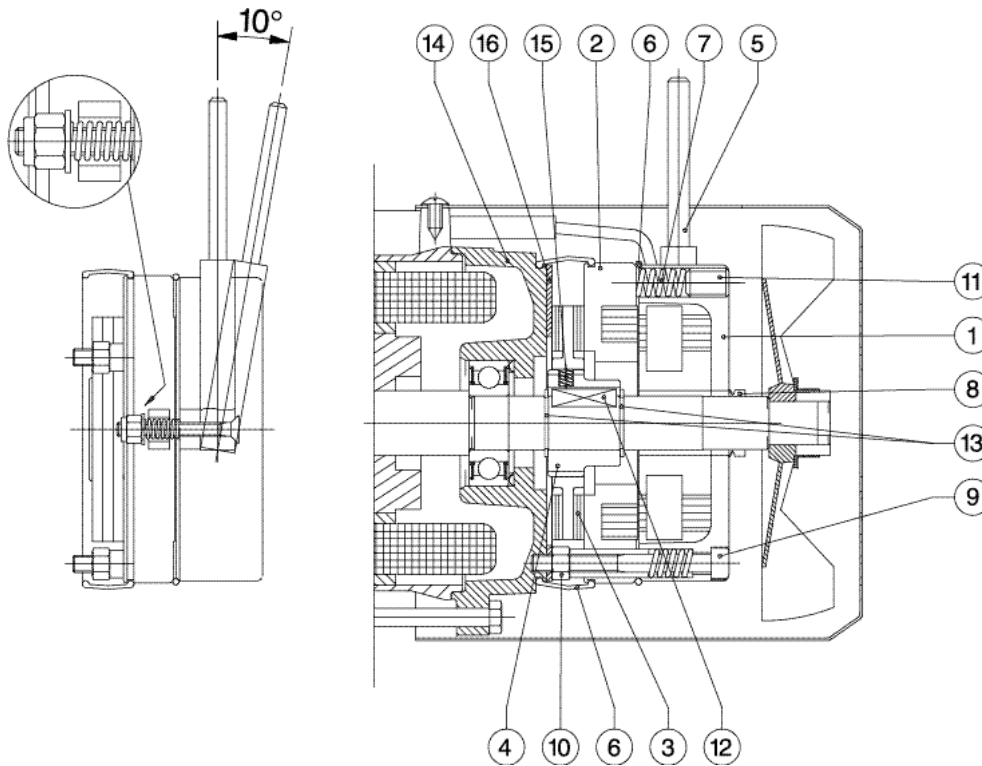
##### Alternate current brake



1. When the MS brake is directly connected to the motor power supply, supply cables of the brake are in parallel with those of the motor and set in the same terminal board. The brake coil is automatically energized and the brake is released when power is supplied to the motor.  
When power to the motor is interrupted, the brake coil is automatically de-energized and the brake is set. During this phase, the braking response time  $t_2$  must be added to delay R, generated by the inertia of the load and by the energy accumulated by the motor. R changes in every motor size. The value of R depends on the load characteristics and cannot be calculated prior to determining the application parameters.
2. When the MS brake has an independent power supply, power is supplied through a separate terminal board. Brake release time  $t_1$  and brake response time  $t_2$  depend only on the brake characteristics.
3. Please contact Motovario for standard  $t_1$  and  $t_2$  values.



**Brake Motors**



- |                                  |  |                                       |
|----------------------------------|--|---------------------------------------|
| 1. MAGNET BODY                   | 7. THRUST SPRINGS                                      | 12. KEY                               |
| 2. MOBILE COIL                   | 8. V-RING (BY REQUEST- COMBINED WITH PROTECTION COVER) | 13. CIRCLIP                           |
| 3. BRAKE PADS                    | 9. FIXING SCREWS                                       | 14. CAST IRON END SHIELD              |
| 4. DRIVING HUB                   | 10. LOCKING NUTS                                       | 15. VIBRATION DAMPING SPRING          |
| 5. RELEASE LEVER (BY REQUEST)    | 11. ADJUSTING SCREWS FOR BRAKING TORQUE (BY REQUEST)   | 16. STAINLESS STEEL DISK (BY REQUEST) |
| 6. PROTECTION COVER (BY REQUEST) |  |                                       |