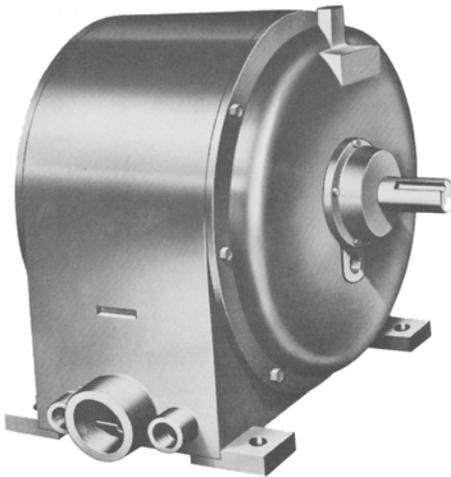


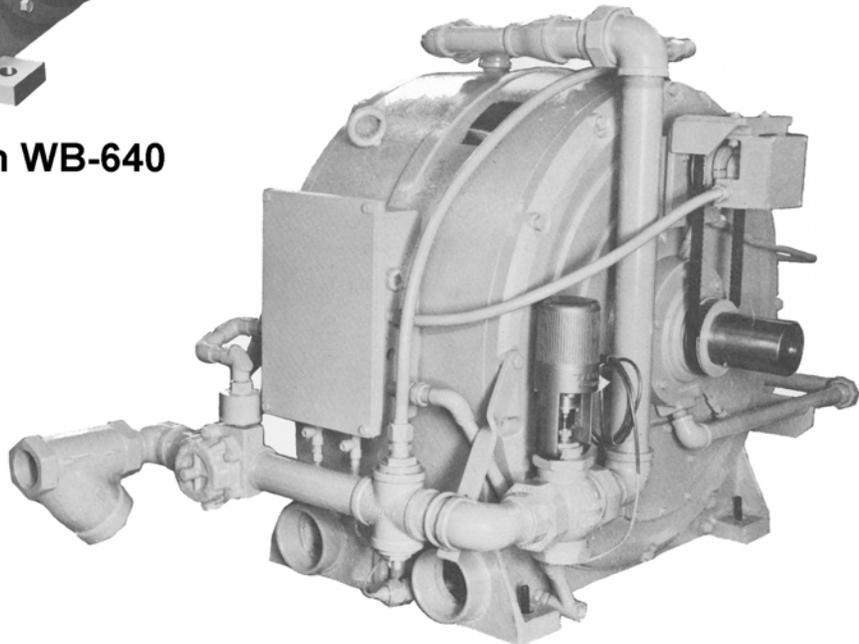
Dynamatic®

Instruction Manual

Dynamatic® Liquid Cooled Eddy-Current Brakes Models WB-620 through WB-640 and Models WB-6163 through WB-6313



WB-620 through WB-640



WB-6163 through WB-6313

DYNAMATIC Corporation

DANGER HIGH VOLTAGE



Motor control equipment and electronic controllers are connected to hazardous line voltage. When servicing drives and electronic controllers, there may be exposed components with their cases and protrusions at or above line potential. Extreme care should be taken to protect against shock. Stand on an insulating pad and make it a habit to use only one hand when checking components. Always work with another person in case an emergency occurs. Disconnect power whenever possible to check controllers or to perform maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on an electronic controller or electrical rotating equipment.

CAUTION

Rotating shafts and above ground electrical potentials can be hazardous. Therefore, it is strongly recommended that all electrical work conform to National Electrical Codes and local regulations. Installation, alignment and maintenance should be performed only by qualified personnel.

Factory recommended test procedures, included in the instruction manual, should be followed. Always disconnect electrical power before working on the unit.

REFER TO OSHA RULES AND REGULATIONS, PARAGRAPH 1910.219 FOR GUARDS ON MECHANICAL POWER TRANSMISSION APPARATUS.

IMPORTANT NOTICE

The printed contents in this manual are to be used for reference only. Due to periodic engineering design changes and the addition of modifications, this material is provided as a guide only. Please refer to the drawings for your specific unit.

For additional information regarding contents of this manual, please contact:

DYNAMATIC Corporation

Phone: 1-800/548-2169

Fax: 1-800/828-5072

E-mail: mkt@dynamatic.com

Web site: www.dynamatic.com

Instruction Material	Marketing Department
Operational Functions	Technical Service Department
Parts	Customer Service Department

This notice is provided to clarify the intent of the instruction book contents and to inform our customers how to obtain appropriate technical assistance from the proper source.



Please Observe the Following Safety Guidelines

Allow installation and service by qualified personnel only.

Electrical rotating equipment and associated controls can be dangerous. Therefore, it is essential that only trained personnel be allowed to work with this equipment under competent supervision. The danger is increased when the equipment is not handled, installed, maintained or used properly. This equipment must be installed, adjusted and serviced only by qualified personnel familiar with the construction and operation of the equipment and the hazards involved. Failure to observe this precaution could result in personal injury and/or equipment damage.

Read Instructions and Warnings

These instructions should be read and clearly understood before working on the equipment. Become especially familiar with all safety instructions and procedures. Read and heed all danger, warning and caution notices contained in this manual and attached to the equipment and be sure to instruct others in their meaning and importance.

Danger, High Voltage

Disconnect Power before Servicing Equipment

Various component parts and terminals of the drive equipment are at or above line voltage when AC power is connected to the input terminals. All ungrounded conductors of the AC power line must be disconnected before it is safe to touch any internal parts of this equipment. Some control equipment may contain capacitors that retain a hazardous electrical charge for a period of time after power is removed. After power is removed, wait at least two minutes to allow capacitors to discharge before touching any internal parts of the equipment. Failure to observe these precautions could result in fatal injury.

Precautions when Working On Live Circuits

Stand on an insulating mat. Make a habit of using only one hand. Make sure that there is another person nearby in case emergency assistance is required.

Application of Equipment and Safety Devices

The adjustable speed drive and all components of the drive system, such as operator control devices, electrical power distribution equipment, the motor and mechanical power transmission equipment, must be properly selected and applied to assure a safe and reliable installation. Each individual installation has unique requirements for safety equipment such as emergency stop pushbuttons, pre-start alarms, motor and power disconnect devices and guards on mechanical power transmission apparatus. The party responsible for the overall design and operation of the facility must make sure that qualified personnel are employed to select and apply all components of the drive system including appropriate safety devices.

Hazard of personal injury or equipment damage exists if the drive and/or the driven machine are operated above their rated speed due to maladjustment or electronic failure. Be sure to consider this factor in selecting gear ratios and safety devices.

Always Wear Safety Glasses

Safety glasses should be worn by all personnel involved in installing or maintaining the equipment. This applies equally to electrical and mechanical workers. Other safety clothing should be selected as appropriate to the task and work environment.

Handle With Care

Handle the equipment carefully to avoid personal injury or damage to the unit.

Provide Appropriate Guards Around Moving Parts

Before operating the equipment, make sure that appropriate guards and other safety devices are in place. Refer to OSHA rules and regulations, paragraph 1910.219 for guards on mechanical power transmission apparatus.

Observe Requirements of the National Electric Code

All wiring must be in accordance with the National Electrical Code (NEC) and/or other codes as required by the authority having jurisdiction. The electrical connections completed by the installer must conform to the instructions and diagrams supplied.

National Electric Code Article 430-102 requires a disconnecting means for each motor and controller located in sight from the motor, controller and driven machinery locations or capable of being locked in the open position if not located in sight. This disconnecting means is not included with the drive equipment unless specifically ordered.

Not for Use in Hazardous Locations

Unless specifically labeled as approved for such use, this equipment is not suitable for use in an explosive atmosphere or in a "Hazardous (Classified) Location" as defined in article 500 of the National Electric Code.

Provide Adequate Ground Connections

For personnel safety and reliable equipment operation, firmly earth ground each piece of equipment as directed in this manual and shown on the connection diagrams provided. The ground conductor should be the same size as the incoming power wires or sized according to NEC table 250-95. A copper or aluminum conductor must be used. Grounded conduit connections are not adequate for use as equipment ground connections.

Instruction Material and Drawings

In addition to this manual, data sheets, drawings, supplementary instruction sheets and data sheets may be included in the package of instruction material that is furnished for each drive. Be sure to save each of these items for future reference. The drawings and data included in this manual are generally representative of the product line, but do not accurately include every detail pertaining to specific equipment provided for an individual customer order. Drawings and data sheets that are identified by PRO/Serial number as pertaining to a specific piece of equipment take precedence over this manual. Note: The information furnished may not cover changes made to the equipment after shipment. **All data is subject to change without notice.**

Technical Assistance

It is best to request assistance through *DYNAMATIC Corporation's* Service Repair Department, 1-800/548-2169. Please listen to message to connect to the department you require.

SECTION 1 GENERAL INFORMATION

Introduction

This manual provides general information and operating instructions for the Dynamatic WB Line of Liquid-cooled, eddy-current brakes.

The instructions are arranged in a logical sequence. Beginning with general information, the instructions proceed from receiving, handling and storage, through installation, operation, start-up and adjustment to maintenance, service and renewal parts.

While every effort has been made to provide a complete and accurate manual, there is no substitute for trained, qualified personnel to handle unusual situations. Any questions that arise should be referred to **DYNAMATIC Corporation**. Please call **1-800/548-2169** to obtain the telephone, number of your local sales office.

Safety

Electrical rotating equipment and associated controllers can be dangerous. Therefore, it is essential that only trained personnel be allowed to work with this equipment, under competent supervision. The danger is increased when the equipment is not handled, installed, maintained or used properly.

Read this instruction manual before attempting to install or use this equipment. Become especially familiar with all safety instructions and procedures. Heed any hazard labels on the equipment and be sure to instruct others in the meaning and importance of these labels. The various types of labels used to alert personnel of hazards and their degree of hazard potential are as follows:

DANGER: Used to call attention to an immediate hazard, where failure to follow instructions could be fatal.

WARNING: Identifies hazards having possibilities for injury to personnel.

CAUTION: Used to warn of potential hazards and unsafe practices. See sample label:



Caution Label

INSTRUCTION NOTE: Used where there is a need for special instructions relating to safety, proper operation or maintenance.

Receiving and Damage Claims

All equipment is assembled and tested prior to shipment. Each unit is then packaged using approved packaging methods so it can arrive at **its destination** in the best possible condition. Upon receipt, check items against the packing list to be sure the shipment is complete. Then inspect shipment as follows:

1. Inspect the packaging, covering and pallet for signs of mistreatment.
2. Carefully examine the housing, end bells, conduit box, lead wires and terminals to make sure there is no damage. Tighten any exterior screws and nuts if they have become loose in transit.
3. Manually rotate the shaft to be sure it is free from binding and noise.
4. Look into all openings for signs of moisture or foreign material that could damage electrical windings or bearings, or which may be caught in the rotating members.

Returning Material

It is very important that you contact the factory for instructions before returning material. If you return material without the proper documentation, it may delay the return process.

Warranty

Your new Water-Cooled Brake is covered by a 1 year warranty against any manufacturing defect in either material or workmanship. This warranty starts on the day of shipment from our factory. The complete warranty is contained in the Standard Terms and Conditions of Sale printed in the Dynamatic Eddy-Current Drives Catalog.

If a warranty failure occurs, contact **DYNAMATIC Corporation** to obtain a warranty authorization number. All repair arrangements must be approved by **DYNAMATIC Corporation** in advance. Note that freight charges, both ways, are your responsibility. For Additional information, refer to the "Renewal Parts and Service" section.

Note - Shipping damages are not covered by the warranty; the carrier assumes responsibility for safe delivery. If you note damage or missing items, IMMEDIATELY file a claim with the carrier. At the same time, notify DYNAMATIC Corporation. If assistance is needed to settle a claim, contact the factory or one of its sales offices. To expedite this service, refer to your equipment by purchase

order, model number, part number and serial number.

Handling

Care must be exercised in handling this drive properly. Dropping, jarring, pounding on the shaft or lifting in an unapproved manner can cause serious damage to bearings and other components. Handling is best accomplished with a forklift or crane. Skilled personnel, following all standard safety practices, should operate the forklift or crane. Never lift the unit by its shaft. Avoid dropping the unit as well as jarring or pounding on the shaft. When using a forklift, be sure the unit is well supported from beneath, without strain or danger of dropping with the forks adequately spread and -centered under the pallet. When using a crane, attach crane cables to all lifting lugs provided on the unit. Horizontal, foot mounted units are equipped with one lifting lug at end. Units mounted on a common base with other equipment may be lifted with a suitable sling under the base or by attaching cables to lifting lugs designed and installed into the base for lifting the complete assembly.

STORAGE

General:

Special care must be given to liquid-cooled equipment that will not be operated for an indefinite period. Unless equipment is properly cared for, rust will develop to the extent that difficulties will arise when the equipment is put into operation later.

Storage Procedure:

1. Remove source of power (if connected).
2. Drain all water from the machine.
3. Pour undiluted rust inhibited ethylene glycol (automobile radiator anti-freeze) through the water inlet while rotating at motor speed. **CAUTION: DO NOT use ethylene glycol solutions with stop-leak additives.**
4. Apply approximately one ounce of fresh grease into each of the grease fittings (if so equipped).
5. While the unit is set aside, it should be protected with a ventilated covering to prevent dust and moisture from accumulating. If wrapped with an airtight material such as polyethylene, a moisture absorbent material such as silica gel should be used to prevent rust.
6. Once each week, hand rotate shaft(s) and stop with the shaft(s) in a different each time. This is necessary to prevent the bearings from becoming brinelled.
7. When resuming normal operation, the normal flow of coolant will automatically flush the unit.

Storage Procedure for Heat Exchangers:

1. Stop source of liquid coolant and remove all piping (if connected).
2. Open all drain outlets.
3. Tip heat exchanger in a vertical position. Allow unit to drain completely.
4. Purge or blow out the tubes with compressed air.
5. Close drain outlets and seal all entrance and exit ports.
6. Fill unit completely with water-soluble oil.
7. Cover unit with a ventilated covering.

SECTION 2 EQUIPMENT DESCRIPTION

General

A liquid-cooled, stationary field, eddy-current brake consists of a straight-through shaft and a stationary field coil. Specifically, double support brakes consist of a toothed rotor keyed to the shaft with smooth surfaced field assembly surrounding it. Single support brakes consist of a smooth drum keyed to the shaft and a segmented field assembly mounted inside of it. In both versions, the shaft is supported by a bearing in each end bell to maintain the required air gap between the smooth surface and the toothed, or segmented, surface. Energy absorbed by liquid cooled brakes is converted into heat that is carried away by a flow of cooling water. As water enters the brake housing, centrifugal force carries it over the heated surfaces and discharges to the brake sump and out of the brake. Bearings, field coil and the governor generator are protected from moisture with effective seals. An automatic water piping system controls the amount of water entering the brake in order to provide enough water to cool the heated surfaces, but also to conserve water whenever heat dissipation requirements are accommodated. Built-in protection devices in the water piping system remove brake excitation if water pressure fails, or if water flow demanded becomes greater than available water supply.

Brake Operation:

Until the field coil of the brake is energized, the rotor or drum is free to revolve at the speed of the prime mover. When the field coil of the brake is energized, a magnetic flux is established between the poles, or segments, and the smooth surface. As the rotor, or

drum, revolves magnetic lines of force are cut in the air gap and eddy-currents are generated which in turn retard rotation at a rate determined by the amount of excitation applied to the field coil. Braking torque is a function of speed and field coil excitation. Eddy-current brakes cannot be used for holding functions because there is zero torque at zero slip. By employing a Dynamic controller and a governor generator, infinitely adjustable, well-regulated braking torque can be achieved.

Heat developed as slip occurs between the rotor or drum and the stationary field, must be carried away by a coolant such as water or oil. Centrifugal force carries the coolant along the heated surfaces where it absorbs the heat and is carried away through a drain.

Ordering Replacement Parts

All parts should be ordered from your local distributor. In ordering parts, determine the part number from the bill of material or a parts breakdown drawing. The parts breakdown drawing contains a parts list of all parts considered to be subject to replacement. If you are unable to provide your distributor with a part number from the bill of material or a parts breakdown drawing, please furnish them with the serial number and/or the PRO number of the liquid cooled brake. With the serial number and/or PRO number, we can then locate the original order for your unit and will provide you with the parts breakdown drawing you require. Additional information on parts is always available at your request.

SECTION 3 INSTALLATION

Mounting:

The unit should be mounted directly to a bed, base or platform to ensure that it is rigid. Even if it is purchased mounted on a base, the base must still be aligned and secured. **CAUTION: Failure to properly mount and level this unit may result in distortion to the housing, mechanical failure, misalignment and rapid bearing wear.**

Mount the unit as follows:

1. Push slotted shims under the lowest foot and moderately tighten the bolt.
2. Align the unit (see ALIGNMENT instructions). Insert feeler gauges under the remaining feet during the alignment procedure to level the unit.
3. Replace feeler gauges with equal thickness of slotted shims. (Use a few thick shims rather than a large number of thin shims.)
4. Alternately tighten bolts.
5. Recheck alignment and change shims as required.
6. Dowel all directly connected units to prevent creeping and future misalignment.

Alignment

Proper installation and alignment of this unit, as specified herein, is a condition of the Manufacturer's warranty.

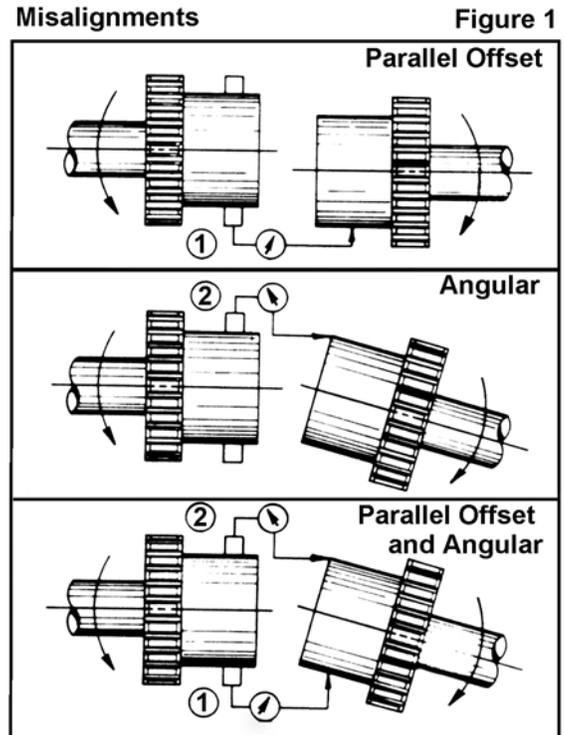
Angular misalignment and *Offset misalignment* between directly connected shafts will cause increase bearing loads and vibration, even when the connection is made by means of a flexible coupling. Shaft alignment becomes especially critical if operated at high speeds. For this reason, the alignment of directly connected shafts must be checked with a dial indicator after coupling hubs have been installed.

Flexible Couplings

A flexible coupling should be used to connect in-line shafts in order to avoid undue bearing stresses. It should never be forced onto a shaft by pounding or serious damage to the bearings is risked. Moderate heat can be applied to the hubs to locate them in place on the shafts. If the hubs must be pressed on, use the threaded hole in the end of the shaft in order to avoid bearing damage. Be careful to start it true, not cocked, otherwise it is possible to burr the shaft. A light film of oil or other lubricant on the shaft will prove an aid to mounting. Be sure that the shafts are well cleaned before the coupling hubs are installed. When pressed over a considerable length of shaft, it may be necessary to expand the coupling hubs by heating. **CAUTION: DO NOT drive or force the coupling hubs onto the shafts.**

If a Key is used in a coupling, be sure that the key fits snugly in the shaft and coupling, but does not fill the

space on top of the key. Some clearance must be left at this point.



Parallel Offset Alignment:

Offset misalignment is illustrated in Figure 1. Also shown is the location of the dial indicator. *Offset alignment* can be accomplished as follows:

1. Clamp the dial indicator on the hub and position the finger on the ground or machined diameter of the other hub (Figure 1, Item 1).
2. Scribe a mark on the surface of the hub where the finger is located.
3. Rotate both shafts simultaneously while keeping the finger on the scribe mark. Note the readings at each 1/4 revolution.

NOTE: Refer to Table 1 for permissible parallel offset misalignment.

Angular Alignment:

Angular Misalignment is illustrated in Figure 1. Also shown is the location of a dial indicator. Angular alignment can be accomplished as follows:

1. Clamp the dial indicator on the hub and position the finger on the other hub face (Figure 1, Item 2).
2. Scribe a mark on the face of the hub where the finger is located.
3. Rotate both shafts simultaneously while keeping the finger on the scribe mark. Note the readings at each 1/4 revolution.

NOTE: Refer to Table 1 for permissible angular misalignment.

For One Rotating Shaft:

If it impossible to rotate both shafts, the dial indicator should still be used by following this procedure for both angular and offset alignment:

Clamp the dial indicator to the rotating shaft.

1. Position the finger against the fact of the other

hub (Figure 1).

2. Rotate the shaft and note the dial indicator reading for a measurement of the *angular misalignment* per Table 1.
3. Position the finger against the diameter of the other hub.
4. Rotate the shaft and note the dial indicator reading for a measurement of *offset misalignment* per Table 1.

Permissible Operating Misalignment*

Table 1

Model Number	Basic Coupling Size In.	Parallel Offset ① X, In.	Angular ② Y, In./In. Radius	Maximum Angular ② With a Measured Parallel Offset ① In./In. Radius**
620	1.5	.0050	.0040	Y ② = .0040 - .8 x ①
630	1.5	.0050	.0040	Y ② = .0040 - .8 x ①
640	2.0	.0100	.0058	Y ② = .0058 - .6 x ①
6163, 4, 5	2.5	.0100	.0052	Y ② = .0052 - .5 x ①
6172, 3	3.0	.0120	.0064	Y ② = .0064 - .5 x ①
6192, 3	3.5	.0120	.0040	Y ② = .0040 - .3 x ①
6212, 3	4.0	.0120	.0035	Y ② = .0035 - .3 x ①
6232, 3	4.5	.0120	.0029	Y ② = .0029 - .2 x ①
625, 3	4.5	.0120	.0029	Y ② = .0029 - .2 x ①

*Operating misalignment is dependent on the following factors: initial misalignment, temperature growth and foundation settlement. Initial alignment should allow for the effects of temperature growth and foundation settlement. All above values are (TIR) Total Indicator Runout. To avoid errors in readings due to shaft magnetism, non-magnetic indicators should be used.

**Maximum value for either must not exceed those given in columns 3 and 4.

NOTE: Although flexible couplings are designed to accommodate parallel and angular misalignment, care should be taken to align the driving and driven machinery as accurately as possible when the coupling is installed. Even when the original alignment has been very accurate, misalignment may occur later because of settling conditions, wear of bearings, etc. It is a good idea to make periodic checks to see that such misalignment does not become excessive.

Rough Check: The unit can be roughly aligned without the use of a dial indicator, but alignment as such is not recommended for permanent installations. The degree of *angular misalignment* can be roughly determined by

inserting feeler gauges between faces of the coupling hubs. The amount of *offset misalignment* can be roughly determined by positioning a straight edge across the machined diameter of the hubs.

Allowable Overhung Load

If this unit is to be belt or chain driven, reference must be made to the allowable overhung load, per Table 2. Table 2 lists the maximum force in pounds that may be applied radially at the center of the output shaft keyway (and on input shaft of WCS and WB units). If a sheave or sprocket is to be installed on a new shaft, the resultant load which is imposed by the belt or chain must not exceed the allowable limit at the speeds specified in the Table.

Allowable Overhung Load at Center of Standard Shaft Keyway Table 2

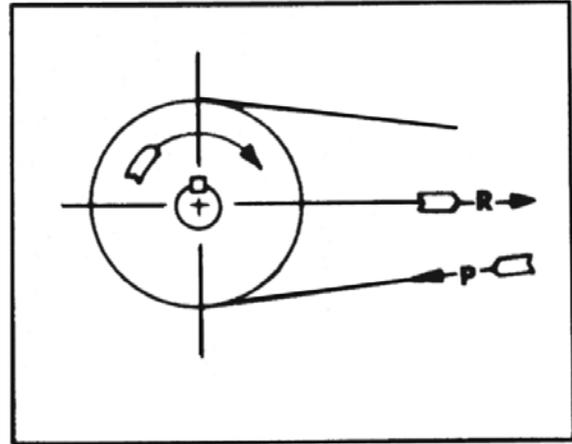
Model WB	Output end over hung loads (Lbs.) at RPM of			
	900	1200	1800	3600
620	495	440	390	310
630	960	870	755	600
640	965	880	765	600
6163, 4, 5	1,430	1,295	1,125	860
6172, 3	2,145	1,945	1,680	1,285
6192, 3	2,490	2,260	1,950	-
6212, 3	3,010	2,715	2,330	-
6232, 3 6252, 3 6272, 3 6292, 3 6312, 3	These units for direct coupling only. DO NOT BELT.			

"P" in Figure 2 represents the pull produced in a chain or belt and is a direct function of the torque of the driving sprocket or sheave. "R" represents the normal, reactive force imposed on the shaft and is equal to "P" plus the tension required to prevent slipping of the belts.

When chain and sprocket drives are used, the reactive force "R" will be approximately equal to "P," since no additional tension is required in a chain for an effective transmission of power. However, if "V" belts are used, the reactive force "R" will be approximately 1.5 times the value of "P" because of the belt tension required to prevent the belts and sheaves from slipping. With flat belts and sheaves, "R" will be 2.5 to 31 times "P," depending on the size of the sheaves, since smaller sheaves require tighter belting. Belting strains imposed on the shaft of this unit should never be greater than the amount required to prevent slipping of the sheaves.

Reactive Force

Figure 2



SECTION 4 MAINTENANCE

Grease Lubricated Units:

The unit was sufficiently lubricated at the factory to require no further lubrication for 2,000 hours, if operated under reasonably normal conditions not harmful to bearings and lubricant. Operating conditions and atmospheric conditions existing in the area of installation must be considered when determining how often lubrication is necessary. If operating under favorable conditions that do not warrant frequent lubrication, the grease inlets should be equipped with plugs that are replaced with grease fittings only during lubrication. Refer to Figure 3.

Allow only experienced maintenance personnel to lubricate this unit. Before attempting to lubricate this unit, refer to your specific assembly drawing to review the specific type and location of bearings that are used. In the interest of safety, the machine should be shut down for lubrication.

Procedure

The following steps constitute the procedure for lubricating the bearings:

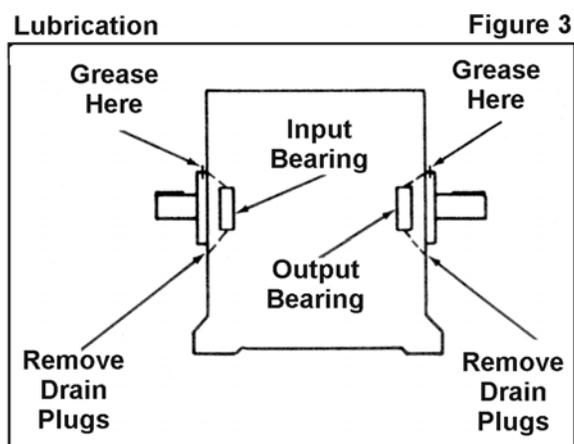
1. Clean the exterior of the unit around the grease and drain plugs.
2. Remove the drain plugs and if grease holes have plugs, remove the plugs and install grease fittings in their place.
3. On these liquid-cooled units slowly introduce recommended grease per Table 2 into the input and output until clean grease appears at the drain holes.
4. Slowly introduce approximately one to two ounces of grease into the pilot bearing (2). DO NOT over-lubricate. Churning of grease may result in harmful over-heating of bearings.
5. Before replacing the drain plugs, operate the unit for approximately 15 minutes to expel any grease from the bearing chambers. Then wipe off all grease from around drain holes and grease fittings. Replace drain plugs.
6. If the unit is being operated under reasonably normal conditions and doesn't require frequent lubrication, replace grease fittings with plugs as a precaution against co-workers over-lubricating the bearings.
- 7.

Recommended Greases

The greases listed in Table 3 are recommended for use in all bearings of your unit. All old grease must be flushed from the bearing chambers before lubricating if another type of grease has been used.

Recommended Greases Table 3

Company	Grease
Shell	Alvania #2
Gulf	Gulfcrown #2
Texaco	Multifak #2
Standard	Amolith #2
Sinclair	Litholine Industrial #2
Cities Service	H-2



Oil Lubrication:

Before operating this coupling, fill the reservoir with recommended oil. If available oil is different, send a sample to the factory for an analysis and recommendation.

Sampling

After the coupling is put into service, take an oil sample from the sediment chamber every thirty (30) days -for the first six months. Six months later take another sample and once each year thereafter. Samples should be sent, to the Oil Company for analysis and recommendation of oil change intervals. Unless recommended differently by the Oil Company, change the oil at least every two years.

Adding Oil

If additional oil is required between oil changes fill the reservoir with the required amount. Pour it through a 200-mesh filter in order to exclude any sediment.

Changing Oil

Drain the coupling of oil and flush the reservoir thoroughly with clean kerosene or mineral spirits. Pour the new oil through a 200-mesh filter in order to exclude any sediment.

NOTE: Before running oil through the coupling the first time, run it through the piping in order to clean any sediment from inside of the piping system,

then replace the oil with new oil and re-connect piping to the coupling.

Recommended Oils

The following turbine type oils have been tested and approved for use in Dynamatic oil cooled couplings:

TRADE NAME	COMPANY
Nonpareil - Medium & Stanoil 15	Standard Oil, Div. of American Oil Co.
Regal A (R&O) Code 800	Texaco Oil Co.
Tellus. 27	Shell Oil Co.
Gulcrest No. 44 & Gulf - Harmony No. 44	Gulf Oil -Co.
Humble Termtic No. 43	Humble Oil Co.

Oil Specifications

Approved oils (MML 6-1.1) require the following physical properties:

PROPERTY	ENTITY
Gravity, Degrees, API	29.00 Min.
Gravity, Specific 60/60°F	0.89 Max.
Flash, COC °F	370.00 Min.
Pour Point °F	10.00 Max.
Viscosities, Saybolt Universal Seconds @:	
100°F	145.00 Min. 170.00 Max.
210°F	43.00 Min. 46.00 Max.

Annual Inspection

A complete inspection of the coupling and oil piping system must be made after the first year of operation and subsequently every three years. Check bearings for wear and cleanliness, replacing when required. Thermocouples, pressure switches and electrical components must be inspected and replaced when defective.

Coil Maintenance

Coil resistance, voltage and current should be checked against specifications on the nameplate. Using a nondestructive hipot tester, check the coil resistance. It must be within ± 10% when measured at 68° F. (20°C.). Resistance from each coil to ground must be at least 5,000 megohms when 500 volts DC are applied to the coil. Coils originally withstand 5,000 volts AC (RMS) or 7,000 volts DC breakdown applied between each coil and ground for one minute.

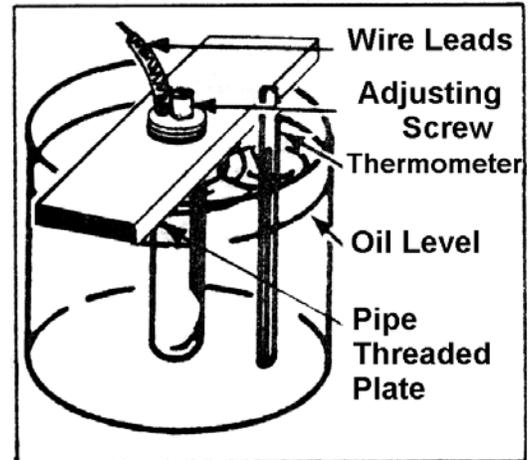
WARNING: While testing coils, observe safety cautions and keep other personnel away.

Oil Temperature Switch

The oil temperature switch, shown in Figure 4, is normally closed (N.C.) and temperature sensitive. The switch opens when the discharge oil temperature exceeds its set temperature, which is adjustable by

means of the slotted temperature adjusting screw. The differential between the opening and closing temperatures is approximately 0.2°F. The bulb must be covered with oil in order to detect excessive temperatures in the unit. The temperature switch is equipped with a temperature locking device for vibration and tampering.

Temperature Switch In A Container of Oil Figure 4



Adjustments

The temperature switch is factory adjusted to open when exposed to a nominal temperature of 200°F. (93°C.). This setting should not be disturbed unless a check of the switch indicates that the setting is incorrect. To check the setting of the temperature switch, install the switch in a pipe-threaded plate to assimilate actual installation of the switch unit into the base wall of the Dynamatic coupling. Tighten the thread engagement to a normal degree equivalent to actual installation in the coupling. This procedure is recommended to achieve a setting that will be accurate under normally tightened conditions upon installation in the machine housing. Then immerse the complete bulb (up to the threaded portion) and a thermometer into a container of oil, as shown in Figure 4, and connect the wire leads to an ohmmeter or a continuity tester. At room temperature, the switch should appear as a short circuit. While agitating the oil, increase the temperature until the switch opens. If the temperature is not between 194° F and 200°F. when the switch opens, the position of the slotted adjusting screw must be changed. Clockwise rotation of the screw causes the switch to open at a lower temperature and counter-clockwise rotation causes the switch to open at a higher temperature.

NOTE: Temperature switches must be checked at least once a year.

WARNING: The switch must open by the time the oil temperature at the bulb reaches 200°F. Do not increase the setting beyond this point.

Installation

If it is necessary to install the temperature switch, do so in the position shown in the oil piping drawing and wire the leads into the control starting circuit as shown in the wiring diagram? The temperature switch bulb is located in the unit so it will always be covered with oil even at minimum oil flow. The wire leads are connected into the starting circuit so the switch is in series with the Stop button. Therefore, the starting circuit will be open when the temperature switch is open.

WARNING: Coat the threads with sealing compound before installation to ensure effective sealing without excessive tightness. Tighten the switch only enough to prevent leak age. The temperature setting may be affected by excessive tension on the pipe threads. The temperature switch is installed in this unit to protect the equipment against overheating. Do not by pass this switch when making electrical installations.

Oil Pressure Switch

The pressure switch is in its normally open position whenever the pressure applied to its bellows is less than 11 PSI because any pressure less than this amount would provide insufficient oil to properly cool the coupling. If a pressure switch is not used, the temperature switch will have to be depended upon to open the control circuit, but only after it detects an excessive temperature. Pressure in excess of 11 PSI closes the switch, thus permitting excitation.

An input pressure of 35 PSI is usually required. Since line pressure variation may be great enough to momentarily remove excitation, a recommended supply pressure into the oil piping system should be between 35 and 100 PSI.

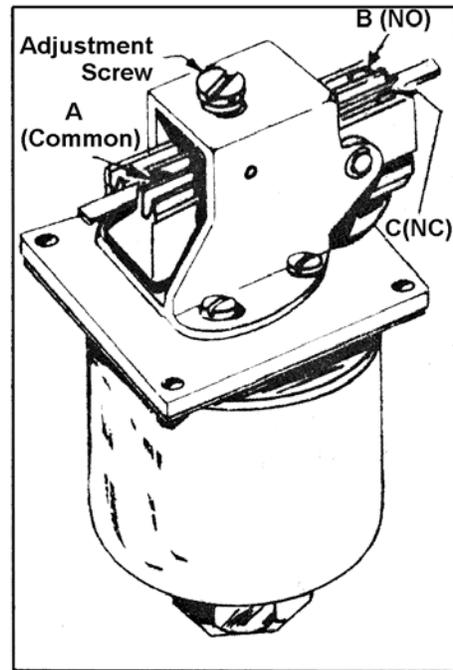
Installation

The pressure switch must be installed in the oil piping system as shown on the oil piping drawing. One type of pressure switch used is shown in Figure 5. Terminal "A" is the common lead terminal of the switch and should be connected directly to the terminal of the relay contacts. Terminal "B", the normally open contact of the switch, which is open when oil pressure is not sufficient to close the switch, should be connected to the common terminal of the temperature switch. Terminal "C" is the normally closed terminal and is not used in the control circuit of this unit.

WARNING: Coat the threads with sealing compound before installation to ensure effective sealing without excessive tightness. Tighten only enough to prevent leakage. The pressure switch is installed in the system for insuring ample flow of oil to safeguard the unit. Do not by-pass this switch when making electrical installations.

Typical Oil Pressure Switch

Figure 5



NOTE: The pressure switch is sensitive to pressure drops in the oil supply system. Demands on the system by other machinery or equipment may cause temporary or prolonged pressure drops, opening the pressure switch and cutting off power to the unit. Do not attempt to correct this situation by by-passing the pressure switch or decreasing the setting of the switch below the required minimum pressure without approval from the Engineering Department at the factory. Make certain that the oil supply system is adequate to maintain proper cooling oil pressure under all conditions.

Adjustments

The coolant oil pressure switch must be adjusted so it will open when pressure drops below 11 PSI. This will de-energize the control circuit, thus, automatically removing excitation from the coupling.

If the setting must be changed, rotate the adjustment screw until the switch opens at the required setting ± 1 PSI with decreasing pressure. With the pressure switch adjusted properly, it will not close again when the pressure is increased to the same setting because there is a differential between the opening and closing pressures. However, it will open at a slightly higher pressure.

Governor Generator:

The generator is a permanent magnet, alternating current device that produces a linear voltage in direct proportion to the speed at which it is driven. In the governing circuit of the control system, the voltage produced by the generator represents the actual speed

of the unit. The voltage is amplified and compared with a constant voltage in the reference circuit, representing the desired speed of the unit, to effect speed control. At maximum speed, the output of the generator is approximately 55 to 60 volts. Frequency varies with the speed to a maximum of 500 to 600 Hz. This generator is designed to operate with equal output and efficiency in either direction of rotation.

The use of an AC governor generator eliminates rotating windings and consequently no maintenance of brushes, slip rings, or commutators is required.

The Alnico magnet employed in this unit retains its field strength over a long period, assuring a constant generator output at a given speed. This magnet should not be subjected to sharp impacts, abuse, or temperatures higher than the maximum operating temperature of the unit, as this will result in a weakening of the field strength. Should removal of the

magnet be necessary for re-magnetization or repairs, the entire generator assembly should be returned to the factory.

Description:

The generator either is generally classified as a separately mounted or around-the-shaft-type of unit. A separately mounted type generator is contained within its own housing and is driven by appropriate pulleys and belts from the output shaft. An around-the-shaft type generator has an Alnico rotor that is keyed directly to the output shaft and mounted close to the field.

The specific assembly print will identify the type of generator used in your equipment.

A specific volt per RPM is not essential. Correct adjustment of the controller (see operating instructions) will compensate for wide variance in generator output.

G-2 Generator Specifications

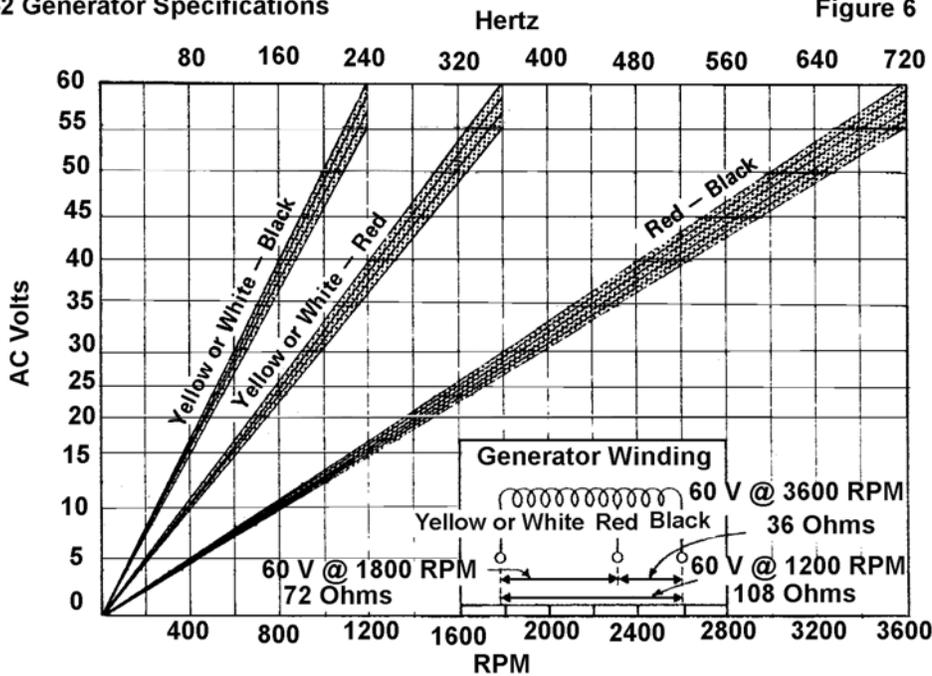
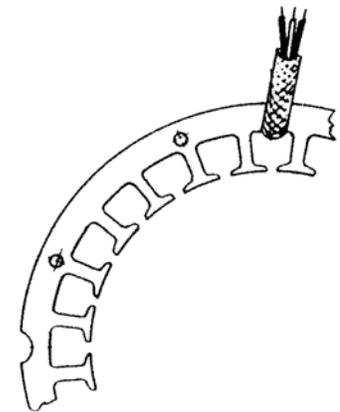


Figure 6

Alnico Stator

Lamination Assembly

Figure 7



Cleaning:

Mineral deposits and corrosion scale on the internal parts of Dynamatic water cooled units retard heat transfer and impedes cooling. Considerable accumulations of scale or minerals in the air gap between the driving and driven members of brakes may cause erratic action and poor control, especially when operating at low excitation. Excessive corrosion and deposition may be caused by the use of cooling water with a high mineral content. Refer to the instructions on installation of water piping for information on the acidity and mineral content of cooling water.

In areas where favorable water conditions are found, it should not become necessary to de-scale a unit until it is disassembled for normal bearing replacement.

The factory recommended procedure for cleaning water-cooled units is to disassemble them and manually clean all parts. This procedure guarantees complete removal of scale, rust, etc.

DYNAMATIC Corporation assumes no responsibility for injuries to personnel or damage to equipment incurred by the use of chemicals used in this suggested cleaning procedure.

The following steps constitute the procedure for cleaning water-cooled units:

1. Refer to Figure 5 for a suggested arrangement for the cleaning of Dynamatic units and Table 4 for manufacturers of cleaning solutions.
2. The solution, per Table 4, should be handled with care. Use it only in a well-ventilated area, away from all fires, sparks or other ignition sources.
3. Do not permit the solution to come in contact with the eyes or mouth via the hands.
4. **The level of the cleaning solution must be lower than the bearings to prevent bearing damage.**
5. If the unit has a vent, the solution spills from the vent when over-filled.
6. Use a cleaning solution pump (3 to 12 gallon capacity) for circulating the solution. Slowly rotate both the input and output members through the solution so all areas are immersed until completely cleaned. Instructions with cleaning solutions usually indicate a change in color when cleaning is complete. For separately mounted brakes, the input can be rotated by hand.
7. Start the solution pump. While the solution is actively removing water scale, gas is generated by chemical action that causes a heavy foaming in the return line and tank. As the equipment is cleaned, the amount of foam greatly decreases. However, some foam may persist due to the agitation of the pumping action on the penetrating agents used in the solution.
8. This foaming action indicates that the solution is still active and dissolving scale in the system. If foaming stops and scale is still present in the system, add a small amount of solution. This will cause foaming to resume.
9. Observe the foaming action. When the foaming ceases, stop the solution pump and drain the solution from the unit.
10. Connect the unit to the water supply and thoroughly flush it with fresh water. When the unit has been flushed and discharge water is clear, turn the water off and replace the drain plug.
11. For the removal of heavy accumulations of corrosion scale and mineral deposits, the unit should be disassembled and all internal parts should be cleaned and painted. A special corrosion-resistant paint is available upon request from *DYNAMATIC Corporation*.

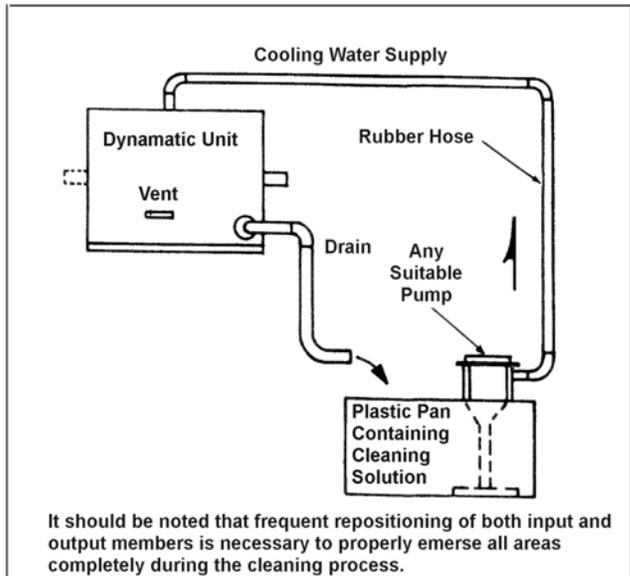
Mfgs. of Cleaner for Scale Remover Table 4

Calgon Company
Oakite Products Company
Ohio Valley Chemical Corporation

NOTE: When using a particular product, follow the manufacturer's recommendations.

Typical Arrangement for Cleaning Dynamatic Liquid Cooled Units

Figure 8



Disassembly/Re-assembly:

Read these instructions carefully and check the appropriate typical cross section drawing with your own assembly drawing to determine the extent of disassembly that is necessary. Should it be necessary to remove bearings, they should be removed by force applied to the outer race when removing from a housing, or the inner race when removing from a shaft.

Match mark all parts before removing to aid in re-assembly.

When reassembling the unit, the use of new bearings is recommended. After all parts are cleaned and all machine fits have been checked, repaired or replaced, proceed with re-assembly.

Installation of Bearings:

Bearings should never be forced onto a shaft or into a housing by blows applied to either race. To do so is to risk serious damage to the bearings. Use either an arbor press or a jack and a piece of soft metal tubing squared on both ends, if necessary. Be careful to start the bearing true, not cocked; otherwise, it is possible to burr the shaft. A light film of oil or other lubricant on the shaft will prove an aid to mounting. Be sure that the shaft and bearing bores are well cleaned before bearing is installed. In addition, the mechanic doing the work should be careful that particles of metal or other foreign matter do not enter the bearing during installation. **Do not unwrap bearing until ready for installation.**

When a bearing is to be pressed over a considerable length of shaft, or over a tight fitting seat, it may be necessary to expand the bearing by heating in oil. When a bearing is heated in oil, the temperature of the oil should not exceed 200° F. and the bearing should not be kept in the bath longer than necessary to bring the entire bearing to the required temperature.

SECTION 5
ENGINEERING DATA

Ratings, Models WB-620 through WB-6313

Table 5

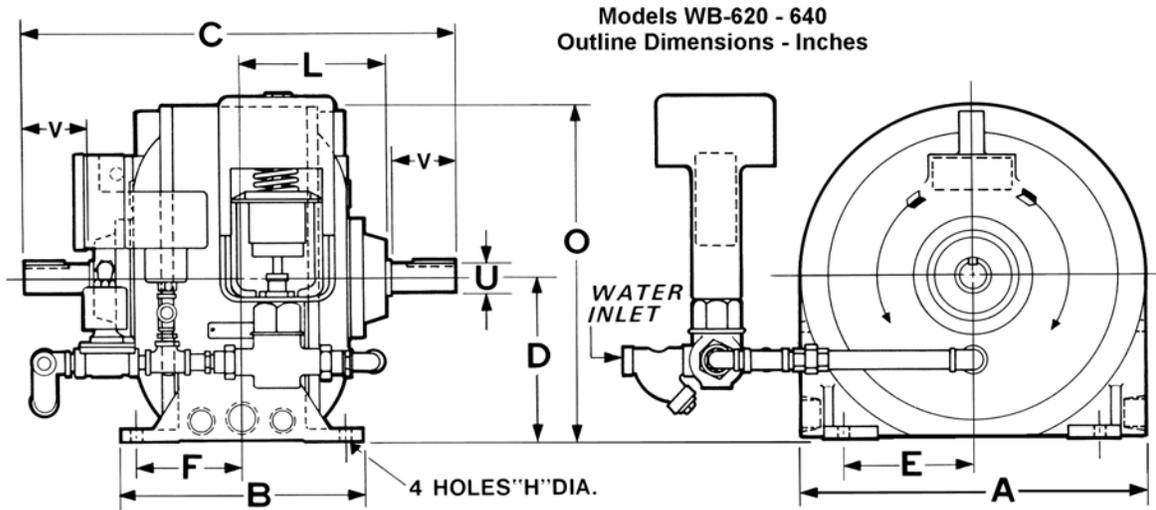
Model WB	Torque (Lbs. Ft.)					Speed RPM			Therm. Cap. HP ^②	WK ² lb. ft. ²	Control Size	Size Supply Line ^③	Weight Lbs. ^④
	@ 100 RPM	@ 200 RPM	@ 500 RPM	@ 900 RPM	Peak	Max RPM ^①	Norm. Max. RPM	Therm Limit Speed					
620	60	80	105	125	130	5000	1800	1600	40	8.5	1	1/2	276
630	150	200	210	215	225	4400	1800	1400	60	14	1	1/2	391
640	250	330	390	380	400	4400	1800	1310	100	30	2	3/4	535
6163	710	1175	1750	2000	2100	4675	3450	1700	625	68	3	1 1/2	1650
6164	920	1525	2225	2400	2400	4675	3450	1400	625	68	4	1 1/2	1650
6165	1150	1700	2425	2650	2650	4675	3450	1400	625	68	4	1 1/2	1650
6172	1275	1900	2600	2800	2800	3900	2600	1700	750	116	3	2	2600
6173	1540	2300	3400	3150	3500	3900	2600	1500	750	116	3	2	2600
6192	1800	2750	3900	4375	4400	3500	2300	1050	900	175	4	2	3400
6193	2300	3500	5100	4800	5200	3500	2300	1000	900	175	4	2	3400
6212	3375	4850	6900	7500	7500	3100	2050	950	1350	277	7	2 1/2	4500
6213	4225	6000	8100	8100	8700	3100	2050	850	1350	277	7	2 1.2	4500
6232	5050	6900	9100	9500	9600	2500	1650	800	1450	538	8	2 1/2	7400
6233	6300	8500	10500	10100	10700	2500	1650	720	1450	538	8	2 1/2	7400
6252	9200	11700	13200	12900	13200	2500	1650	800	2000	824	8	3	8350
6253	11700	14500	14900	11700	15300	2500	1650	900	2000	824	8	3	8350
6272	18500	20500	20500	19000	21000	1800	725	550	2250	2300	9	3	13500
6273	20000	23000	21500	17000	23000	1800	725	500	2250	2300	9	3	13500
6292	30000	32000	31500	29000	32000	1500	600	500	3000	4715	9	3 1/2	20500
6293	34500	37500	36100	52000	37500	1500	600	450	3000	4715	9	3 1/2	20500
6312	46000	47000	45700	44500	47000	1300	500	450	4000	9350	10	4	27500
6313	51000	54000	52000	47000	55000	1300	500	350	4000	9350	10	4	27500

① Models WB-6163 and larger are supplied with oil lubricated bearings at these speeds.

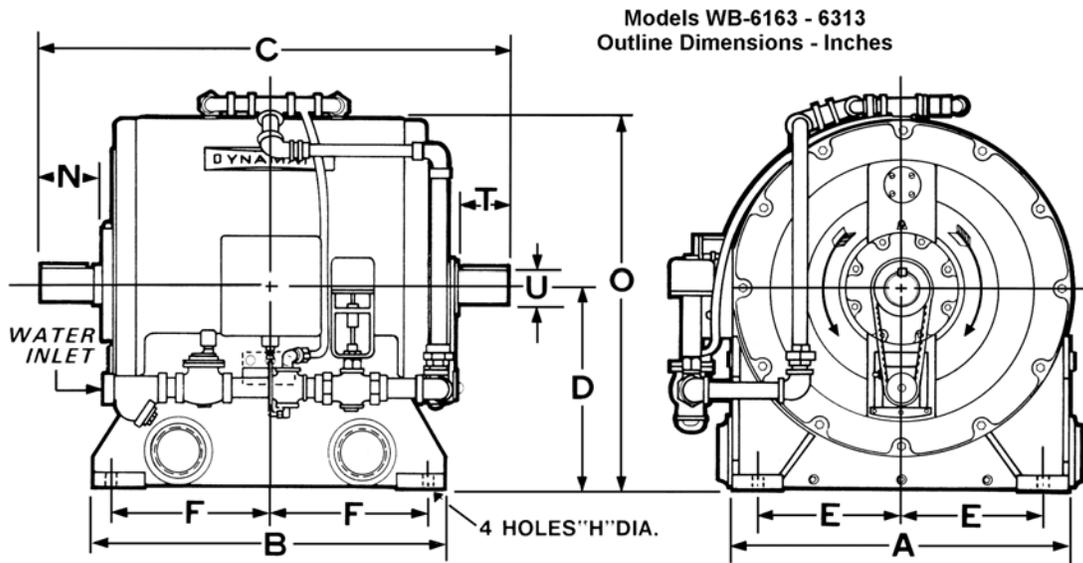
② Thermal HP absorption capacity is shown in this column. When selecting a brake for an application, check the maximum required absorption with this formula: $HP = RPM \times Torque \div 5252$. Then compare the value given in the above table with the maximum HP to be absorbed at any point in the operating range of the brake.

③ This column shows the diameter of the coolant supply line in inches.

④ This column shows the Approximate shipping Weight in lbs.



Model WB	A	B	C	D	E	F	H	L	O	U	V	Print Number
620	14.75	10.50	18.50	7.00	5.50	4.50	.53	6.25	14.38	1.31	2.68	C-30790
630	16.00	12.00	19.00	8.00	6.25	5.00	.68	6.68	16.00	1.50	2.81	
640	18.00	14.00	24.00	9.00	7.50	6.00	.81	8.50	18.00	1.62	3.50	



Model WB	A	B	C	D	E	F	H	N	O	T	U	Print Number
6163, 4, 5	25.00	20.00	31.25	13.50	10.50	8.75	1.00	5.06	26.22	4.50	2.25	C-54342
6172, 3	28.00	21.50	33.00	14.50	12.00	9.50	1.12	5.62	29.31	4.75	3.00	
6192, 3	30.00	22.00	33.88	17.25	13.00	9.50	1.12	4.88	34.00	5.00	3.38	
6212, 3	32.00	27.12	40.88	17.25	14.00	12.06	1.12	5.88	34.25	5.50	3.75	
6232, 3	40.00	36.00	50.00	22.00	17.00	16.00	1.25	7.18	42.12	6.50	4.38	C54343
6252, 3	40.00	42.00	56.50	24.00	17.00	19.00	1.25	7.44	44.12	6.75	4.50	C-56515
6272, 3	48.00	48.00	65.50	29.00	20.50	21.50	1.44	7.50	53.12	7.50	5.00	
6292, 3	56.00	54.00	72.50	33.00	24.00	24.00	1.44	9.38	61.00	9.00	6.00	
6312, 3	62.00	65.00	88.75	37.00	26.00	28.00	1.62	15.00	68.25	13.50	7.00	

For Water Piping Dimensions - Consult the factory