2011 Harnish Blvd.
Billings, MT 59101

Phone: (406)656-4360/(800)523-3888
Fax: (406)656-4363

FAST-WAY LIMITED WARRANTY POLICY

Ideal Manufacturing, Inc., hereinafter referred to as "Manufacturer" warrants FAST-WAY equipment to be free from defect in material and workmanship, under normal use and service, for a period of one (1) year from the date of original purchase. Manufacturer will, at its option, replace or repair at factory in Billings, MT, any part or parts which shall appear, to the satisfaction of the Manufacturer, upon inspection at its factory, to have been defective in material or workmanship. This warranty does not obligate the Manufacturer to bear any transportation charges in connection with replacement or repair of defective parts. This warranty excludes electrical components and damage due to Acts of God, unauthorized modifications, misuse, abuse or negligence to this product.

In order to proceed with a warranty claim, Ideal Manufacturing must be notified of the problem. A new part will be shipped out prepaid (Ground UPS). If the customer requests that the part be expedited that shipping charge will be charged to the owner.

The part that is being warranted must be returned to Ideal Manufacturing postage prepaid. When the new part is shipped out, it will go out with an invoice and a warranty part return number. The defective part must be returned to Ideal Manufacturing, Inc freight prepaid, with the warranty part return number. At that time the invoice will be considered paid in full.

This warranty is exclusive and in lieu of all other obligation, liabilities or warranties. In no event shall Ideal Manufacturing be liable or responsible for incidental or consequential damage or for any other direct or indirect damage loss, cost, expense or fee.

This warranty shall not apply to any products or parts that have been altered or repaired without written consent of Ideal Manufacturing.

Labor to remove and reinstall defective product or parts will be paid from a labor rate and schedule only. Consult Ideal Manufacturing for that rate and schedule.

For further information on returning your product or questions concerning Ideal Manufacturing warranty, please contact Ideal Manufacturing.

TABLE OF CONTENTS

SAFETY RULES

1. Follow instructions, don't take chances. If you don't know, ask. When setting up, lowering or putting equipment into traveling position, follow all instructions in operatorôs manual.

2. Correct or report unsafe conditions. If not sure of how to correct a hazard, report it and get help.

3. Keep everything clean and orderly. Trips or falls can cause serious injuries.

4. Use the right tools and equipment for the job. Use them safely. Replace all machine guards after repair.

5. Report all injuries and get first aid or medical treatment promptly.

6. Use prescribed protective equipment. Keep it in good condition. Wear your hardhat, safety climbing devices or belt. Wear safe clothing to protect you from material being handled cold or hot. Wear a dust mask when conditions require them. When conditions require them, use gloves, eye protection/safety glasses, and earplugs for noise.

7. Use, adjust, and repair equipment only when authorized.

8. Remember, all petroleum fumes, gasoline, L.P. gasses are highly explosive.

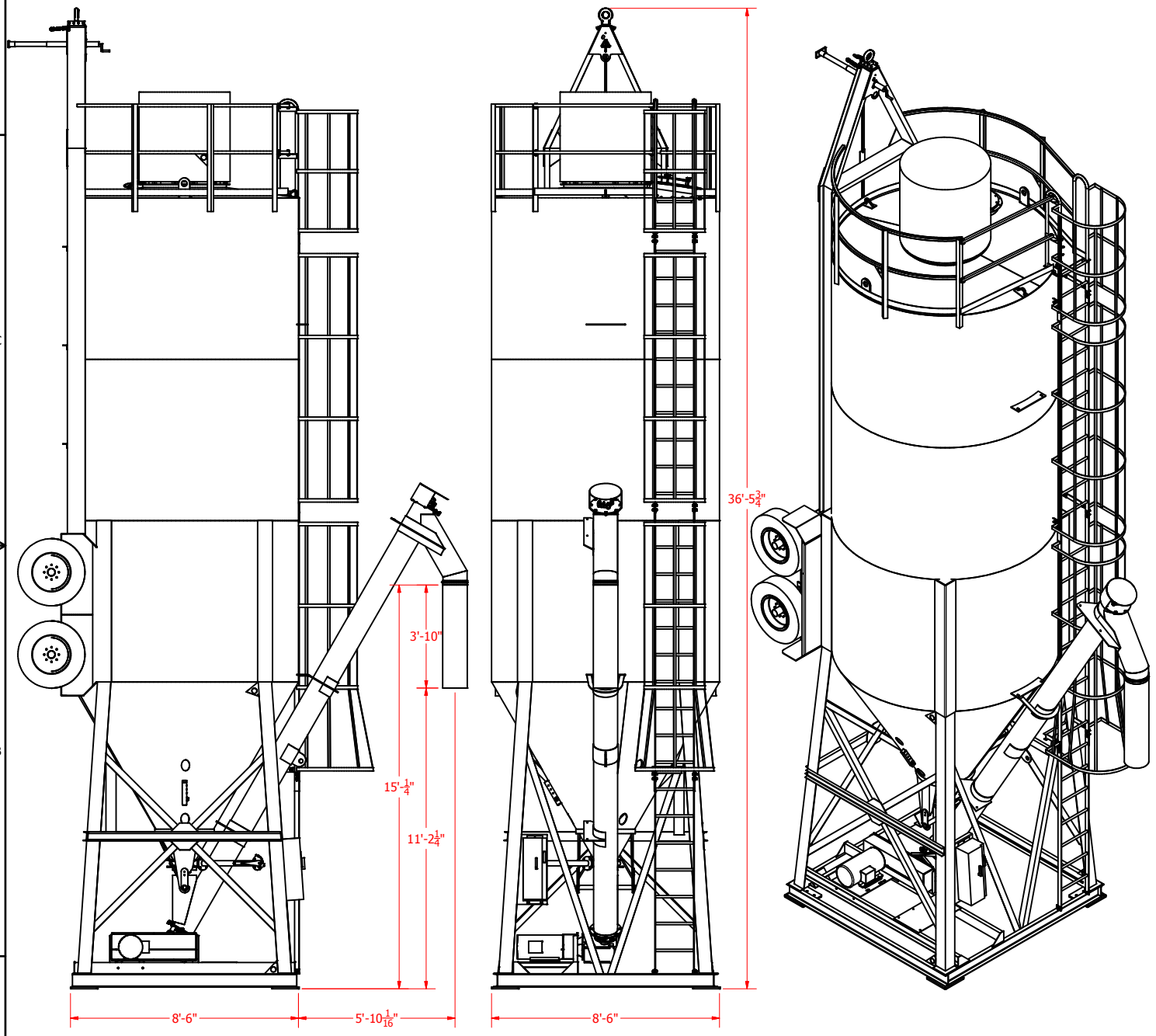
9. Donôt horseplay: avoid distracting others.

10. When lifting, bend your knees and get help for heavy loads.

11. Don't repair or adjust equipment while in motion. Shut off power source, gasoline engines or electric motors.

12. Comply with safety rules and signs.

SILO 275-A10
GENERAL ARRANGEMENT



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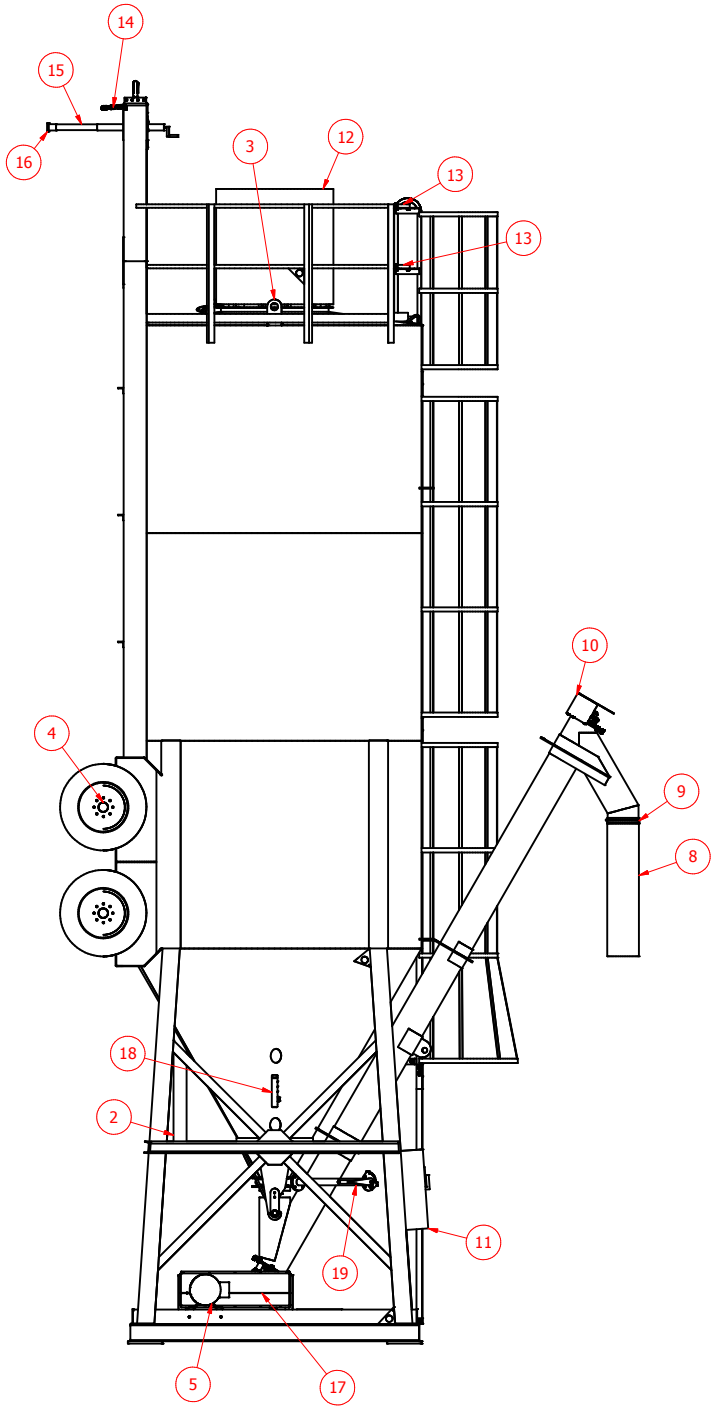
CHECKED	8/8/2013	TITLE	
QA		SILO 275 -A10 GENERAL ARRANGEMENT	
MFG			
APPROVED		SIZE C	DWG NO A10-100 REV
		SCALE	SHEET 1 OF 1

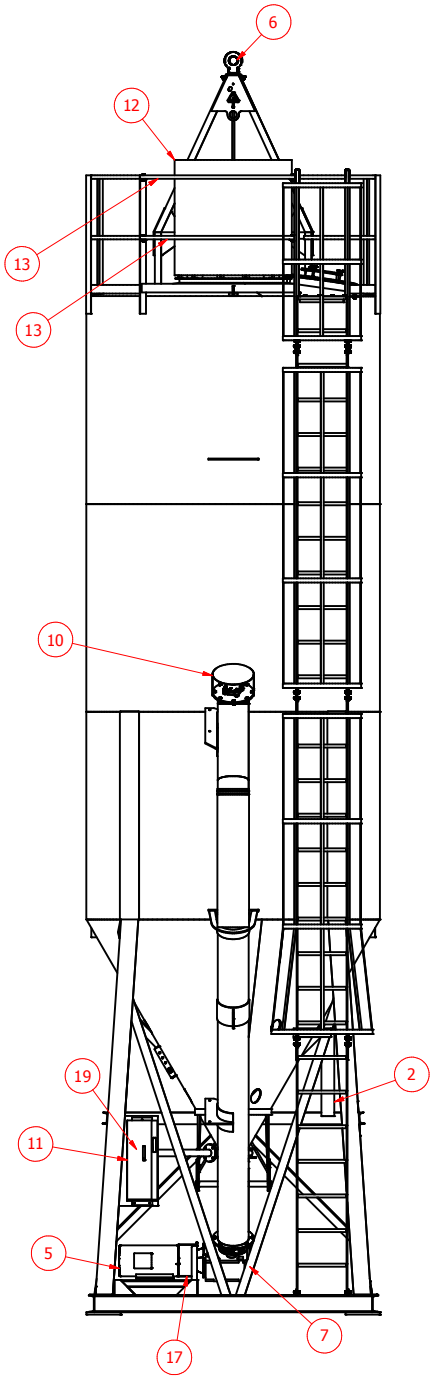
Notes:

SILO 275-A10
MAIN COMPONENT LIST
Reference drawing A10-101 page 5

REF #	DISCRIPTION	REQ'D #
1	Cement silo 1155 cu. Ft., 275-barrel capacity	1
2	Cement filler line	1
3	Silo lifting eye one each side	2
4	Axle assembly	2
5	15 hp 3 PH electric motor, gas engine, or diesel engine	1
6	Tow ring	1
7	Nord gear reducer	1
8	Discharge boot	1
9	Discharge boot clamp	1
10	Auger rain cap	1
11	Electrical control enclosure	1
12	Bag house	1
13	Removable handrail	2
14	Safety tow chains	2
15	Top wind jack	1
16	Jack foot	1
17	Belt guard	1
18	Air manifold for silo aerator system	1
19	Discharge valve	1

SILO 275-A10
MAIN COMPONENTS





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QA		SILO 275 -A10 COMPONENTS	
MFG			
APPROVED		SIZE C	DWG NO A10-101 REV
		SCALE	SHEET 1 OF 1

275-A10
SET UP PROCEDURE
Reference drawings A10-102 page 7 and A10-105 page 15

Note: Silo 275-A10 weighs approximately 12,000 lbs.
Note: Auger assembly weighs approximately 1,400 lbs.
Always use Proper Equipment For Overhead Lifting.

1. Select a level site with solid footing for setting up and operating cement silo. Position silo close to site selected.

2. Remove belt guard, and guard mounting bracket, (see drawing A10-102A page 9). Keep all removed hardware for reinstallation.

3. Connect appropriate sized lifting chokers, chains, or slings to lifting eye on auger and to appropriate sized crane, (detail B page 7). Remove the four 1/2ò transport bolts securing auger to silo, (detail A and C). Attach tag lines to upper and lower ends of auger assembly. Slowly raise auger assembly off of silo. When auger is suspended by the crane the auger should be at approximately 30 deg. angle. Lower drive end of auger into the auger supports at bottom of cone section, (detail D). Be sure attaching plates are outside of both support hooks. Position auger to secure auger to silo discharge position mounting bracket using two 1/2ò bolts washers, and nuts, (detail E). Place four 3/8ò bolts washers, and nuts to secure auger to auger supports at bottom of cone section, (detail F). Check to see that discharge on silo is in line with inlet on auger. Tighten all bolts, and disconnect crane.

4. Attach discharge boot to auger discharge using supplied hose clamp. Attach connecting boot to silo discharge, and auger inlet using supplied hose clamps.

5. The bag house must be partly disassembled to avoid damage during set up. See drawing A10-105 page 15 for reference. Remove bag house cover, (# POO635). Remove 4 nyloc nuts, and flat washers, (REF # 4 & 2). Carefully remove the 4 bolts, (REF # 8) while supporting filter bag support hoop, (#SIP139). Slowly lower filter bag support hoop catching springs, (#POO196). Let the filter bag support hoop rest on support hoop post, (# SIP140). Slide the filter bag support hoop toward top of silo. Keep all removed hardware for reassembly after silo is stood up.

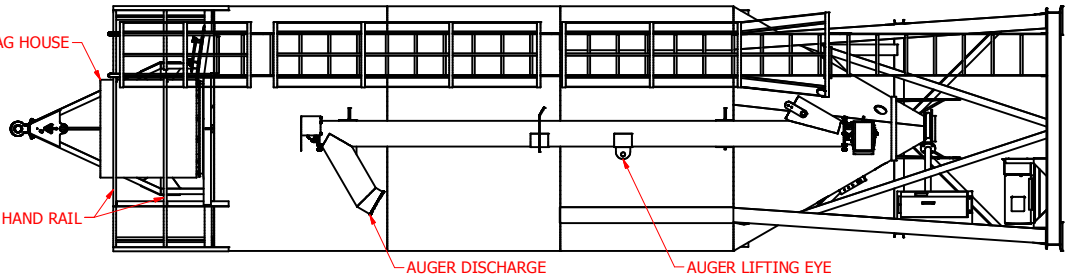
6. Remove the 2 bolts from removable handrails above bag house

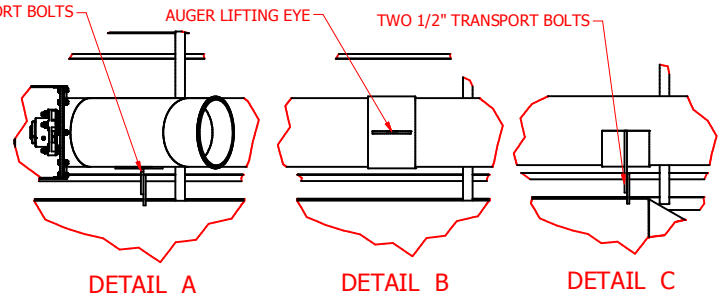
7. At front of silo connect appropriate sized lifting chokers, chains, or slings to lifting eyes. Do not use chokers, chains or slings longer than 7 feet in length. Damage will occur to hand hail if they are to long.

8. Hook lifting device to appropriate sized crane. Raise silo, and place on solid level site selected. Level silo, and shim under support as required. Disconnect crane.

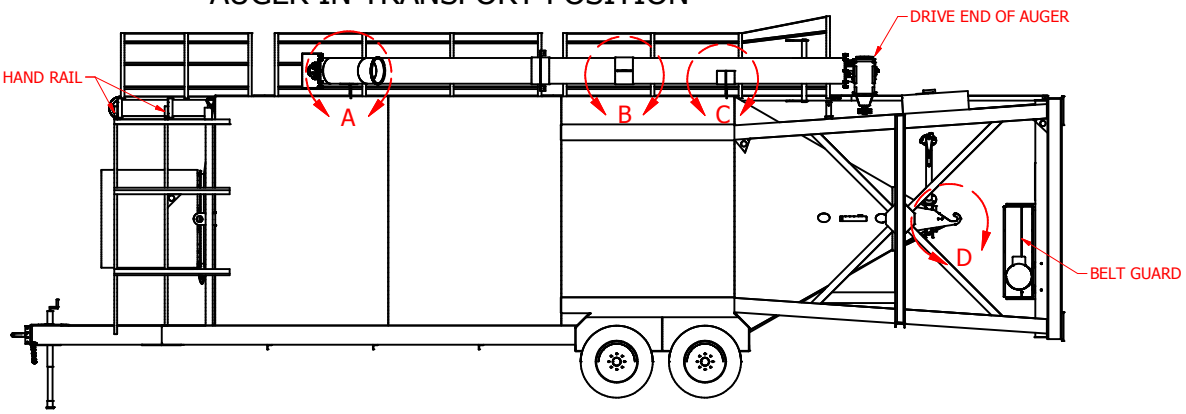
9. Reassemble handrails and bag house. Compress the springs (# POO196) on filter bag support hoop to 2 1/4ò.

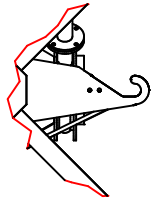
(CONTINUED ON PAGE 8)



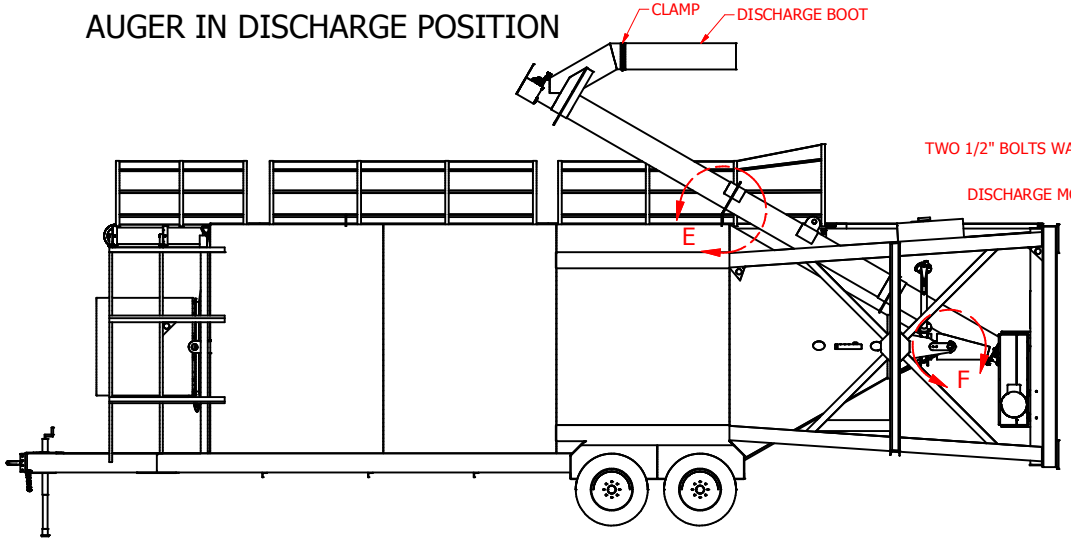


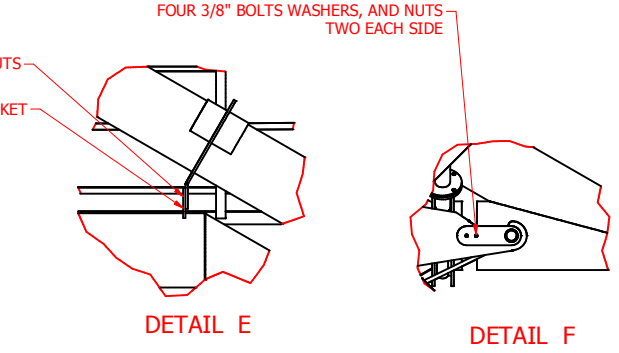
AUGER IN TRANSPORT POSITION





AUGER IN DISCHARGE POSITION





SILO 275-A10
SET UP PROCEDURE

DRAWN THenry	7/27/2010	IDEAL MFG., INC.
CHECKED	8/8/2013	TITLE: 275-A10 SET UP PROCEDURE
QA		
MFG		
APPROVED		
SIZE C	DWG NO A10-102	REV
SCALE	SHEET 1 OF 1	

275-A10
SET UP PROCEDURE
Reference drawings A10-102A page 9 and A10-106 page 13

10. Connect air supply to manifold for aerators. Aerators require 10.2 CFM @ 90 PSI with a 60 gallon tank.

11. To install drive belts see page 13 drawing A10-106. Loosen nuts (REF #1) on belt adjusting studs about 2 inches. Loosen nuts (REF #2) so motor mounting plate (REF # 3) can move free. Push motor mount plate toward gear box (REF # 9).

12. Place Belt Guard Back (# SIP500) see page 9 drawing A10-102A. Gear box sheave should fit though the square hole in Belt Guard Back. Install bolts washers, and nuts to hold guard in place. Leave the bolts loose at this time for adjustment of guards later.

13. Place V belts (REF # 8 page 13) in groves of sheaves (REF #4 and #5). Using a straight edge check sheaves for proper alignment. If sheaves are not aligned correct as needed. Tighten nuts (REF #1) for proper V belt tension, about ½ò deflection when pushing down in center between sheaves. When proper alignment and tension of V belts has been confirmed tighten nuts and bolts (REF # 2) to secure motor mounting plate. Check all nuts on belt adjusting studs to be sure they are all tight.

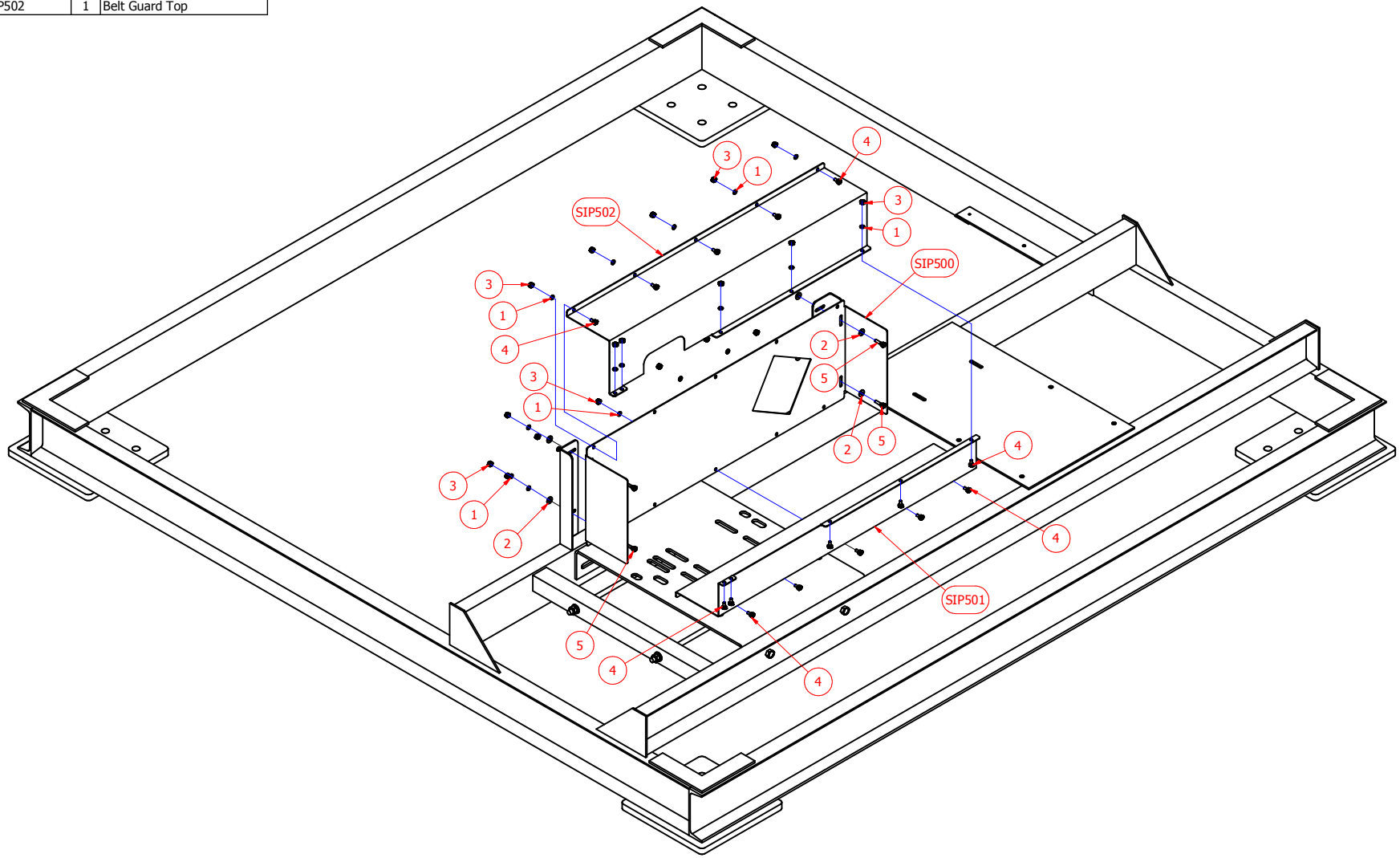
14. Slide Belt Guard Bottom (#SIP501) see page 9 under motor shaft. Secure Belt Guard Bottom to Belt Guard Back (# SIP500) with nuts bolts, and washers. Check for clearance around both sheaves so they will not rub on guards. Adjust as needed and tight nuts, and bolts placed through guard back in step 11. Install Belt Guard Top, (#503) to guard back and bottom with nuts washers, and bolts.

15. Have qualified person connect electric power to disconnect box. Check for proper rotation of auger, looking at lower end of gear box the shaft should turn counter clockwise. Correct as needed.

16. If a gas or diesel power unit was order be sure to check all fluid levels before starting engine. Always let engine idle for a few minutes before discharging product.

SILO 275-A10
SET UP PROCEDURE
BELT GUARDS

Parts List			
REF. NO.	PART NUMBER	QTY	DESCRIPTION
1	1	19	Lock Washer 1/4
2	2	8	Flat Washer 1/4
3	3	19	Hex Nut 1/4-20
4	4	15	Hex Bolt 1/4-20 X 1/2
5	5	4	Hex Bolt 1/4-20 X 1
SIP500	SIP500	1	Belt Guard Back
SIP501	SIP501	1	Belt Guard Bottom
SIP502	SIP502	1	Belt Guard Top



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CHECKED	8/8/2013	TITLE: SILO 275 -A10 SET UP PROCEDURE
QA		
MFG		
APPROVED		
		SIZE C | DWG NO A10-102A | REV
		SCALE | SHEET 1 OF 1

275-A10 SILO
OPERATING PROCEDURE
Reference drawing A10-103 page 11

1. FILLING SILO

    a. Remove filler pipe cap, (REF # 1).
    b. Air pump cement thru filler pipe, (REF # 1).
    c. **You must shake upper section of bag-house to clean filter bags each time after filling silo**.

2. DISCHARGE OF SILO PRODUCT ELECTRIC MOTOR
    a. Position unit to be filled under discharge pipe, (REF# 2).
    b. Place discharge boot in opening of unit being filled, (REF# 3).
    c. Open ball valve on air manifold to aerate silo tank for one-minute minimum, (REF# 4) close ball valve on air manifold.
    d. Raise power handle on electrical panel to ON position, (REF #5).
    e. Push start button on electrical panel. Open product valve,(REF #6). Observe discharge boot for product delivery.
    f. Close product valve, and let auger run to clear tube of product. Push stop button on electrical panel to stop product delivery.
    g. Lower power handle on electrical panel to OFF position.
    h. Turn off air supply to aerators if still on.
    i. Remove discharge boot for unit being filled.

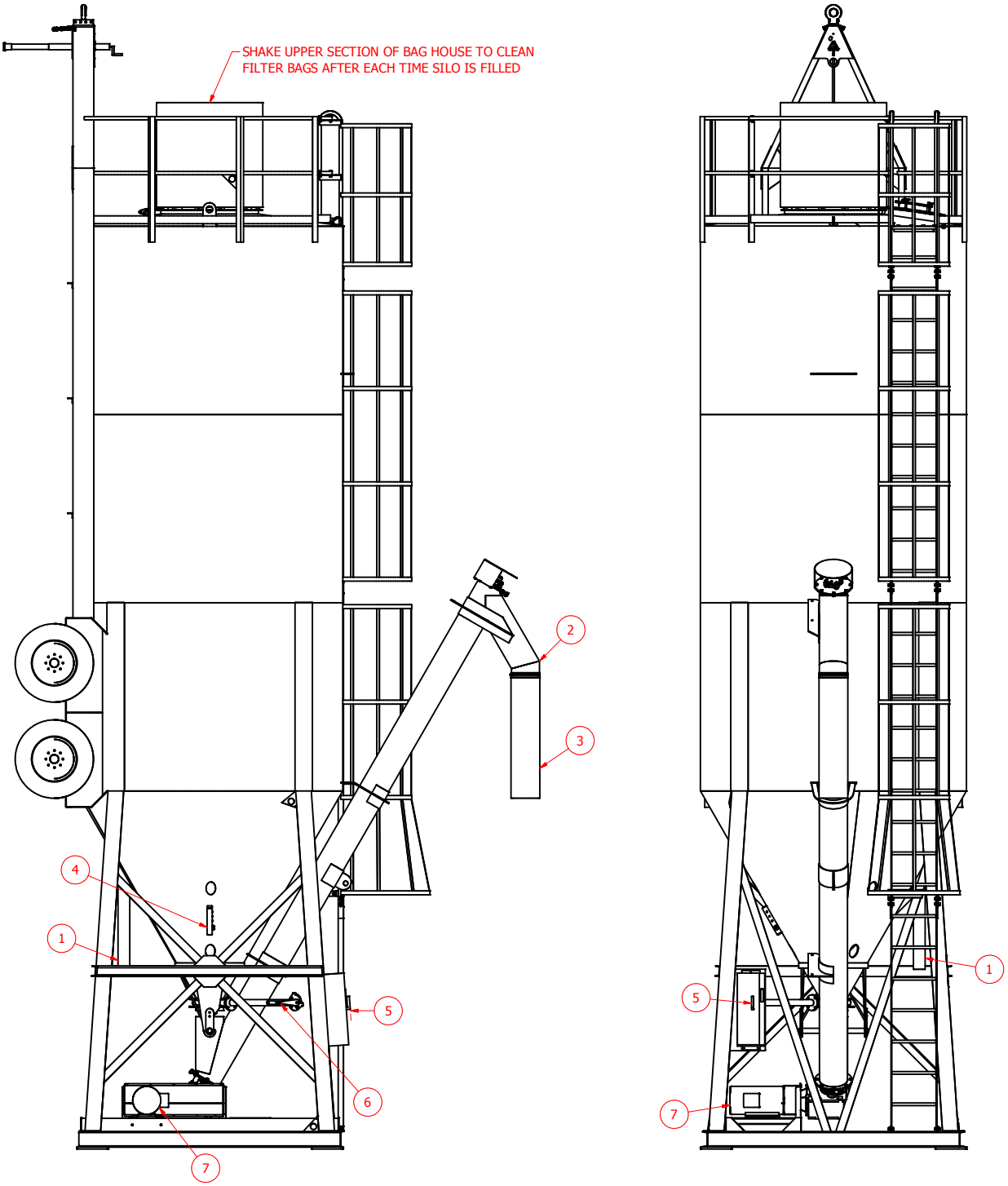
3. DISCHARGE OF SILO PRODUCT GAS OR DIESEL ENGINE

    a. Position unit to be filled under discharge pipe, (REF# 2).
    b. Place discharge boot in opening of unit being filled, (REF# 3).
    c. Open ball valve on air manifold to aerate silo tank for one-minute minimum, (REF# 4) close ball valve on air manifold.
    d. Start engine and let idle to warm engine up, (REF #7). Move throttle control on engine increasing rpm up to working speed. Open product valve, (REF # 6). Observe discharge boot for product delivery.
    e. Close product valve, and let auger run to clear tube of product. Move throttle back to idle position to stop product delivery.
    f. Turn engine off, and turn off air supply to aerators if still on.
    g. Remove discharge boot for unit being filled.

NOTE: Silo fluidizer aerators require 10.2 CFM @ 90 PSI with a 60 gallon tank.

NOTE: If at any time during the discharging operation, cement fails to flow freely as indicated by discharge boot movement, silo cone aeration must be induced.

SILO 275-A10
OPERATING PROCEDURE



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CHECKED	3/14/2011	TITLE	
QA		SILO 275-A10 OPERATING PROCEDURE	
MFG			
APPROVED		SIZE C	DWG NO A10-103 REV
		SCALE	SHEET 1 OF 1

PREPARING SILO FOR TRANSPORT

Qualified person should disconnect electrical power
Reference drawings A10-101 page 5 A10-102 page 7, A10-102A page 9, A10-106 page 13, and A10-105 page 15

1. Most important is to be positive that all cement has been removed from systems before lowering silo. Remove inspection cover at top of silo and observe interior.

2. Disconnect electrical power and air supply.

3. Remove all belt guards see drawing A10-102A page 9 for reference.

4. Loosen motor mount plate nuts, (REF #2) and belt adjusting stud nuts, (REF # 1) see drawing A10-106 page 13 for reference. Slide motor mount plate so V belts can be removed. After V belts have been removed tighten motor mount plate bolts, and adjusting stud nuts.

5. If silo is an engine power unit drain all fluids from engine before lowering to transport position.

6. The bag house must be partly disassembled to avoid damage. See drawing A10-105 page 15 for reference. Remove bag house cover, (# POO365). Remove 4 nyloc nuts, and flat washers, (REF # 4 & 2). Carefully remove the 4 bolts, (REF # 8) while supporting filter bag support hoop, (# SIP139). Slowly lower filter bag support hoop catching springs, (# POO196). Let the filter bag support hoop rest on support hoop post, (# SIP140). Slide the filter bag support hoop toward top of silo. Keep all removed hardware for reassembly after silo is lowered.

7. Connect appropriate sized lifting chokers, chains, or slings to lifting eyes at top of silo. Do not use chokers, chains or slings longer than 7 feet in length. Damage will occur to hand hail if they are to long. Connect to appropriate sized crane.

8. Remove the 2 bolts on handrails, (REF # 13) see drawing A10-101 page 5. Remove all loose objects for top of silo, and lower to ground. DO NOT REMAIN ON SILO WHILE BEING LOWERED.

9. Lower silo on to axles. **CAUTION**: If on an incline, guard against coasting.

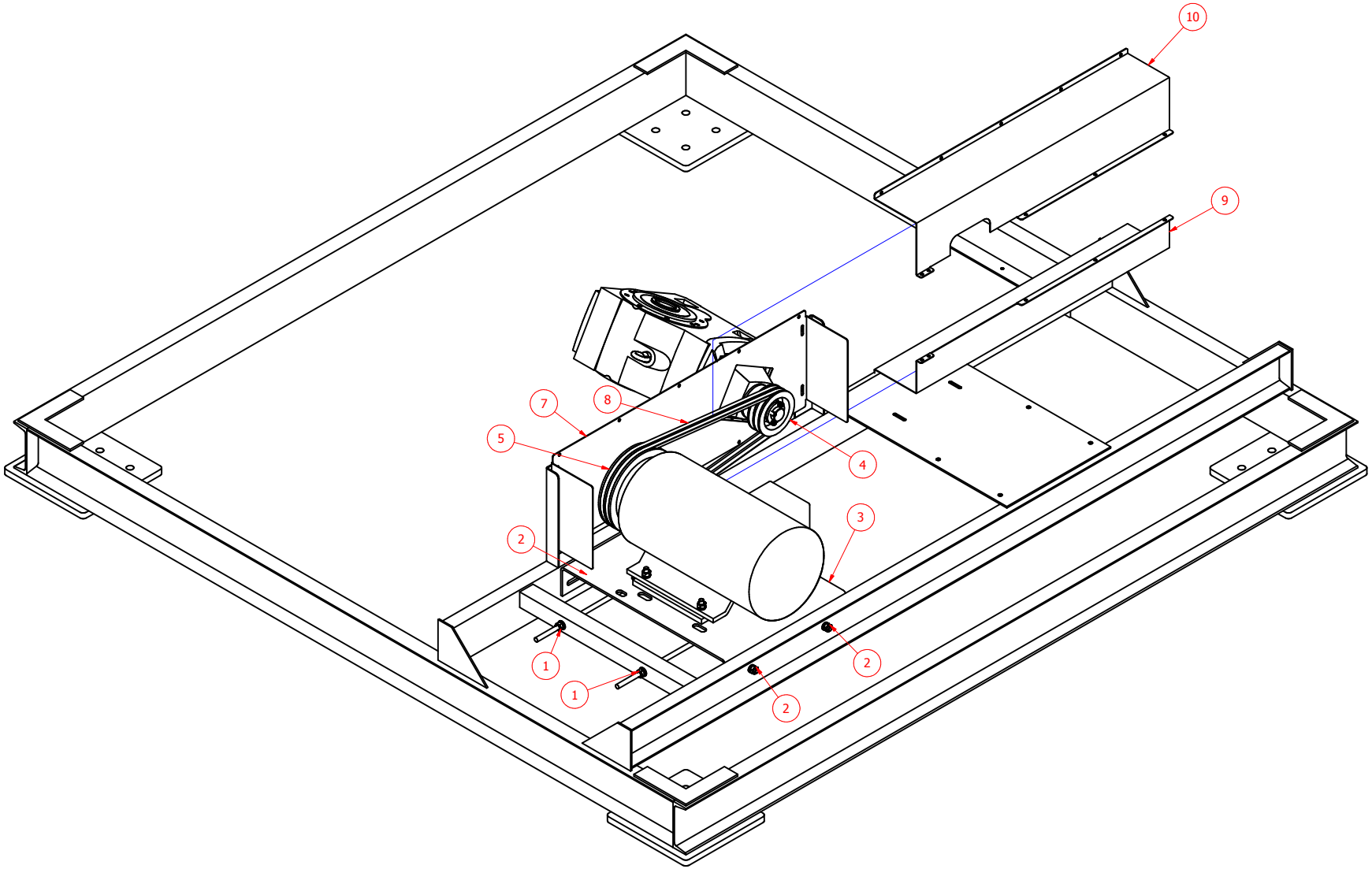
10. Reassemble handrails and bag house. Compress the springs (# POO196) on filter bag support hoop to 2 ¼ò.

11. Connect appropriate sized crane to lifting eye on auger assembly. See detail E drawing A10-102 page 7 for reference. Remove discharge boot. Attach tag lines to both ends of auger assembly. Remove four 3/8ò bolts from auger support hooks detail F. Remove ½ò bolts from discharge mounting bracket detail E. Slowly raise auger from discharge position. Place auger on transport brackets on silo tank, see detail A and C. Secure auger to silo tank with ½ò bolts nuts, and washers.

12. Clean off any loose material from silo, and frame before transport.

13. Connect and check stop, signal and clearance electrical running lights.

SILO 275-A10
MOTOR TO GEAR BOX ASSEMBLY



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CHECKED	8/8/2013	TITLE: MOTOR TO GEAR BOX ASSEMBLY
QA		
MFG		
APPROVED		SIZE C | DWG NO A10-106 | REV
		SCALE | SHEET 1 OF 1

SILO 275-A10
BAG HOUSE & MAN HOLE ASSEMBLY
Reference drawing A10-105 page 15

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	N/A	3/8-16 Hex Nut	26
2	N/A	3/8 Flat Washer	8
3	N/A	3/8 Lock Washer	26
4	N/A	3/8-16 Nylock Hex Nut	4
5	N/A	3/8-16 X 1 Hex Bolt	12
6	N/A	3/8-16 X 1 1/4 Hex Bolt	12
7	N/A	3/8-16 X 2 1/2 Hex Bolt	2
8	N/A	3/8-16 X 3 1/2 Hex Bolt	4
9	N/A	1/2 Lock Washer	3
POO159	POO159	Gasket Inspection Cover	1
POO193	POO193	Hose Clamp	18
POO196	POO196	Spring	4
POO364	POO364	Filter Bag	18
POO365	POO365	Cover (weatherproof)	1
POO452	POO452	1/2-13 Wing Nut	3
POO511	POO511	Gasket	1
POO511A	POO511A	Gasket	1
SIP132	SIP132	Storage Tank	1
SIP137	SIP137	Manifold Adapter (factory installed)	1
SIP138	SIP138	Manifold	1
SIP139	SIP139	Filter Bag Support Hoop	1
SIP140	SIP140	Support Hoop Post	1
SIP152	SIP152	Man Hole	1
SIP153	SIP153	Cover (inspection)	1

SUBJECT: Silo Bag house (Air Filtering System)

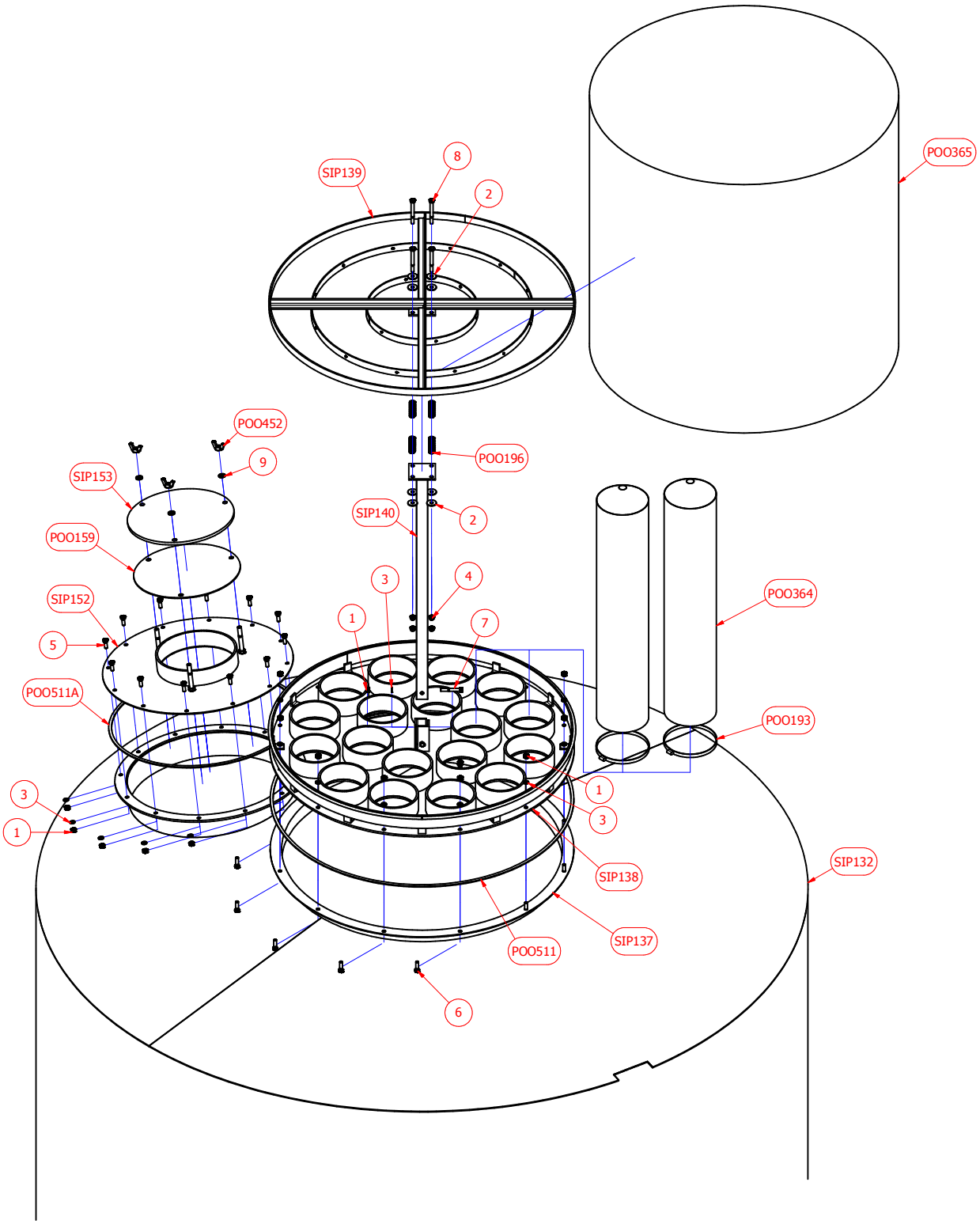
PURPOSE: To prevent cement dust from entering the atmosphere during the filling process of the silo.

DESCRIPTION: Filters:
Quantity - 18
Material - 10 oz polyester material -25 cfm per square foot
Filter Surface - (each) 784 sq. in. = 5.44 sq. ft
Total square feet of filter material = 98 sq. ft.
Total cfm at 25 cfm per square foot = 2450 cfm

MAINTENANCE: Spring loaded upper bag mount that facilitates bag shaking both by wind action as well as manual action to result in filter bag cleaning.

EFFICIENCY: 99.8%

SILO 275-A10
BAG HOUSE AND MAN HOLE ASSEMBLY



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CHECKED	8/8/2013	TITLE	
QA		BAG HOUSE AND MAN HOLE ASSEMBLY	
MFG			
APPROVED		SIZE C	DWG NO A10-105 REV
		SCALE	SHEET 1 OF 1

COMBINATION STARTER
513-CJA-A2J-1-6P-42
15 HP 3 PHASE 240 V
NEMA SIZE 2
100 AMP CIRCUIT BREAKER

509-COD-XXX STARTER

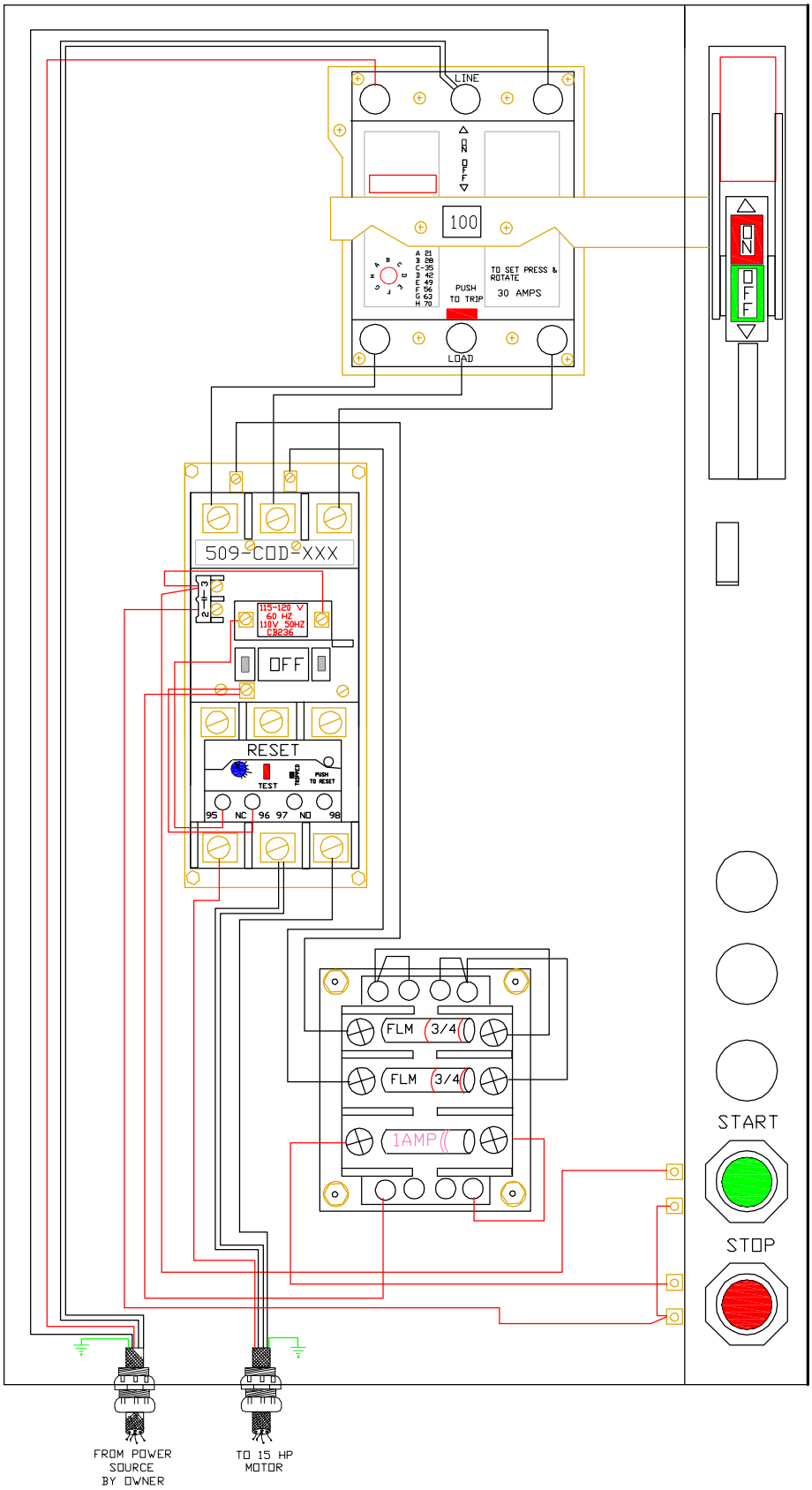
592-A2JD OVERLOAD RELAY

1497--B-BASX-3N 80 VA TRANSFORMER

PRIMARY FUSE 1 AMP/KLDR

SECONDARY FUSE .75 AMP/FLM

ENCLOSURE SIZE
10"W X 26 3/8"H X 8 7/32" DEEP



LEGEND
WHITE
RED
BLACK
GROUND

REVISIONS			IDEAL MANUFACTURING INC.
			2011 HARNISH BLVD, BILLINGS MT, 59101 PHONE: (406)656-4360 FAX: (406)656-4363
NO		DESCRIPTION	275-A10 ELECTRICAL CONTROL PANEL
			240 VOLT 3 PHASE PRIMARY 110 V SECONDARY
			PAC ACAD
			8-12-2013

COMBINATION STARTER
513-CJB-A2H-1-42-6P
15 HP 3 PHASE 480 V
NEMA SIZE 2
30 AMP CIRCUIT BREAKER

509-BOD-XXX STARTER

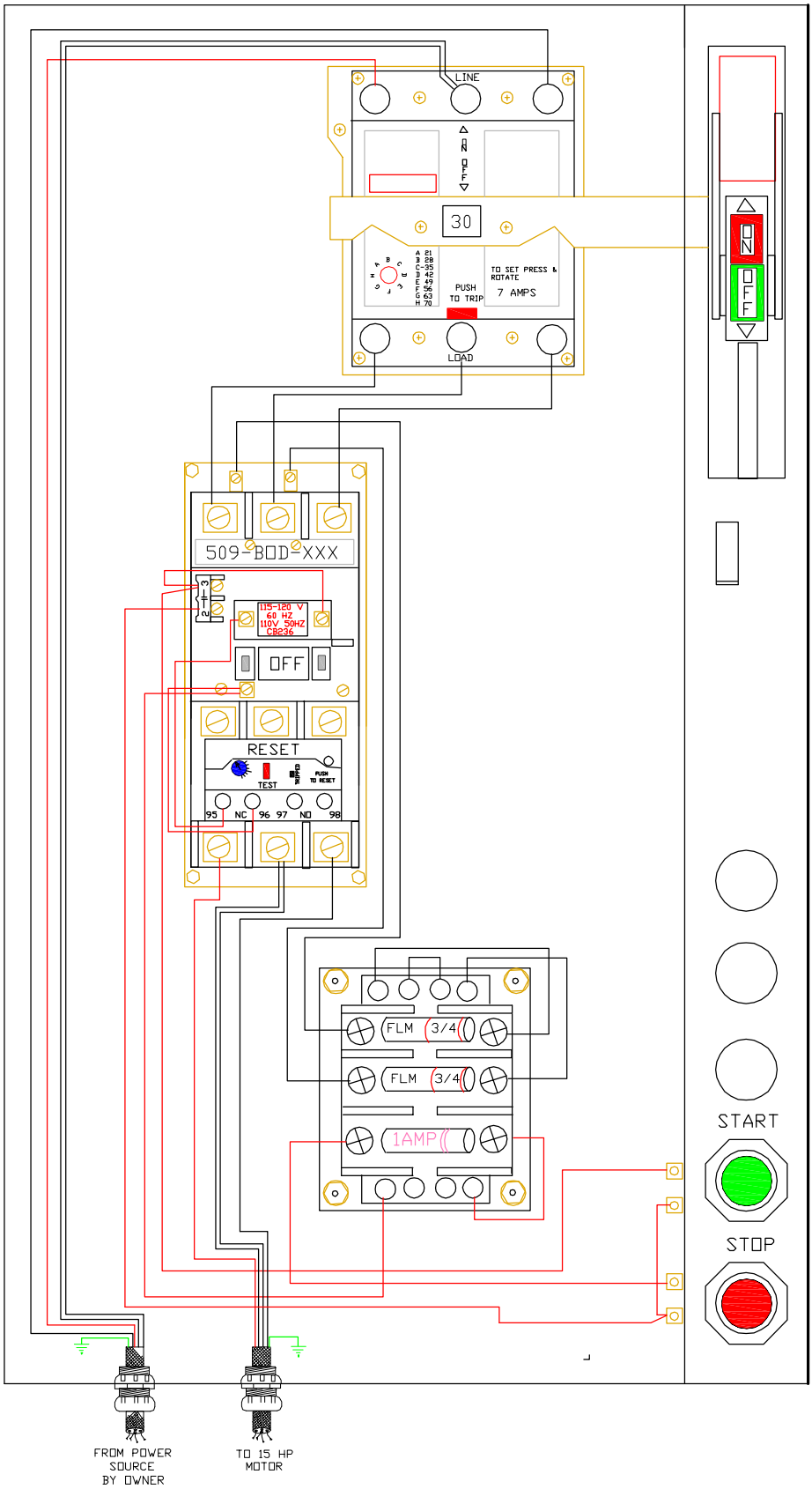
592-A2HC OVERLOAD RELAY

1497-N2PK 80 VA TRANSFORMER

PRIMARY FUSE 1 AMP/KLDR

SECONDARY FUSE .75 AMP/FLM

ENCLOSURE SIZE
10"W X 26 3/8"H X 8 7/32" DEEP



LEGEND
WHITE
RED
BLACK
GREEN

REVISIONS		
NO	DATE	DESCRIPTION

IDEAL MANUFACTURING INC.
2011 HARNISH BLVD, BILLINGS MT, 59101
PHONE: (406)656-4360 FAX: (406)656-4363

275-A10
ELECTRICAL CONTROL PANEL

440 VOLT 3 PHASE
PRIMARY 110 V SECONDARY

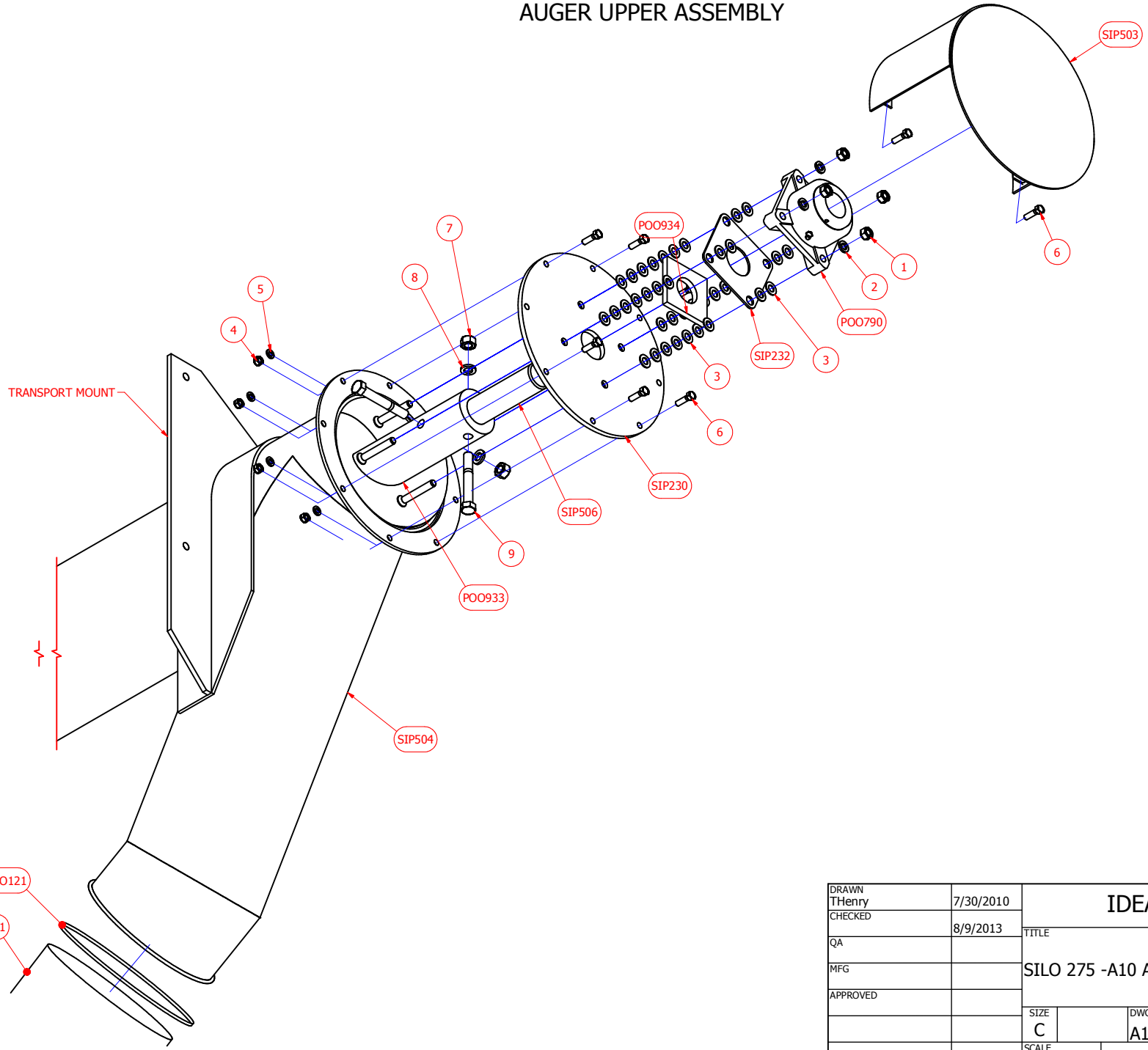
PAC ACAD

8-12-2013

SILO 275-A10
AUGER UPPER ASSEMBLY COMPONENTS
Reference drawing A10-107 page 19

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	N/A	1/2-13 Hex Nut	4
2	N/A	1/2 Lock Washer	4
3	N/A	1/2 USS Flat Washer	36
4	N/A	3/8-16 Hex Nut	8
5	N/A	3/8 Lock Washer	8
6	N/A	3/8-16 X 1 ¼ Hex Bolt	8
7	N/A	5/8-11 Hex Nut	2
8	N/A	5/8 Lock Washer	2
9	N/A	5/8-11 X 4 1/2 Hex Bolt	2
POO121	POO121	Hose Clamp	1
POO691	POO691	Discharge Boot	1
POO790	POO790	Bearing	1
POO933	POO933	Auger Flight	1
POO934	POO934	Felt Seal	1
SIP230	SIP230	Auger Upper Bearing Mount	1
SIP232	SIP232	Felt Seal Plate	1
SIP503	SIP503	Rain Cap	1
SIP504	SIP504	Auger Tube	1

SILO 275-A10
AUGER UPPER ASSEMBLY

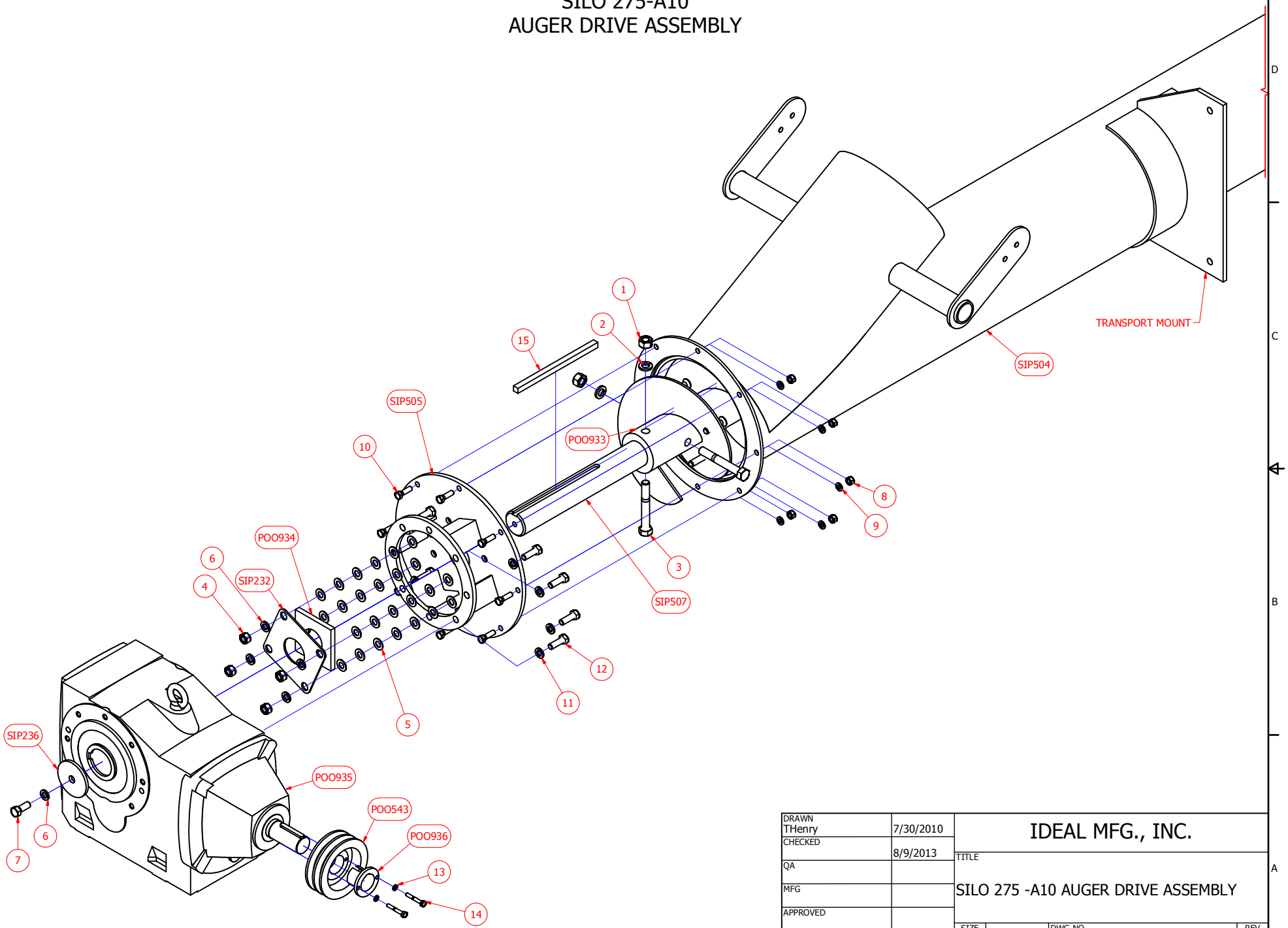


DRAWN THenry	7/30/2010	IDEAL MFG., INC.
CHECKED	8/9/2013	TITLE: SILO 275 -A10 AUGER UPPER ASSEMBLY
QA		
MFG		
APPROVED		SIZE C / DWG NO A10-107 / REV
		SCALE / SHEET 1 OF 1

SILO 275-A10
AUGER DRIVE ASSEMBLY COMPONENTS
Reference drawing A10-108 page 21

REF NO.	PART NO.	DESCRIPTION	REQ'D
1	N/A	5/8-11 Hex Nut	2
2	N/A	5/8 Lock Washer	2
3	N/A	5/8-11 X 4 1/2ò Hex Bolt	2
4	N/A	1/2-13 Hex Nut	4
5	N/A	1/2 USS Flat Washer	28
6	N/A	1/2 Lock Washer	5
7	NA	1/2-13 X 1 1/4 Hex Bolt	1
8	N/A	3/8-16 Hex Nut	8
9	N/A	3/8 Lock Washer	8
10	N/A	3/8-16 X 1 ¼ Hex Bolt	8
11	N/A	12 MM Lock Washer	7
12	N/A	12 MM X 30 Hex Bolt	7
13	N/A	1/4 Lock Washer	2
14	N/A	1/4-20 X 1 3/4 Hex Bolt	2
15	N/A	1/2ñ Key X 9	1
POO543	POO543	Sheave	1
POO933	POO933	Auger Flight	1
POO934	POO934	Felt Seal	1
POO935	POO935	Speed Reducer	1
POO936	POO936	Bushing	1
SIP232	SIP232	Felt Seal Plate	1
SIP236	SIP236	Shaft Pressure Washer	1
SIP504	SIP504	Auger Tube	1
SIP505	SIP505	Speed Reducer Mount	1
SIP507	SIP507	Lower Auger Shaft	1

SILO 275-A10
AUGER DRIVE ASSEMBLY

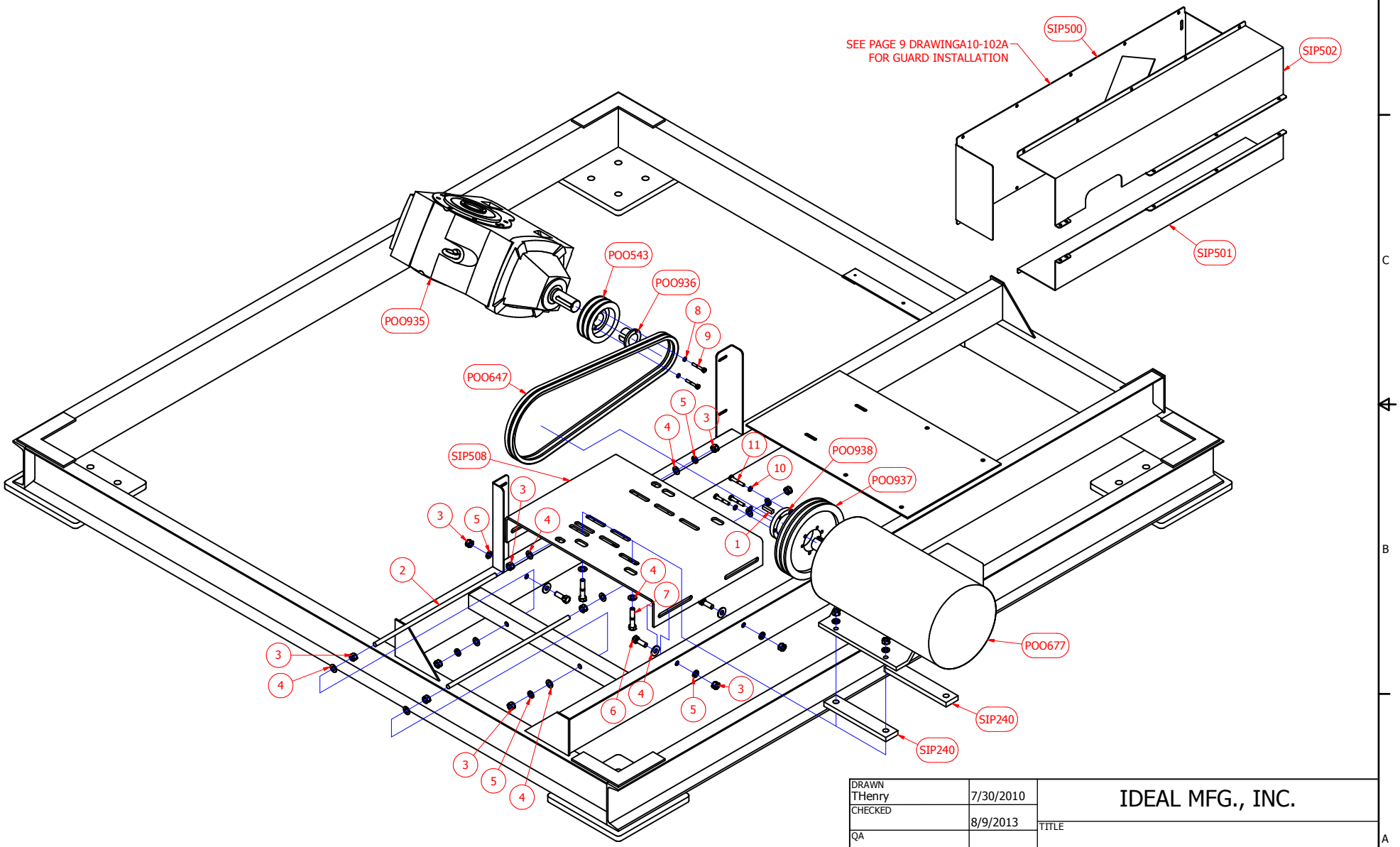


DRAWN THenry	7/30/2010	IDEAL MFG., INC.
CHECKED	8/9/2013	TITLE: SILO 275 -A10 AUGER DRIVE ASSEMBLY
QA		
MFG		
APPROVED		SIZE C | DWG NO A10-108 | REV
		SCALE | SHEET 1 OF 1

SILO 275-A10
ELECTRIC MOTOR COMPONENTS
Reference drawing A10-109 page 23

REF NO.	PART NO.	DESCRIPTION	REQ'D
1	N/A	3/8 Key	1
2	N/A	1/2-13 X 20 All Thread	2
3	N/A	1/2-13 Hex Nut	16
4	N/A	1/2 Flat Washer	16
5	N/A	1/2 Lock Washer	12
6	N/A	1/2-13 X 1 1/2 Hex Bolt	4
7	N/A	1/2-13 X 2 1/2 Hex Bolt	4
8	N/A	1/4 Lock Washer	2
9	N/A	1/4-20 X 1 3/4 Hex Bolt	2
10	N/A	5/16 Lock Washer	3
11	N/A	5/16-18 X 2 Hex Bolt	3
POO543	POO543	Sheave Speed Reducer	1
POO647	POO647	V Belt	2
POO677	POO677	15 HP Electric Motor	1
POO935	POO935	Speed Reducer	1
POO936	POO936	Bushing Speed Reducer	1
POO937	POO937	Sheave Electric Motor	1
POO938	POO938	Bushing Electric Motor	1
SIP240	SIP240	Electric Motor Spacer	2
SIP500	SIP500	Belt Guard Back	1
SIP501	SIP501	Belt Guard Bottom	1
SIP502	SIP502	Belt Guard Top	1
SIP508	SIP508	Motor Mount Plate	1
Not Shown	POO911	Electrical Enclosure	1

SIL 275-A10
ELECTRIC MOTOR COMPONENTS

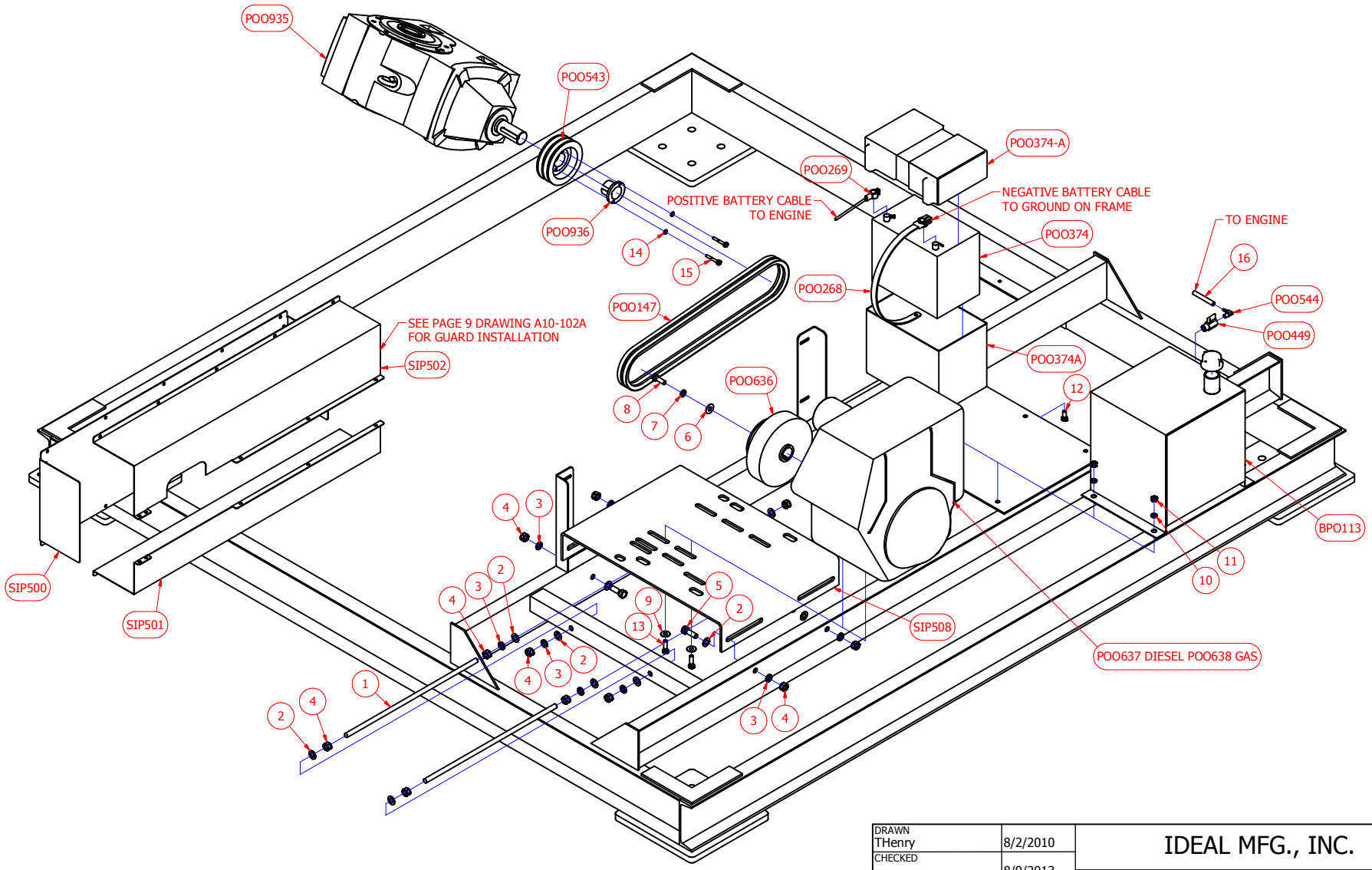


DRAWN THenry	7/30/2010	IDEAL MFG., INC.
CHECKED	8/9/2013	
QA		TITLE: SILO 275 -A10 ELECTRIC MOTOR
MFG		
APPROVED		SIZE C | DWG NO A10-109 | REV
		SCALE | SHEET 1 OF 1

SILO 275-A10
GAS OR DIESEL ENGINE COMPONENTS
Reference drawing A10-110 page 25

REF. NO.	PART NO.	DESCRIPTION	REQ'D NO.
1	N/A	1/2-13 All Thread X 20	2
2	N/A	1/2 Flat Washer	12
3	N/A	1/2 Lock Washer	8
4	N/A	1/2-13 Hex Nut	12
5	N/A	1/2-13 X 1 1/2 Hex Bolt	4
6	N/A	7/16 Flat Washer	1
7	N/A	7/16 Lock Washer	1
8	N/A	7/16-14 X 1 1/4 Hex Bolt	1
9	N/A	3/8 Flat Washer	4
10	N/A	3/8 Lock Washer	8
11	N/A	3/8-16 Hex Nut	4
12	N/A	3/8-16 X 1 Hex Bolt	4
13	N/A	3/8-16 X 1 1/4 Hex Bolt	4
14	N/A	1/4 Lock Washer	2
15	N/A	1/4-20 X 1 3/4 Hex Bolt	2
16	N/A	Fuel Line	1
BPO113	BPO113	Fuel Tank	1
POO147	POO147	V Belt	2
POO268	POO268	Battery Ground Strap	1
POO269	POO269	Battery Terminal	1
POO374	POO374	Battery	1
POO374A	POO374A	Battery Box	1
POO449	POO449	Fuel Valve	1
POO543	POO543	Sheave Speed Reducer	1
POO544	POO544	90 Deg. Fitting	1
POO636	POO636	Sheave Clutch	1
POO637 POO638	POO637 POO638	Diesel Engine Gas Engine	1
POO935	POO935	Speed Reducer	1
POO936	POO936	Bushing Speed Reducer	1
SIP500	SIP500	Belt Guard Back	1
SIP501	SIP501	Belt Guard Bottom	1
SIP502	SIP502	Belt Guard Top	1
SIP508	SIP508	Motor Mount Plate	1
27	POO951	Battery Cable	1

SILO 275-A10
GAS OR DIESEL ENGINE COMPONENTS



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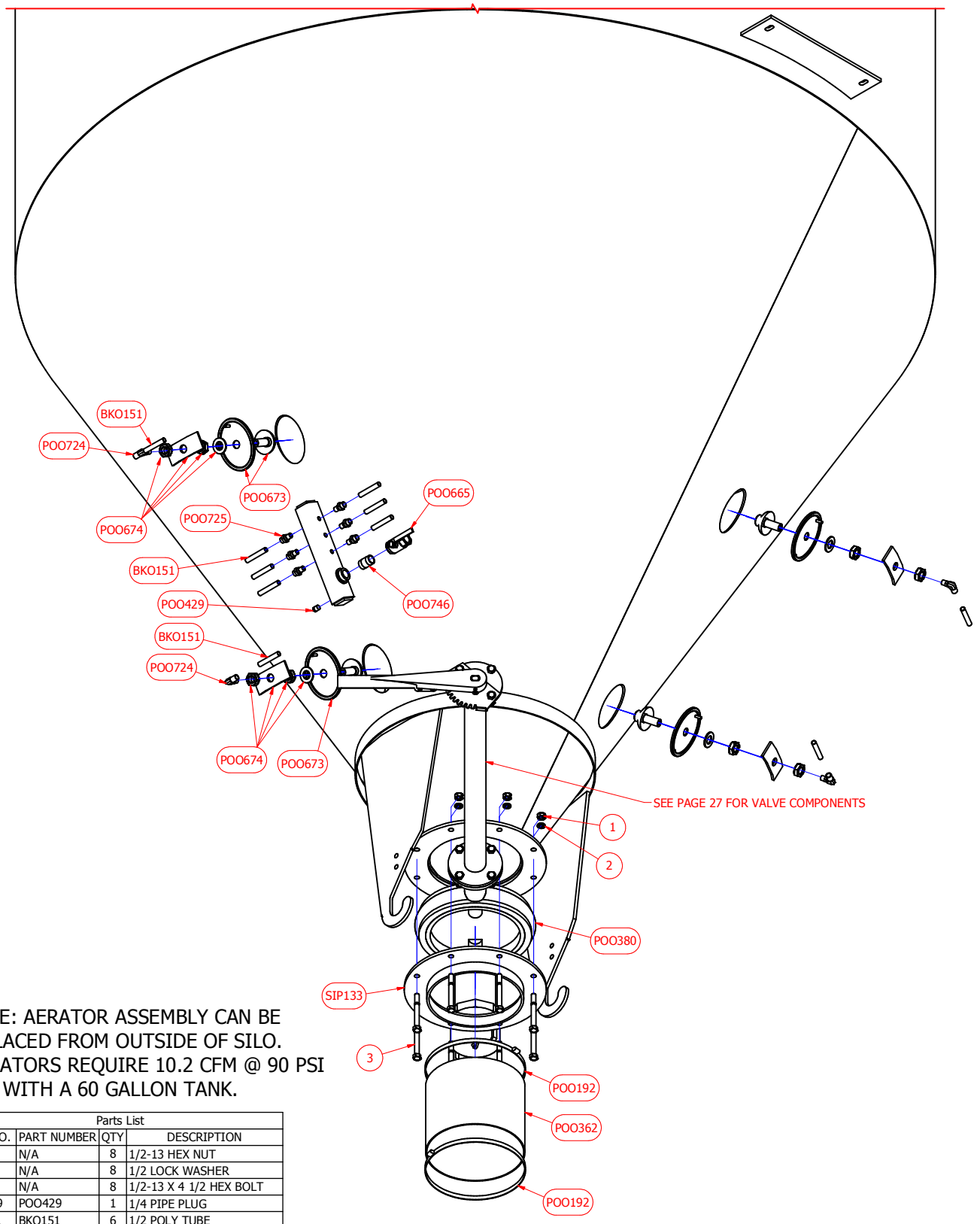
CHECKED	8/9/2013	TITLE	
QA		SILO 275 -A10 GAS DIESEL COMPONENTS	
MFG			
APPROVED		SIZE C	DWG NO A10-110 REV
		SCALE	SHEET 1 OF 1

SILO 275-A10
AERATOR AND FILLER BOOT COMPONENTS

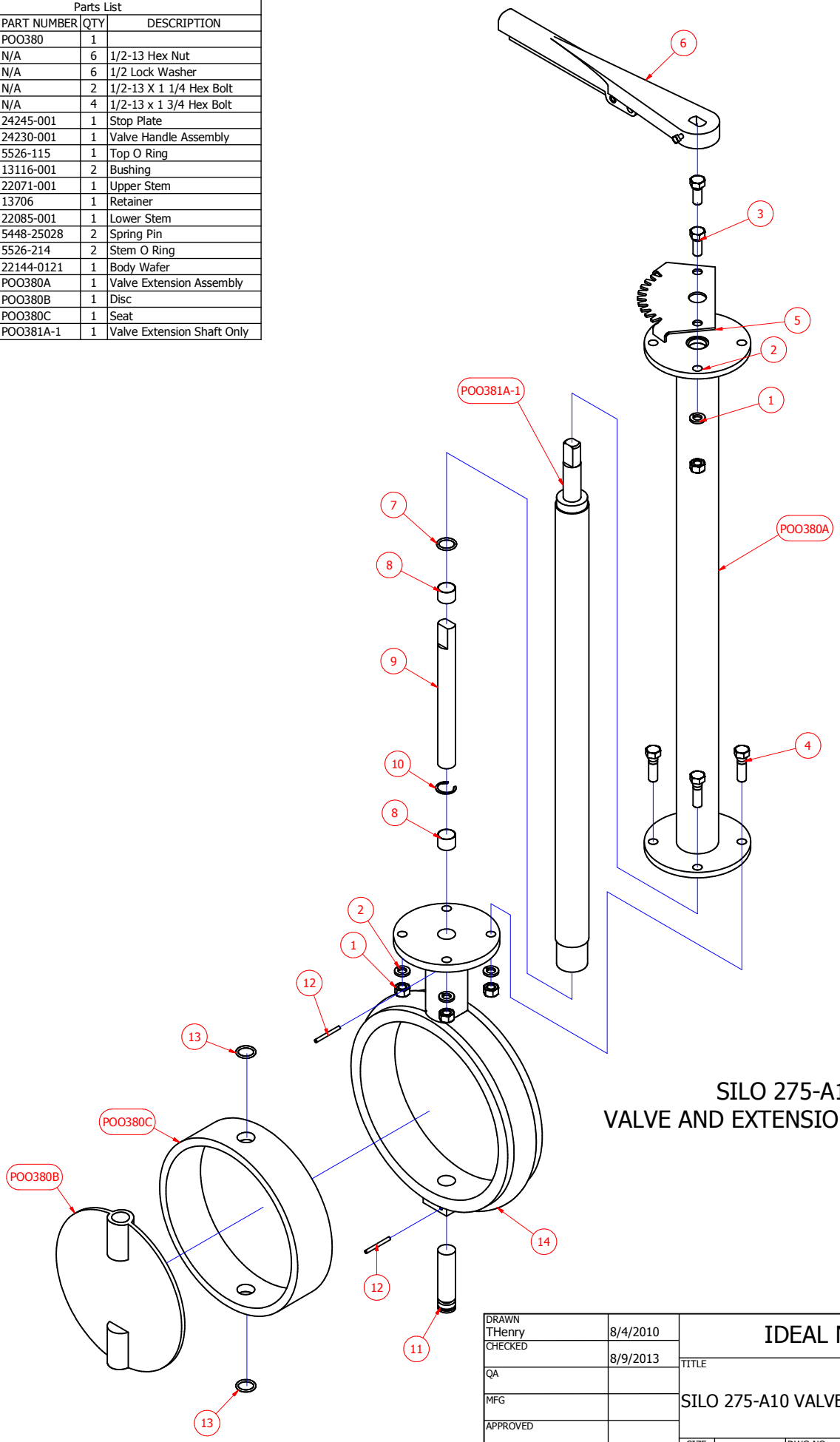


NOTE: AERATOR ASSEMBLY CAN BE REPLACED FROM OUTSIDE OF SILO. SILO AERATORS REQUIRE 10.2 CFM @ 90 PSI WITH A 60 GALLON TANK.

Parts List			
REF. NO.	PART NUMBER	QTY	DESCRIPTION
1	N/A	8	1/2-13 HEX NUT
2	N/A	8	1/2 LOCK WASHER
3	N/A	8	1/2-13 X 4 1/2 HEX BOLT
POO429	POO429	1	1/4 PIPE PLUG
BKO151	BKO151	6	1/2 POLY TUBE
POO192	POO192	2	CLAMP
POO362	POO362	1	FILLER BOOT
POO380	POO380	1	10" VALVE
POO665	POO665	1	3/4 BALL VALVE
POO673	POO673	6	AERATOR
POO674	POO674	6	EZ IN KIT
POO724	POO724	6	TUBE FITTING
POO725	POO725	6	TUBE FITTING
POO746	POO746	1	3/4 CLOSE NIPPLE
SIP133	SIP133	1	VALVE FLANGE
	A10 TANK	1	

DRAWN THenry	8/4/2010	IDEAL MFG., INC.
CHECKED	8/9/2013	
QA		TITLE: SILO 275 -A10 AERATOR COMPONENTS
MFG		
APPROVED		
SIZE C	DWG NO A10-111	REV
SCALE	SHEET 1 OF 1	

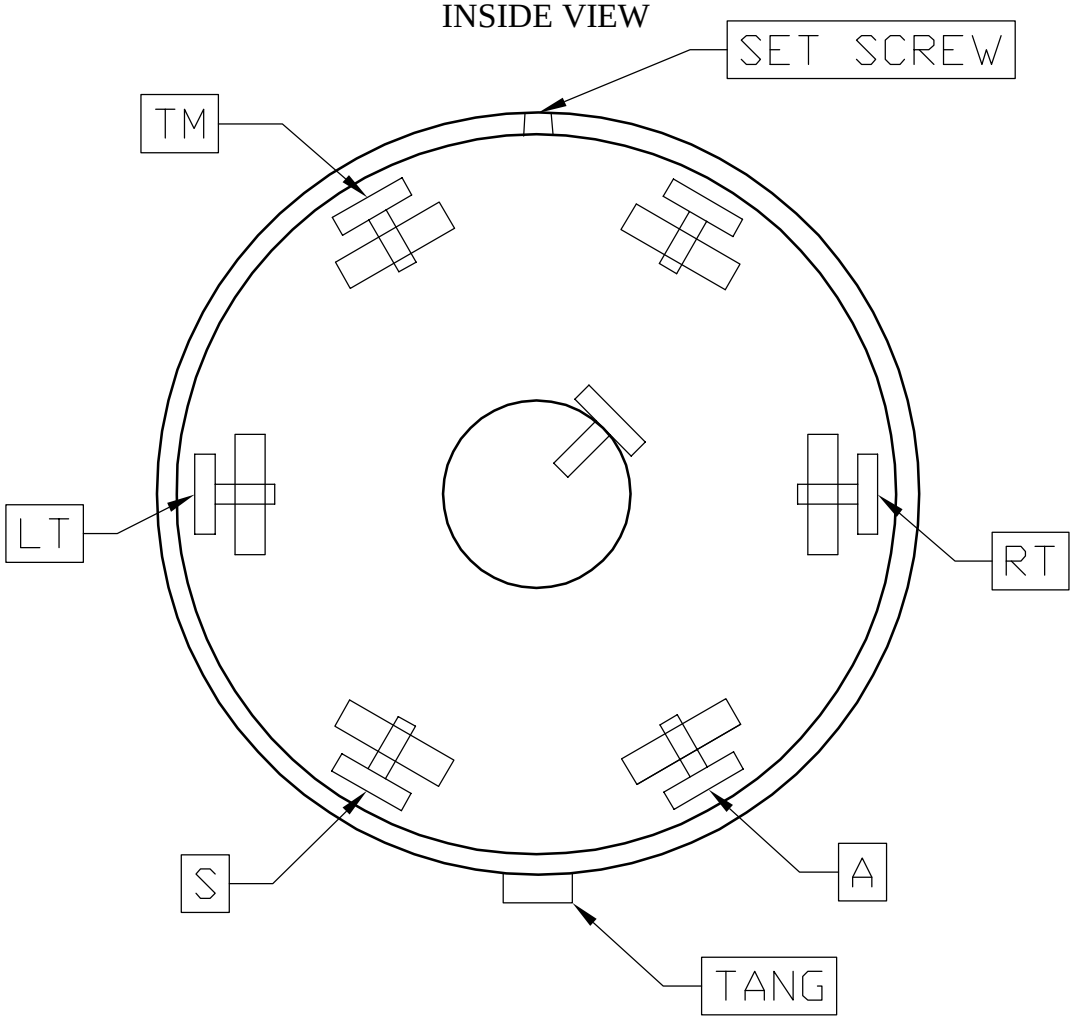
Parts List			
REF. NO.	PART NUMBER	QTY	DESCRIPTION
	POO380	1	
1	N/A	6	1/2-13 Hex Nut
2	N/A	6	1/2 Lock Washer
3	N/A	2	1/2-13 X 1 1/4 Hex Bolt
4	N/A	4	1/2-13 x 1 3/4 Hex Bolt
5	24245-001	1	Stop Plate
6	24230-001	1	Valve Handle Assembly
7	5526-115	1	Top O Ring
8	13116-001	2	Bushing
9	22071-001	1	Upper Stem
10	13706	1	Retainer
11	22085-001	1	Lower Stem
12	5448-25028	2	Spring Pin
13	5526-214	2	Stem O Ring
14	22144-0121	1	Body Wafer
POO380A	POO380A	1	Valve Extension Assembly
POO380B	POO380B	1	Disc
POO380C	POO380C	1	Seat
POO381A-1	POO381A-1	1	Valve Extension Shaft Only



SILO 275-A10
VALVE AND EXTENSION ASSEMBLY

DRAWN THenry	8/4/2010	IDEAL MFG., INC.	
CHECKED	8/9/2013	TITLE	
QA		SILO 275-A10 VALVE ASSEMBLY	
MFG			
APPROVED		SIZE C	DWG NO A10-112 REV
		SCALE	SHEET 1 OF 1

TOP
INSIDE VIEW



SEVEN POLE PLUG CONNECTOR

	DESCRIPTION	
TM	Tail & Clearance Lights	BROWN
S	Brake Ground	WHITE
RT	Right Signal	GREEN
LT	Left Signal	YELLOW
GD	Ground for Lights	WHITE
A	Hot Wire for Brake	BLACK

SILO 275-A10
ELECTRICAL CONNECTOR FOR TOWING

DATE
8-4-2010

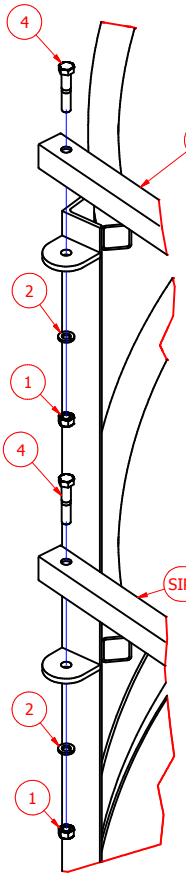
IDEAL MFG INC

A10-114

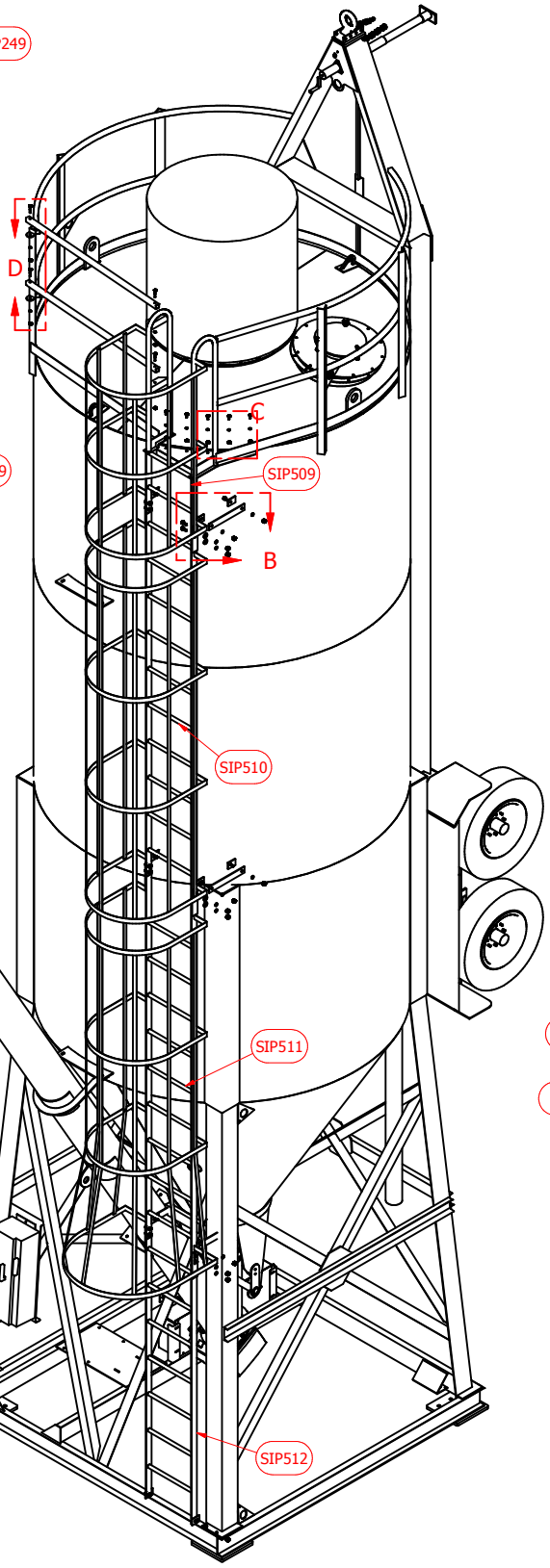
SILO 275-A10
LADDER COMPONENTS
Reference drawing A10-115 page 31

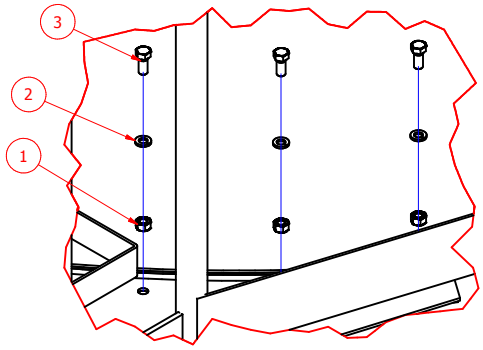
REF NO.	PART NO.	DESCRIPTION	REQ'D
1	N/A	3/8-16 Hex Nut	9
2	N/A	3/8 Lock Washer	9
3	N/A	3/8-16 X 1 Hex Bolt	5
4	N/A	3/8-16 X 2 Hex Bolt	4
5	N/A	1/2-13 Hex Nut	22
6	N/A	1/2 Lock Washer	22
7	N/A	1/2 Flat Washer	20
8	N/A	1/2-13 X 1 1/2 Hex Bolt	22
POO192	POO192	Clamp	1
POO691	POO691	Discharge Boot	1
SIP148	SIP148	Center Brace	2
SIP249	SIP249	Removable Hand Rail	2
SIP509	SIP509	Ladder Landing	1
SIP510	SIP510	Bottom Top Section	1
SIP511	SIP511	Ladder Center Section	1
SIP512	SIP512	Ladder Bottom Section	1

SILO 275-A10
LADDER COMPONENTS

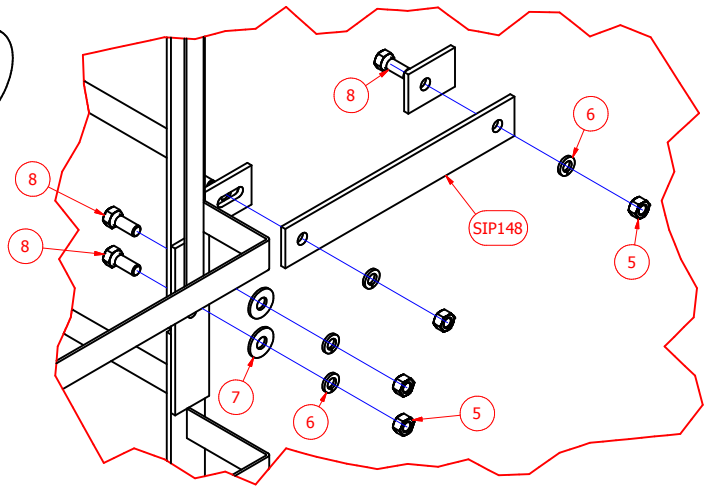


DETAIL D
SCALE 1 / 4





DETAIL C
SCALE 1 / 4

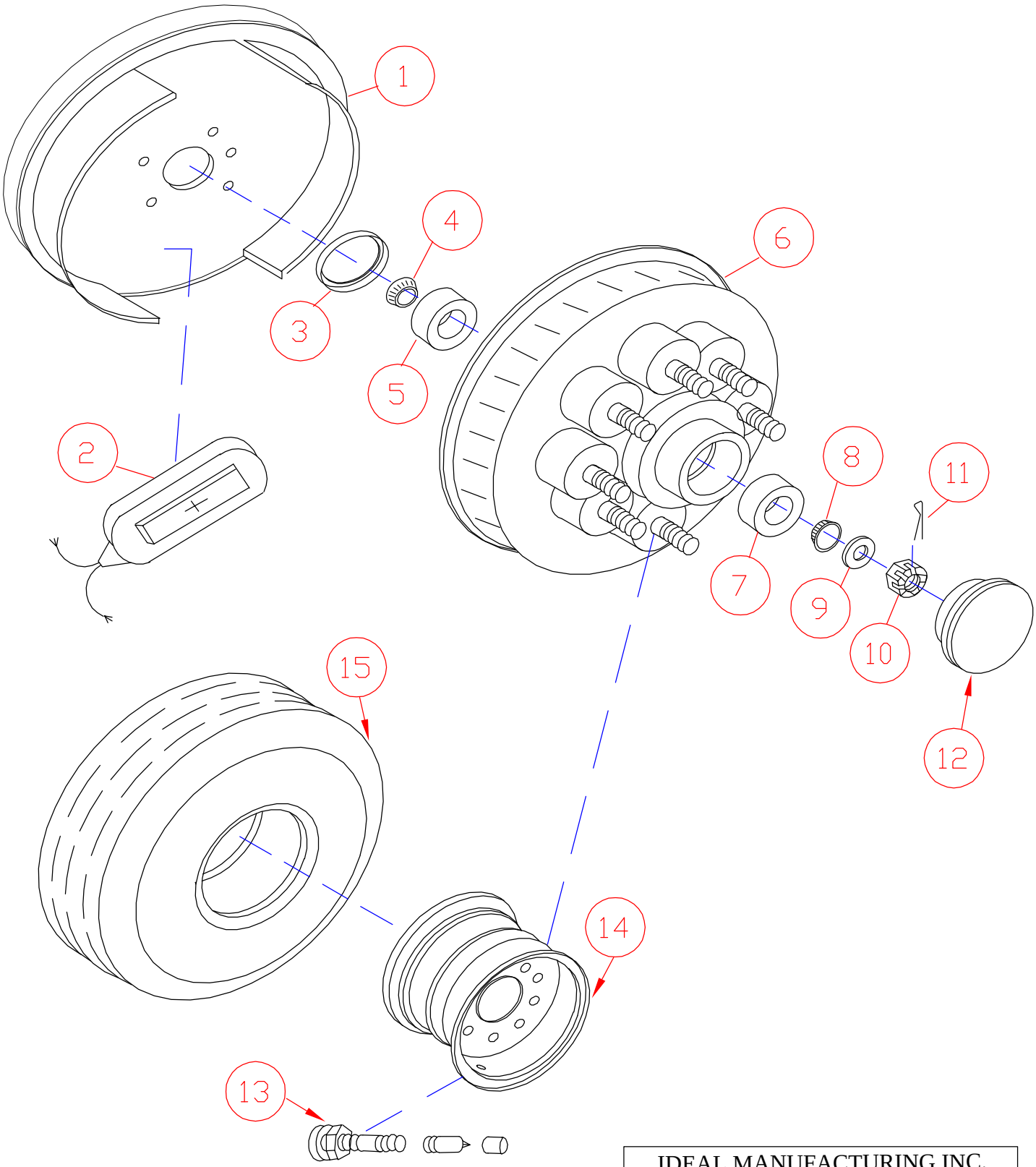


DETAIL B
SCALE 1 / 4

DRAWN THenry	8/5/2010	IDEAL MFG., INC.	
CHECKED	8/9/2013	TITLE	
QA		SILO 275-A10 LADDER COMPONENTS	
MFG			
APPROVED		SIZE C	DWG NO A10-115 REV
		SCALE	SHEET 1 OF 1

SILO 275-A10
TRAILER UNDERCARRIAGE WHEEL COMPONENTS
Reference drawing A10-116 page 33
FOUR ASSEMBLIES INCLUDED

REF NO.	PART NO.	DESCRIPTION	REQ'D
1	POO831	Right Brake Assembly	2
	POO832	Left Brake Assembly	2
2	POO833	Actuator Magnet Kit	4
3	POO834	Inner Grease Seal	4
4	POO835	Inner Bearing	4
5	POO836	Inner Bearing Race	4
6	POO837	Hub and Brake Drum	4
7	POO838	Outer Bearing Race	4
8	POO839	Outer Bearing	4
9	POO840	Spindle Washer	4
10	POO841	Spindle Nut	4
11	N/A	5/32ò x 1 ½ò Cotter Pin	4
12	POO842	Dust Cap	4
13	POO843	Valve Stem Assembly	4
14	POO844	Tire Rim	4
15	POO845	Tire	4
16	POO846	Tire Rim Lug Bolts	32



IDEAL MANUFACTURING INC.

PHONE (406)-656-4360 FAX: (406)-656-4363

SILO 275-A10
WHEEL COMPONENTS

DWG # A10-116

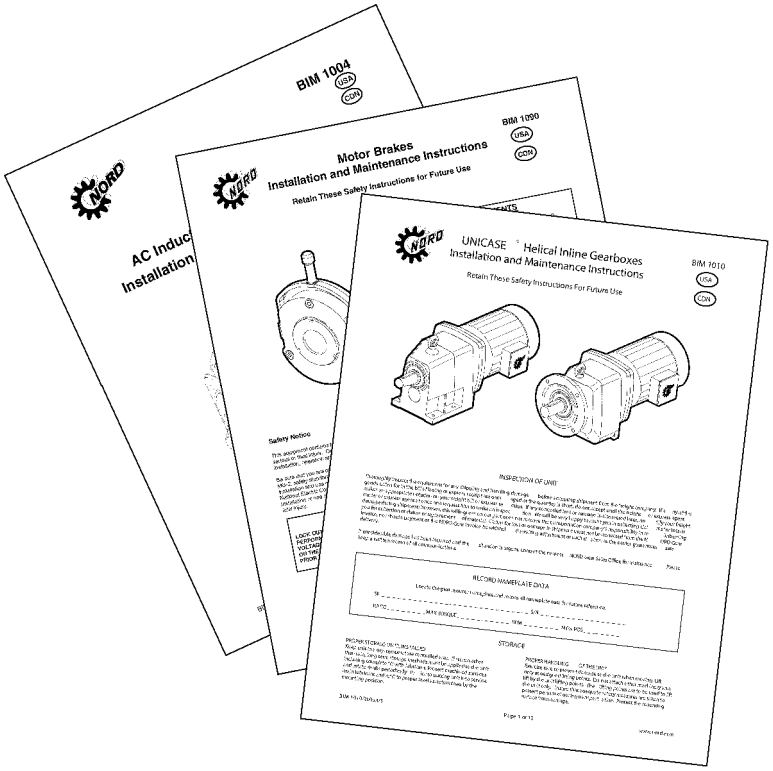
DATE: 08-05-2010

SILO 275-A10
NORD SPEED REDUCER

Note: Nord Speed Reducer is filled with
Mobil Spartan EP220 Lubricant
When changing lubricant use Mobil Spartan EP220 only.

Installation & Operating Instructions
Document Collection

Serial number:	820844216400



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Phone 608-849-0190

MIDWEST
Waunakee, WI (Madison)
Phone 608-849-7300

ATLANTIC
Charlotte, NC
Phone 608-849-0140

CANADA
Brampton, ON
Phone 905-796-3606

GENERAL INSTRUCTIONS

DRIVESYSTEMS — RETAIN FOR FUTURE USE — BIM 1000

1. GENERAL INFORMATION

This documentation is intended to provide general information and safety guidelines. It is the responsibility of the buyer, machine builder, installer and user of the NORD product to make sure that all the proper safety notes and operating instructions have been reviewed and understood. If the contents of this instruction or any applicable operating instructions are not understood, please consult NORD.

WARNING

- Electric motors, gearmotors, electrical brakes, variable frequency drives, and gear reducers contain potentially dangerous high-voltage, rotating-components and surfaces that may become hot during operation. All work involved in the transport, connection, commissioning and maintenance of any NORD product must be carried out by qualified and responsible technicians

2. INSPECT INCOMING FREIGHT

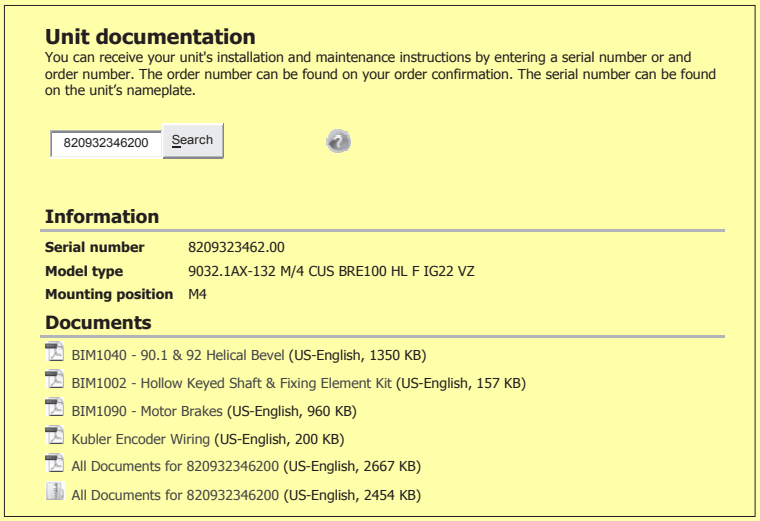
Before accepting shipment from the freight company, thoroughly inspect the NORD equipment for any shipping and handling damage. If any goods called for in the bill of lading or express receipt are damaged, or the quantity is short, do not accept until the freight express agent makes an appropriate notation 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 a formal review of your claim. Claims for loss or damage in shipment must not be deducted from the NORD Invoice, nor should payment of the NORD Invoice be withheld awaiting adjustment of such claims, as the carrier guarantees safe delivery. NORD will try to assist 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.

3. OBTAINING THE DETAILED OPERATING INSTRUCTIONS

One can receive the detailed installation and maintenance instructions by entering a serial number (or NORD order number) at the appropriate location on the NORD web site.

i. Record the serial number from your gearmotor, gear reducer, or motor nameplate, or record the serial number found on your order confirmation.
ii. Go to **www.nord.com/docs** to download the appropriate operating instructions.

EXAMPLE: www.nord.com/docs



4. INTENDED USE

NORD is a supplier of electric motors, gearmotors, reducers, electromechanical brakes, mechanical variable speed drives, and electrical variable frequency drives that are intended for commercial installations on larger systems and machines. NORD does not accept any liability for damage or injury caused by:

- ☑ Inappropriate use, operation or adaptation of the drive system
- ☑ Unauthorized modifications to the drive system
- ☑ Improper servicing or repair work on the drive system
- ☑ Damage caused during shipment or transportation
- ☑ Disregard of the important Safety Notes or Operating Instructions.

5. NOTES CONCERNING WARRANTY AND LIABILITY

All units are supplied according to our standard "Conditions of Sale." The unit limited warranty is defined in our "Conditions of Sale."

All NORD Safety Notes and all related NORD Operating instructions shall be considered up-to-date at the time in which they were compiled by the buyer, machine builder, installer or user. NORD reserves the right to incorporate technical modifications and information updates to any safety instructions or operating instructions that are within the scope of providing additional knowledge or clarification, communicating design changes, or product enhancements.

Information updates may include any NORD product, or subsequent products purchased and supplied by NORD; applicable product categories may include (but are not limited to) NORD electric motors, gearmotors, reducers, electromechanical brakes, mechanical variable speed drives, and electrical variable frequency drives. No specific claims can be derived from the information or illustrations and descriptions contained in the safety notes or related operating instructions.

WARNING

- NORD assumes no liability for personal injury, equipment damage or malfunctions resulting from failure to comply with any installation safety notes. The applicable national, regional, and local work regulations and safety requirements must also be complied with. Failure to comply with any safety notes or regulations may result in serious injury, damage to property, or even death.

6. CHECK LIST FOR INSTALLATION AND OPERATION

- ☑ Verify that purchased NORD product has been supplied with the expected accessories and options. Check the received goods and packing slip to make sure items are properly received.
- ☑ Make sure that you have all the required Operating Instructions for your NORD electric motor, gearmotor, reducer, electromechanical brake, mechanical variable speed drives, or electrical variable frequency drives.
- ☑ Consult NORD if you feel you are missing any documentation or if you have questions.

NORD Gear Corporation
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EAST
Charlotte, NC
Phone: 608.849.0140

CANADA
Brampton, ON (Toronto)
Phone: 905.796.3606

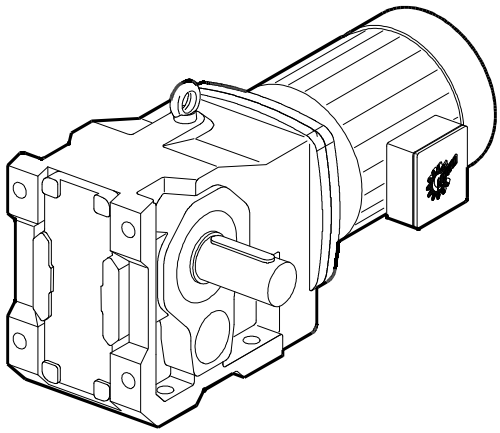
100200100/0309

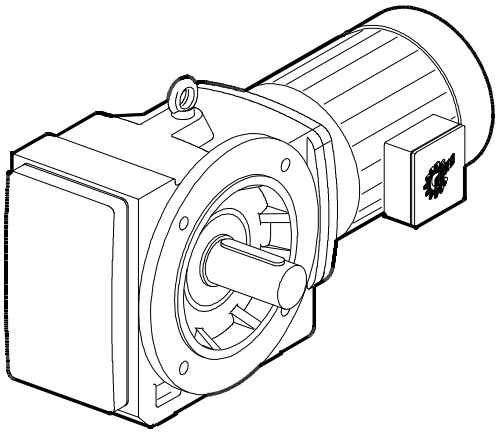
USA

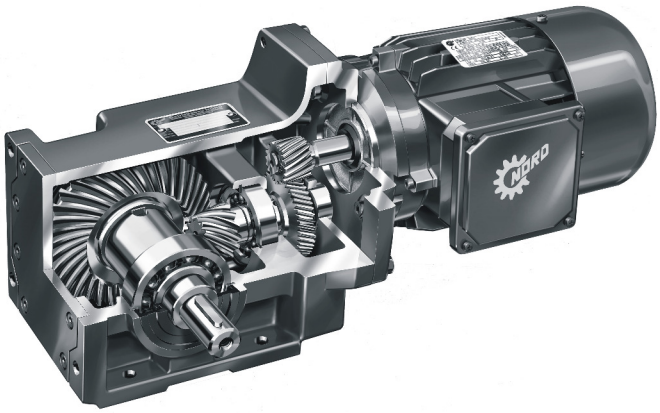
CDN

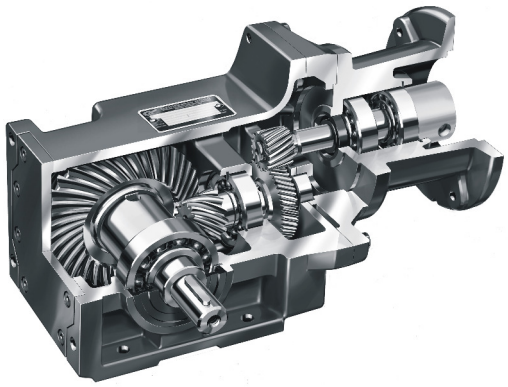
Installation and Maintenance Instructions

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.

INSTALLATION OF UNIT

To ensure long service and dependable performance, an enclosed gear drive must be rigidly supported and the shafts accurately aligned. The following describes the minimum precautions required to accomplish this end.

FOUNDATION
The responsibility for the design and construction of the foundation lies with the user. The foundation must be adequate to withstand normal operating loads and possible overloads while maintaining alignment to attached system components under such loads.

MOUNTING POSITION
Unless a unit is specifically ordered for inclined mounting, the foundation must be level and flat. The lubrication system may not operate properly if the unit is not mounted in the position for which it is designed. It may be desirable to elevate the foundation to facilitate oil drainage.

CONCRETE FOUNDATION
If a concrete foundation is used, steel mounting pads and bolts of sufficient size to distribute the stress into the concrete should be grouted into the foundation.

STEEL FOUNDATION
If a structural steel foundation is used (i.e. wide flange beams or channels), a base plate or sole plate of suitable thickness should be used and should extend under the entire unit.

FOOT MOUNTED UNITS
Use shims under the feet of the unit to align the output shaft to the driven equipment. Make sure that all feet are supported so that the housing will not distort when it is bolted down. Improper shimming will reduce the life of the unit and may cause failure. Dowel pins may be installed to prevent misalignment and ensure proper realignment if removed for service.

SHAFT MOUNTED UNITS
Shaft mounted drives should be mounted as close to the driven equipment bearing support as possible to minimize bearing loads due to overhung load. Design of the joint connection between the torque reaction arm and the foundation is the user's responsibility.

Hollow Shaft Diameter tolerance
Metric (mm)

≤ ∅ 18 = +0.018/-0.000
> ∅ 18 ≤ ∅ 30 = +0.021/-0.000
> ∅ 30 ≤ ∅ 50 = +0.025/-0.000
> ∅ 50 ≤ ∅ 80 = +0.030/-0.000
> ∅ 80 ≤ ∅ 120 = +0.035/-0.000
> ∅ 120 ≤ ∅ 180 = +0.040/-0.000

Inch

≤ ∅ 4.375 = +0.0010 / -0.0000
> ∅ 4.375 = +0.0015 / -0.0000

Customer shaft diameter tolerances with keyed hollow shafts
Metric (mm)

≤ ∅ 18 = +0.000/-0.011
> ∅ 18 ≤ ∅ 30 = +0.000/-0.013
> ∅ 30 ≤ ∅ 50 = +0.000/-0.016
> ∅ 50 ≤ ∅ 80 = +0.000/-0.019
> ∅ 80 ≤ ∅ 120 = +0.000/-0.022
> ∅ 120 ≤ ∅ 180 = +0.000/-0.025

Inch

≤ ∅ 1.500 = +0.000/-0.002
> ∅ 1.500 ≤ ∅ 2.500 = +0.000/-0.003
> ∅ 2.500 ≤ ∅ 7.000 = +0.000/-0.004

Shaft finish to be 125 micro inches or smoother.

Customer shaft diameter tolerance with Shrink Disc fit h6
Metric (mm)

≤ ∅ 18 = +0.000/-0.011
> ∅ 18 ≤ ∅ 30 = +0.000/-0.013
> ∅ 30 ≤ ∅ 50 = +0.000/-0.016
> ∅ 50 ≤ ∅ 80 = +0.000/-0.019
> ∅ 80 ≤ ∅ 120 = +0.000/-0.022
> ∅ 120 ≤ ∅ 180 = +0.000/-0.025

Inch

≤ ∅ 0.750 = +0.0000/-0.0004
> ∅ 0.750 ≤ ∅ 1.125 = +0.0000/-0.0005
> ∅ 1.125 ≤ ∅ 2.000 = +0.0000/-0.0006
> ∅ 2.000 ≤ ∅ 3.000 = +0.0000/-0.0007
> ∅ 3.000 ≤ ∅ 4.750 = +0.0000/-0.0008
> ∅ 4.750 ≤ ∅ 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)

≤ ∅ 18 =-0.016/-0.024
> ∅ 18 ≤ ∅ 30 = -0.020/-0.029
> ∅ 30 ≤ ∅ 50 = -0.025/-0.036
> ∅ 50 ≤ ∅ 80 = -0.030/-0.043
> ∅ 80 ≤ ∅ 120 = -0.036/-0.051
> ∅ 120 ≤ ∅ 180 = -0.043/-0.061

Inch

≤ ∅ 0.750 = -0.0006/-0.0011
> ∅ 0.750 ≤ ∅ 1.125 = -0.0008/-0.0013
> ∅ 1.125 ≤ ∅ 2.000 = -0.0010/-0.0016
> ∅ 2.000 ≤ ∅ 3.000 = -0.0012/-0.0019
> ∅ 3.000 ≤ ∅ 4.750 = -0.0014/-0.0023
> ∅ 4.750 ≤ ∅ 7.000 = -0.0017/-0.0027

Shaft finish to be 125 micro inches or smoother

FLANGE MOUNTED UNITS
If a structural steel foundation is used (i.e. wide flange beams or channels), a base plate or sole plate of suitable thickness should be used and should extend under the entire unit. If a bulk head plate is used it should be of proper strength to minimize buckling distortions.

Flange Pilot 'AK' or 'AK1' tolerance
Metric (mm)

> ∅ 50 ≤ ∅ 80 = +0.012/-0.007
> ∅ 80 ≤ ∅ 120 = +0.013/-0.009
> ∅ 120 ≤ ∅ 180 = +0.014/-0.011
> ∅ 180 ≤ ∅ 230 = +0.016/-0.013
> ∅ 230 ≤ ∅ 315 = +0.000-0.032
> ∅ 315 ≤ ∅ 400 = +0.000/-0.036
> ∅ 400 ≤ ∅ 500 = +0.000/-0.040

Inch

> ∅ 1.969 ≤ ∅ 3.150 = +0.005/-0.0003
> ∅ 3.150 ≤ ∅ 4.724 = +0.005/-0.0004
> ∅ 4.724 ≤ ∅ 7.087 = +0.006/-0.0004
> ∅ 7.087 ≤ ∅ 9.055 = +0.006/-0.0005
> ∅ 9.055 ≤ ∅ 12.402 = +0.000/-0.0013
> ∅ 12.402 ≤ ∅ 15.748 = +0.000/-0.0014
> ∅ 15.748 ≤ ∅ 19.685 = +0.000/-0.0016

BOLT STRENGTH
Bolt size, strength and quantity should be verified to insure proper torque reaction capacity whatever the mounting arrangement.

LUBRICATE SHAFTS
Both the hollow shaft and the driven shaft should be liberally lubricated before assembly. The unit must slide freely onto the driven shaft. Do not hammer or force the unit into place. For shrink disc, follow instructions below.

AXIAL RETENTION
Each drive shaft must be retained in place relative to the gear reducer. Or each gear reducer must be retained in place relative to the drive shaft. Either way NORD recommends the use of shaft shoulders, locking collars or FIXING ELEMENTS to axially retain the shaft or gear reducer in position.

SET SCREWS
If set screws are used for axial retention, they should be tightened evenly. Flats may be filed on the driven shaft and a thread-locking adhesive used for more position retention.

SNAP RING RETENTION
Placing external snap rings on drive shafts must be performed with caution. The groove, which the snap ring fits into, may weaken the drive shaft causing premature failure. NORD does not recommend this type of shaft retention.

THRUST PLATE
In applications, which are subject to high vibratory loads, a thrust plate will provide greater resistance to axial movement. Follow the manufacturer's recommendations for assembly.

SHRINK DISC
If a shrink disc is used to secure a reducer hollow shaft to the driven shaft, follow this assembly procedure. Start with the shrink disc mounted onto the extension of the hollow shaft disc locking bolts loosened.

1. Clean reducer bore and mating solid shaft to be free of any lubricants or dirt.
2. Slide reducer onto the solid shaft until it is about half way through.
3. Lubricate the remaining portion of the solid shaft with a #2 grease or similar lubricant. This part will be located under the bronze bushing. **Do not install grease under the shrink disc gripping area.** Finish installing the solid shaft into the reducer hollow bore.
4. Finger tighten all shrink disc bolts. Now, moving a circular pattern, tighten each shrink disc locking bolt 1/4 to 1/2 turn. **Do not use criss cross pattern.** Continue tightening in the same circular direction with 1/4 or 1/2 turn increments until all bolts reach the specified bolt tightening torque. Bolt tightening torque is shown on the shrink disc label for the particular unit.
5. Run unit for 24 hours, then retighten shrink disc locking bolts to the proper bolt torque as indicated above.

TORQUE REACTION ARM
On the shaft mount 'Clincher', torque is reacted through the integral torque tab, which is part of the casting. Commonly, NORD's optional RUBBER BUFFER bushings are installed on each side of the integral torque tab to dampen torque shocks and allow for mis-alignment received from the machinery during operation.

Torque arm connection fabrications should always be mounted perpendicular to a line through the output shaft center and the point at attachment of the torque arm to the unit housing. In this position the minimum load on the attachment structure arm will be experienced. The attachment structure must be rigid and may not deflect under any load. Doing so will place extra loads on the output bearings of the reducer.

PRIME MOVER MOUNTING
Align the prime mover to the reducer-input shaft using shims under the feet. Make sure that the feet are supported. Dowel the prime mover to its foundation.

SHAFT CONNECTIONS
When connecting shafts to either the input or output of the reducer, consider the following instructions.

FITS
Clearance or interference fits for coupling hubs should be in accordance with ANSI/AGMA 9002-A86 or as follows.

Output and Input shaft Diameter tolerance
Metric (mm)

≤ ∅ 18 = +0.012/+0.001
> ∅ 18 ≤ ∅ 30 = +0.015/+0.002
> ∅ 30 ≤ ∅ 50 = +0.018/+0.002
> ∅ 50 ≤ ∅ 80 = +0.030/+0.011
> ∅ 80 ≤ ∅ 120 = +0.035/+0.013
> ∅ 120 ≤ ∅ 180 = +0.040/+0.015

Inch

≤ ∅ 1.750 = +0.0000/-0.0005
> ∅ 1.750 = +0.0000/-0.0010

Output and Input shaft Drill and tap shaft end
Metric (mm)

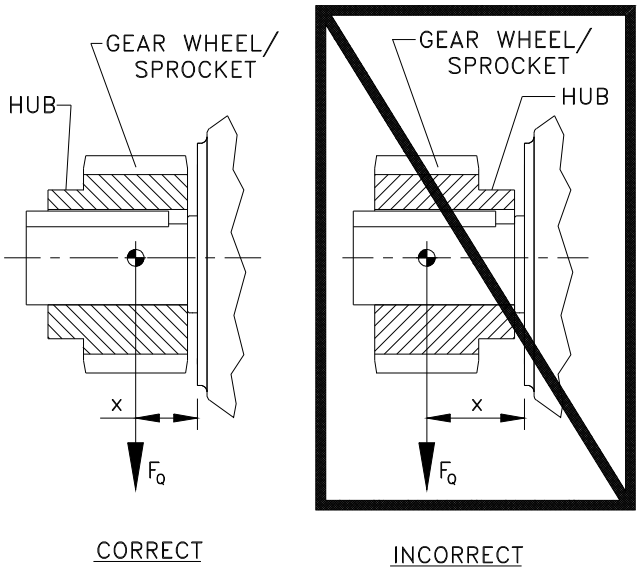
≤ ∅ 16 = M5
> ∅ 16 ≤ ∅ 21 = M6
> ∅ 21 ≤ ∅ 24 = M8
> ∅ 24 ≤ ∅ 30 = M10
> ∅ 30 ≤ ∅ 38 = M12
> ∅ 38 ≤ ∅ 50 = M16
> ∅ 50 ≤ ∅ 85 = M20
> ∅ 85 ≤ ∅ 130 = M24

Inch

≤ ∅ 0.438 = #10-24 x 0.4 deep
> ∅ 0.438 ≤ ∅ 0.813 = ¼-20 x 0.6 deep
> ∅ 0.813 ≤ ∅ 0.938 = 5/16-18 x 0.7 deep
> ∅ 0.938 ≤ ∅ 1.125 = 3/8-16 x 0.9 deep
> ∅ 1.125 ≤ ∅ 1.375 = 1/2-13 x 1.1 deep
> ∅ 1.375 ≤ ∅ 1.875 = 5/8-11 x 1.4 deep
> ∅ 1.875 ≤ ∅ 3.250 = 3/4-10 x 1.7 deep
> ∅ 3.250 = 1-8 x 2.2 deep

Outboard pinion and sprocket fits should be as recommended by the pin sprockets with interference fits should be heated according to the manufacturer's recommendations, generally 250°F to 300°F, (120°C to 150° C) before assembling to the shaft.

LOCATION
Coupling hubs should be mounted flush with the shaft ends, unless specifically ordered for overhung mounting. Pinions, sprockets and sheaves should be mounted as close as possible to the unit housing to minimize bearing loads and shaft deflections.



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.

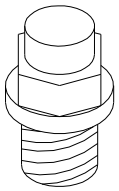
1. Properly install unit on a rigid foundation
   - adequately supported
   - securely bolted into place
   - leveled so as not to distort the gear case
2. Properly install couplings suitable for the application and connected equipment.
3. Ensure accurate alignment with other equipment.
4. Furnish and 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.

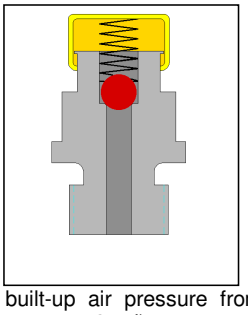
CHANGES IN PERFORMANCE SPECIFICATIONS
Owner has the responsibility to consult with NORD GEAR if such items such as applied loads, operating speeds or other operating conditions have changed.

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.

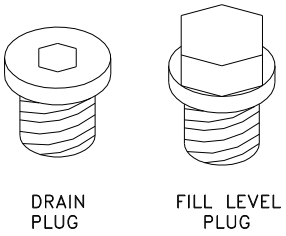
AUTOVENT PLUG
The Autovent plug is brass in color and will be located at the highest point on the gearbox. It operates like a check-valve to allow the reducer to relieve internal pressure while preventing lubricant contamination during cooling. A spring presses a ball or plunger against a machined orifice 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.


AUTOVENT PLUG



The Autovent releases built-up air pressure from inside the gearbox (Max. pressure 2 psi).

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.



Two types of plugs for maintenance

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 ½ inch of the bottom of the fill plug threads.

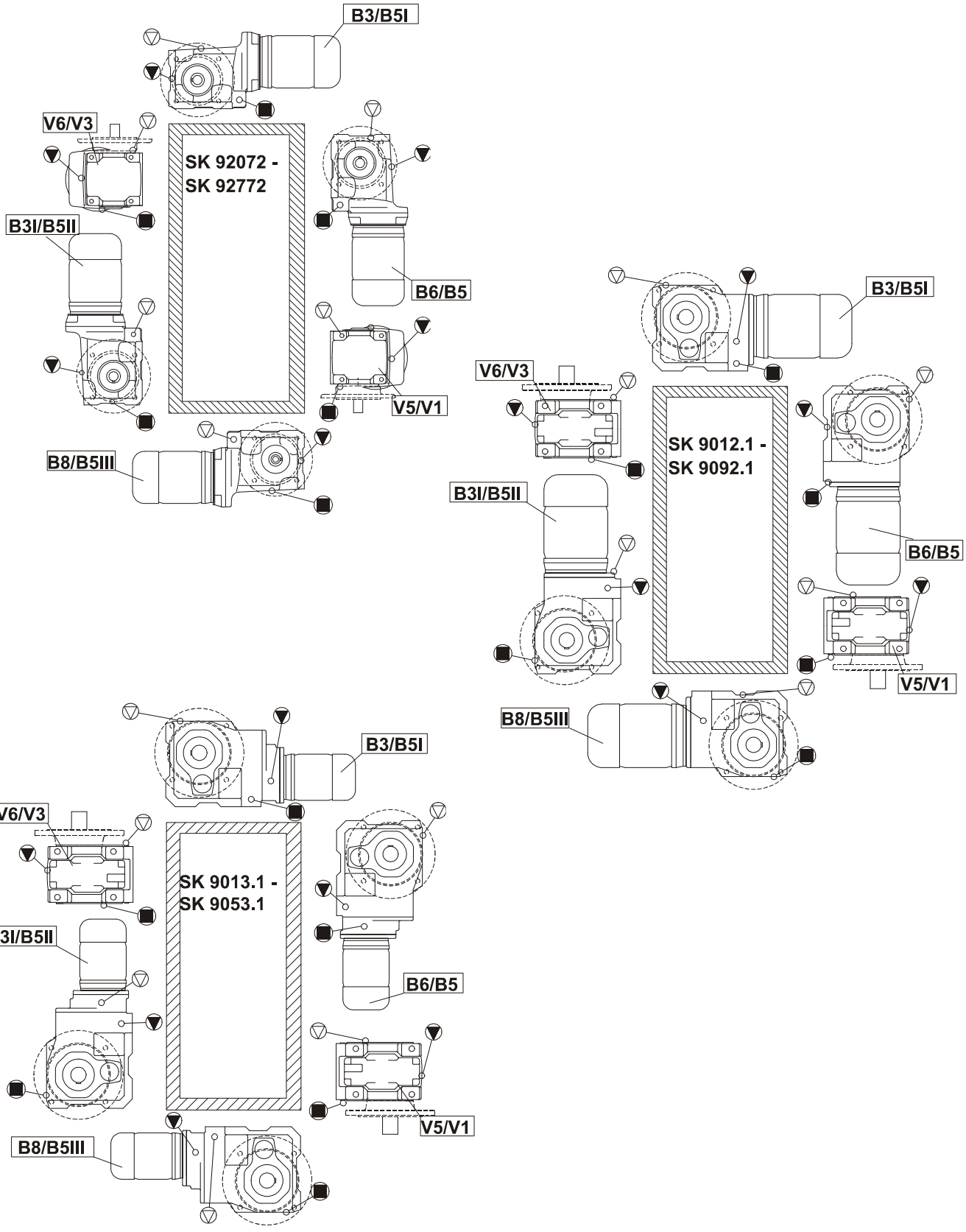
OPERATION AND MAINTENANCE CHECKLIST
1. Operate the equipment as it was intended to be operated
2. Do not overload.
3. Run at correct speed.
4. Maintain lubricant in good condition and at proper level.
5. Dispose of used lubricant in accordance with applicable laws and regulations.
6. Apply proper maintenance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

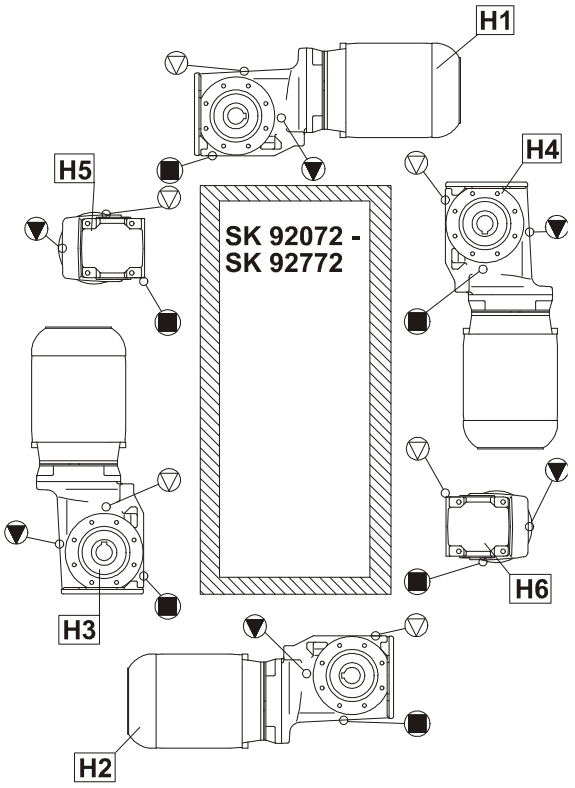
NOTES

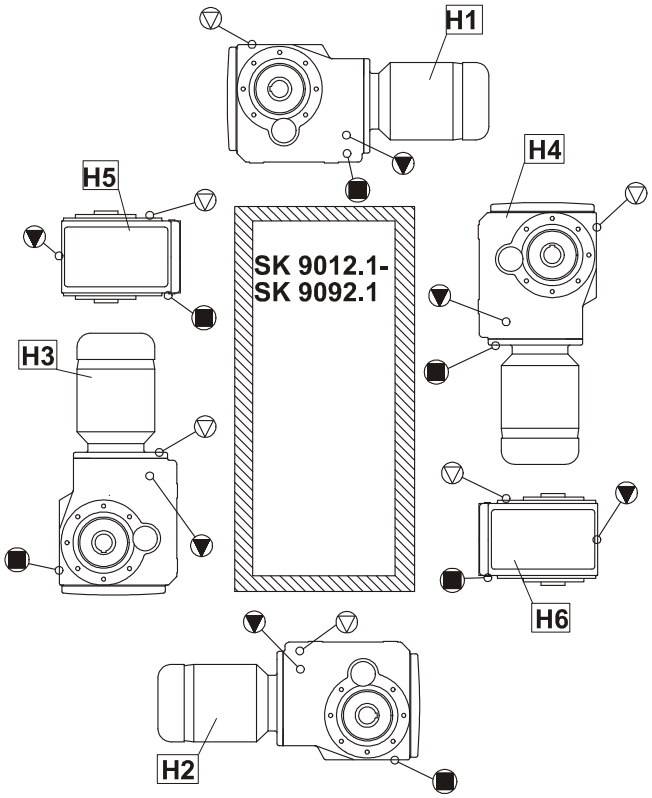
MOUNTING POSITIONS

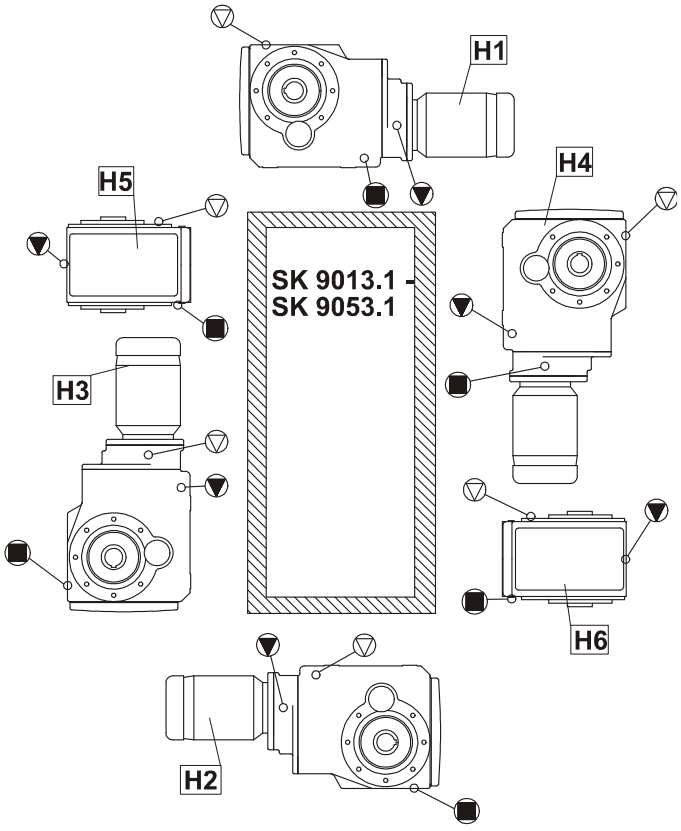
These charts detail the mounting positions for horizontal and vertical mounting. The Autovent, oil fill plug and drain plug are indicated on each mounting position picture. The factory set mounting position and plug locations match that shown on the gearbox nametag. For mounting orientations other than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

The 92 Series Helical Bevel gearbox sizes SK92072, SK92172 & SK92372 have no vent or drain plugs. They are filled with synthetic oil so the units are "Lubed for Life".




H1
H4
H5
SK 92072 -
SK 92772
H6
H3
H2


H1
H4
H5
SK 9012.1-
SK 9092.1
H3
H6
H2


H1
H4
H5
SK 9013.1 -
SK 9053.1
H3
H6
H2

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.

The 92 Series Helical Bevel gearbox sizes SK92072, SK92172 & SK92372 have no vent or drain plugs. They are filled with synthetic oil so the units are "Lubed for Life".

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	Mobil	Shell	Castrol	KLÜBER LUBRICATION	bp	Tribol
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 +77F	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 +50F	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 ½ inch of the bottom of the fill plug threads.

LUBRICATION CAPACITY – 90.1 SERIES HELICAL BEVEL GEARBOXES

Mounting position		Foot mounting															
		triple reduction										quadruple reduction					
		9012.1	9016.1	9022.1	9032.1	9042.1	9052.1	9072.1	9082.1	9086.1	9092.1	9013.1	9017.1	9023.1	9033.1	9043.1	9053.1
B 3	quarts	0.74	0.74	1.37	1.80	4.64	6.87	10.60	17.96	27.47	38.04	1.27	1.27	2.54	3.49	4.86	10.57
	liters	0.70	0.70	1.30	1.70	4.39	6.50	10.02	17.00	26.00	36.00	1.20	1.20	2.40	3.30	4.60	10.00
B 3 I	quarts	2.54	2.54	4.44	7.08	10.36	22.72	38.10	75.55	107.78	181.75	3.17	3.17	5.60	8.24	13.52	25.57
	liters	2.40	2.40	4.20	6.70	9.80	21.50	36.05	71.50	102.00	172.00	3.00	3.00	5.30	7.80	12.79	24.20
B 6	quarts	1.69	1.69	2.74	5.07	9.19	16.91	29.10	54.42	77.14	165.90	2.11	2.11	3.17	6.97	10.87	17.69
	liters	1.60	1.60	2.59	4.80	8.70	16.00	27.53	51.50	73.00	157.00	2.00	2.00	3.00	6.60	10.29	16.74
B 6 I	quarts	0.74	0.74	1.37	1.79	4.65	6.87	10.60	17.96	27.47	38.04	1.27	1.27	2.54	3.49	4.86	10.57
	liters	0.70	0.70	1.30	1.69	4.40	6.50	10.02	17.00	26.00	36.00	1.20	1.20	2.40	3.30	4.60	10.00
B 6 II	quarts	2.54	2.54	4.44	7.08	10.36	22.72	38.10	75.55	107.78	181.75	3.17	3.17	5.60	8.24	13.52	25.57
	liters	2.40	2.40	4.20	6.70	9.80	21.50	36.05	71.50	102.00	172.00	3.00	3.00	5.30	7.80	12.79	24.20
B 8	quarts	2.01	2.01	3.70	6.76	10.57	20.08	33.80	66.04	89.82	179.64	2.32	2.32	4.02	7.40	11.31	21.13
	liters	1.90	1.90	3.50	6.40	10.00	19.00	31.98	62.50	85.00	170.00	2.20	2.20	3.80	7.00	10.70	20.00
B 8 I	quarts	1.69	1.69	2.74	5.07	9.19	16.91	29.10	54.42	77.14	165.90	2.11	2.11	3.17	6.97	10.78	17.69
	liters	1.60	1.60	2.59	4.80	8.70	16.00	27.53	51.50	73.00	157.00	2.00	2.00	3.00	6.60	10.20	16.74
V 5	quarts	1.27	1.27	2.11	4.33	7.18	11.62	19.00	34.87	50.72	84.54	1.48	1.48	2.32	4.54	5.49	12.15
	liters	1.20	1.20	2.00	4.10	6.79	11.00	17.98	33.00	48.00	80.00	1.40	1.40	2.20	4.30	5.20	11.50
V 5 I	quarts	1.27	1.27	2.11	4.33	7.18	11.62	19.00	34.87	50.72	84.54	1.48	1.48	2.32	4.54	5.49	12.15
	liters	1.20	1.20	2.00	4.10	6.79	11.00	17.98	33.00	48.00	80.00	1.40	1.40	2.20	4.30	5.20	11.50
V 6	quarts	1.80	1.80	2.96	5.39	7.93	16.38	25.40	49.14	65.51	95.10	2.01	2.01	3.28	5.39	7.08	17.43
	liters	1.70	1.70	2.80	5.10	7.50	15.50	24.03	46.50	62.00	90.00	1.90	1.90	3.10	5.10	6.70	16.49
V 6 I	quarts	1.80	1.80	2.96	5.39	7.93	16.38	25.40	49.14	65.51	95.10	2.01	2.01	3.28	5.39	7.08	17.43
	liters	1.70	1.70	2.80	5.10	7.50	15.50	24.03	46.50	62.00	90.00	1.90	1.90	3.10	5.10	6.70	16.49
Mounting position		Flange mounting															
		triple reduction										quadruple reduction					
B 5	quarts	2.01	2.01	2.75	5.49	10.25	17.44	29.10	57.06	82.42	137.37	2.43	2.43	3.17	6.02	10.78	19.02
	liters	1.91	1.91	2.61	5.22	9.74	16.57	27.53	54.21	78.30	130.50	2.31	2.31	3.01	5.72	10.24	18.07
B 5 I	quarts	0.74	0.74	1.37	2.01	3.80	7.93	12.70	22.19	38.04	42.27	1.27	1.27	2.54	2.85	6.02	13.21
	liters	0.70	0.70	1.30	1.91	3.61	7.53	12.02	21.08	36.14	40.16	1.21	1.21	2.41	2.71	5.72	12.55
B 5 II	quarts	2.54	2.54	4.44	7.71	12.15	24.83	40.70	84.54	124.69	184.92	3.17	3.17	5.60	8.98	15.53	28.00
	liters	2.41	2.41	4.22	7.32	11.54	23.59	38.51	80.31	118.46	175.67	3.01	3.01	5.32	8.53	14.75	26.60
B 5 III	quarts	2.01	2.01	3.70	6.76	12.05	21.13	34.90	69.74	96.16	162.73	2.32	2.32	4.02	7.29	12.04	22.19
	liters	1.91	1.91	3.52	6.42	11.45	20.07	33.02	66.25	91.35	154.59	2.20	2.20	3.82	6.93	11.44	21.08
V 1	quarts	1.27	1.27	2.11	3.49	6.87	12.15	20.10	40.15	56.00	86.65	1.47	1.47	2.32	3.80	6.97	13.74
	liters	1.21	1.21	2.00	3.32	6.53	11.54	19.02	38.14	53.20	82.32	1.40	1.40	2.20	3.61	6.62	13.05
V 3	quarts	1.80	1.80	2.96	5.39	8.66	19.02	27.50	54.95	80.31	96.16	2.01	2.01	3.28	5.92	10.41	17.96
	liters	1.71	1.71	2.81	5.12	8.23	18.07	26.02	52.20	76.29	91.35	1.91	1.91	3.12	5.62	9.89	17.06
Mounting position		Shaft mounting															
		triple reduction										quadruple reduction					
H 1	quarts	0.74	0.74	1.37	2.08	3.80	7.93	12.70	22.19	38.04	42.27	1.27	1.27	2.54	2.85	6.02	13.21
	liters	0.70	0.70	1.30	1.98	3.61	7.53	12.02	21.08	36.14	40.16	1.21	1.21	2.41	2.71	5.72	12.55
H 2	quarts	2.01	2.01	3.70	6.76	12.05	21.13	34.90	69.74	96.16	162.73	2.32	2.32	4.02	7.29	12.05	22.19
	liters	1.91	1.91	3.52	6.42	11.45	20.07	33.02	66.25	91.35	154.59	2.20	2.20	3.82	6.93	11.45	21.08
H 3	quarts	2.54	2.54	4.44	7.71	12.15	24.83	40.70	84.54	124.69	184.92	3.17	3.17	5.60	8.98	15.53	28.00
	liters	2.41	2.41	4.22	7.32	11.54	23.59	38.51	80.31	118.46	175.67	3.01	3.01	5.32	8.53	14.75	26.60
H 4	quarts	2.01	2.01	2.74	5.49	10.25	17.43	29.10	57.06	82.42	137.37	2.43	2.43	3.17	6.02	10.77	19.02
	liters	1.91	1.91	2.60	5.22	9.74	16.56	27.53	54.21	78.30	130.50	2.31	2.31	3.01	5.72	10.23	18.07
H 5	quarts	1.27	1.27	2.11	3.49	6.87	12.15	20.10	40.15	56.01	86.65	1.48	1.48	2.32	3.80	6.97	13.74
	liters	1.21	1.21	2.00	3.32	6.53	11.54	19.02	38.14	53.21	82.32	1.41	1.41	2.20	3.61	6.62	13.05
H 6	quarts	1.80	1.80	2.96	5.39	8.66	19.02	27.50	54.95	80.31	96.16	2.01	2.01	3.28	5.92	10.14	17.96
	liters	1.71	1.71	2.81	5.12	8.23	18.07	26.02	52.20	76.29	91.35	1.91	1.91	3.12	5.62	9.63	17.06

Standard lubricant for the gearboxes is mineral oil. Synthetic oil is available at a surcharge.

Note: Filling quantities are approximate figures. Oil level must be checked according to oil level plug.

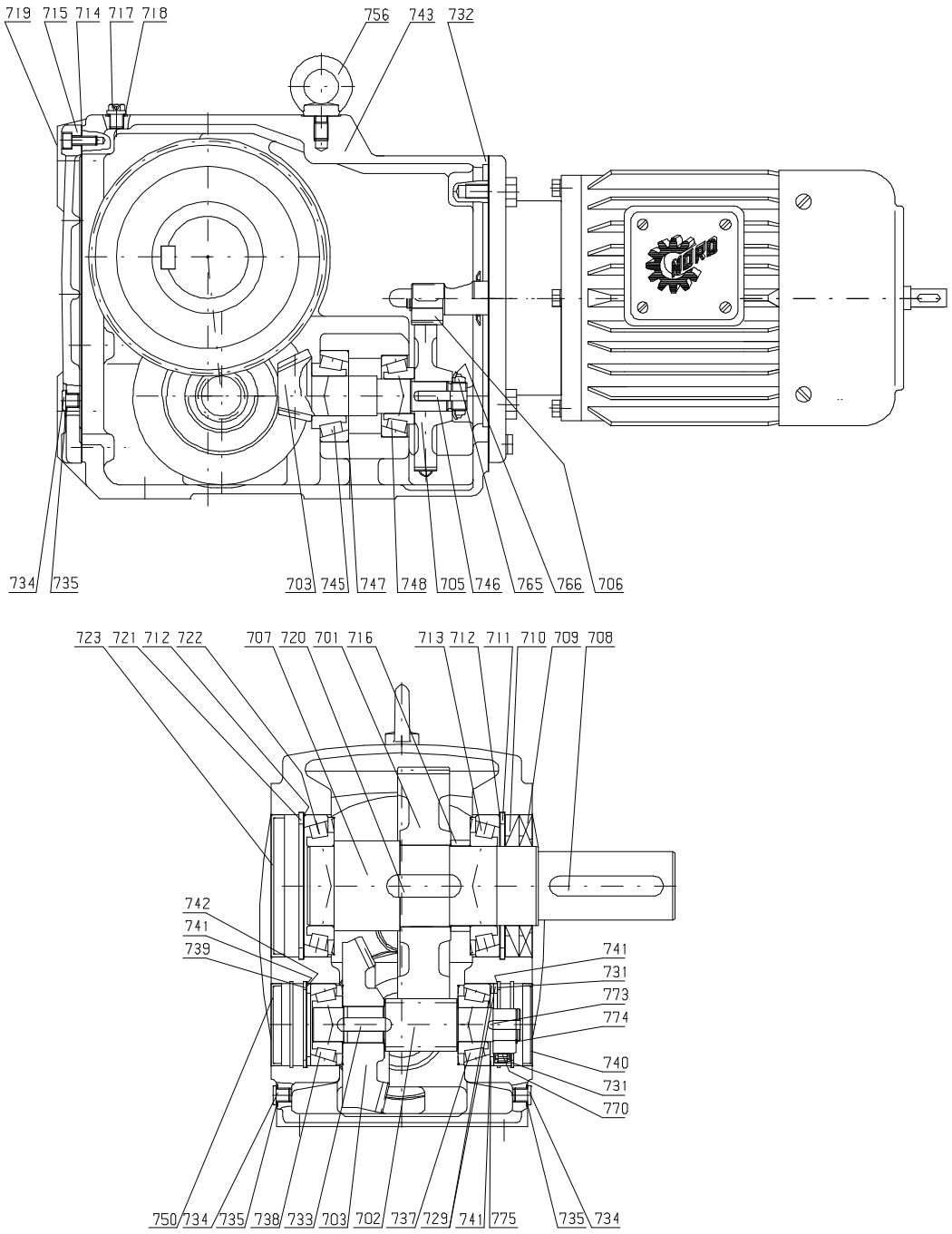
For mounting angles not shown, consult factory.

LUBRICATION CAPACITY – 92 SERIES HELICAL BEVEL GEARBOXES										
Mounting Position	Model Size									
	SK92072		SK92172		SK92372		SK92672		SK92772	
	[Quarts]	[Liters]	[Quarts]	[Liters]	[Quarts]	[Liters]	[Quarts]	[Liters]	[Quarts]	[Liters]
B3	0.42	0.40	0.63	0.60	0.95	0.90	1.90	1.80	2.43	2.30
B3I	0.85	0.80	1.06	1.00	1.69	1.60	3.59	3.40	5.60	5.30
B6	0.74	0.70	0.95	0.90	1.37	1.30	3.70	3.50	4.76	4.50
B6I	0.42	0.40	0.63	0.60	0.95	0.90	1.90	1.80	2.43	2.30
B6II	0.85	0.80	1.06	1.00	1.69	1.60	3.59	3.40	5.60	5.30
B8	0.63	0.60	1.16	1.10	1.53	1.45	3.38	3.20	4.86	4.60
B81	0.74	0.70	0.95	0.90	1.37	1.30	3.70	3.50	4.76	4.50
V5	0.63	0.60	0.79	0.75	1.27	1.20	2.75	2.60	4.33	4.10
V5I	0.63	0.60	0.79	0.75	1.27	1.20	2.75	2.60	4.33	4.10
V6	0.63	0.60	0.79	0.75	1.27	1.20	2.75	2.60	4.33	4.10
V6I	0.63	0.60	0.79	0.75	1.27	1.20	2.75	2.60	4.33	4.10
B5	0.74	0.70	1.06	1.00	1.59	1.50	2.96	2.80	4.65	4.40
B5I	0.42	0.40	0.63	0.60	1.22	1.15	1.64	1.55	2.91	2.75
B5II	0.85	0.80	1.16	1.10	1.80	1.70	3.49	3.30	5.71	5.40
B5III	0.63	0.60	1.00	0.95	1.27	1.20	2.64	2.50	4.33	4.10
V1	0.63	0.60	0.79	0.75	1.22	1.15	2.54	2.40	3.70	3.50
V3	0.63	0.60	0.79	0.75	1.22	1.15	2.54	2.40	3.70	3.50
H1	0.42	0.40	0.63	0.60	1.22	1.15	1.64	1.55	3.17	3.00
H2	0.63	0.60	1.00	0.95	1.27	1.20	2.64	2.50	4.76	4.50
H3	0.85	0.80	1.16	1.10	1.80	1.70	3.49	3.30	5.81	5.50
H4	0.74	0.70	1.06	1.00	1.59	1.50	2.96	2.80	4.54	4.30
H5	0.63	0.60	0.79	0.75	1.22	1.15	2.54	2.40	3.80	3.60
H6	0.63	0.60	0.79	0.75	1.22	1.15	2.54	2.40	3.17	3.00

The 92 Series Helical Bevel gearbox sizes SK92072, SK92172 & SK92372 have no vent or drain plugs. They are filled with synthetic oil so the units are "Lubed for Life".

PARTS LIST

SK9012 - SK9092
Foot mounted



701	Output gear
702	Output pinion shaft
703	Bevel gearset
705	Input gear
706	Input pinion
707	Output shaft
708	Key
709	Shaft seal
710	Shaft seal
711	Circlip
712	Shim
713	Taper roller bearing
714	Gasket
715	Gear case cover
716	Spacer
717	Vent screw
718	Seal
719	Socket head screw
720	Key
721	Circlip
722	Taper roller bearing
723	Sealing plug
729	Supporting disc
731	Circlip
732	Gasket
733	Key
734	Drain plug
735	Seal
737	Taper roller bearing
738	Taper roller bearing
739	Circlip
740	Sealing plug
741	Shim
742	Supporting disc
743	Gear case
745	Taper roller bearing
746	Key
747	Shim
748	Taper roller bearing
750	Sealing plug
756	Flanged eye bolt
765	Slotted round nut
766	Tab washer
770	Backstop
773	Key
774	Circlip
775	Supporting disc

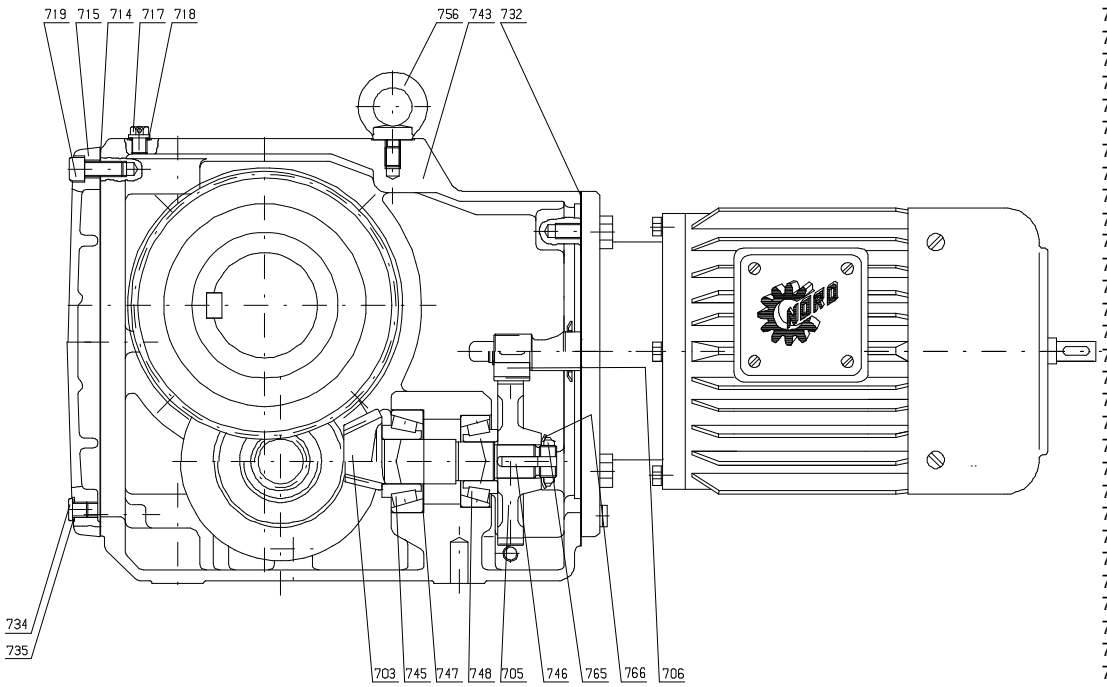
RECOMMENDED SPARE PARTS

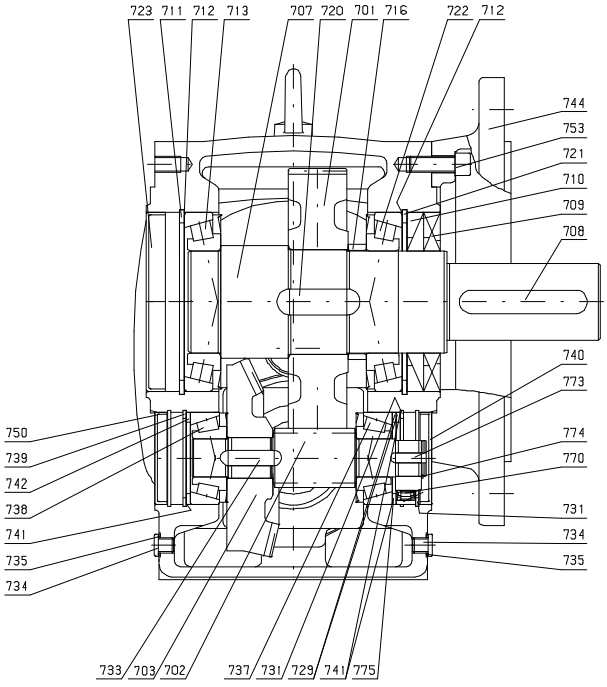
Bearings – *all* Gaskets – *all* Shims – *all*
Seals – *all* Seal Plugs – *all*

IMPORTANT!

When ordering parts, it is necessary to have the ***NORD SERIAL NUMBER*** from the unit the parts are for. The serial number will dictate the correct parts for that particular unit. The gearbox nameplate will have the serial number on it.

SK 9012 - SK 9092 VF
Flange mounted

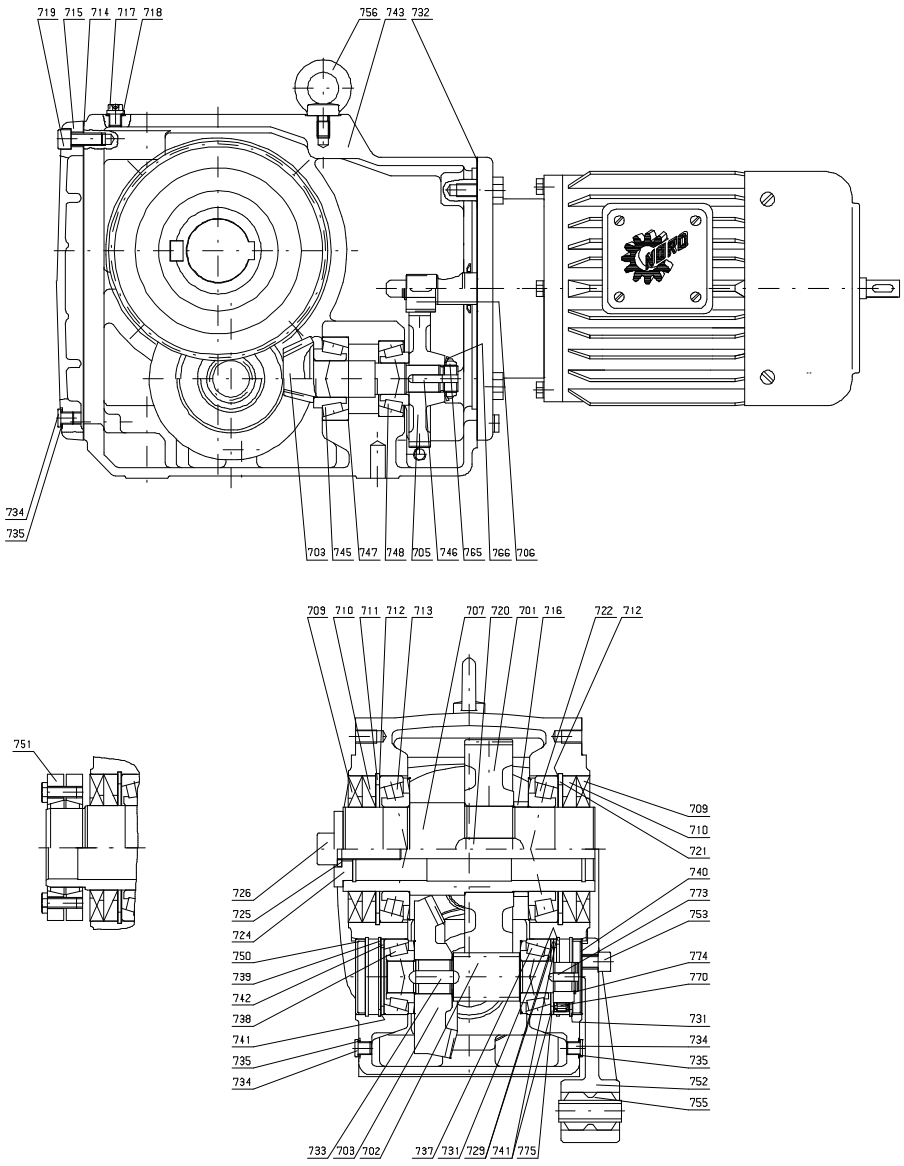




701	Output gear
702	Output pinion shaft
703	Bevel gearset
705	Input gear
706	Input pinion
707	Output shaft
708	Key
709	Shaft seal
710	Shaft seal
711	Circlip
712	Shim
713	Taper roller bearing
714	Gasket
715	Gear case cover
716	Spacer
717	Vent screw
718	Seal
719	Socket head screw
720	Key
721	Circlip
722	Taper roller bearing
723	Sealing plug
729	Supporting disc
731	Circlip
732	Gasket
733	Key
734	Drain plug
735	Seal
737	Taper roller bearing
738	Taper roller bearing
739	Circlip
740	Sealing plug
741	Shim
742	Supporting disc
743	Gear case
744	Flange
745	Taper roller bearing
746	Key
747	Shim
748	Taper roller bearing
750	Sealing plug
753	Socket head screw
756	Flanged eye bolt
765	Slotted round nut
766	Tab washer
770	Backstop
773	Key
774	Circlip
775	Supporting disc

PARTS LIST

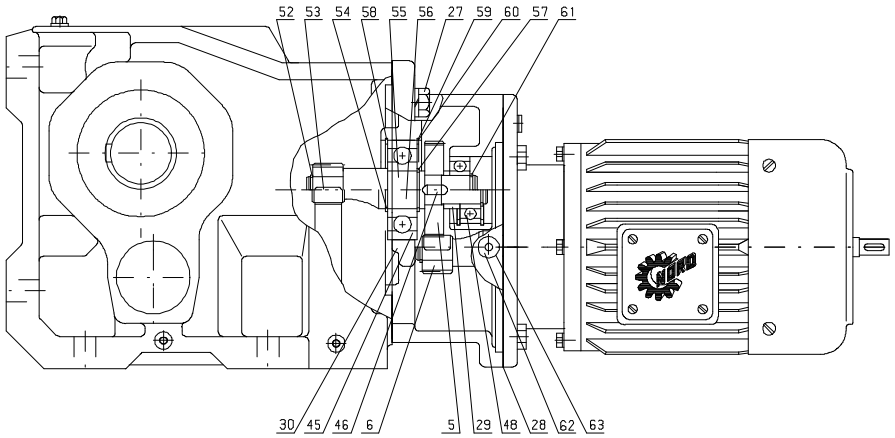
SK9012 - SK9092 AZ
Shaft mounted



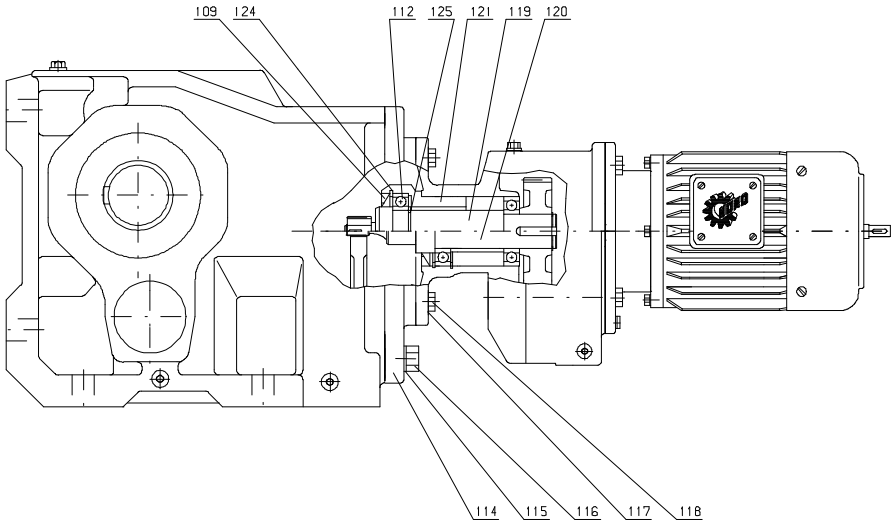
701 Output gear
702 Output pinion shaft
703 Bevel gearset
705 Driving gear
706 Driving pinion
707 Hollow shaft
709 Shaft seal
710 Shaft seal
711 Circlip
712 Shim
713 Taper roller bearing
714 Gasket
715 Gear case cover
716 Spacer
717 Vent screw
718 Seal
719 Socket head screw
720 Key
721 Circlip
722 Taper roller bearing
724 Washer
725 Spring washer
726 Socket head screw
729 Supporting disc
731 Circlip
732 Gasket
733 Key
734 Drain plug
737 Taper roller bearing
738 Taper roller bearing
739 Circlip
740 Sealing plug
741 Shim
742 Supporting disc
743 Gear case
745 Taper roller bearing
746 Key
747 Shim
748 Taper roller bearing
750 Sealing plug
751 Shrink disc connector
752 Torque arm
753 Socket head screw
755 Rubber buffer
756 Flanged eye bolt
765 Slotted round nut
766 Tab washer
770 Backstop

PARTS LIST

SK 9013 - SK 9053
Foot mounted
Flange mounted VF
Shaft mounted AZ



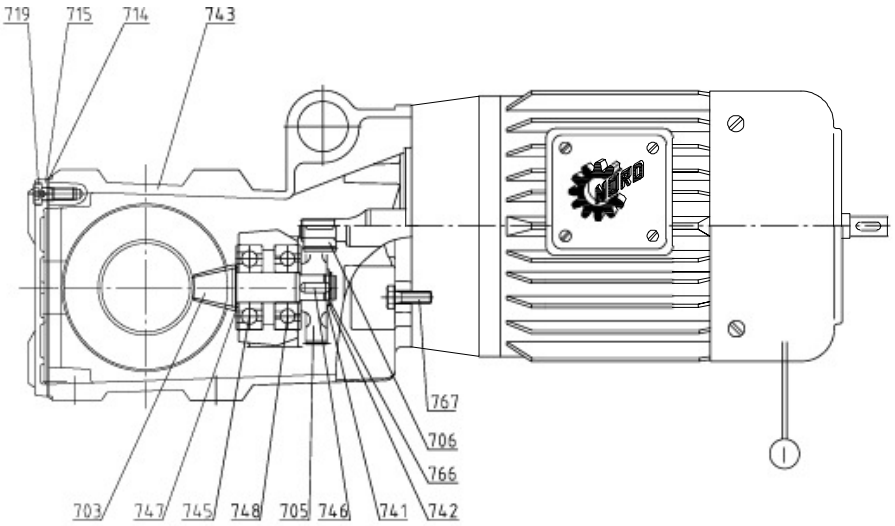
SK 9062/32 - SK 9092/52
Foot mounted
Flange mounted VF
Shaft mounted AZ



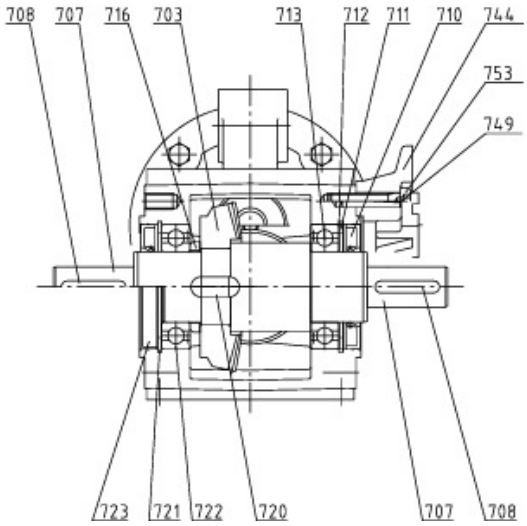
5	Input gear
6	Input pinion
27	Bolt
28	Gasket
29	Supporting disc
30	Third reduction gearcase
45	Ball bearing
46	Key
48	Ball bearing
52	Circlip
53	Key
54	Circlip
55	Intermediate shaft, plain
56	Intermediate shaft, gearcut
57	Circlip
58	Circlip
59	Shim
60	Circlip
61	Circlip
62	Plug
63	Seal
109	Shaft seal
112	Ball bearing
114	Intermediate flange
115	Spring washer
116	Bolt
117	Spring washer
118	Bolt
119	Intermediate shaft, plain
119	Intermediate shaft, gearcut
121	Bearing sleeve
124	Circlip
125	Circlip

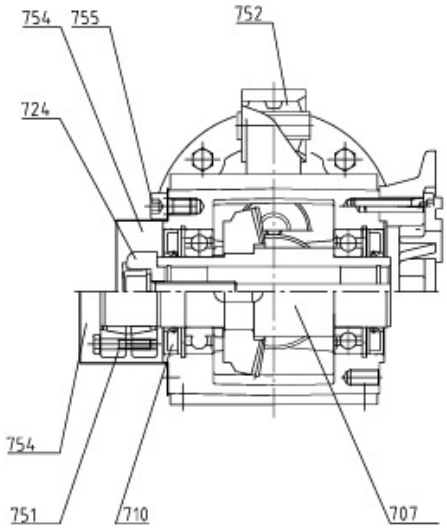
PARTS LIST

SK92072



703 Bevel gearset
705 Input gear
706 Input pinion
707 Output shaft
708 Key
710 Shaft seal
711 Circlip
712 Shim
713 Taper roller bearing
714 Gasket
715 Gear case cover
716 Spacer
719 Socket head screw
720 Key
721 Circlip
722 Taper roller bearing
723 Sealing plug
724 Fixing element
741 Shim
742 Supporting disc
743 Gear case
744 Flange
745 Taper roller bearing
746 Key
747 Shim
748 Taper roller bearing
749 Grooved pin
751 Shrink disc connector
752 Rubber buffer
753 Socket head screw
754 Cover
755 Socket head screw
766 Circlip
767 Hexagon screw





RECOMMENDED SPARE PARTS

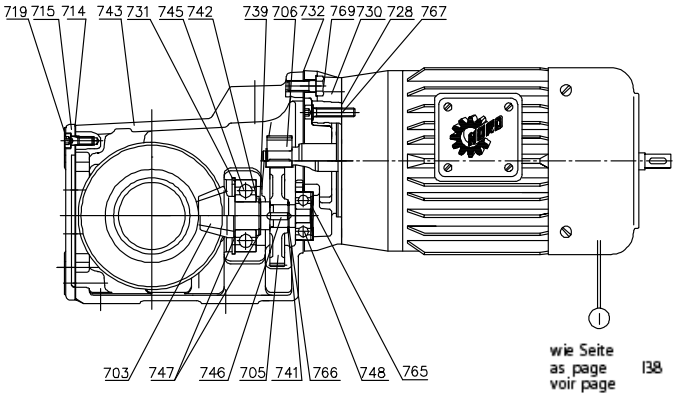
Bearings – *all* Gaskets – *all* Shims – *all*
Seals – *all* Seal Plugs – *all*

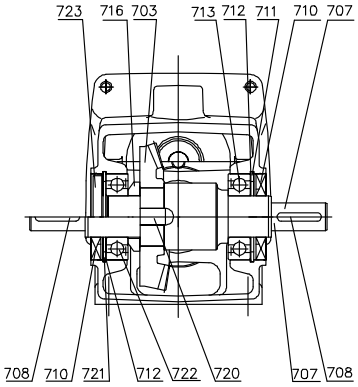
IMPORTANT!

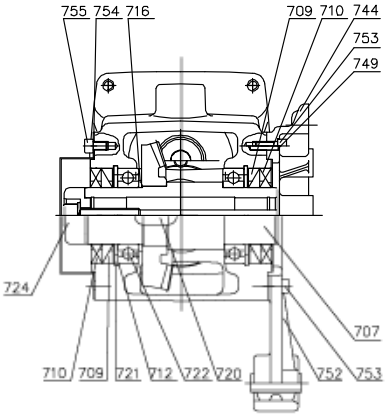
When ordering parts, it is necessary to have the ***NORD SERIAL NUMBER*** from the unit the parts are for. The serial number will dictate the correct parts for that particular unit. The gearbox nameplate will have the serial number on it.

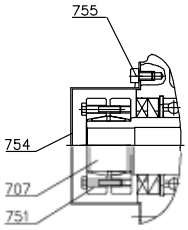
PARTS LIST

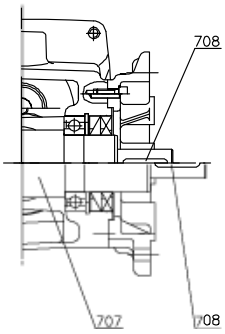
SK 92172 - SK 92772











703 Bevel gearset
705 Input gear
706 Input pinion
707 Output shaft
708 Key
709 Shaft seal
710 Shaft seal
711 Circlip
712 Shim
713 Taper roller bearing
714 Gasket
715 Gear case cover
716 Spacer
719 Socket head screw
720 Key
721 Circlip
722 Taper roller bearing
723 Sealing plug
724 Fixing element
728 Gasket
730 Gearbox conver
731 Circlip
732 Gasket
739 Circlip
741 Shim
742 Supporting disc
743 Gear case
744 Flange
745 Taper roller bearing
746 Key
747 Shim
748 Taper roller bearing
749 Grooved pin
751 Shrink disc connector
752 Torque arm
753 Socket head screw
754 Cover
755 Socket head screw
765 Bearing shim
766 Tab washer
767 Socket head screw
769 Hexagon screw
775 Supporting disc

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Fax 905-796-8130

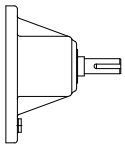
NORD Gearbox Inputs
Installation and Maintenance Instructions

BIM 1009

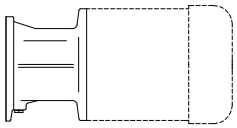
USA

CDN

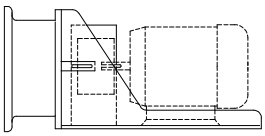
Retain These Safety Instructions For Future Use



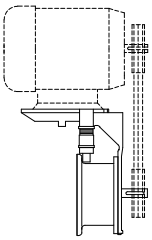
W-STYLE



NEMA/IEC



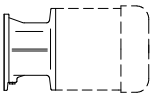
SUGAR SCOOP



MOTOR MOUNT PLATFORM

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.

NEMA/ IEC Motor Adapters



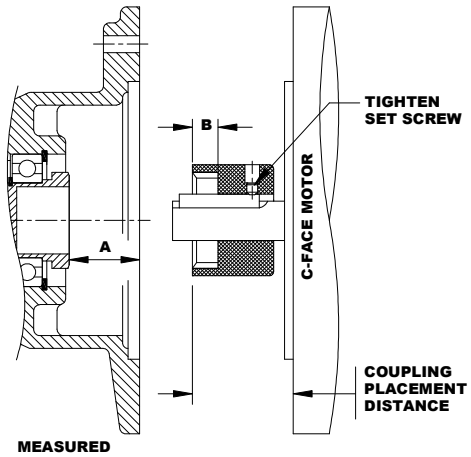
NORD Gear supplies a coupling that is to be mounted onto the motor shaft. It is important that the coupling is properly positioned. For **NEMA Input Adapters**, follow the Motor Installation Instructions below to insure full coupling engagement onto the input shaft. For **IEC Input Adapters**, the supplied coupling will mount directly against the motor shaft shoulder. No locating measurements need to be taken. *NOTE: Some of the larger IEC inputs will have a coupling spacer included to help locate the coupling. Slide the spacer against the motor shaft shoulder, slide the coupling against the spacer and tighten set screw(s).*

For the larger motor adapters (IEC160 / N250TC and larger), an **Automatic Lubricator** is supplied. **This will need to be activated at the time of startup.** For operation and activation instructions, refer to the "*Automatic Lubricator*" section.

NORD supplies three different types of couplings depending on the size of input: "J" style, "M" style and "Jaw" style coupling. Following are instructions on how to properly mount each type of coupling onto the motor. First, identify which coupling has been supplied to you by referring to the "*Couplings for the NEMA and IEC Adapters*" section on the next page. Make sure the motor flange and shaft are cleaned and verify that the proper key is in the motor shaft.

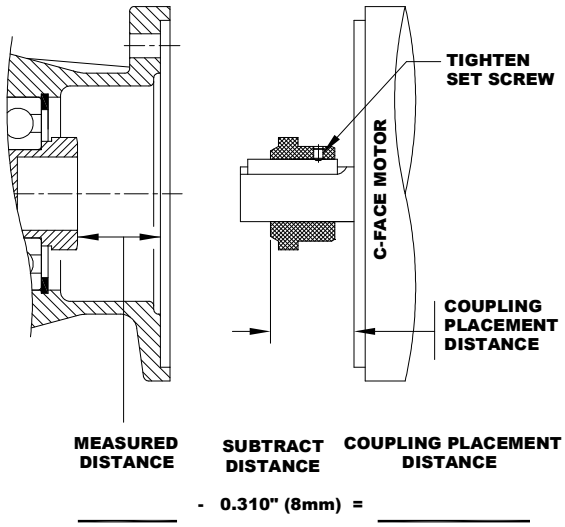
"J" Style Coupling
NEMA C-face Motor Installation Instructions

1. Measure the distance from the face of the input adapter to the face of the splined shaft and record that measurement.
2. Subtract 0.08" (~2mm) from the distance. ***This needs to be done so that the coupling will not be preloaded after installation!***
3. Use that measurement to locate the coupling from the face of the motor onto the shaft.
4. Once in place, tighten the set screw to lock the coupling in place. It is recommended that the key is staked or bonded (Loctite) in place to prohibit the key from vibrating out.
5. Mount the motor onto the input adapter with customer supplied bolts. Make sure that the coupling from the adapter and the motor engage securely. Use lock washers or Loctite to prohibit bolts from becoming loose from vibration.



"M" Style Coupling
NEMA C-face Motor Installation Instructions

1. Measure the distance from the face of the input adapter to the face of the splined shaft and record that measurement.
2. Subtract 0.31" (~8mm) from the distance. ***This needs to be done so that the coupling will not be preloaded after installation!***
3. Use that measurement to locate the coupling from the face of the motor onto the shaft.
4. Once in place, tighten the set screw to lock the coupling in place. It is recommended that the key is staked or bonded (Loctite) in place to prohibit the key from vibrating out.
5. Mount the motor onto the input adapter with customer supplied bolts. Make sure that the coupling from the adapter and the motor engage securely. Use lock washers or Loctite to prohibit bolts from becoming loose from vibration.



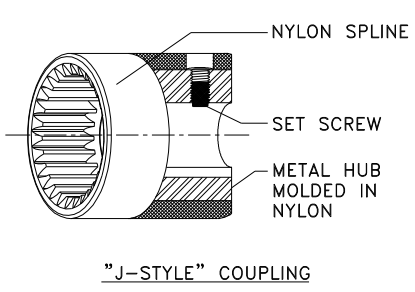
Couplings for the NEMA and IEC Adapters

Depending on the size of the input adapter to the gearbox, NORD Gear supplies two styles of couplings - BoWex® (gear tooth) and Rotex® (jaw) couplings.

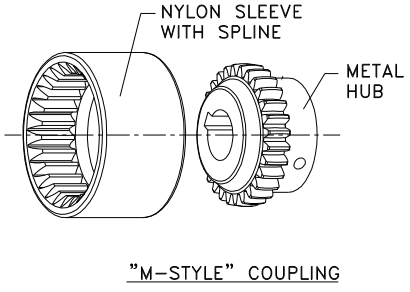
BoWex® Couplings

NORD C-face adapter input shafts have a machined spline on the end. NORD incorporates two styles of BoWex® couplings, the "J" and "M" styles. The "J" style is a one-piece coupling with a metal hub and nylon spline. The "M" style is a two-piece coupling – the metal hub and a nylon sleeve. Nylon and steel components allow them to operate in high ambient temperatures without lubrication or maintenance.

- Nylon sleeves resist dirt, moisture, most chemicals and petroleum products
- No lubrication required
- Operating Conditions: -22°F - 195°F (-30°C - 90°C)
- Higher temperature coupling sleeve available up to 250°F (120°C)
- Special bore available



"J–STYLE" COUPLING



"M–STYLE" COUPLING

BoWex® Mechanical Ratings

"J" Style

Coupling Type	Available Bore Sizes	Cont. / Peak Torque	Input
J14	11, 14 mm 5/8 in.	10 / 20 Nm 89 / 177 lb-in	IEC 63, 71 NEMA 56C
J24	19, 24 mm 5/8, 7/8 in	20 / 40 Nm 177 / 354 lb-in	IEC 80, 90 NEMA 56C,140TC
J28	28mm 1-1/8 in	45 / 90 Nm 399 / 797 lb-in	IEC 100, 112 NEMA 180TC

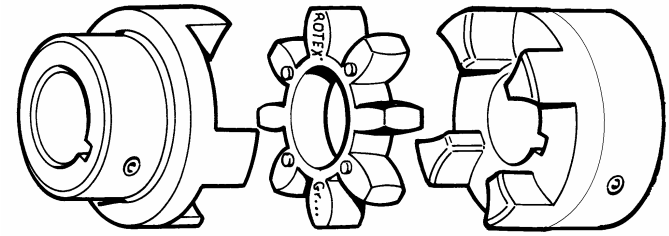
"M" Style

Coupling Type	Available Bore Sizes	Cont. / Peak Torque	Input
M14/M24/M28	Same as "J" style	Same as "J" style	Same as "J" style
M38	38 mm 1-1/8, 1-3/8 in.	80 / 160 Nm 708 / 1,416 lb-in	IEC 132 NEMA 180TC, 210TC
M42	42 mm 1-5/8 in	100 / 200 Nm 885 / 1,770 lb-in	IEC 160 NEMA 250TC
M48	48 mm 1-7/8 in	140 / 280 Nm 1240 / 2,478 lb-in	IEC 180 NEMA 280TC

Rotex® Couplings

The cast iron jaw type couplings have an integral urethane "spider" that provides smooth transmission of the motor torque. A set screw on the coupling prohibits axial movement along the motor shaft.

- Excellent shock and vibration dampening
- Excellent resistance to oils and most chemicals
- No metal-to-metal contact
- Operating Conditions: -40°F - 195°F (-40°C - 90°C)
- Higher temperature material (Hytrel) spider available up to 230°F (110°C)
- Special bores available



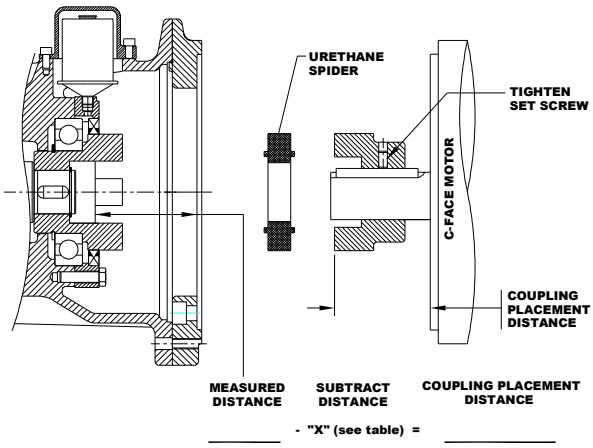
Hub Design 1 **Spider** **Hub Design 1a**

Rotex® Mechanical Ratings

Coupling Type	Available Bore Sizes	Continuous / Peak Torque	Inputs Used With	Spider
R19	14, 19 mm	17 / 34 Nm 150 / 300 lb-in	SEK/SEP 100	Urethane 98 Shore A Hardness Color: Red
R24	19, 24 mm	60 / 120 Nm 530 / 1,060 lb-in	SEK/SEP 100, 130	
R28	32, 38 mm	95 / 190 Nm 840 / 1,680 lb-in	SEK/SEP 165, 215	Urethane 92 Shore A Hardness Color: Yellow
R38	1.89" (48mm) Max Bore	190 / 382 Nm 1,680 / 3,380 lb-in	-	
R42	2.44" (62mm) Max Bore	310 / 620 Nm 2,740 / 5,480 lb-in	-	
R48	42, 48 mm 1-5/8, 1-7/8 in	310 / 620 Nm 2,740 / 5,485 lb-in	IEC 160, 180 NEMA 250T, 280T SEK/SEP 300, 215	
R65	60 mm 2-1/8, 2-3/8 in	625 / 1,250 Nm 5,530 / 11,060 lb-in	IEC 225 NEMA 320T, 360T	
R90	65, 75, 80 mm 2-1/8, 2-3/8 in	2,400 / 4,800 Nm 21,240 / 42,480 lb-in	IEC 250, 280, 315 NEMA 360T, 400TS, 440TS	

Jaw" Style Coupling
NEMA C-face Installation Instructions

1. Measure the distance from the face of the input adapter to the face of the coupling as shown and record that measurement.
2. Subtract the "X" dimension from the measured distance. ***This needs to be done so that the coupling will not be preloaded after installation!***
3. Use that measurement to locate the coupling from the face of the motor onto the shaft.
4. The metal portion of the coupling should be heated up prior to assembly, generally 250°F to 300°F (120°C to 150°C). ***DO NOT HEAT THE URETHANE SPIDER.***
5. Once in place, tighten the setscrew to lock coupling in place. Let the coupling cool down before placing the spider into the jaws. It is recommended that the key is staked or bonded (Loctite) in place to prohibit the key from vibrating out.
6. Mount the motor onto the input adapter with customer supplied bolts. Make sure that the coupling from the adapter and the motor engage securely. Use lock washers or Loctite to prohibit bolts from becoming loose from vibration.



Coupling Size	"X" *(Subtract this value from measured distance)*
R14	0.06" (1.5mm)
R19 & R24	0.08" (2.0mm)
R28	0.10" (2.5mm)
R38/42	0.12" (3.0mm)
R48	0.14" (3.5mm)
R65	0.18" (4.5mm)
R90	0.22" (5.5mm)

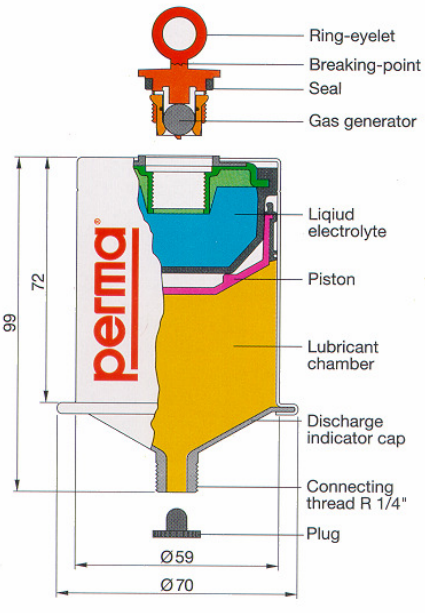
Automatic Lubricator

NORD Gear supplies the larger C-face motor adapters with an Automatic Lubricator. This will provide additional grease lubrication to the outboard bearing. As the pressure from the lubricator canistor pushes the new grease into the bearing, the old grease will flow into the cavity towards the gearbox. When the cavity is filled with the "used" grease, the pressure from the new grease pushes the used grease into the gear box thru the input seal. The old grease mixes with the oil but will not cause harm to the gearing or bearings. Regular oil changes with the gearbox will remove the old grease which has been pushed into the gearbox. Refer to the PARTS LISTS for inputs equipped with the Automatic Lubricator.

Principle of Operation

After tightening the plastic activating screw, the Zinc-Molybdenum pellet drops into the Citric Acid electrolyte. The chemical reaction builds up pressure that causes the piston to move forward. The lubricant is continuously injected into the lubrication point. At the end of the lubrication period, the discharge indicator cap becomes clearly visible indicating the lubricant has been fully discharged. The lubrication period is determined and defined by the color of the activating screw.

For the bearings used in NORD Gear products, a 12-month lubrication period is standard, indicated by a **gray activating screw**. This applies for an average operating time of 8 hours/day. For longer operating times, the replacement interval decreases to 6 months. Lubrication canisters are also available for cold temperature applications. Contact NORD Gear for more information.



Assembly Instructions

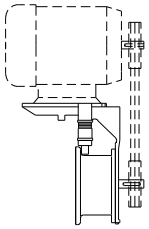
1. Remove the plug from the male connecting thread.
2. Screw male fitting into bearing housing within Input Adapter.
3. Insert activating screw into end of canister. Tighten until the ring-eyelet breaks off.
4. Replace every twelve months.

Perma Classic Specifications

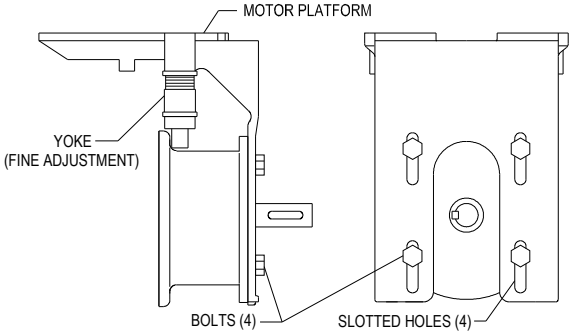
Standard Lubricant	Klüber Petamo GHY 133 (synthetic)
NORD Part Number	28301000
Lubricant Volume	120 mL (4 oz.)
Operating Temperature Range★	-30°C to 150°C (-22°F to 302°F)
Discharge Time	12 months at 25°C (77°F)
Operating Position	Independent of mounting position, operates even under water.
Male Connecting Thread	1/4" NPT

★ *The temperature range shown is for the Perma Classic Lubricator only and does not apply to other components and/or lubricants within the gear reducer.*

MK Motor Mount Platform



For proper installation of the belt drive, consult the V-belts manufacturer. NORD MK motor mounts are adjustable in two ways. Slotted holes are provided at the input cylinder for the initial height adjustment. There are two fine adjustments at the Yolk to increase/decrease tension. Two Spanner head wrenches will be needed to tighten/loosen the fine adjustments. The four bolts holding the motor platform to the input cylinder must be loosened in order to use the fine adjustments.



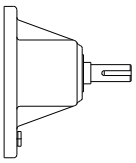
The motor mounting platform has tapped holes to accept the foot pattern of the standard footed NEMA or IEC motor. All MK mounting input shaft diameters are metric.

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

WARNING:

NORD Gear does not furnish the safety guards for the traction mechanism. It is the responsibility of the customer to install a safety guard to conform to OSHA standards.

Solid Shaft (W-Type)



The shaft will be inch or metric, depending on how the unit was ordered. Measure and verify the shaft before mounting anything on the shaft. Below are the tolerances used for the solid shafts.

All solid input shafts have a tapped hole on the end for customer use. The chart below indicated the tap size for each shaft. Keys are also supplied with solid shaft.

Outboard pinion and sprocket fits should be as recommended by the manufacturer. The components should be heated according to the manufacturer's recommendations, generally 250°F to 300°F, (120°C to 150°C) before assembling to the shaft. The coupling hub or sprocket should be mounted per Figure 1.

On larger gearboxes, there is grease fitting on the W-Type inputs to grease the outboard bearing. About 0.75 ounce (20 - 25g) of synthetic grease should be added every 1,000 service hours. There is a sticker adjacent to the grease fitting detailing which grease should be used. **The standard bearing grease is Kluber Petamo GHY 133N synthetic grease. Bearings should be re-greased with a compatible product.**

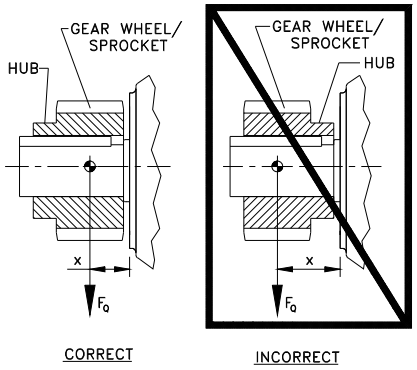


Figure 1. Mounting a coupling or a sprocket on a shaft.

Output and Input Shaft Diameter Tolerance

Metric (mm)

≤ ∅ 18 = +0.012/+0.001
> ∅ 18 ≤ ∅ 30 = +0.015/+0.002
> ∅ 30 ≤ ∅ 50 = +0.018/+0.002
> ∅ 50 ≤ ∅ 80 = +0.030/+0.011
> ∅ 80 ≤ ∅ 120 = +0.035/+0.013
> ∅ 120 ≤ ∅ 180 = +0.040/+0.015

Inch

≤ ∅ 1.750 = +0.0000/-0.0005
> ∅ 1.750 = +0.0000/-0.0010

Solid Shaft Drill and Tap Shaft End

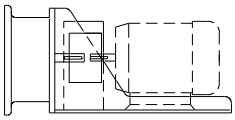
Metric (mm)

≤ ∅ 16 = M5
> ∅ 16 ≤ ∅ 21 = M6
> ∅ 21 ≤ ∅ 24 = M8
> ∅ 24 ≤ ∅ 30 = M10
> ∅ 30 ≤ ∅ 38 = M12
> ∅ 38 ≤ ∅ 50 = M16
> ∅ 50 ≤ ∅ 85 = M20
> ∅ 85 ≤ ∅ 130 = M24

Inch

≤ ∅ 0.500 = #10-24 x 0.4 deep
> ∅ 0.500 ≤ ∅ 0.875 = ¼-20 x 0.6 deep
> ∅ 0.875 ≤ ∅ 0.938 = 5/16-18 x 0.7 deep
> ∅ 0.938 ≤ ∅ 1.100 = 3/8-16 x 0.9 deep
> ∅ 1.100 ≤ ∅ 1.300 = 1/2-13 x 1.1 deep
> ∅ 1.300 ≤ ∅ 1.875 = 5/8-11 x 1.4 deep
> ∅ 1.875 ≤ ∅ 3.500 = 3/4-10 x 1.7 deep
> ∅ 3.500 = 1-8 x 2.2 deep

Sugar Scoop



Each sugar scoop includes the coupling for the motor and the coupling guard. The coupling guard must be mounted when the machine is in use. NORD's standard supplied coupling is the jaw type. Make sure the set screw is tighten after coupling is in place. The coupling hub or sprocket should be mounted per Figure 2.

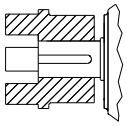


Figure 2. Place coupling flush with end of motor shaft and tighten setscrew.

Motor Installation Instructions

1. Make sure that the motor shaft is clean
2. Mount the coupling onto the motor. Place the coupling so that the inside face is flush with the end of the motor shaft (see Figure 2). The coupling should be heated prior to assembly, generally 250°F to 300°F (120°C to 150°C). ***DO NOT HEAT THE URETHANE SPIDER.** Once in place, tighten the setscrew into the motor shaft to lock coupling in place.
3. Let the coupling cool down before mounting the spider into the jaws. The spider should not be under axial compression when installed.
4. Place the motor onto the scoop and engage the couplings together. The scoop has slotted holes for axial alignment.

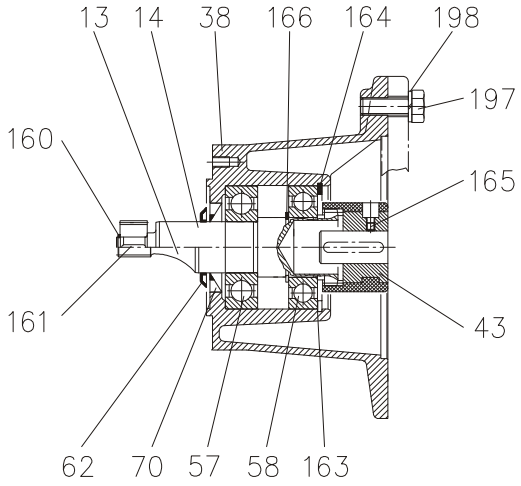
****The motor and input shaft must be aligned in all directions to assure proper operation of the system.**

5. Before tightening the motor feet down, check the coupling alignment with a straight edge or a level. Maximum parallel misalignment should not exceed 0.015" and angular misalignment should be held to 1.5°. Shim the motor feet to align the couplings. Careful alignment extends the life of not only the coupling but all the components of the drive train.
6. Once aligned, tighten the bolts on the feet to the scoop. Check the coupling alignment again due to compression of the shims.
7. Mount the supplied coupling guard to the scoop.
8. After a period of operation, recheck alignment and adjust as required.

NOTES

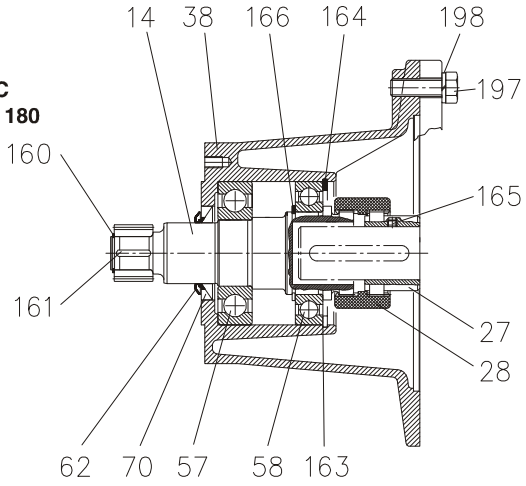
PARTS LIST
INPUTS FOR “NORDBLOC” GEARBOXES

56C - 180 TC
IEC 63 – IEC 112



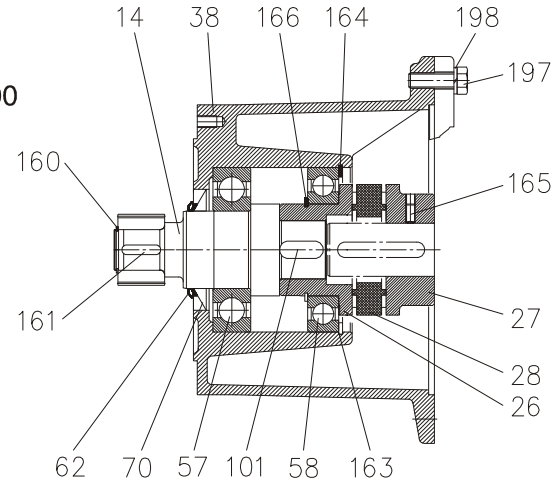
C-FACE INPUTS FOR
SK172 – SK973
&
SK92072 – SK92773

180 TC - 280 TC
IEC 132 – IEC 180

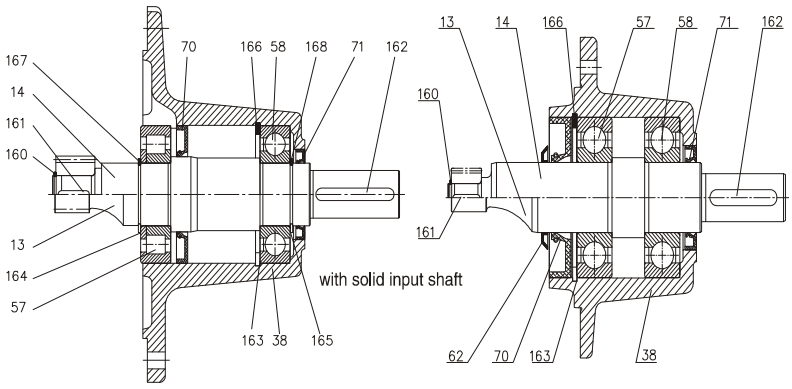


13	Clutch pinion shaft
14	Clutch shaft
26	Coupling
27	Coupling
28	Coupling
38	IEC Adapter
43	Coupling
57	Clutch shaft bearing
58	Clutch shaft bearing
62	Oil flinger
70	Shaft seal
101	Key
160	Snap ring
161	Key
163	Shim
164	Snap ring
165	Set screw
166	Snap ring
197	Bolt
198	Spring washer

IEC 200



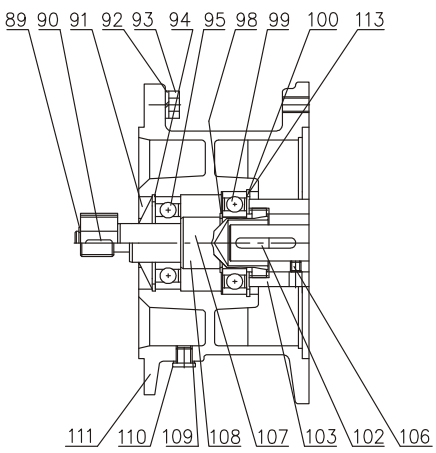
W-TYPE INPUTS FOR
SK172 – SK973
&
SK92072 – SK92773



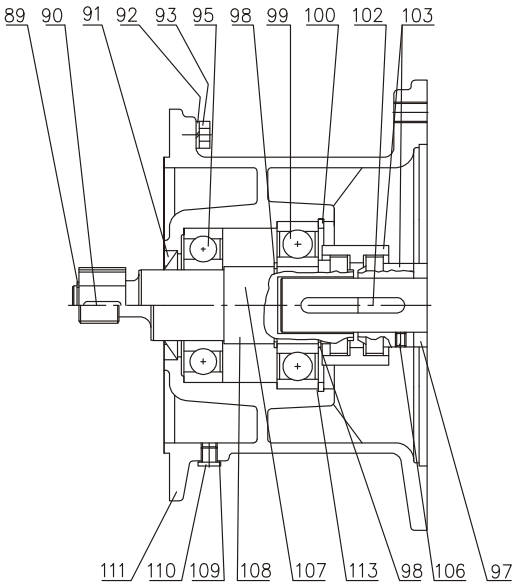
13	Clutch pinion shaft	161	Key
14	Clutch shaft	162	Key
38	IEC Adapter	163	Shim
57	Clutch shaft bearing	164	Shim
58	Clutch shaft bearing	165	Shim
70	Shaft seal	166	Snap ring
71	Shaft seal	167	Snap ring
160	Snap ring	168	Snap ring

PARTS LIST
C-FACE INPUTS FOR "UNICASE" GEARBOXES

NEMA 56C - 180TC
IEC 63 – IEC 112

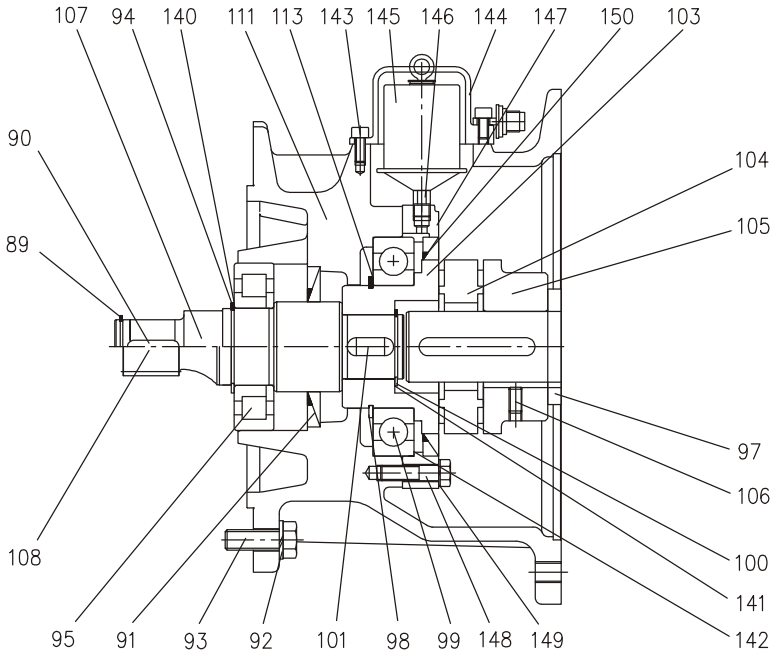


NEMA 210TC - 280TC
IEC 132 – IEC 180



89	Circlip
90	Key
91	Shaft seal
92	Washer
93	Hexagon screw
94	Circlip
95	Clutch shaft bearing
97	Spacer
98	Circlip
99	Clutch shaft bearing
100	Circlip
101	Key
102	Key
103	Coupling
104	Coupling
105	Coupling
106	Set screw
107	Clutch shaft
108	Clutch pinion shaft
109	Seal
110	Oil-plug
111	NEMA / IEC Adapter
112	Oil flinger
113	Shim
140	Shim
141	Shim
142	Shim
143	Socket head screw
144	Cover
145	Automatic lubricator
146	Adapter
147	Bearing cover
148	Hexagon screw
149	Washer
150	Shaft seal

NEMA 250TC – 400TC
IEC 160 – IEC 315



RECOMMENDED SPARE PARTS

Bearings – *all* Gaskets – *all* Shims – *all*
Seals – *all* Seal Plugs – *all*

IMPORTANT!

When ordering parts, it is necessary to have the ***NORD SERIAL NUMBER*** from the unit the parts are for. The serial number will dictate the correct parts for that particular unit. The gearbox nameplate will have the serial number on it.

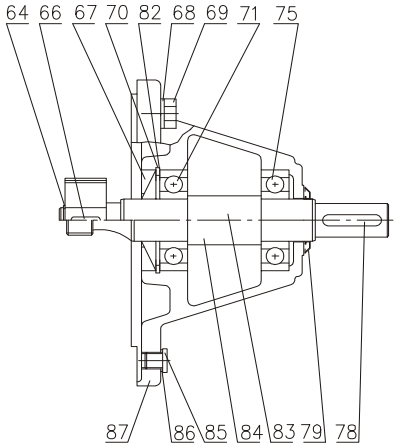
PARTS LIST
W-TYPE INPUTS FOR "UNICASE" GEARBOXES

SK 02 - SK 52
SK 03 - SK 63

SK 0182NB - SK 6382

SK 02040 - SK 42125
SK 13050 - SK 43125

SK 92072 - SK 92772
SK 9012.1 - SK 9052.1
SK 9013.1 - SK 9053.1

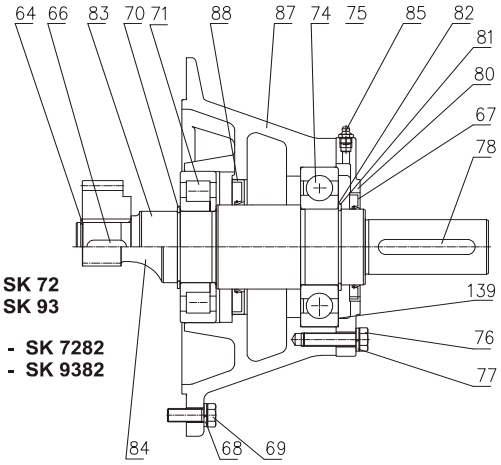


64	Circlip
66	Key
67	Shaft seal
68	Washer
69	Hexagon screw
70	Circlip
71	Input shaft bearing
74	Ball bearing
75	Input shaft bearing
76	Washer
77	Hexagon screw
78	Key
79	Oil flinger
80	Bearing cover
81	Circlip
82	Shim
83	Input shaft, plain
84	Input shaft, gearcut
85	Drain plug
86	Seal
87	Input bearing housing
88	Shaft seal (Oil flinger)
139	Shim

SK 62 - SK 72
SK 73 - SK 93

SK 6282 - SK 7282
SK 7382 - SK 9382

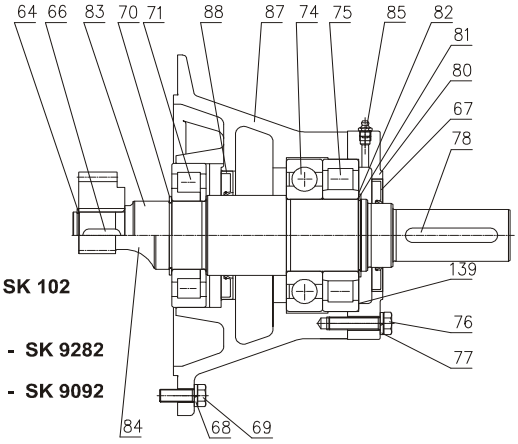
SK 9062



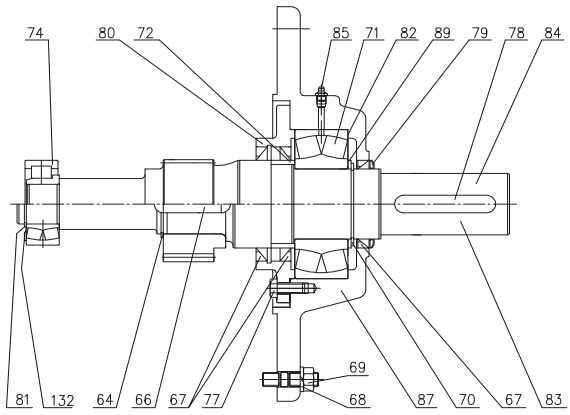
SK 82 - SK 102
SK 103

SK 8282 - SK 9282

SK 9082 - SK 9092



SK 10282 - SK 12382



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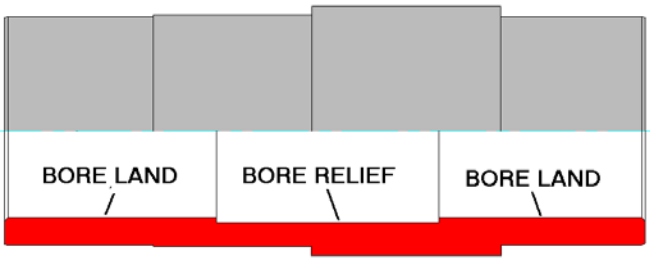
Hollow Keyed Shaft & Fixing Element Installation and Maintenance Instructions

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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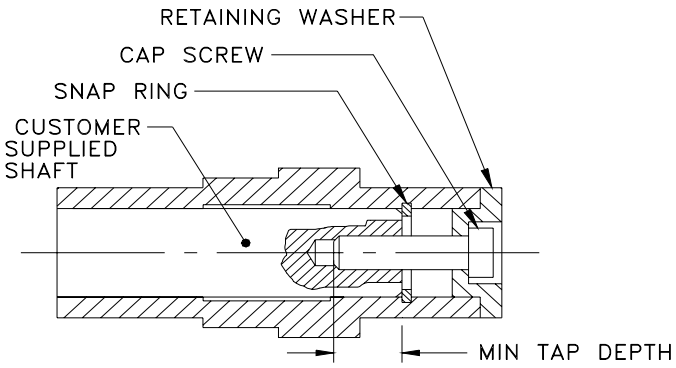
Optional Fixing Element Kit

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 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.