MOTOR MOUNTING

The following procedure is required only when the motor is mounted at the job site.

1. Thoroughly clean the motor feet and mounting pads of grease, burrs, and other foreign matter to ensure firm seating of the motor.

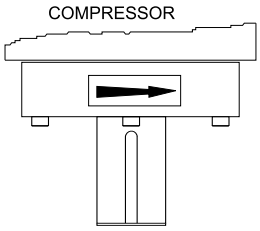
2. Attach the motor to the base using the bolts and motor-raising blocks, if required. Bolt snugly through the base.

3. Weld the four kick bolts into place so that they are positioned to allow movement of the motor feet.

4. Now that the motor has been set, check to see that the shafts are properly spaced for the coupling being used. Refer to the coupling data tables for the applicable dimension (pages 5 and 6).

CHECKING MOTOR/COMPRESSOR ROTATION

⚠WARNING **Make sure coupling hubs are tightened to the shaft before rotating the motor to prevent them from flying off and possibly causing serious injury or death.**



COMPRESSOR ROTATION IS CLOCKWISE WHEN FACING THE END OF THE COMPRESSOR SHAFT. Under **NO** conditions should the motor rotation be checked with the coupling center installed as damage to the compressor may result. Bump the motor to check for correct compressor rotation. After verification, install gear or disk drive spacer, as applicable.

COMPRESSOR/MOTOR COUPLINGS INSTALLATION

RWB II units are arranged for direct motor drive and require a flexible drive coupling to connect the compressor to the motor. Before installing, perform the following:

1. Inspect the shaft of the motor and compressor to ensure that no nicks, grease, or foreign matter is present.

2. Inspect the bores in the coupling hubs to make sure that they are free of burrs, dirt, and grit.

3. Check that the keys fit the hubs and shafts properly.

CH COUPLING – The T.B. Woods Elastomeric CH Coupling is used in most applications up to 600 HP. It consists of two drive hubs and a loose, gear-type Hytrel Drive Spacer. The split hub is clamped to the shaft by tightening the clamp screws. Torque is transmitted from the motor through the elastomeric gear which floats freely between the hubs. Install as follows:

1. Slide one hub onto each shaft as far as possible. It may be necessary to use a screwdriver as a wedge in the slot to open the bore before the hubs will slide on the shafts.

2. Hold the elastomeric gear between the hubs and slide both hubs onto the gear to fully engage the mating teeth. Center the gear and hub assembly so there is equal engagement on both shafts. Adjust the space between hubs as specified in the CH Coupling Data Table below.

3. Torque the clamping bolts in both hubs to the torque value given in the CH Data Table. **DO NOT USE ANY LUBRICANT ON THESE BOLTS.**

4. Proceed to Coupling Alignment.

DBZ-B COUPLING – The Thomas DBZ-B coupling is used on applications above 600 HP and with sleeve bearing motors that do not have axial end float constraint. The DBZ-B coupling consists of two drive hubs and a flexible metal disc drive spacer that is bolted to both hubs. A flexible steel disc pack serves as the drive element. This disc pack is bolted to the coupling hubs and prevents axial end float between the compressor and motor shafts which may occur with sleeve bearing motors. On sleeve bearing motors, the magnetic center must be determined and maintained by securing the coupling to the motor shaft with the shaft properly located.

⚠CAUTION **Injury may occur if loose clothing, etc. becomes entangled on the spinning motor shaft.**

If the motor is coupled to the compressor using a fixed-end-play coupling, such as a DBZ-B coupling, and the motor is not properly centered, additional thrust loads will be transmitted to the compressor bearings that could result in premature bearing failure. Install as follows:

1. Remove the eight locknuts and long bolts attaching the center member to the disc pack.

2. Slide the disc pack and coupling hub assemblies on their respective shafts.

DBZ-B COUPLING DATA TABLE

DBZ-B COUPLING SIZE	HUB FACE SPACING in.	HUB FACE SPACING mm	HUB FACE +/- in.	HUB FACE +/- mm	MAXIMUM TOTAL INDICATOR READING in.	MAXIMUM TOTAL INDICATOR READING mm	CLAMP BOLT TORQUE (LUBE) ft-lb	CLAMP BOLT TORQUE (LUBE) Nm	CLAMP BOLT SIZE
226	$3^{13}/_{16}$	96.8	1/64	.40	.003	.076	14	19.5	$^{5}/_{16}$ - 24 UNRF
263	$4^{5}/_{16}$	109.5	1/32	.79	.004	.102	22	30.6	$^{3}/_{8}$ - 24 UNRF
301	$4^{7}/_{8}$	123.8	1/32	.79	.004	.102	37	51.5	$^{7}/_{16}$ - 20 UNRF
351	$5^{7}/_{8}$	149.2	1/32	.79	.004	.102	55	76.5	$^{1}/_{2}$ - 20 UNRF
401	$6^{11}/_{16}$	169.9	1/32	.79	.004	.102	49	68.2	$^{1}/_{2}$ - 20 UNRF

CH COUPLING DATA TABLE

CH COUPLING SIZE	BETWEEN SHAFT SPACING MIN* in.	BETWEEN SHAFT SPACING MIN* mm	BETWEEN SHAFT SPACING MAX in.	BETWEEN SHAFT SPACING MAX mm	COUPLING HUB SHAFT ENGAGEMENT MIN in.	COUPLING HUB SHAFT ENGAGEMENT MIN mm	COUPLING HUB SHAFT ENGAGEMENT MAX in.	COUPLING HUB SHAFT ENGAGEMENT MAX mm	FACE SPACING in.	FACE SPACING mm	MAX TOTAL INDICATOR READING in.	MAX TOTAL INDICATOR READING mm	CLAMP BOLT TORQUE (DRY) ft-lb	CLAMP BOLT TORQUE (DRY) Nm	CLAMP BOLT SIZE	KEYWAY SETSCREW TORQUE ft-lb	KEYWAY SETSCREW TORQUE Nm
8	$3^{13}/_{16}$	96.8	4	101.6	$1^{1}/_{16}$	27.0	$1^{13}/_{16}$	46.0	$1^{1}/_{8}$	28.6	.004	.104	55	74.6	$^{3}/_{8}$ - 24 UNF	13	17.6
9	$4^{5}/_{16}$	109.5	$5^{7}/_{16}$	138.1	$1^{7}/_{16}$	36.5	$2^{3}/_{16}$	61.9	$1^{7}/_{16}$	36.5	.004	.104	55	74.6	$^{3}/_{8}$ - 24 UNF	13	17.6
10	$4^{5}/_{16}$	109.5	$6^{3}/_{8}$	161.9	$1^{11}/_{16}$	42.9	$2^{9}/_{16}$	65.1	$1^{11}/_{16}$	42.9	.004	.104	130	176.4	$^{1}/_{2}$ - 20 UNF	13	17.6
11	$4^{7}/_{8}$	123.8	$5^{7}/_{8}$	149.2	2	50.8	$2^{7}/_{8}$	73.0	$1^{7}/_{8}$	47.6	.004	.104	130	176.4	$^{1}/_{2}$ - 20 UNF	13	17.6

* Required for shaft seal removal.

3. Adjust the distance between hub faces as specified in the DBZ-B Data Table by sliding the hubs. Key and secure hubs to the shafts by tightening setscrews.

4. Reinstall the eight previously removed bolts and locknuts. Alternately tighten each locknut as you would the lug nuts on an automobile. **NOTE: ALWAYS TURN THE NUT. NEVER TURN THE BOLT.**

5. Torque the locknuts to the value shown in the DBZ-B Data Table for the size coupling being installed.

CAUTION **Lubricated and/or plated bolts and locknuts develop higher bolt tension with less tightening than those that are dry and not plated.** Torques for lubricated and/or plated bolts and locknuts will generally fall in the lower range; while those that are dry or as received from the factory fall into the upper range. Torque readings should be observed while locknut is being turned.

6. Proceed to coupling alignment.

SERIES 52 COUPLING – The Thomas Series 52 coupling is also used on applications above 600 HP. It has two drive hubs, a center spool, and disc packs which are bolted between the center spool and each drive hub. A center spool and two flexible steel disc packs serve as the drive element. These three parts, situated between the motor and compressor hubs, prevent axial end float between the motor and compressor shafts. End float tends to occur with sleeve bearing motors. The magnetic center of the sleeve bearing motors must be determined and maintained by securing the coupling hub to the motor shaft with the shaft properly located.

CAUTION **Injury may occur if loose clothing, etc. becomes entangled on the spinning motor shaft.**

If the motor is coupled to the compressor using a fixed-end-play coupling such as the Series 52 coupling and the motor is not properly centered, the additional thrust loads will be transmitted to the compressor bearings. This additional thrust could result in premature bearing failure. Install as follows:

1. Before proceeding with the alignment process found on pages 7 and 8 of this manual, disassemble the Series 52 coupling **noting the arrangement of bolts, washers, and nuts as THEY MUST BE REPLACED IN THE SAME ORDER.** Mark the adjoining bolt holes of each part, the two hubs, the two disc packs, and the center spool, so they are put back together in the same position.

2. Mount the coupling hubs on their respective shafts. The hub is bored for an interference fit on the shaft. Heating of the coupling hub may be necessary for assembly. **DO NOT SPOT HEAT THE HUB** as it may cause distortion. Heat in water, oil, or use a SOFT open flame and quickly position on the shaft.

3. Adjust the distance between hub faces, as specified in the Series 52 Coupling Data Table, by sliding the hubs. Key and secure the hubs to the shafts by tightening the set screws.

4. Reassemble the coupling with the disc packs and the center spool. Ensure that they are reassembled exactly as they were disassembled.

WOODS BP SERIES COUPLING – is also used on applications above 600 HP. It utilizes a center spool and two flexible steel disc packs as the drive element. These three parts, situated between the motor and compressor hubs, prevent axial end float between the motor and compressor shafts. End float tends to occur with sleeve bearing motors.

CAUTION **Injury may occur if loose clothing, etc. becomes entangled on the spinning motor shaft.**

If the motor is coupled to the compressor using a fixed-end-play coupling and the motor is not properly centered, the additional thrust loads will be transmitted to the compressor bearings. This additional thrust could result in premature bearing failure. Install the BP Series coupling using the following instructions:

1. Before proceeding with the alignment process in the following section, disassemble the BP Series coupling **noting the arrangement of bolts, washers, and nuts as THEY MUST BE REPLACED IN THE SAME ORDER.** Mark the adjoining bolt holes of each part, the two hubs, the two disc packs, and the center spool, so they are put back together in the same position.

2. Install the motor and compressor coupling hubs on their respective shafts with the keys. Ensure that the hubs slide, so that when the shim packs are installed, no axial stresses are transferred to the shim packs because the coupling hub is stuck.

BP SERIES COUPLING DATA TABLE

BP	HUB FACE *		DISC PACK		CLAMP BOLT		
SERIES	SPACING		BOLT TORQ.		TORQ. DRY		SIZE
SIZE	in.	mm	ft-lb	Nm	ft-lb	Nm	UNF
BP48	4.88	124	40	54	41	56	3/8-24
BP53	5.88	150	60	81	65	88	7/16-20
BP58	6.00	152	120	163	100	136	1/2-20
BP58	6.69	170	120	163	100	136	1/2-20
BP63	7.00	179	120	163	100	136	1/2-20

* Max total indicator reading .003 in. or .076 mm for all sizes.

SERIES 52 COUPLING DATA TABLE

COUPLING	HUB FACE				MAX TOTAL INDICATOR READING				CLAMP BOLT		
	SPACING		+/-		ANGULAR		PARALLEL		TORQUE (LUBE)		SIZE
SIZE	in.	mm	in.	mm	in.	mm	in.	mm	ft-lb	Nm	
225	5	127.0	1/32	.914	.004	.102	.004	.102	7.5	10.5	1/4-20 UNRF
262	5	127.0	1/32	.914	.004	.102	.004	.102	22	30.6	3/8-24 UNRF
312	5-1/2	139.7	3/64	1.295	.004	.102	.004	.102	37	51.5	7/16-20 UNRF
350	6	152.4	3/64	1.295	.004	.102	.004	.102	55	76.5	1/2-20 UNRF
375	7	177.8	1/16	1.574	.004	.102	.004	.102	55	76.5	1/2-20 UNRF
425	7	177.8	1/16	1.574	.004	.102	.004	.102	96	133.6	5/8-18 UNRF
450	8	203.2	1/16	1.574	.004	.102	.004	.102	96	133.6	5/8-18 UNRF
500	9	228.6	5/64	2.083	.004	.102	.004	.102	250	348.0	7/8-14 UNRF

WARNING **All rotating power transmission equipment is potentially dangerous. Ensure that the couplings are properly guarded prior to turning on the power. Coupling guards are provided with the equipment and must be in place and secured properly while the equipment is in operation.**

3. Reassemble the coupling with the disc packs and the center spool. Center the coupling between the shafts and ensure that the keys are fully engaged in their keyways. Ensure that they are reassembled exactly as they were disassembled. Torque disc pack hardware to specification in BP Series Coupling Data Table.

4. Key and secure the hubs to the shafts by tightening the clamping bolts. Make sure that the keyways are offset 180° to maintain balance.

5. Torque the clamping bolts of both hubs to the torque value given in the Data Table. **DO NOT USE ANY LUBRICANT ON THESE BOLTS.**

6. IMPORTANT: Only after the shaft clamping bolts are tightened to their final torque can the keyway setscrew be tightened! If the keyway setscrew is tightened before the shaft clamping bolts are tightened, then the hub can be cocked on the shaft.

7. Proceed to Coupling Alignment.

COUPLING ALIGNMENT PROCEDURE

The life of the compressor shaft seal and bearings, as well as the life of the motor bearings, is dependent upon proper coupling alignment. Couplings may be aligned at the factory but realignment **MUST ALWAYS** be done on the job site after the unit is securely mounted on its foundation. Initial alignment must be made prior to start-up and rechecked after a few hours of operation. Final (HOT) field alignment can only be made when the unit is at operating temperature. After final (HOT) alignment has been made and found to be satisfactory for approximately one week, the motor may be dowelled to maintain alignment.

NOTE: Frick recommends cold aligning the motor .005" high. This cold misalignment compensates for thermal growth when the unit is at operating temperature.

The following procedure is applicable to both the CH and DBZ-B couplings. Dial indicators are to be used to measure the angular and parallel shaft misalignment. Coupling alignment is attained by alternately measuring angular and parallel misalignment and repositioning the motor until the misalignment is within specified tolerances.

⚠WARNING **ALWAYS LOCK OUT MAIN MOTOR DISCONNECT BEFORE TOUCHING MOTOR SHAFT. MISALIGNMENT MUST NOT EXCEED .004" FOR ALL CH, DBZ-B AND SERIES 52 COUPLINGS EXCEPT DBZ-B 226 WHICH SHALL NOT EXCEED .003".**

ANGULAR ALIGNMENT

1. To check angular alignment, as shown in Figure 1., attach dial indicator rigidly to the motor hub. Move indicator stem so it is in contact with the outside face of compressor hub, as shown in Figure 2.

NOTE: When DBZ-B couplings are used on motors with sleeve bearings, it is necessary to secure the two coupling hubs with a bolt to prevent them from drifting apart when rotating.

2. Rotate both coupling hubs several revolutions until they seek their normal axial positions.

Check the dial indicator to be sure that the indicator stem is slightly loaded so as to allow movement in both directions.

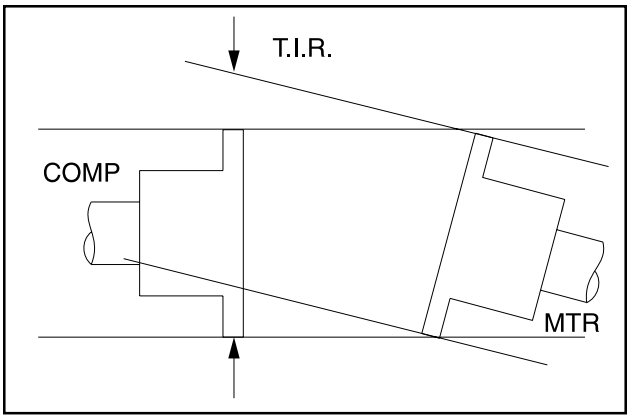


Figure 1 - Angular Misalignment

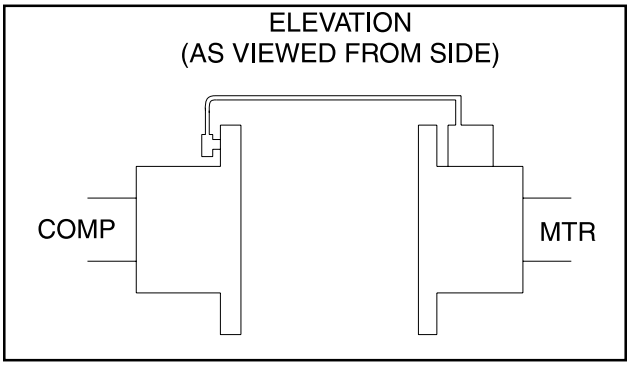


Figure 2 - Dial Indicator Attached (at 12 o'clock)

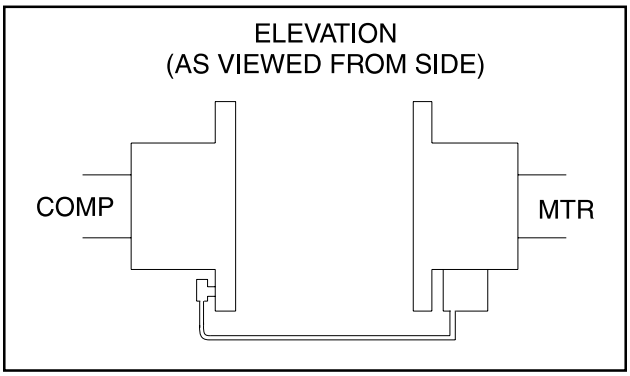


Figure 3 - Dial Indicator at 6 o'clock

3. Set the dial indicator at zero when viewed at the 12 o'clock position, as shown in Figure 2.

4. Rotate both coupling hubs together 180° (6 o'clock position), as shown in Figure 3. At this position the dial indicator will show TOTAL angular misalignment.

NOTE: The use of a mirror is helpful in reading the indicator dial as coupling hubs are rotated.

5. Loosen motor anchor bolts and move or shim motor to correct the angular misalignment.

After adjustments have been made for angular misalignment retighten anchor bolts to prevent inaccurate readings. Repeat Steps 3 through 5 to check corrections. Further adjustments and checks shall be made for angular misalignment until the total indicator reading is within the specified tolerance.

PARALLEL ALIGNMENT

6. To check parallel alignment, as shown in Figure 4, reposition dial indicator so the stem is in contact with the rim of the compressor hub, as shown in Figure 5.

Check the dial indicator to be sure that the indicator stem is slightly loaded so as to allow movement in both directions.

7. Check parallel height misalignment by setting dial indicator at zero when viewed at the 12 o'clock position. Rotate both coupling hubs together 180° (6 o'clock position). At this position the dial indicator will show TWICE the amount of parallel height misalignment.

8. Loosen motor anchor bolts and add or remove shims under the four motor feet until parallel height misalignment is within specified tolerance when anchor bolts are retightened.

CAUTION **CARE MUST BE USED WHEN CORRECTING FOR PARALLEL MISALIGNMENT TO ENSURE THAT THE AXIAL SPACING AND ANGULAR MISALIGNMENT IS NOT SIGNIFICANTLY DISTURBED.**

9. After the parallel height misalignment is within tolerance, repeat Steps 1 through 5 until angular misalignment is within specified tolerance.

10. Check parallel lateral misalignment by positioning dial indicator so the stem is in contact with the rim of the compressor hub at 3 o'clock, as shown in Figure 6.

Set indicator at zero and rotate both coupling hubs together 180° (9 o'clock position), as shown in Figure 5.

Adjust parallel lateral misalignment using the motor adjusting screws until reading is within specified tolerance.

11. Recheck angular misalignment and realign if necessary.

12. Tighten motor anchor bolts and rotate both coupling hubs together, checking the angular and parallel misalignment through the full 360° travel at 90° increments. If dial readings are in excess of specified tolerance realign as required.

13. When the coupling hubs have been aligned to within specified tolerance, a recording of the cold alignment must be made for unit records and usage during hot alignment.

CAUTION **Install the coupling guard before operating the compressor.**

CAUTION **When installing drive spacer, make sure that hub spacing is within limits shown on the Coupling Data Table applicable to the coupling being installed and that the clamping bolt(s) are properly torqued.**

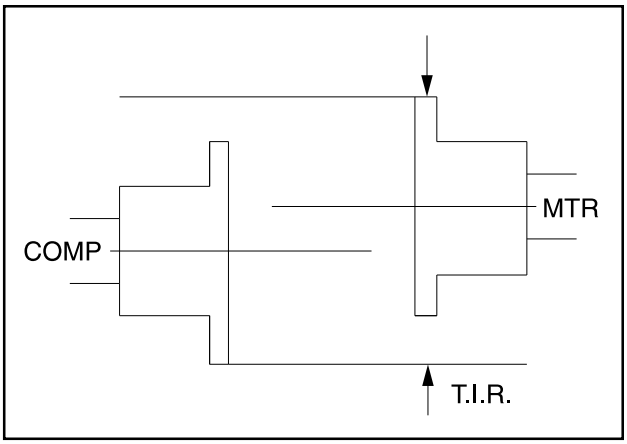


Figure 4 - Parallel Misalignment

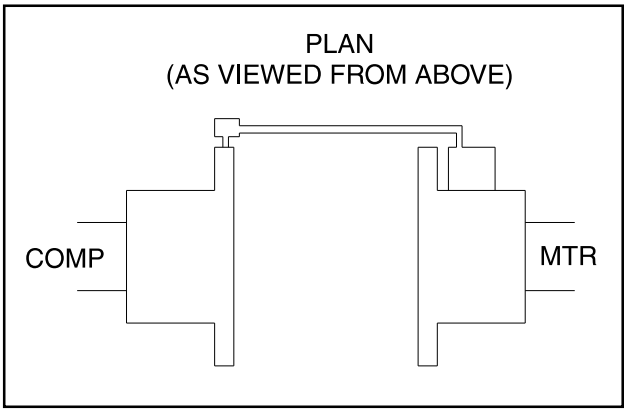


Figure 5 - Dial Indicator Attached (at 9 o'clock)

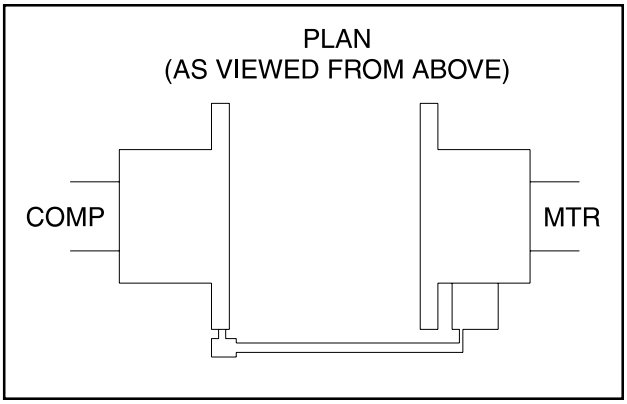


Figure 6 - Dial Indicator at 3 o'clock

HOT ALIGNMENT OF COMPRESSOR/MOTOR

Hot alignments can only be made after the unit has operated for several hours and all components are at operating temperatures.

Shut down the unit and quickly affix dial indicator to coupling motor hub, then take readings of both the face and rim of the compressor hub. If these readings are within tolerance, record reading, attach coupling guard and restart unit. However, if the reading is not within limits, compare the hot reading with the cold alignment and adjust for this difference; i.e. if the rim at 0° and 180° readings indicates that the motor rises .005" between its hot and cold state, .005" of shims should be removed from under the motor.

After the initial hot alignment adjustment is made, restart unit and bring to operating temperature. Shut down and recheck hot alignment. Repeat procedure unit hot alignment is within specified tolerance.

⚠ CAUTION **INSTALL COUPLING GUARD BEFORE OPERATING COMPRESSOR.**

OIL PUMP COUPLING

Compressor units with direct motor/pump coupled pumps need no pump/motor coupling alignment since this is maintained by the close-coupled arrangement.

HOLDING CHARGE AND STORAGE

Each RWB II compressor unit is pressure and leak tested at the Frick factory and then thoroughly evacuated and charged with dry nitrogen to ensure the integrity of the unit during shipping and short term storage prior to installation.

NOTE: Care must be taken when entering the unit to ensure that the nitrogen charge is safely released.

⚠ WARNING **Holding charge shipping gauges on separator and external oil cooler are rated for 30 PSIG and are for checking the shipping charge only. They must be removed before pressure testing the system and before charging the system with refrigerant. Failure to remove these gauges may result in catastrophic failure of the gauge and uncontrolled release of refrigerant resulting in serious injury or death.**

All units must be kept in a clean, dry location to prevent corrosion damage. Reasonable consideration must be given to proper care for the solid-state components of the microprocessor.

Unit which will be stored for more than two months must have the nitrogen charge checked periodically.

COMPRESSOR UNIT OIL

⚠ WARNING **DO NOT MIX OILS of different brands, manufacturers, or types. Mixing of oils may cause excessive oil foaming, nuisance oil level cutouts, oil pressure loss, gas or oil leakage and catastrophic compressor failure.**

⚠ CAUTION **Use of oils other than Frick Oil in Frick compressors must be approved in writing by Frick engineering or warranty claim may be denied.**

⚠ CAUTION **Use of filter elements other than Frick must be approved in writing by Frick engineering or warranty claim may be denied.**

The oil charge shipped with the unit is the best suited lubricant for the conditions specified at the time of purchase. If there is any doubt due to the refrigerant, operating pressures, or temperatures, refer to Frick Pub. E160-802 SPC for guidance.

OIL CHARGE

The normal charging level is midway in the top sight glass located midway along the oil separator shell**.** Normal operating level is midway between the top sight glass and bottom sight glass. The table gives the approximate oil charge quantity.

RWB II MODEL NO.	BASIC* CHARGE (gal.)
60	35
76	35
100	65
134	65
177	110
222	110
270	140
316	140
399	140
480	170

* Includes total in oil separator and piping. Additional oil supplied for oil cooler.

Add oil by attaching the end of a suitable-pressure-type hose to the oil charging valve, located on the top of the oil separator at the compressor end. Using a pressure-type pump and the recommended Frick oil, open the charging valve and pump oil into the separator. **NOTE: Fill slowly because oil will fill up in the separator faster than it shows in the sight glass.**

Oil distillers and similar equipment which act to trap oil must be filled prior to unit operation to normal design outlet levels. The same pump used to charge the unit may be used for filling these auxiliary oil reservoirs.

NOTE: The sight glass located in the coalescing end of the separator near the discharge connection should remain empty.

OIL HEATER(S)

Standard units are equipped with two or three 500 watt oil heaters, providing sufficient heat to maintain the oil temperature for most indoor applications during shutdown cycles to permit safe start-up. Should additional heating capacity be required because of low ambient temperature, contact Frick. The heaters are energized only when the unit is not in operation.

⚠ WARNING **DO NOT ENERGIZE THE HEATERS when there is no oil in the unit, the heaters will burn out. The oil heaters will be energized whenever 120 volt control power is applied to the unit and the compressor is not running, unless the 16 amp circuit breaker in the micro enclosure is turned off.**