

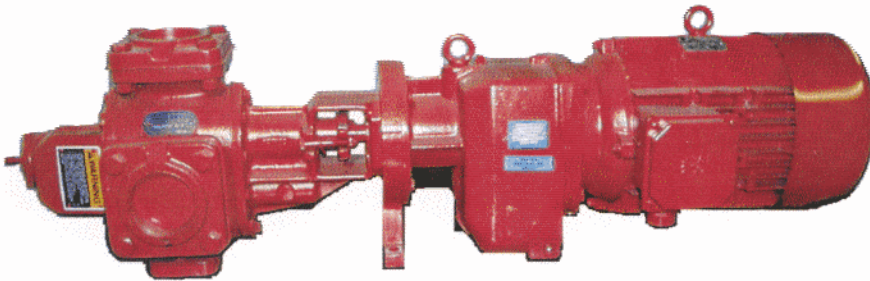


3600 CLOSE COUPLED DRIVE OWNERS MANUAL

G12-428

7/10/2003

This is a supplement to the standard 3600 series pump instructions also supplied with the pump. Read and follow those instructions.



SAFETY INSTRUCTIONS

This is an industrial component, which is intended for a qualified systems integrator to design it into a system.

It is up to the integrator to determine proper plumbing, mounting, external driveline and guard components.

Fully understand and follow the instructions shown in this manual before operation

ATTACHING DRIVE TO PUMP

HANDLING

To prevent damage or shifting due to an unbalanced load when moving the components, use straps (i.e. sling) on the pump. The reducer has eye-bolts for hooks or slings can be used. Make sure the load is balanced and to lift at least 2 points to prevent shifting and overloading a single area.



Figure 1: Proper Lift Points

ASSEMBLY

- 1) Make sure the key is installed in the male pump shaft. It should be a tight fit and inserted to the bottom of the key slot.
- 2) Coat the male pump shaft and key with anti-seize compound. Anti-seize compound is to make assembly easier, and to ease disassembly if required for maintenance. It is produced by several manufacturers (Permatex[®], Loctite[®], etc.) and can be purchased through most industrial supply companies (WW Grainger[®], McMaster-Carr[®], etc.)
- 3) Place the support plate on the pump male pilot. The support plate is furnished unpainted to assure that the pilot diameters and the flange faces seat properly.
- 4) Insert the supplied support plate mounting bolts finger tight.
- 5) With the bolts finger tight place the pump feet and the support plate feet on a flat surface. A flat workbench will suffice. This is to align the pump and plate feet.
- 6) Tighten support plate bolts while sitting on flat surface.
- 7) Slide the drive on the pump shaft. Make sure the male pump shaft key lines up with the female drive keyway.
- 8) Push the units together until the flange faces are close enough to use the supplied drive mounting bolts to draw them together. The use of temporary, longer draw bolts (not supplied) may be used if required.

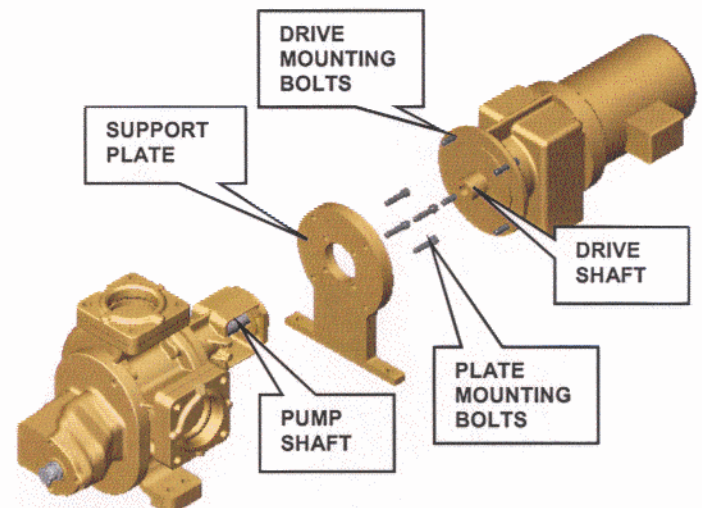


Figure 2: Pump to Drive Connection

INSTALLING ASSEMBLY

HANDLING

To prevent damage or shifting due to an unbalanced load when moving the pump, use a strap (i.e. sling) wrapped around the pump section and a hook or second sling on the reducer section (see figure at right).

MOUNTING BASE

Integral motors and C-face type inputs do not require a base plate for most applications. The reaction forces between the drive components and the pump are contained within the package. The system integrator must determine if plumbing forces requires a mounting base.

Male shaft inputs require a base plate to handle the input reaction forces (See section on male shaft input).

Shim mounting feet to prevent uneven loading:

- 1) Place the pump and drive on the planned mounting surface. In some configurations the drive may be heavy enough to lift the pump feet off the mounting surface. It may be necessary to temporarily support the drive to square the assembly.
- 2) Use a thickness gage set (Feeler gage) to probe under the mounting feet to determine if there is a gap at any of them.
- 3) Shim the feet as required .

DRIVELINE GUARDS

A driveline guard is not required in most applications. There are no exposed snag points. The length of exposed rotating shaft is short and shield from most accidental contacts by the extensions around the seal chamber. The system integrator must determine if guards are required and that all OSHA, Federal, state and local codes are followed.

INPUT VARIATIONS

See sections for style of input; Integral Electric Motor, Male Shaft ("W" type), or NEMA C-face.

Note: Auto vent breather must be located at the highest point. The drive is inverted on some models for ground clearance. The vent is factory positioned and does not need to be changed for floor mounting the pump. See section on "Lubricant Capacity" for details on which models are inverted, and how to change oil level for non-floor mounting.



Figure 3: Proper Lift Points

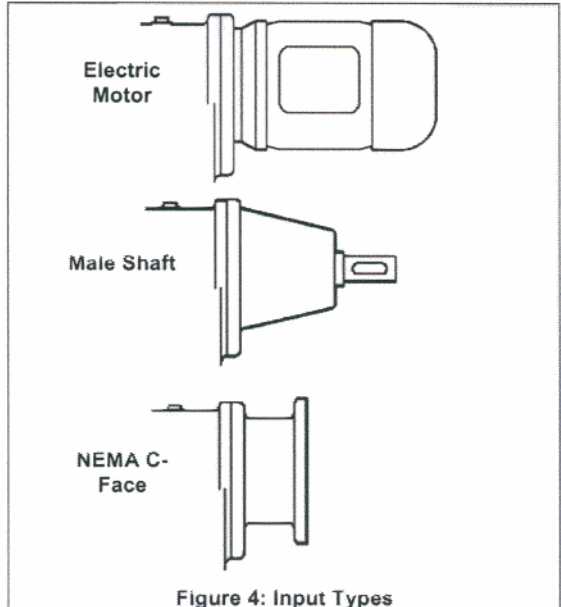


Figure 4: Input Types

GEARBOX SECTION

LUBRICANT

The gearbox is factory lubricated and ready for operation. Standard lubrication type is shown in the table on the right. However, units may have other lubricants selected to operate in certain environments. Consult the sticker adjacent to the fill plug to determine the type of lubricant installed at the factory.

Table 1 Standard Lubrication

Lubricant	Grade	Factory Fill
Oil	ISO VG220	Texaco Meropa 220
Grease	NLGI 2EP Lithium	Texaco Multifak EP2

MOUNTING POSITIONS

Oil volume is set for horizontal mounting of the pump. The Lubricant Capacity details required changes in oil volume and case plug locations for other mounting positions.

CASE PLUGS

Vent

Brass color, hex head with round top. Located at the highest point on the gearbox.

Fill Level

Hex head screw. Located between the vent and drain plugs; gasket sealed.

Drain

Socket head screw. Located at the lowest point of the gearbox; gasket sealed.

MAINTENANCE

Lubricant should be changed shorter of 10,000 service hours or two years. In case of extreme operating (e.g. high humidity, aggressive environment or large temperature variations), shorter intervals between changes are recommended. When changing the oil, consult the Lubricant Capacity tables to determine the amount of oil.

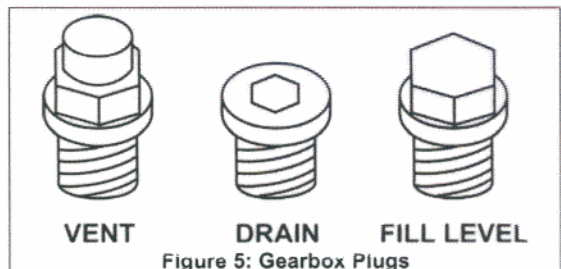


Figure 5: Gearbox Plugs

Note: Oil volume in table is approximate. Adjust the final level based on the level plug. Minimum acceptable oil level is within 1/2 inch of the bottom of the fill plug threads, when cool. The level will rise in operation due to heat

CCD36S LUBRICANT CAPACITY

*(Drive Shaft Down Requires Optional Overflow Canister)

Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	41	quarts 1.06	2.96	3.49	1.69	2.75
	liters	1.00	2.80	3.30	1.60	2.60
Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	22	quarts 0.74	2.11	1.64	1.90	2.11
	liters	0.70	2.00	1.55	1.80	2.00
32	quarts 1.37	3.49	2.54	3.28	3.06	3.06
liters	1.30	3.30	2.40	3.10	2.90	2.90
Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	42	quarts 4.78	1.90	3.91	4.23	4.65
	liters	4.50	1.80	3.70	4.00	4.40

▽ = Auto Vent Plug

▼ = Oil Level Plug

■ = Drain Plug

CCD36M LUBRICANT CAPACITY

*(Drive Shaft Down Requires Optional Overflow Canister)

Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	quarts	1.90	4.33	4.02	3.17	3.70
	liters	1.80	4.10	3.80	3.00	3.50
Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	quarts	1.37	3.49	2.54	3.28	3.06
	liters	1.30	3.30	2.40	3.10	2.90
Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	quarts	4.76	1.90	3.91	4.23	4.65
	liters	4.50	1.80	3.70	4.00	4.40
	quarts	6.55	3.17	5.92	7.82	7.19
	liters	6.20	3.00	5.60	7.40	6.80
	quarts	14.79	7.40	16.91	19.55	15.85
liters	14.00	7.00	16.00	18.50	15.00	

▽ = Auto Vent Plug

▼ = Oil Level Plug

■ = Drain Plug

CCD36L LUBRICANT CAPACITY

*(Drive Shaft Down Requires Optional Overflow Canister)

Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	51 quarts	1.90	4.33	4.02	3.17	3.70
	51 liters	1.80	4.10	3.80	3.00	3.50
Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	32 quarts	1.37	3.49	2.54	3.28	3.06
	32 liters	1.30	3.30	2.40	3.10	2.90
42	quarts	1.90	4.76	3.91	4.23	4.66
	liters	1.80	4.50	3.70	4.00	4.40
52	quarts	3.17	6.55	5.92	7.82	7.19
	liters	3.00	6.20	5.60	7.40	6.80
Pump Mount Location		Floor (Standard)	Ceiling	Wall; Left & Right	Wall Shaft Down	Wall Shaft Up
Drive Size	Drive Orientation					
	62 quarts	14.79	7.40	16.91	19.55	15.85
	62 liters	14.00	7.00	16.00	18.50	15.00

▽ = Auto Vent Plug

▼ = Oil Level Plug

■ = Drain Plug

INTEGRAL ELECTRIC MOTOR INPUT

INSTALLATION

The user is responsible for conforming to The National Electric Code and all other applicable local codes. Wiring practices, grounding, disconnects and over current protection are of particular importance. Failure to observe these precautions could result in severe bodily injury or loss of life.

WIRING

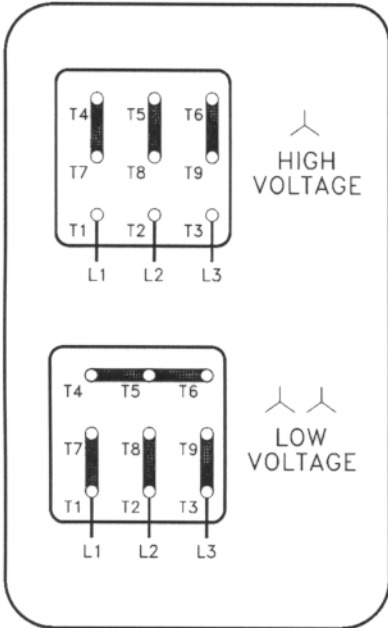
Connect the 3 phase wires to the terminals shown in Figure 6 Changing motor voltage between high and low is accomplished by moving jumper bars on a terminal block located in the motor junction box. Additional bars required for some voltage changes are located under the visible bars.



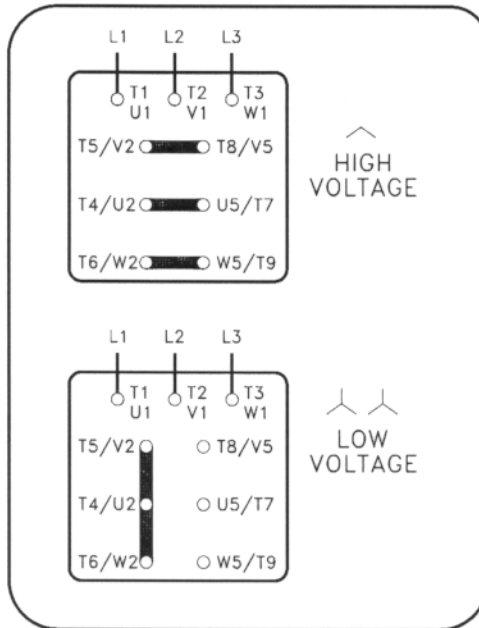
WARNING

Improper Wiring Can Cause
Electrical Shock. Resulting In Injury
Or Death

Frame 63-132
230/460V 60Hz 3 ϕ



Frame 160 +
230/460V 60Hz 3 ϕ



332/575V 60Hz 3 ϕ
230/400V 50Hz 3 ϕ
400/690V 50Hz 3 ϕ
200/346V 60Hz 3 ϕ

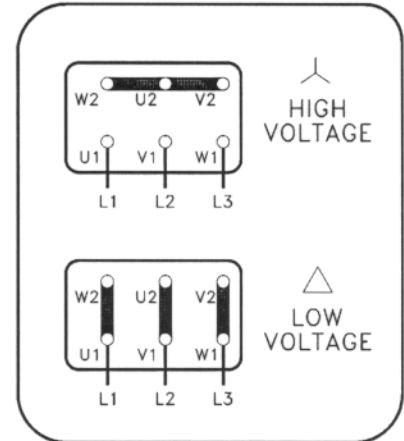


Figure 6 Motor Connections

MAINTENANCE

Motor Inspection

Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first.

- Check the fan ventilation openings. Make sure they are not blocked and are free of debris.
- Check that the motor fins and other surfaces are clean. Accumulated dirt (oil, grease, lint, etc.) can insulate the motor and prevent proper heat dissipation, causing overheating and early motor failure.

Motor Bearings

The motors bearings are shielded and factory greased. No maintenance is required.

MALE SHAFT INPUT (W-TYPE)

SHAFT SIZE

Below are the tolerances for the shafts. They have a tapped hole on the end, for customer use, also indicated below. The key is supplied.

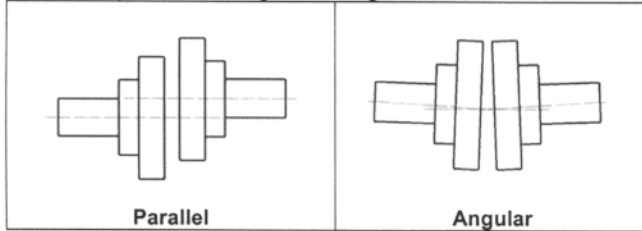
Shaft Tolerance	Shaft End Tap
$\leq \varnothing 1.750 = +0.0000/-0.0005$	$> \varnothing 0.875 \leq \varnothing 0.938 = 5/16-18 \times 0.7$ deep
$> \varnothing 1.750 = +0.0000/-0.0010$	$> \varnothing 0.938 \leq \varnothing 1.100 = 3/8-16 \times 0.9$ deep
	$> \varnothing 1.100 \leq \varnothing 1.300 = 1/2-13 \times 1.1$ deep
	$> \varnothing 1.300 \leq \varnothing 1.875 = 5/8-11 \times 1.4$ deep

DRIVELINE GUARDS

Assure adequate guards have been installed to prevent accidental contact of moving components. Follow all OSHA, Federal, state and local codes.

CHECK ALIGNMENT OF PUMP TO DRIVELINE

Excessive misalignment can overload the pump input shaft and cause premature failure. The figures below show parallel and angular misalignments.



Components installed on the shaft should be fitted to the manufacturer's recommended by the. 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.

Note: DO NOT hammer on the input shaft. Hammering could damage internal parts.

To reduce the over hung load on the shaft; mount the hub extension on sprockets, belt sheaves, or gears as shown in Figure 7.

MOUNTING BASE

Mount the unit on a rigid, heavy base to provide support and absorb shock. Bases should not only be designed for high rigidity but also for strength.

When mounting to cement or concrete use a steel base plate (supplied by others) to distribute the mounting stress over an area large enough to prevent the cement from failing. The base plate should be at least as thick as the pump feet, and grouted in place.

MAINTENANCE

The bearings are factory greased and shielded and do not require any maintenance.

Size 62F Only

Grease the outboard bearing zerk fitting every 4,000 hours of use. Use 0.75 ounce (20 - 25g) of synthetic grease should be added. There is a sticker adjacent to the zerk detailing which grease should be used. **USE ONLY SYNTHETIC GREASE - NOT MINERAL.**



Moving machinery can grab, crush, cut, mangle and dismember. Do not operate without adequate guards in place. Operating without guards could result in serious injury or death.

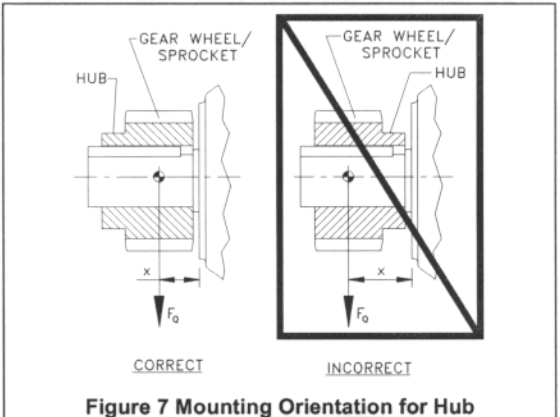


Figure 7 Mounting Orientation for Hub

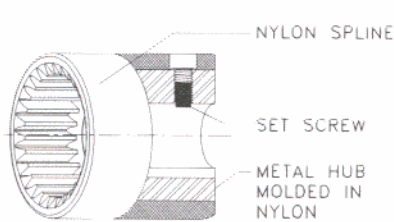
NEMA C-FACE INPUT

MOTOR INSTALLATION

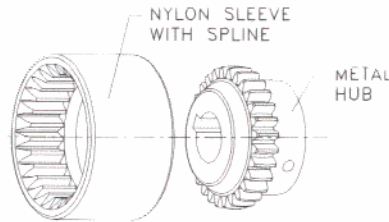
A coupling is supplied for mounting on the motor shaft. A coupling tag is supplied with the unit showing the proper alignment of the coupling on the motor. If the coupling tag is unavailable use the procedure on the next page to determine the proper location.

There are 3 types of couplings that vary depending on size of the input; BoWex® (gear tooth) "J" style, BoWex® "M" style, and Rotex® (jaw). It is important that the coupling is properly positioned. Follow the Motor Installation Instructions on next page to insure full coupling engagement onto the input shaft.

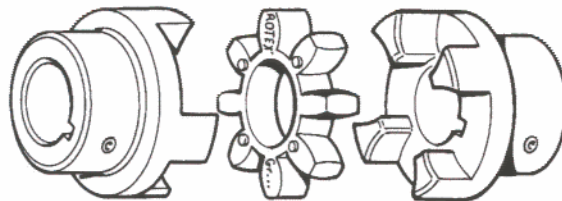
refer to the "Automatic Lubricator" section.



"J-STYLE" COUPLING



"M-STYLE" COUPLING



BoWex® "J" style Coupling is a one-piece coupling with a metal hub and nylon spline.

BoWex® "M" style Coupling is a two-piece coupling – the metal hub and a nylon sleeve.

Rotex® coupling is a cast iron jaw type coupling with a urethane "spider".

SIZE IEC160 NEMA 250TC & LARGER ONLY

AUTOMATIC LUBRICATOR

Continuously injects lubricant into the outboard bearing. The canister is exhausted (fully discharged) when red shows in the translucent plastic funnel area at the bottom. The automatic lubricator will last approximately 12 months.



Specifications

Supplier & Model	Perma Classic
Lubricant	Klüber Isoflex Topas NB52 (synthetic)
Lubricant Volume	120 mL (4 oz.)
Operating Temperature Range	0°C to 40°C (32°F to 104°F)
Discharge Time	12 months at 25°C (77°F)

Installation Instructions:

1. Remove metal cover, which protects the canister from mechanical damage.
2. Remove the plug from the male fitting.
3. Screw male fitting into input housing.
4. Thread activating screw into canister, and tighten until the ring-eyelet breaks off.
5. Reinstall metal protective cover.

Maintenance:

Replace automatic lubricator when red shows in the translucent funnel area; approximately every 12 months.

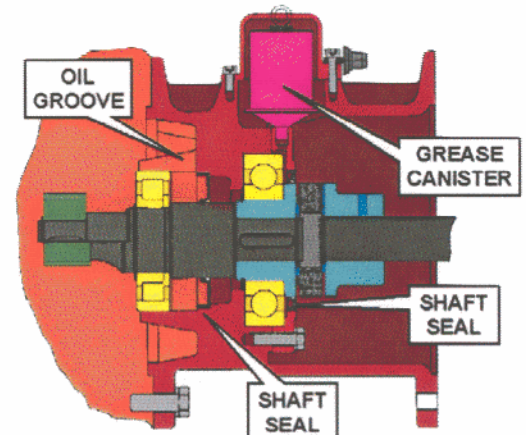
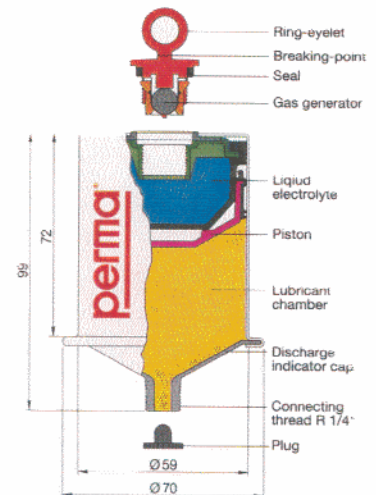
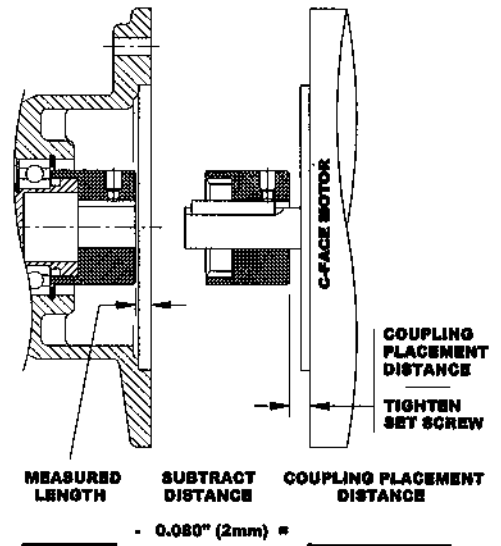


Figure 8 Automatic Lubricator

J" Style Coupling

NEMA C-face Motor Installation Instructions

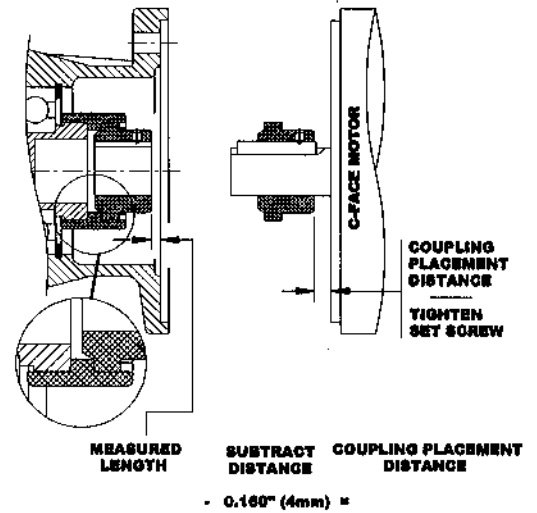
1. Put the coupling onto the splined input shaft until it is firmly seated.
2. Measure the distance from the face of the input adapter to the face of the coupling and record that measurement.
3. Subtract 0.08" (~2mm) from the distance. *This needs to be done so that the coupling will not be preloaded after installation!*
4. Use that measurement to locate the coupling from the face of the motor onto the shaft.
5. 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.



"M" Style Coupling

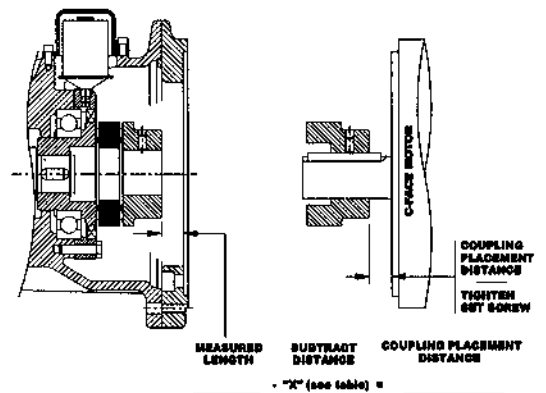
NEMA C-face Motor Installation Instructions

1. Put the sleeve and hub onto the splined input shaft until they are firmly seated.
2. Measure the distance from the face of the input adapter to the face of the coupling and record that measurement.
3. Subtract 0.18" (~4mm) from the distance. *This needs to be done so that the coupling will not be preloaded after installation!*
4. Use that measurement to locate the coupling from the face of the motor onto the shaft.
5. Once in place, tighten the setscrew to lock the coupling in place.



"Jaw" Style Coupling

1. Put the spider and hub onto the jawed input shaft until they are firmly seated.
2. Measure the distance from the face of the input adapter to the face of the coupling and record that measurement.
3. Subtract the "X" dimension from the measured distance.
4. Use that measurement to locate the coupling from the face of the motor onto the shaft.
5. 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.**
6. Once in place, tighten the setscrew to lock coupling in place. Let the coupling cool down before placing the spider into the jaws.
7. 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)
R48	0.14" (3.5mm)
R85	0.18" (4.5mm)
R90	0.22" (5.5mm)



Roper Pump Company

3475 Old Maysville Rd PO Box 269

Commerce, GA 30529

Phone: 706-335-5551 Fax: 706-335-5490

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