

INSTALLATION, OPERATION AND MAINTENANCE MANUAL



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NOTE: FOR PRODUCT SPECIFIC INFORMATION, SUCH AS PERFORMANCE PERFORMANCE (HYDRAULIC CURVE / SELECTION TABLE), EXPLODED VIEWS, DIMENSIONS, APPLICATIONS AND OPTIONS, VISIT OUR **WEBSITE: www.ebara.com.br**



Failure to observe the Installation and Operation Manual may result in accidents and damage to the equipment.

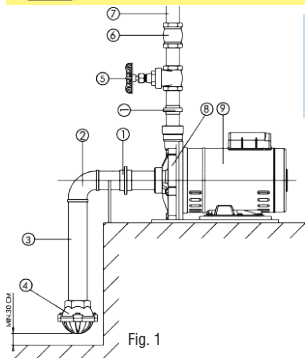


Fig. 1

ATTENTION:
IT IS RECOMMENDED THAT THE INSTALLATION OF THE EQUIPMENT
BE CARRIED OUT BY A SPECIALIZED PROFESSIONAL
IN HYDRAULICS AND ELECTRICAL.

- 1 - Coupling
- 2 - 90° Elbow
- 3 - Suction Piping
- 4 - Foot Valve
- 5 - Valve
- 6 - Check Valve
- 7 - Discharge Piping
- 8 - Pump
- 9 - Electric Motor



- Do not overload the motor.
- Be sure to operate the pump within its rated operating capabilities. Otherwise this may cause damage to the product.
- Never operate the pump with blockage in the suction or discharge. Pump operation, even for a short period under these conditions can cause the pumped liquid to overheat and cause damage to the equipment.

CHECK BEFORE FIRST STARTING

After carrying out the electrical and hydraulic installation, it is recommended to check whether the rotating assembly is free, to prevent the motors from suffering unnecessary efforts, causing them to burn out, not covered by the manufacturer's warranty.

The water that is retained inside the pump, due to possible tests carried out on it, until the period in which the pump is effectively installed, can cause oxidation/corrosion between the impeller "nozzle" and the housing/stage, making it difficult for the impeller to turn freely. To unlock it is simple. If the motor has an IP-21 or IP-23 degree of protection, with the aid of a tool, rotate the motor shaft from the rear of the motor. If the motor has IP-55 degree of protection, it will be necessary to remove the deflector cover (rear part of the motor) to gain access to the rear "fan", which must be rotated. On intermediate pump models, the unlocking shaft can be rotated using a fixed wrench.

After performing the above procedure, the shaft should rotate freely.

Otherwise, send the equipment to the nearest authorized Technical Assistance

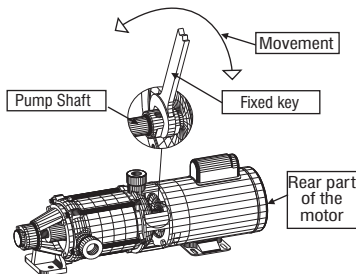


Fig. 2

GENERAL INSTRUCTIONS FOR HYDRAULIC INSTALLATION



Damage caused by mechanical stresses and torsions, water hammer, cavitation, weather, as well as vibrations can cause damage to equipment and users.

1. Install the pump as close as possible to the water source, on a solid base with a height slightly above the ground (approximately 30cm) and well leveled, in order to guarantee the perfect alignment of the motor pump set.
2. Keep enough space for ventilation and easy access for maintenance.
3. Do not reduce the diameter of the pump suction pipe, it must be equal to or greater than the pump nozzle. The diameter of discharge piping must be used according to of the required pressure.
4. Use as few connections as possible in the installation. Opt for long radius elbows.
5. It is recommended to use threaded unions in suction and discharge pipes. They must be installed close to the pump to facilitate assembly and disassembly.
6. Seal all connections with appropriate sealant (teflon tape or similar). Note: Never thread the suction piping beyond from the end of the housing nozzle thread, thus preventing the impeller from locking.
7. Install the suction piping with a slight slope the pick-up location towards the pump in order to avoid the formation of bubbles.
8. Always use a foot valve with a larger diameter than the pump suction piping (the foot valves usually have passage restrictions).
9. The foot valve must be submerged at least 0.5m in the water.
10. Carry out the correct anchoring of the pipes to avoid water hammer and stress on the pump nozzles.
11. Install at least one check valve in the discharge pipe next to the pump and add check valve every 20m height difference.
12. **Before connecting the discharge pipe, prime the pump (completely fill the pump body and junction pipe with clean water suction pipe). Note: if the pump has a priming plug, it can be used.**
13. **Check all hydraulic and electrical installations before starting the pump.**

NEVER START THE PUMP BEFORE PRIMING IT (FILL WITH WATER).

GENERAL INSTRUCTIONS FOR ELECTRICAL INSTALLATION



- All electrical equipment must be grounded.
- All electrical installations must be carried out by qualified professionals, taking into account the national and local standards.
- Carefully read the following instructions.

1. **AVOID ACCIDENTS:** check the voltage at which the connection will be made.
2. Be careful when choosing the wires for the pump installation. The wire gauge depends on the motor power, the mains voltage and the distance from the pump set to the distribution board (**see GUIDANCE TABLE SELECTION FOR UNIPOLAR AND MULTIPOLAR CABLES between pages 14 and 19**).
3. The electric motor connection diagram, printed on the motor nameplate, guides the correct connection of the terminals to the electrical network according to the voltage available on site.
4. It is mandatory to install a protection panel suitable for the motor with at least the overload relay (overcurrent) and lack of phase (three phase motor) for the safety of your electric motor.
The regulation of the overcurrent relay protection (amperage) must be in accordance with the maximum amperage contained on the motor board in its respective tension/voltage.
5. The pump must never be connected to branch lines or outlets and splicing of wires must be avoided (when necessary, wires must be tightly tied and insulated). The wire gauge must be kept constant from the power board to the motor.

6. Correct grounding of electric motors according to NBR5410 is mandatory.
7. In case the three-phase motors, check the direction of rotation of the shaft. The correct direction must be counterclockwise with reference to the front of the pump or clockwise with reference to the drive side
8. Motors with degree of protection IP21 or IP23 (open) must always be sheltered and protected against the weather.
9. When it is necessary to use a float switch (level control), follow the manufacturer's installation instructions.
10. If the motor pump set is stored for more than 2 years, it is recommended to change the motor bearings, or remove inspect and relubricate them before putting them into operation. After this storage period, it is also recommended that the starting capacitors of singlephase motors are replaced due to possible losses of their operational characteristics.
11. Motor drain plugs should always be positioned so that drainage is facilitated (at the lowest point of the engine). Motors with rubber drain plugs are shipped from the factory in the closed position and must be opened periodically to allow condensate water to escape. For environments with high water condensation and motors with IP55 degree of protection, the drains can be mounted in the open position. For motors with degree of protection IP56, IP65 and IP66, the drains must remain in the closed position, being opened only during motor maintenance.
12. **The disassembly of the motor during the warranty period must only be carried out by the authorized technical assistant of the supplier in question.**

PERIPHERAL PUMPS - TP-60JR - TP-60 and TP-80



- Peripheral Pumps models TP-60 and TP-80 have dual voltage motors with selector (127V/220V). They are supplied in the 220V configuration. If the installation voltage is 127V, the connector inside the motor connection box must be changed.
- Peripheral Pumps model TP-60JR have a single voltage of 127V or 220V, and it is not possible to perform the voltage change.

Note: Peripheral Pumps have the particularity of increasing the motor current (load) as a function of the increase in discharge pressure, unlike the radial centrifugal pumps.



Check general instructions for hydraulic and electrical installation on pages 3 and 4.

SUBMERSIBLE VIBRATING PUMPS - TSV-300 - TSV-800 and TSV-900

TSV vibrating pumps have single voltage of 127V, 220V or 254V, and it is not possible to change the voltage.
Maximum depth of 20m.



When pumping drinking water or food liquids, it is recommended to use a filter at the point of consumption.

INSTALLATION

- The product consists of a vibrating pump, clamp kit and curve support.
- The pump must be installed centrally between the walls of the well/reservoir, respecting the minimum distance of 40 cm from the bottom of the well and fully submerged supported by the hose.
- For any movement of the pump, the hose or an additional non-metallic safety rope (E) must be used, it is recommended in "nylon", fixed to the pump outlet.
- The hose (A), after its length has been determined, must be connected to the pump using a clamp (B), supplied with the equipment.
- Use 3/4" flexible hose for models TSV-300 and TSV-800 and 1" flexible hose for model TSV-900. Using smaller diameter hoses will generate an additional load on the pump. Using larger diameter hoses, pump operation will not be affected.

Note: Polyethylene hose with a minimum wall of 2mm is recommended.

- Connect the electrical cable (C) to the electrical network, isolating the splice, made with a self-fusion, so that there is a correct seal against water ingress.
- Install the support curve (D) at the end (outlet of the well/reservoir) of the hose (A) with the clamp (B) observing the direction of the water flow inserted in the part.

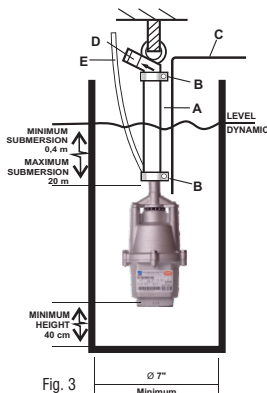


Fig. 3



- The correct operation of the equipment occurs with the pump fully submerged in clean water with a maximum temperature of 35°C, without touching the walls or bottom of the well/reservoir
- Do not interrupt or restrict the flow of water by using a valve or bending the hose.
- If the safety rope is used, it must be loose.
- When operating the pump, it is necessary to observe the quality of the transferred water. If the water is dirty, turn off the pump and change its position relative to the bottom of the well. If the transferred water contains sand or stones, this will result in erosion of the internal parts.
- The maximum operating time pump off must be 12 hours a day with stops of 15 to 20 minutes every 2 hours.
- Satisfactory pump operation and its lifetime depend considerably on the correct value of the mains voltage. When the mains voltage varies more than the permissible value ($\pm 4\%$), this can cause metallic collisions in the pump's magnetic system, resulting in premature wear of the equipment. If these collisions occur while the pump is running, the power must be switched off and the main voltage normalized.

The first inspection on the pump should be carried out 1 to 2 hours after its operation. Other inspections must be carried out every 100 hours of operation or within a maximum period of 3 months.

If a pump operating in a well shows some signs of wear on its body (due to contact with the walls of the well), the centering should be reviewed.

Any signs of wear on a pump body under the power cord are evidence of over-tightening the power wire during pump installation.

This can result in breakage of the cables. When reinstalling the pump, removes excessive stress from the power wire.

Every time the pump is pulled out, check the condition of the nut on top of the pump body. Nuts and bolts must be properly tightened.

There should be no clearance in the pump body.

If the pump suction is clogged, it can be cleaned with a tool without a sharp tip to avoid any possibility of damaging rubber parts.

CIRCULATOR PUMP - TPA and TPA (B)

TPA and TPA (B) circulator pumps have single voltage of 127V or 220V, and it is not possible to change the voltage. Maximum working pressure allowed of 6.0bar.

Note.: TPA models built with cast iron housing with anti-rust treatment. Allowed range of water temperature between -10°C to 60°C.

TPA (B) models, built with bronze housing. Allowed range of water temperature between -10°C to 90°C.

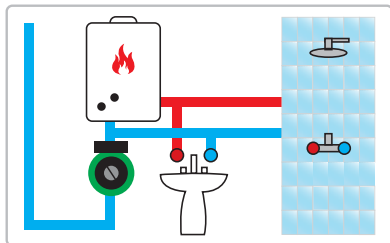


TPA

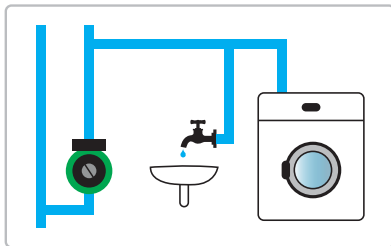


TPA(B)

HEATER



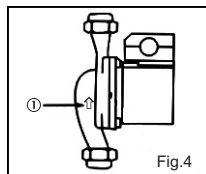
SINK AND LAUNDRY



When pumping drinking water or food liquids, it is recommended to use a filter at the point of consumption.

INSTALLATION

- Install the pump only after all welding in the pipeline is completed and the pipeline has been thoroughly flushed to remove foreign bodies and impurities that can damage the pump.
- It is recommended to install valves in the suction and discharge of the pump, facilitating the assembly and pump disassembly.
- **The pump must be installed with the motor shaft in a horizontal position.**
- The flow direction must correspond with the arrow located on the pump housing (Fig.4).



Selector: This switch has three positions:

- **OFF:** the pump is off.
- **AUTO:** the pump turns on automatically if there is water flow and turns off if the water flow is stopped.
- **MANUAL:** the pump is kept on continuously. It is recommended to use this position only during the priming procedure.

PROCEDURE IN THE FIRST STARTING

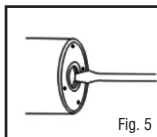


Protect electrical parts during the priming procedure.

To ensure that all piping is fully primed, the procedures below must be performed:

- Keep the pump off.
- Close the valve on the pump discharge.

- Remove the priming screw, which is located at the rear of the equipment (Fig.5).
- **Turn on the pump by positioning the selector in the MANUAL position.**
- After 15 to 30 seconds, replace the priming screw.
- Open the valve on the pump discharge.
- Once the priming procedure is completed, position the selector to the AUTO position.
- This priming procedure must be carried out on the first start-up or if air accumulates in the pump in case of lack of water.



Additional items:



1 wrench and 2 screw adapters (for models TPA and TPA (B) 15-9-160 = 3/4" to 1/2" and TPA and TPA (B) 25-12-200/ 25-15-200 = 1" to 3/4") plus gaskets.

SWIMMING POOL PUMP WITH PRE-FILTER - TSW

The pumps with pre-filter for swimming pools **TSW** models, provide excellent performance, robust construction, silent operation in a compact and easy installation.



- Its powerful self-priming system allows the quick elimination of the air contained in the suction system and suction hose.
- Built with components in contact with water made in engineering thermoplastics, with high resistance to corrosion and UV rays, providing a long service life.
- Easy removal of the pre-filter cover even under vacuum, without the need for special tools or accessories.
- Large pre-filter basket, allowing cleaning to be done between longer intervals.
- It has a drain plug in the housing to facilitate maintenance.
- Bivolt single-phase electric motor (127/220V) with voltage selector. It is supplied in the 220V configuration, if the installation voltage is 127V, the connector inside the motor connection box must be changed.
- Safe and electrically adapted installation for machine rooms.
- High performance graphite x ceramic mechanical seal for long life.
- Corrosion-resistant stainless steel motor shaft tip.
- Corrosion-resistant raised base mounting to keep moisture away from the motor.

Check general instructions for hydraulic and electrical installation on pages 3 and 4.



- Lack of regular maintenance may cause damage not covered by warranty.
- The pre-filter basket should be inspected through the transparent cover frequently and emptied when debris accumulates. The pre-filter cover "O-ring" must be greased with silicone based lubricant.
- Follow the instructions below:

1. Turn off the pump.
2. Loosen the knobs on the pre-filter cover and remove it.
3. Remove the pre-filter basket by lifting it up onto the housing.
4. Remove any debris stuck in the basket. Clean by squirting water with a hose if necessary.
5. Check the integrity of the pre-filter basket and put it back in the pump, if it is eventually damaged, provide a replacement.
6. Replace the cover and close with the knobs. Make sure it is well sealed in the "O' ring".

SELF PRIMING PUMPS (CLOSED IMPELLER) - TJET - TJETF and APP-13

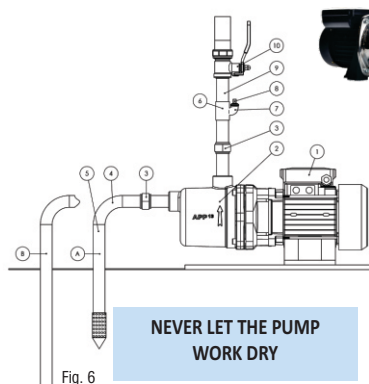


Fig. 6

- | | |
|-------------------|---------------------|
| 1. Electric Motor | 7. 90° elbow |
| 2. Jet Pump | 8. Plug |
| 3. Threaded Union | 9. Discharge Piping |
| 4. Elbow 90° | 10. Valve |
| 5. Suction Piping | A. Well Tip |
| 6. TEE | B. Well Piping |

Self-priming pumps require a single priming operation right after installation.

Note: APP-13: does not require a foot/check valve, as the model has a horizontal check valve internally.

TJET-60, TJET-100, TJETF-10 and TJETF-20: come with a check valve to be installed in the pump suction.

Check general instructions for hydraulic and electrical installation on pages 3 and 4.

AFTER INSTALLATION

With the electrical and hydraulic installations already completed and verified, release the discharge tube and prime the pump (fill the pump housing with water). After priming, definitively connect the discharge tube and start the motor. **It will take a few minutes to eliminate all air from the suction pipe.** If you notice that the equipment has not primed within 5 minutes, prime the casing again.

SELF PRIMING PUMPS (SEMI-OPEN IMPELLER) - AEX-1 - AE-2 and AE-3

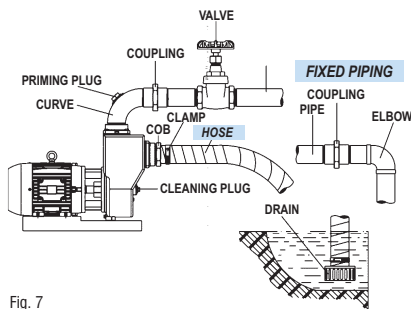


Fig. 7



The self-priming pump has a semi-open impeller, which allows for the pumping of non-fibrous suspended solids in a maximum proportion of 20% and diameters not exceeding 4mm, 5mm and 20mm, respectively in the AEX-1, AE-2 and AE-3 series. It is recommended to use with **suction height up to 3mca** for pumping water, if the fluid is denser and/or viscous, suction may be compromised.

Note: the installation does not require a foot valve, however, it is necessary to install a drain/filter to avoid the obstruction of the passage of water (liquid), caused by the entry of larger particles.

Check general instructions for hydraulic and electrical installation on pages 3 and 4.

INJECTOR PUMPS - TJ-16 and TPJ-16

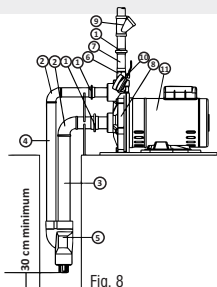


Fig. 8

1. Threaded Union
2. 90° Elbow
3. Suction Piping
4. Pressure Piping (return)
5. Injector
6. Control Valve
7. Discharge Piping
8. **Injector Centrifugal Pump**
9. "Y" with Plug (for priming)
10. Pressure gauge
11. Motor



Note: Even if installing plastic tubes, the connections must be threaded. Use metal unions.

INSTALLATION AND OPERATION INSTRUCTIONS

1. **Initial Observations:** measure the depth of the well and check the length of the pipes to be installed, observing if the submergence of the injector is sufficient. The injector must be installed at a depth greater than the minimum indicated in the catalogue. Never use the injection pump for well cleaning (sand removal), as it will cause damage and loss of warranty.

2. **Piping in the well:** use pipes of the same dimensions as the openings corresponding to the injector, never smaller. The table on the side indicates the openings of each injector model and the diameters of the pipes to be used. The efficient operation of an injection pump fundamentally depends on the perfect sealing of the pipes inside the well.

Whenever possible, use new pipes or pipes with new, clean and undamaged threads. Use good quality sealing paste, avoiding the use of paint. A permanent clamp must support the piping at the wellhead. Use metal unions.

MODEL INJECTOR	OPENING	
	SUCTION	PRESSURE
TJ	1 1/4"	1"
TPJ	1 1/2"	1 1/4"

3. **Seating the pump:** the distance between the wellhead and the pump must be as short as possible, avoiding exceeding 4 meters. In cases where this distance is just over 4 meters, use larger diameter pipes, with a small drop to the well. The joints used between the well piping and the pump openings must be of good quality and with a bronze seat. On pump discharge, install the control register. The pump must be installed on a suitable and leveled base.
4. **Priming and start-up:** fill with water through the discharge pipe (item 7), suction pipe (item 3), pressure pipe (item 4), injector (item 5) and pump housing using a "Y" with plug (item 9). Close the control valve (item 6) and start the pump. If after 30 seconds the pressure gauge does not register pressure, turn off the pump and repeat the priming operation. Once the pressure is reached, adjust the control valve (item 6).
5. **Adjustment of the control register:** the control register has two purposes: first, to prevent the pump from taking more water than the well supplies; second, to maintain a pressure in the pump body to activate the injector. Opening the control valve too far, the pressure in the body will be insufficient to make the water pass through the injector and up in the suction tube until it reaches the level where the pump can recirculate it.

TO OBTAIN THE MAXIMUM PERFORMANCE POINT

1. Start the pump with the valve closed (item 6). After a few seconds the pressure gauge (item 10) should show a maximum pressure.
2. Gradually open the control valve, noting that the pressure indicated on the manometer will drop as the valve opens. Keep opening the valve until you notice a sudden drop in the pointer, accompanied by a loss of flow. Close quickly, noting this drop point on the pressure gauge.
3. Repeat the above instruction until the point is verified and finish by gradually closing the control register until the pointer reaches a pressure of 0.2bar to 0.3bar above the drop point.
4. Let the pump run for 15 to 30 minutes. If the pump stops pumping, prime it again and adjust the flow rate control a little tighter.
5. After adjusting the control register, make a mark indicating the opening position. Close it and complete the pump discharge installation. When it is ready, open the register to the mark made earlier.

PORTABLE SUBMERSIBLE PUMP - TSP-250N and TSP-550W

The **TSP-250N** and **TSP-550W** submersible pumps are extremely simple to install and operate, just connect the outlet nozzle to a hose, submerge the pump in the place to be drained and connect the electrical plug to a compatible outlet.



RISK OF ELECTRIC SHOCK!

10m of cable



- The pumps are supplied with a grounding connector and a suitable electrical outlet in accordance with the ABNT NBR14136 standard. To reduce the risk of electrical shock, ensure it is connected to a properly grounded electrical system.
- The single-phase motor has a single voltage (127V or 220V), and it is not possible to change the voltage.
- The use of extension is not recommended.
- Never place or remove the pump with the unit connected to electrical power.
- Unplug the equipment when the water has drained to its lowest level.
- Do not remove the electrical cable from the pump or make any connections directly to the pump.
- Installation and checking the pump must be carried out by a professional.
- Always see the existence of any object that may be obstructing the pump. Check that there is no interference that could prevent the correct operation of the float
- TSP pumps are pumps designed to transport clean water with a temperature not exceeding 35°C.
- Oil free.
- TSP pumps must always operate in the vertical position.
- **ADJUSTABLE AUTOMATIC FLOAT BUILT IN:**
 - * Starts up to 500 mm to TSP-250N - 550 mm to TSP-550W.
 - * Ends when up to 130 mm
- Stepped nozzle to be used with:
 - * Internal Ø flexible hose 34mm.
 - * Internal Ø flexible hose 24mm.
 - * Sleeve BSP Ø 1".
- Minimum water level: TSP-250N = 240mm and TSP-550W = 260mm.
- Failures in its operation due to the use of water transport with sludge, cement, wood shavings, corrosive materials or any other other aggressive material, will not be covered by the manufacturer's warranty.



The pump can be enclosed in sealed wells/reservoirs. Sanitary seal.

TYPICAL INSTALLATION



ABNT NBR 14136 socket with ground pin

Check-Valve
"Not included"



Unit with automatic float

GET THE MAXIMUM PERFORMANCE FROM YOUR PUMP

- The best performance of your pump is achieved with a 7m long hose.
- The pump can work with longer hose lengths, but the water flow will be reduced. Make sure there are no clogs in the hose.
- When the pump is switched on, it will make a small noise indicating its operation. If no water is coming out, there may be air in the water flow. Tilt the pump to the side and submerge in the water. Another possibility to be investigated is the existence of some object that is obstructing the passage of water. Swing the pump down to remove any objects that may be obstructing the flow of water.

SUBMERSIBLE PUMPS - TSB - TSBD and TSBE

Submersible pumps, due to their semi-open impellers, can pump non fibrous suspended solids of 5mm (TSB 105 and TSB-205), 6mm (TSBD-100, TSBD-250, TSBD-300), 7mm (TSBD-1000), 20mm (TSB-120, TSB-220, TSBE-250, TSBE-300, TSBE-500) and up to 50mm (TSB-250) in diameter, in the proportion of up to 20% by volume.



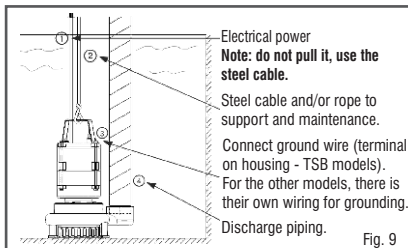
INSTALLATION

The TSB, TSBD and TSBE Series submersible pumps are easy to install, as they are light, portable, compact, and the discharge tube is directly connected to the pump's threaded flange, requiring no special connections.

Do not open the motor under any circumstances, as it contains dielectric oil or hydraulic oil and this procedure must only be carried out by a specialized technician.

IMPORTANT RECOMMENDATIONS

1. Do not use this product to pump water for animal and/or human consumption.
2. Do not use this product at temperatures above 40°C, risk of leakage of dielectric/hydraulic oil.
3. Diameter of suspended solids according to the specification of each model.
4. Do not move the pump while it is on.
5. When installing/assembling, ground the motor to avoid electric shocks.
6. Use the product only in submersible condition (motor and pump).
7. Do not use the power cable to secure the pump.



TSB and TSBE
5m of cable

TSB
3,5m of cable



BARESHAF PUMPS



- Follow the shaft alignment procedures to avoid premature wear of parts and loss of warranty.
- Always disconnect the electrical supply to the motor before carrying out any installation or maintenance tasks.



Check general instructions for hydraulic installation on page 3.

Pump bearing, except shielded bearings (ZZ bearings), must be lubricated to avoid metallic contact between the rolling elements and also to protect them from corrosion and wear.

The properties of lubricants deteriorate due to aging and mechanical work, which is why they must be filled and replaced periodically.

GREASE: Grease must always be lithium-based. In the GREASE SPECIFICATION table, there is a list of grease manufacturers and their respective products. Although the products are equivalent, we do not recommend mixing them together when relubricating.

The following table below shows the RELUBRICATION INTERVAL by operating hours according to dimension rotation.

GREASE SPECIFICATION	
MANUFACTURER	GREASE
ATLANTIC	LITHOLINE
CASTROL	GREASE LM2
ESSO	BEACON 2
IPIRANGA	ISAFLEX 2
MOBIL	GREASE MP
PETROBRÁS	LUBRAX GMT3
SHELL	ALVANIA R3
TEXACO	MULFAK 2
SKF	GS 265

GREASE RELUBRICATION INTERVAL IN HOURS OF OPERATION		
BEARING	3.500 RPM	1.750 RPM
6203 C-3	10.000 h	
6302 C-3	10.000 h	
6303 C-3	10.000 h	
7309 C-3	4.000 h	8.500 h
7310 C-3	3.500 h	8.000 h
3309 C-3		500 h
3310 C-3		450 h
NU210 KC-3		4.500 h
NU211 KC-3		4.000 h

ATTENTION: Excess or lack of grease will damage the bearing.



Small/medium size bearing pumps, installed in stationary motors through pulleys and belts, it is recommended to use a bearing/auxiliary shaft so that when the belt is tractioned, the pump shaft does not twist and the internal parts of the pump, are damaged occasion that will result in loss of warranty.

OIL: the table on the side shows RELUBRICATION INTERVAL WITH OIL to the detriment of bearings according to the recommendations of their manufacturers. It is important to periodically check the oil level using the dipstick.

The following list provides options for appropriate oils available on the market.

OIL RELUBRICATION INTERVAL IN WORKING TIME	
6305 C-3	6 month or 2.500 operating hours
6306 C-3	6 month or 2.500 operating hours
6308 C-3	6 month or 2.500 operating hours
6309 C-3	6 month or 2.500 operating hours
6310 C-3	6 month or 2.500 operating hours
6314 C-3	6 month or 2.500 operating hours

Note: As recommended by the bearing manufacturer.

BEARING OIL		
MANUFACTURER	UP TO 3,000 RPM	ABOVE 3,000 RPM
CASTROL	HYSPIN AWS 68	HYSPIN AWS 46
ESSO	NUTO H 68	NUTO H 46
MOBIL OIL	HIDRAULIC AW 68	HIDRAULIC AW 46
IPIRANGA	IPITURAW 68	IPITUR AW 46
PETROBRAS	HR 68 EP	HR 46 EP
SHELL	TELLUS 68	TELLUS 46
TEXACO	RANDO HD 68	RANDO HD 46
BARDAHL	MAXLUB MA 20	MAXLUB MA 15

* You can also use SAE 30 lubricating oil without HD (detergents).



PUMPS HOUSED WITH OIL BEARING LUBRICATION ARE SUPPLIED WITHOUT OIL, AND THEY MUST BE FILLED BEFORE OPERATING.



"DRY" BEARING HOUSING PUMPS HAVE SHIELDED BEARINGS WITH INTERNAL LUBRICATION, THEREFORE, NO LUBRICATION WOULD BE NECESSARY, JUST THE REPLACEMENT OF THE BEARINGS WHEN THERE IS ABNORMAL NOISE, LEAKAGE OF GREASE OR EVERY 2 YEARS.

TRACTOR PUMPS - RL-33T - GST and TSLT

The Tractorized Pump set has high technology, easily adaptable to the three-point hitch of the tractor, facilitating transport and handling.

Note: RL-33T series - supplied with closed rotors, designed for pumping liquids free of solids to the tractor's power take-off at 493rpm.

GST Series - supplied with closed impeller, designed for pumping solids free liquids to tractor power at 540rpm.

TSLT series - supplied with semi-open impellers, designed for liquids with non-fibrous solids in suspension not exceeding 20% concentration and maximum diameter of 18mm, for tractor power take-off at 540rpm.



Check general instructions for hydraulic installation on page 3.



- Periodically check the oil level.
- Oil change - it is recommended to do the 1st change after 100 hours of work, to remove possible impurities. Too many changes every 500 hours.
- Type of oil recommended in the transmission box: Petrobrás TRM-590 oil (4 liters) or similar.
- Lubricate the cardan crossheads, when used.
- Approximately every 2000 working hours, change the transmission box bearings.
- When applicable, NEVER operate Tractor Pumps with graphite sealing packing fully tightened. The packing must be fully open to avoid burning the gasket. After starting work, tighten them until a drip is obtained on the shaft.
- Do not allow the pump to operate with air, to avoid cavitation.
- Always install check valves in places with accentuated unevenness to avoid "WATER HAMMER".

INTERNAL COMBUSTION ENGINE FOR EBARA PUMPS

To check the product items and perform the correct assembly of the equipment, access our website www.ebara.com.br and download the exploded views (parts list) depending on the model purchased.

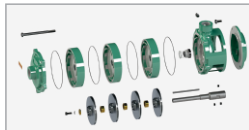
Shaft assembly (when applicable)

The shaft is fixed to the motor power take-off using 4 allen screws. Fit the shaft into the power take-off until it touches the shoulder and then tightens the screws. Care must be taken when tightening the screw so that the shaft does not move.

As the power take-off is made of a harder material, the screws will not mark it, tighten them well so that they do not come loose, otherwise damage to the impellers not covered by the warranty may result.

Mechanical Seal Assembly and O-ring seal.

Do not use the metal tool to assemble the mechanical seal, as it can crack or even break the ceramic part, resulting in leakage. It is recommended to use PVC tool with diameter of the mechanical seal to assemble it. When assembling both the mechanical seal and the O-rings, it is recommended to use clean water, alcohol, neutral detergent to facilitate the assembly by fixing them in the channels to the internal components of the equipment, an occasion that invalidates the warranty.



- When the Assembly Kit is finished, turn the shaft motor without starting it and observe if there is. If there is any abnormality, it will be necessary to disassemble it and check the reason.
- Before turning on the motor pump set, it is necessary to fill the pump with water (priming) to avoid damage to the internal components of the equipment, an occasion that invalidates the warranty.

GUIDANCE TABLE FOR SELECTION OF UNIPOLAR AND MULTIPOLAR CABLES FOR SINGLE-PHASE NETWORKS

Made in accordance with the ABNT NBR 5410 standard, allowing a maximum voltage drop of 4% for conduits and cable trays (non-magnetic) assuming a conductor temperature of up to 70°C and a maximum ambient temperature of 30°C.

SINGLE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)															
								10	15	20	25	30	40	50	60	70	80	90	100	125	150		
								WIRE GAUGE OR COPPER CABLE (conductor in mm ²)															
CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	10	10	10	10	16	
7	1/4	5,06	1/4	7	-	-	1,5 <td>1,5<td>1,5<td>2,5<td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td></td></td></td></td></td></td>	1,5 <td>1,5<td>2,5<td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td></td></td></td></td></td>	1,5 <td>2,5<td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td></td></td>	4 <td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td></td>	4 <td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td></td>	6 <td>6<td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td></td>	6 <td>10<td>10<td>10<td>10<td>16<td>16</td></td></td></td></td></td>	10 <td>10<td>10<td>10<td>16<td>16</td></td></td></td></td>	10 <td>10<td>10<td>16<td>16</td></td></td></td>	10 <td>10<td>16<td>16</td></td></td>	10 <td>16<td>16</td></td>	16 <td>16</td>	16		
9	1/3	8,51	-	-	-	-	1,5 <td>1,5<td>2,5<td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td></td></td></td></td></td></td>	1,5 <td>2,5<td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td></td></td></td>	4 <td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td></td></td>	4 <td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td></td>	6 <td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td></td>	6 <td>10<td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td></td>	10 <td>10<td>10<td>10<td>16<td>16</td><td>16</td></td></td></td></td>	10 <td>10<td>10<td>16<td>16</td><td>16</td></td></td></td>	10 <td>10<td>16<td>16</td><td>16</td></td></td>	10 <td>16<td>16</td><td>16</td></td>	16 <td>16</td> <td>16</td>	16	16		
11	1/2	9,20	1/3	10,5	1/2	9,8	1,5 <td>2,5<td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>2,5<td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>4<td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td></td>	4 <td>4<td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td>	4 <td>6<td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td>	6 <td>6<td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td>	6 <td>10<td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td>	10 <td>10<td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td>	10 <td>10<td>10<td>16<td>16</td><td>25</td><td>25</td></td></td></td>	10 <td>10<td>16<td>16</td><td>25</td><td>25</td></td></td>	10 <td>16<td>16</td><td>25</td><td>25</td></td>	16 <td>16</td> <td>25</td> <td>25</td>	16	25	25		
14	3/4	11,73	1/2	12,8	-	-	1,5 <td>2,5<td>4<td>4<td>6<td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td></td></td></td>	2,5 <td>4<td>4<td>6<td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td></td></td>	4 <td>4<td>6<td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td></td>	4 <td>6<td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td></td>	6 <td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td></td>	6 <td>6<td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td></td>	6 <td>10<td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td></td>	10 <td>10<td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td></td>	10 <td>16<td>16<td>16<td>16</td><td>25</td><td>25</td></td></td></td>	16 <td>16<td>16<td>16</td><td>25</td><td>25</td></td></td>	16 <td>16<td>16</td><td>25</td><td>25</td></td>	16 <td>16</td> <td>25</td> <td>25</td>	16	25	25		
18,5	1,0, 1,5	16,1, 18,9	0,75, 1,0	16,8, 18,2	-	-	4 <td>4<td>4<td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td></td></td></td></td></td></td>	4 <td>4<td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td></td></td></td></td></td>	4 <td>6<td>6<td>10<td>10<td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td></td></td></td></td>	6 <td>6<td>10<td>10<td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td></td></td></td>	6 <td>10<td>10<td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td></td></td>	10 <td>10<td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td></td>	10 <td>16<td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td></td>	16 <td>16<td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td></td>	16 <td>16<td>16<td>25</td><td>25</td><td>35</td><td>35</td></td></td>	16 <td>16<td>25</td><td>25</td><td>35</td><td>35</td></td>	16 <td>25</td> <td>25</td> <td>35</td> <td>35</td>	25	25	35	35		
25	2,0	23,0	1,5	23,1	-	-	4 <td>4<td>6<td>10<td>10<td>16<td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td></td></td></td></td></td></td>	4 <td>6<td>10<td>10<td>16<td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td></td></td></td></td></td>	6 <td>10<td>10<td>16<td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td></td></td></td></td>	10 <td>10<td>16<td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td></td></td></td>	10 <td>16<td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td></td></td>	16 <td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td></td>	16 <td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>50</td><td>50</td></td>	16 <td>25</td> <td>25</td> <td>25</td> <td>35</td> <td>35</td> <td>50</td> <td>50</td>	25	25	25	35	35	50	50		
32	3,0	31,74	2,0	25,9	-	-	6 <td>6<td>10<td>10</td><td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>35</td><td>50</td><td>70</td><td>95</td></td></td></td></td>	6 <td>10<td>10</td><td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>35</td><td>50</td><td>70</td><td>95</td></td></td></td>	10 <td>10</td> <td>16<td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>35</td><td>50</td><td>70</td><td>95</td></td></td>	10	16 <td>16<td>25</td><td>25</td><td>25</td><td>35</td><td>35</td><td>35</td><td>50</td><td>70</td><td>95</td></td>	16 <td>25</td> <td>25</td> <td>25</td> <td>35</td> <td>35</td> <td>35</td> <td>50</td> <td>70</td> <td>95</td>	25	25	25	35	35	35	50	70	95		
43	-	-	3,0	36,0	-	-	10 <td>10</td> <td>16</td> <td>16</td> <td>25</td> <td>25</td> <td>35</td> <td>35</td> <td>50</td> <td>50</td> <td>50</td> <td>70</td> <td>95</td> <td>120</td> <td>120</td>	10	16	16	25	25	35	35	50	50	50	70	95	120	120		

SINGLE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)													
								10	15	20	25	30	40	50	60	70	80	90	100	125	150
								WIRE GAUGE OR ALUMINUM CABLE (conductor in mm²)													
CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	P (hp)	I Máx(A)															
127V	7	1/4	5,06	1/4	7	-	-	*	*	*	*	*	*	*	*	*	*	*	16	25	25
	9	1/3	8,51	-	-	-	-	*	*	*	*	*	*	*	*	*	*	16	16	16	25
	11	1/2	9,20	1/3	10,5	1/2	9,8	*	*	*	*	*	*	*	*	*	16	16	16	25	
	14	3/4	11,73	1/2	12,8	-	-	*	*	*	*	*	*	*	*	16	16	16	25	35	
	18,5	1,0, 1,5	16,1, 18,9	0,75, 1,0	16,8, 18,2	-	-	*	*	*	*	*	*	16	16	25	25	35	35	50	
	25	2,0	23,0	1,5	23,1	-	-	*	*	*	*	*	16	16	25	25	35	35	50	70	
	32	3,0	31,74	2,0	25,9	-	-	*	*	*	16	16	25	25	35	35	50	50	70	95	
	43	-	-	3,0	36,0	-	-	16	16	16	25	25	35	35	50	50	70	70	95	120	

SINGLE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)														
								20	30	40	50	60	80	100	120	140	160	180	200	250	300	
	CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	P (hp)	I Máx(A)	WIRE GAUGE OR COPPER CABLE (conductor in mm²)														
220V	7	1/4 to 3/4	2,53 to 5,8	1/4 to 1/2	3,5 to 6,4	1/2 and 3/4	4,8 and 6,0	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	10	10	10	16
	9	1,0	8,05	3/4	8,4	1,0	7,8	1,5	1,5	2,5	2,5	4	4	6	6	10	10	10	10	16	16	
	11	1,5	9,43	1,0	9,1	1,5	9,8	1,5	2,5	2,5	4	4	6	6	10	10	10	10	16	16	25	
	14	2,0	11,50	1,5 and 2,0	11,6 and 13	2,0	12,4	1,5	2,5	4	4	6	6	10	10	16	16	16	16	25	25	
	18,5	3,0	15,87	3,0	18	3,0	16,5	4	4	4	6	6	10	10	16	16	16	25	25	35	35	
	25	4,0 and 5,0	21,3 and 24,8	-	-	-	-	4	4	6	10	10	10	16	16	25	25	35	35	50	50	
	32	-	-	-	-	-	-	6	6	10	10	10	16	25	25	35	35	35	50	70		
	43	7,5	36,80	-	-	-	-	10	10	10	16	16	25	25	35	35	50	50	50	70	95	
57	10,0	48,30	-	-	-	-	16	16	16	16	25	25	35	50	50	70	70	70	95	120		
75	12,5 and 15	58,6 and 70,4	-	-	-	-	25	25	25	25	35	50	70	70	70	95	95	95	120	150		

GUIDANCE TABLE FOR SELECTION OF UNIPOLAR AND MULTIPOLAR CABLES FOR SINGLE-PHASE NETWORKS

Made in accordance with the ABNT NBR 5410 standard, allowing a maximum voltage drop of 4% for conduits and cable trays (non-magnetic) assuming a conductor temperature of up to 70°C and a maximum ambient temperature of 30°C.

SINGLE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)															
		20	30	40	50			60	80	100	120	140	160	180	200	250	300						
	CURRENT (A)	P (hp)	I Mx (A)	P (hp)	I Mx (A)	P (hp)	I Mx (A)	WIRE GAUGE OR ALUMINUM CABLE (conductor in mm²)															
220V	7	1/4 to 3/4	2,53 to 5,8	1/4 to 1/2	3,5 to 6,4	1/2 and 3/4	4,8 and 6,0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	9	1,0	8,05	3/4	8,4	1,0	7,8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	11	1,5	9,43	1,0	9,1	1,5	9,8	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	14	2,0	11,50	1,5 and 2,0	11,6 and 13	2,0	12,4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	18,5	3,0	15,87	3,0	18	3,0	16,5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	25	4,0 and 5,0	21,3 and 24,8	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	32	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
	43	7,5	36,80	-	-	-	-	16	16	16	25	25	35	50	50	70	70	95	95	95	120	150	
	57	10,0	48,30	-	-	-	-	25	25	25	25	35	50	70	70	95	95	95	120	150	185	240	
	75	12,5 and 15	58,6 and 70,4	-	-	-	-	50	50	50	50	50	70	70	95	95	120	150	150	185	240	300	

SINGLE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)															
		40 60 80 100 120 160 200 240 280 320 360 400 500 600																			
	CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	WIRE GAUGE OR COPPER CABLE [conductor in mm²]															
440V	7	1/4 to 2	1,2 to 5,7	1/4 to 2	1,75 to 6,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	10	10	10	16		
	9	3,0	7,94	3,0	9,0	1,5	1,5	2,5	2,5	4	4	6	6	10	10	10	10	16	16		
	11	4,0	10,64	-	-	1,5	2,5	2,5	4	4	6	6	10	10	10	10	16	16	25		
	14	5,0	12,42	-	-	1,5	2,5	4	4	6	6	10	10	10	16	16	16	25	25		
	18,5	7,5	18,40	-	-	4	4	4	6	6	10	10	16	16	16	25	25	25	35		
	25	10,0	24,15	-	-	4	4	6	10	10	10	16	16	25	25	25	35	35	50		
	32	12,5	29,33	-	-	6	6	10	10	10	16	25	25	25	35	35	35	50	70		
	43	15,0	35,25	-	-	10	16	16	16	16	25	25	35	35	50	50	50	70	95		

SINGLE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)													
		P (hp)	I Máx (A)	P (hp)	I Máx (A)	40	60	80	100	120	160	200	240	280	320	360	400	500	600
		WIRE GAUGE OR ALUMINUM CABLE (conductor in mm²)																	
CURRENT (A)																			
7	1/4 to 2	1,2 to 5,7	1/4 to 2	1,75 to 6,5	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
9	3,0	7,94	3,0	9,0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11	4,0	10,64	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14	5,0	12,42	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18,5	7,5	18,40	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
25	10,0	24,15	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
32	12,5	29,33	-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
43	15,0	35,25	-	-	16	16	16	25	25	35	50	50	70	70	95	95	120	120	120

GUIDANCE TABLE FOR SELECTION OF UNIPOLAR AND MULTIPOLAR CABLES FOR THREE-PHASE NETWORKS

Made in accordance with the ABNT NBR 5410 standard, allowing a maximum voltage drop of 4% for conduits and cable trays (non-magnetic) assuming a conductor temperature of up to 70°C and a maximum ambient temperature of 30°C.

THREE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)																		
		CURRENT (A)	P (hp)	I Máx (A)	P (hp)			I Máx (A)	P (hp)	I Máx (A)	WIRE GAUGE OR COPPER CABLE (conductor in mm²)															
											20	30	40	50	60	80	100	120	140	160	180	200	250	300		
220V	7	1/4 to 2	1,05 to 6,3	1/3 to 2	2,5 to 6,7	1/2 to 1	3,8 to 5,7	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	6	10	10	10	10		
	9	-	-	3	9,2	1,5 and 2	7,4 and 9	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	10	10	10	10	10	10	16		
	10	3	9,25	-	-	-	-	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	10	10	10	10	10	10	16		
	13	4	12,31	-	-	3,0	12,1	1,5	2,5	2,5	4	4	6	6	6	10	10	10	10	16	16	16	16	25		
	17,5	5 and 6	14,7 to 17,4	-	-	4,0	14	2,5	2,5	4	4	6	10	10	10	10	16	16	16	16	16	25	25	35		
	23	7,5	21,6	-	-	5,0	18,7	4	4	4	6	10	10	16	16	16	16	25	25	25	35	35	35	50		
	29	10,0	28,75	-	-	7,5	25,0	6	4	6	10	10	16	16	16	25	25	25	35	35	35	50	70	70		
	39	12,5	34,50	-	-	10,0	34,6	10	10	10	10	16	16	25	25	25	35	35	35	50	50	70	95	120		
	52	15,0	41,60	-	-	-	-	16	16	16	16	16	25	25	35	35	35	50	50	70	70	95	120	150		
	68	20,0	57,30	-	-	-	-	25	25	25	25	25	35	35	50	50	70	70	70	95	95	120	150	185		
	83	25 and 30	70,1 and 83	-	-	-	-	35	35	35	35	35	50	50	70	70	95	95	120	150	150	185	240	300		
	99	-	-	-	-	-	-	50	50	50	50	50	70	70	95	95	95	120	150	150	185	240	300	400		
	125	40,0	113,90	-	-	-	-	70	70	70	70	70	95	95	120	120	150	150	185	185	240	300	400	500		
	150	50,0	139,2	-	-	-	-	95	95	95	95	95	120	120	150	150	185	185	240	240	300	400	500	700		
	172	60,0	163,30	-	-	-	-	120	120	120	120	120	150	150	185	185	240	240	300	300	400	500	700	900		
	196	75,0	196,65	-	-	-	-	150	150	150	150	150	185	185	240	240	300	300	400	400	500	700	900	1100		
	223	-	-	-	-	-	-	185	185	185	185	185	240	240	300	300	400	400	500	500	700	900	1100	1400		
	261	-	-	-	-	-	-	240	240	240	240	240	300	300	400	400	500	500	700	700	900	1100	1400	1800		
	298	100,0	269,10	-	-	-	-	300	300	300	300	300	400	400	500	500	700	700	900	900	1100	1400	1800	2400		
	355	125,0	326,60	-	-	-	-	400	400	400	400	400	500	500	700	700	900	900	1100	1100	1400	1800	2400	3000		
	406	150,0	393,3	-	-	-	-	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500		

THREE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)																		
		WIRE GAUGE OR ALUMINUM CABLE (conductor in mm²)																								
		20	30	40	50			60	80	100	120	140	160	180	200	250	300									
CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	1/2 to 1	3,8 to 5,7	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
220V	7	1/4 to 2	1,05 to 6,3	1/3 to 2	2,5 to 6,7	1/2 to 1	3,8 to 5,7	1,5 and 2	7,4 and 9	*	*	*	*	*	*	*	*	*	*	*	*	16	16	25	25	
	9	-	-	3	9,2	1,5 and 2	7,4 and 9	-	-	*	*	*	*	*	*	*	*	*	*	*	16	16	16	25	25	
	10	3	9,25	-	-	-	-	-	-	*	*	*	*	*	*	*	*	*	*	*	16	16	16	25	25	
	13	4	12,31	-	-	-	3,0	12,1	-	-	*	*	*	*	*	*	*	*	*	*	16	16	25	25	35	
	17,5	5 and 6	14,7 to 17,4	-	-	-	4,0	14	-	-	*	*	*	*	*	*	*	*	*	*	16	16	25	35	50	
	23	7,5	21,6	-	-	-	5,0	18,7	-	-	*	*	*	*	*	*	*	*	*	*	16	16	25	35	50	
	29	10,0	28,75	-	-	-	7,5	25,0	-	-	*	*	*	*	*	*	*	*	*	*	16	16	25	35	50	
	39	12,5	34,50	-	-	-	10,0	34,6	-	-	*	*	*	*	*	*	*	*	*	*	16	16	25	35	50	
	52	15,0	41,60	-	-	-	-	-	25	25	25	25	25	35	50	50	70	70	95	95	120	120	120	120	120	
	68	20,0	57,30	-	-	-	-	-	35	35	35	35	35	50	70	70	95	95	120	150	185	185	240	240	240	
	83	25 and 30	70,1 and 83	-	-	-	-	-	70	70	70	70	70	70	70	95	95	120	150	185	240	240	240	240	240	
	99	-	-	-	-	-	-	-	70	70	70	70	70	70	95	95	120	150	185	240	240	240	240	240	240	
	125	40,0	113,90	-	-	-	-	-	120	120	120	120	120	120	120	150	185	185	240	300	300	300	300	300	300	
	150	50,0	139,2	-	-	-	-	-	150	150	150	150	150	150	150	185	240	240	240	300	300	300	300	300	300	
	172	60,0	163,30	-	-	-	-	-	185	185	185	185	185	185	185	240	240	240	240	300	300	300	300	300	300	
	196	75,0	196,65	-	-	-	-	-	240	240	240	240	240	240	240	240	240	240	300	300	300	300	300	300	300	
	223	-	-	-	-	-	-	-	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	
	261	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	298	100,0	269,10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	355	125,0	326,60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	406	150,0	393,3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

GUIDANCE TABLE FOR SELECTION OF UNIPOLAR AND MULTIPOLAR CABLES FOR THREE-PHASE NETWORKS

Made in accordance with the ABNT NBR 5410 standard, allowing a maximum voltage drop of 4% for conduits and cable trays (non-magnetic) assuming a conductor temperature of up to 70°C and a maximum ambient temperature of 30°C.

THREE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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		WIRE GAUGE OR COPPER CABLE (conductor in mm²)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	6	10	10	16	16	25	25	35	35	50	50	70	70	95	95	120	120	150	150	185	185	240	240	300	300	400	400	500	500	700	700	900	900	1200	1200	1500	1500	2000	2000	2500	2500	3000	3000	4000	4000	5000	5000	7000	7000	9000	9000	12000	12000	15000	15000	20000	20000	25000	25000	30000	30000	40000	40000	50000	50000	70000	70000	90000	90000	120000	120000	150000	150000	200000	200000	250000	250000	300000	300000	400000	400000	500000	500000	700000	700000	900000	900000	1200000	1200000	1500000	1500000	2000000	2000000	2500000	2500000	3000000	3000000	4000000	4000000	5000000	5000000	7000000	7000000	9000000	9000000	12000000	12000000	15000000	15000000	20000000	20000000	25000000	25000000	30000000	30000000	40000000	40000000	50000000	50000000	70000000	70000000	90000000	90000000	120000000	120000000	150000000	150000000	200000000	200000000	250000000	250000000	300000000	300000000	400000000	400000000	500000000	500000000	700000000	700000000	900000000	900000000	1200000000	1200000000	1500000000	1500000000	2000000000	2000000000	2500000000	2500000000	3000000000	3000000000	4000000000	4000000000	5000000000	5000000000	7000000000	7000000000	9000000000	9000000000	12000000000	12000000000	15000000000	15000000000	20000000000	20000000000	25000000000	25000000000	30000000000	30000000000	40000000000	40000000000	50000000000	50000000000	70000000000	70000000000	90000000000	90000000000	120000000000	120000000000	150000000000	150000000000	200000000000	200000000000	250000000000	250000000000	300000000000	300000000000	400000000000	400000000000	500000000000	500000000000	700000000000	700000000000	900000000000	900000000000	1200000000000	1200000000000	1500000000000	1500000000000	2000000000000	2000000000000	2500000000000	2500000000000	3000000000000	3000000000000	4000000000000	4000000000000	5000000000000	5000000000000	7000000000000	7000000000000	9000000000000	9000000000000	12000000000000	12000000000000	15000000000000	15000000000000	20000000000000	20000000000000	25000000000000	25000000000000	30000000000000	30000000000000	40000000000000	40000000000000	50000000000000	50000000000000	70000000000000	70000000000000	90000000000000	90000000000000	120000000000000	120000000000000	150000000000000	150000000000000	200000000000000	200000000000000	250000000000000	250000000000000	300000000000000	300000000000000	400000000000000	400000000000000	500000000000000	500000000000000	700000000000000	700000000000000	900000000000000	900000000000000	1200000000000000	1200000000000000	1500000000000000	1500000000000000	2000000000000000	2000000000000000	2500000000000000	2500000000000000	3000000000000000	3000000000000000	4000000000000000	4000000000000000	5000000000000000	5000000000000000	7000000000000000	7000000000000000	9000000000000000	9000000000000000	12000000000000000	12000000000000000	15000000000000000	15000000000000000	20000000000000000	20000000000000000	25000000000000000	25000000000000000	30000000000000000	30000000000000000	40000000000000000	40000000000000000	50000000000000000	50000000000000000	70000000000000000	70000000000000000	90000000000000000	90000000000000000	120000000000000000	120000000000000000	150000000000000000	150000000000000000	200000000000000000	200000000000000000	250000000000000000	250000000000000000	300000000000000000	300000000000000000	400000000000000000	400000000000000000	500000000000000000	500000000000000000	700000000000000000	700000000000000000	900000000000000000	900000000000000000	1200000000000000000	1200000000000000000	1500000000000000000	1500000000000000000	2000000000000000000	2000000000000000000	2500000000000000000	2500000000000000000	3000000000000000000	3000000000000000000	4000000000000000000	4000000000000000000	5000000000000000000	5000000000000000000	7000000000000000000	7000000000000000000	9000000000000000000	9000000000000000000	12000000000000000000	12000000000000000000	15000000000000000000	15000000000000000000	20000000000000000000	20000000000000000000	25000000000000000000	25000000000000000000	30000000000000000000	30000000000000000000	40000000000000000000	40000000000000000000	50000000000000000000	50000000000000000000	70000000000000000000	70000000000000000000	90000000000000000000	90000000000000000000	120000000000000000000	120000000000000000000	150000000000000000000	150000000000000000000	200000000000000000000	200000000000000000000	250000000000000000000	250000000000000000000	300000000000000000000	300000000000000000000	400000000000000000000	400000000000000000000	500000000000000000000	500000000000000000000	700000000000000000000	700000000000000000000	900000000000000000000	900000000000000000000	1200000000000000000000	1200000000000000000000	1500000000000000000000	1500000000000000000000	2000000000000000000000	2000000000000000000000	2500000000000000000000	2500000000000000000000	3000000000000000000000	3000000000000000000000	4000000000000000000000	4000000000000000000000	5000000000000000000000	5000000000000000000000	7000000000000000000000	7000000000000000000000	9000000000000000000000	9000000000000000000000	12000000000000000000000	12000000000000000000000	15000000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THREE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		SUBMERGED MOTOR		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)																
								35	52	69	86	104	138	173	207	242	276	311	345	432	518			
								WIRE GAUGE OR ALUMINUM CABLE (conductor in mm²)																
CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)																		
7	1/4 to 3	0,6 to 5,3	1/3 to 3	1,5 to 5,3	1/2 to 3	2 to 6,9	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	6	10	10	16	16	25
9	4 and 5	7,1 and 8,5	-	-	4,0	8,1	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	6	10	16	16	25	25
10	6,0	10,00	-	-	-	-	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	6	10	16	16	25	25
13	7,5	12,50	-	-	-	5,0	10,8	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	10	16	25	25	35
17,5	10,0	16,60	-	-	-	7,5	14,4	2,5	2,5	4	4	6	6	10	10	10	16	16	16	16	25	35	50	70
23	12,5 and 15	19,9 and 24	-	-	-	10,0	20	4	4	4	4	6	6	10	10	16	16	16	16	25	35	35	50	70
29	-	-	-	-	-	-	-	6	6	6	6	10	10	16	16	16	25	25	25	35	35	50	70	90
39	20,0	33,04	-	-	-	-	-	16	16	16	16	16	25	25	35	35	50	50	70	70	70	95	120	150
52	25 and 30	40,5 and 47,91	-	-	-	-	-	25	25	25	25	25	35	35	50	50	70	70	70	95	95	120	150	185
68	40,0	65,69	-	-	-	-	-	35	35	35	35	35	50	50	70	70	95	95	95	120	150	185	240	300
83	50	80,29	-	-	-	-	-	70	70	70	70	70	70	70	95	95	120	120	150	150	185	240	300	400
99	60,0	94,22	-	-	-	-	-	70	70	70	70	70	70	95	95	95	120	150	150	185	240	300	400	500
125	75,0	113,47	-	-	-	-	-	120	120	120	120	120	120	120	150	185	185	240	240	300	300	400	500	700
150	-	-	-	-	-	-	-	150	150	150	150	150	150	150	185	185	240	240	300	300	400	500	700	900
172	-	-	-	-	-	-	-	185	185	185	185	185	185	185	185	185	185	240	300	300	400	500	700	900
196	100,0	155,27	-	-	-	-	-	240	240	240	240	240	240	240	240	240	240	300	300	300	400	500	500	700
223	125,0	188,45	-	-	-	-	-	300	300	300	300	300	300	300	300	300	300	300	300	300	400	500	500	700
261	150,0	226,93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
298	175,0	278,69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
355	200,0	311,87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
406	250 and 270	378,22 and 403,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

GUIDANCE TABLE FOR SELECTION OF UNIPOLAR AND MULTIPOLAR CABLES FOR THREE-PHASE NETWORKS

Made in accordance with the ABNT NBR 5410 standard, allowing a maximum voltage drop of 4% for conduits and cable trays (non-magnetic) assuming a conductor temperature of up to 70°C and a maximum ambient temperature of 30°C.

THREE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)																	
		40 60 80 100 120 160 200 240 280 320 360 400 500 600																					
	CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)	WIRE GAUGE OR COPPER CABLE (conductor in mm²)																	
440V	7	1/4 to 4	0,5 to 6,2	1/3 to 3	1,3 to 4,6	1,5	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	6	10	10				
	9	5 and 6	7,4 and 8,7	-	-	1,5	1,5	1,5	2,5	2,5	4	4	6	6	6	10	10	10	16				
	10	-	-	-	-	1,5	1,5	2,5	2,5	4	4	6	6	6	10	10	10	16					
	13	7,5	10,80	-	-	1,5	2,5	2,5	4	4	6	6	10	10	10	16	16	25					
	17,5	10 and 12,5	14,4 and 17,3	-	-	2,5	2,5	4	4	6	10	10	10	16	16	16	25	25					
	23	15,0	20,80	-	-	4	4	4	6	10	10	16	16	16	25	25	35	35					
	29	20,0	28,60	-	-	6	6	6	10	10	16	16	16	25	25	35	35	50					
	39	25,0	35,10	-	-	10	10	10	10	16	16	25	25	25	35	35	50	70					
	52	30,0	41,50	-	-	16	16	16	16	16	25	25	35	35	50	50	70	95					
	68	40,0	57,00	-	-	25	25	25	25	25	35	50	50	70	70	95	95	120					
	83	50 and 60	69,6 and 81,65	-	-	35	35	35	35	35	50	50	70	70	95	95	120	150					
	99	75,0	98,30	-	-	50	50	50	50	50	70	70	95	95	95	120	150	185					
	125	-	-	-	-	70	70	70	70	70	70	95	95	120	150	150	185	240					
	150	100,0	134,55	-	-	95	95	95	95	95	95	95	120	150	185	185	240	400					
	172	125,0	163,30	-	-	120	120	120	120	120	120	120	150	185	185	240	300	400					
	196	150,0	196,65	-	-	150	150	150	150	150	150	150	185	185	185	240	300	400					
223	-	-	-	-	185	185	185	185	185	185	185	185	185	240	300	400	500						
261	175,0	241,50	-	-	240	240	240	240	240	240	240	240	240	300	400	400	-						
298	200,0	270,25	-	-	300	300	300	300	300	300	300	300	300	300	400	500	-						
355	250 and 270	327,75 and 388,6	-	-	400	400	400	400	400	400	400	400	400	500	-	-	-						
406	300,0	385,30	-	-	500	500	500	500	500	500	500	500	500	-	-	-	-						

GUIDANCE TABLE FOR SELECTION OF UNIPOLAR AND MULTIPOLAR CABLES FOR THREE-PHASE NETWORKS

Made in accordance with the ABNT NBR 5410 standard, allowing a maximum voltage drop of 4% for conduits and cable trays (non-magnetic) assuming a conductor temperature of up to 70°C and a maximum ambient temperature of 30°C.

THREE-PHASE		IP-55 (Enclosed) II Poles 3500rpm		IP-21 (Open) II Poles 3500rpm		DISTANCE FROM THE MOTOR TO THE GENERAL BOARD OF DISTRIBUTION (Meters)															
						40	60	80	100	120	160	200	240	280	320	360	400	500	600		
						WIRE GAUGE OR ALUMINUM CABLE (conductor in mm ²)															
	CURRENT (A)	P (hp)	I Máx (A)	P (hp)	I Máx (A)																
440V	7	1/4 to 4	0,5 to 6,2	1/3 to 3	1,3 to 4,6	*	*	*	*	*	*	*	*	*	*	*	*	16	16	25	
	9	5 and 6	7,4 and 8,7	-	-	*	*	*	*	*	*	*	*	*	*	*	16	16	25		
	10	-	-	-	-	*	*	*	*	*	*	*	*	*	*	16	16	16	25		
	13	7,5	10,80	-	-	*	*	*	*	*	*	*	*	16	16	16	25	25	35		
	17,5	10 and 12,5	14,4 and 17,3	-	-	*	*	*	*	*	16	16	25	25	25	25	35	35	50		
	23	15,0	20,80	-	-	*	*	*	*	16	16	25	25	25	35	35	35	50	70		
	29	20,0	28,60	-	-	*	*	*	16	16	25	25	35	35	50	50	70	70	70		
	39	25,0	35,10	-	-	16	16	16	16	25	25	35	50	50	50	70	70	95	95		
	52	30,0	41,50	-	-	25	25	25	25	25	35	50	50	70	70	95	95	120	120		
	68	40,0	57,00	-	-	35	35	35	35	35	50	70	70	95	95	95	120	150	185		
	83	50 and 60	69,6 and 81,65	-	-	70	70	70	70	70	70	70	95	95	120	120	150	185	240		
	99	75,0	98,30	-	-	70	70	70	70	70	70	95	95	120	120	150	185	240	240		
	125	-	-	-	-	120	120	120	120	120	120	120	150	185	185	240	240	300	-		
	150	100,0	134,55	-	-	150	150	150	150	150	150	150	150	185	185	240	240	300	-		
	172	125,0	163,30	-	-	185	185	185	185	185	185	185	185	185	240	240	300	300	-		
	196	150,0	196,65	-	-	240	240	240	240	240	240	240	240	240	240	300	300	300	-		
	223	-	-	-	-	300	300	300	300	300	300	300	300	300	300	300	-	-	-		
	261	175,0	241,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
298	200,0	270,25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
355	250 and 270	327,75 and 349,6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
406	300,0	385,30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

TROUBLE SHOOTING

FAUT	PROBABLE CAUSES
The motor pump/pump does not start.	<ul style="list-style-type: none"> • Incorrect electrical supply or not supplied to the motor. • Power cord(s) cut. • Ground conductor or motor winding shorted. • Defective capacitor (if applicable). • Control panel circuit breaker open. • Selector in OFF position (if applicable). • Motor supply voltage lower than that required by the motor. • Friction of rotating parts with stationary parts. • Locked rotor or shaft.
The motor pump/pump works with little or no flow/pressure.	<ul style="list-style-type: none"> • Suction piping and pump are empty or low on water (loss of primer). • Head greater than calculated or specified (causing extreme reduction in pumping capacity). • Air inlet through suction pipe or foot valve (pipes and/or connections poorly sealed or cracked, water level too low). • Liquid level below minimum submergence requirement (if applicable). • Vortex in the pump/motor pump suction. • High suction depth > 8mca (if applicable). • Closed discharge valve or stuck check valve. • Closed suction valve or foot valve problems. • Foot valve stuck, partially or completely clogged, or undersized (if applicable). • Filter clogging (if applicable). • Worn wear ring(s) (if applicable). • Worn or defective rotor. • Impeller rotation direction incorrect (if applicable).
The motor pump/pump works manually, but not automatically.	<ul style="list-style-type: none"> • Defective relay or contactor coil (if applicable). • Selector is not in automatic position (if applicable). • Defective level sensor (if applicable). • Motor supply voltage lower than that required by the motor.
The motor pump/pump works manually, but not automatically.	<ul style="list-style-type: none"> • The motor pump/pump operated without water or with the discharge valve closed, or with the check valve stuck or with the foot valve obstructed. • Leaking sealing ring(s). • Leakage in the mechanical seal. • Pump body punctured. • Misaligned or bent shaft. • Pump pump/pump assembly incorrectly. • Pumping of abrasive fluid.
The motor pump/pump works and acts to protect the motor.	<ul style="list-style-type: none"> • Unbalanced electrical supply (overvoltage or undervoltage). • Isolation between phases and earth conductor < 1 MΩ (1 Mega Ohm). • Motor does not receive adequate voltage on all 3 phases (if applicable). • Motor installation wire gauge with a diameter smaller than that indicated by NBR 5410 or equivalent standard in the country where the product will be used. • Lower head than specified, resulting in flow higher than specified. • Very high density of the pumped fluid. • High ambient temperature.

TROUBLE SHOOTING

FAUT	PROBABLE CAUSES
<p>The motor pump/pump heats up in operation.</p>	<ul style="list-style-type: none"> • Unbalanced electrical supply (overvoltage or undervoltage). • Motor installation wire gauge with a diameter smaller than that indicated by the NBR 5410 or equivalent standard in the country where the product will be used. • Faulty soft starter or frequency inverter (if applicable). • Suction piping and pump are empty or low on water (loss of primer). • Head greater than calculated or specified (causing extreme reduction in pumping capacity). • Liquid level below minimum submergence requirement (if applicable). • Very high density of the pumped fluid. • Closed discharge valve or stuck check valve. • Closed suction valve or foot valve problems. • Impeller stuck or rubbing against the housing (snail). • Misaligned or bent shaft. • Lack of lubrication or defect in bearings and/or bearings (if applicable). • Gasket too tight (if applicable).
<p>The motor pump/pump has abnormal vibrations or noises.</p>	<ul style="list-style-type: none"> • Current head greater than calculated or specified. • Lower head than specified, resulting in flow higher than specified (cavitation). • Air inlet through suction pipe or foot valve (pipes and/or connections poorly sealed or cracked, water level too low). • Liquid level below minimum submergence requirement (if applicable). • Vortex in the suction of the pump/motor pump (if applicable). • Obstruction in suction or foot valve (if applicable). • Foreign body inside the pump/impeller. • Lack of lubrication or defect in bearings and/or bearings (if applicable). • Worn wear ring(s) (if applicable). • Impeller stuck or rubbing against the housing (snail). • Misaligned or bent shaft.
<p>Excessive energy/ electric current consumption (A).</p>	<ul style="list-style-type: none"> • Unbalanced electrical supply (overvoltage or undervoltage). • Motor supply voltage lower than that required by the motor. • Motor installation wire gauge with a diameter smaller than that indicated by the NBR 5410 or equivalent standard in the country where the product will be used. • Motor pump/pump operating outside the specified operating range. • Lower head than specified, resulting in flow higher than specified. • Very high density of the pumped fluid. • Lack of lubrication or defect in bearings and/or bearings (if applicable). • Impeller stuck or rubbing against the housing (snail). • Motor ventilation blocked or insufficient. • Gasket too tight (if applicable).



**In case of product defect, seek AUTHORIZED TECHNICAL ASSISTANCE as specified
in the WARRANTY TERM on page 22.**

EBARA BOMBAS AMÉRICA DO SUL LTDA., a unit in Vargem Grande do Sul-SP, guarantees the product owner a warranty against any manufacturing defect within a period of 12 months (90 legal days plus 275 additional days) for series models: **B -10, B-13, B-15, TP, TSV, TPA, TJET, TJETF, TSW, TSP and Engine Driven Pumps Sets or 18 months** (90 legal days plus 456 additional days) for other models, counted from the Purchase Invoice, free of hours worked, limited to 24 months from the manufacturing date, regardless of the installation date.

PRESCRIPTIONS

- I - The products are guaranteed against any manufacturing defects found, except for materials with natural wear and tear.
- II - The warranty period is counted from the date of supply, restricted to the first Customer/User.
- III - Only the parts covered by this warranty will be replaced, if defects are found, through technical assistance with factory authorization.

WARRANTY CANCELLATION

- I - Damage due to misuse or accidents.
- II - Damage caused by fire, flood, earthquake or other disasters beyond human control.
- III - Use in disagreement with the Installation, Operation and Maintenance Manual and the General Product Catalog, which contains the technical specifications of each pump model (consult these data with the Dealer or Factory).
- IV - Deficient, improper or subject to excessive oscillations in electrical installations.
- V - Incompatibility between the pumped liquid and the pump's construction material: pumping of a product that contains abrasive (sand) and corrosive (chemical) material.
- VI - Damage caused by the use of non-original parts.
- VII - Violations or repairs made by unauthorized persons.
- VIII - Inadequate transport and storage.
- IX - Damage caused by water hammer, cavitation, bad weather, as well as vibrations and mechanical stresses arising from the system or other machines/equipment.
- X - Other reasons beyond the control of EBARA.

ELECTRIC MOTOR

It is guaranteed against manufacturing defects by the respective engine manufacturer in accordance with their standards. There will be no warranty when the burn is due to problems in the power supply network: overload (sags or power oscillations) or lack of phase (three-phase motors), poorly dimensioned conductor wires, absence or failure of protection devices, wrong connection, water or foreign objects in the motor and the bearings jamming due to excess moisture (corrosion).

Notes: It is essential to present the purchase invoice for warranty service. The purchaser/user is responsible for the costs of removal and subsequent reinstallation of the equipment, as well as the risk of transport (round trip) to the Technical Assistance Workshop(s) closest to your home or location.

The warranty proposed here is limited to sending the parts/components/products to the Authorized Technical Assistant to replace those considered defective, or their replacement within the facilities of **EBARA BOMBAS AMÉRICA DO SUL LTDA.** (when necessary and requested by the same). If, by way of exception, the technicians of **EBARA BOMBAS AMÉRICA DO SUL LTDA.**, or authorized third parties need to travel to the equipment installation site to carry out maintenance or repairs, "travel" expenses such as airline tickets, fuel, tolls, parking, accommodation and food, will be charged at prevailing prices detailed in the request through budget and prior customer approval.

If the warranty is found to be unfounded by means of proof (technical report), the customer will be charged the costs related to the labor worked by the technician(s), as well as used parts. If the warranty is found to be valid, the customer will not be charged the costs related to the "worked labor" of the technician(s), as well as used parts.

All parts replaced under warranty become the property of **EBARA BOMBAS AMÉRICA DO SUL LTDA.**, and they may return to the factory, if requested by the same, for due analysis and/or disposal.

The warranty is limited to products manufactured and distributed by **EBARA BOMBAS AMÉRICA DO SUL LTDA.**, which is not responsible for damages to people, third parties, other equipment or facilities, loss of profits or other damages.

In the event of a defect in this product, contact the **EBARA** assistant (**THEBE**) closest, according to the relationship available in the **QR CODE** below or on our website:

<https://www.ebara.com.br/assistencia-tecnica>

Email: assistencia.vgs@ebara.com.br

The product within the warranty period must only be opened by an Authorized Technical Assistance.



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