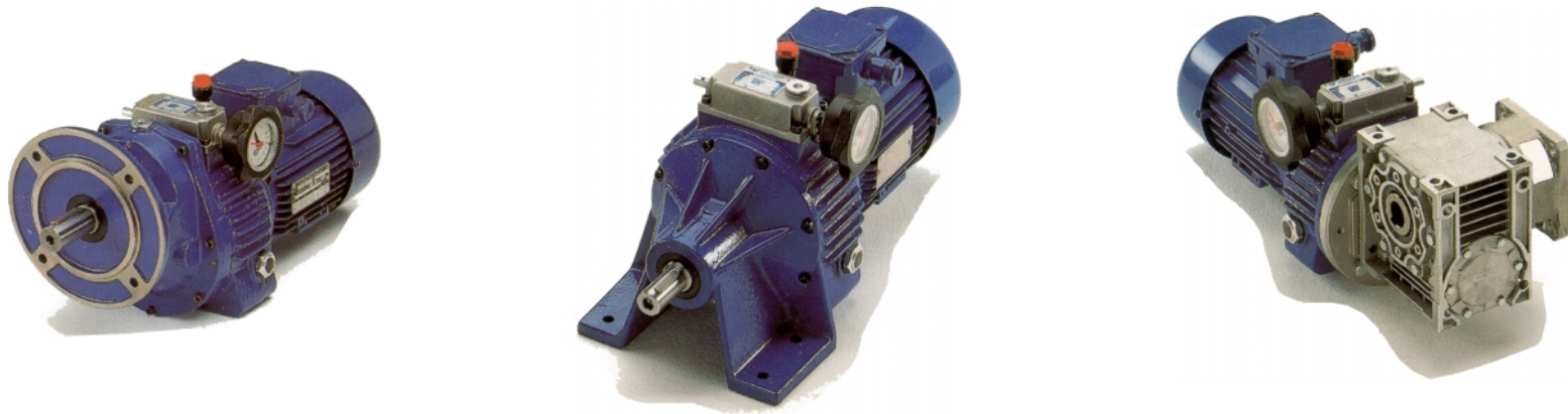
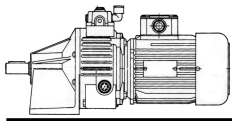

Maintenance and operational instructions for motor variators



TRANSMAX VARIATOR



Warehouse storage

When moving the unit, care should be taken to protect external parts from breakage or damage due to accidental knocks or falls.

If the unit is to be stored in a hostile atmosphere or for a long period of time (2/4 months), it is important to apply protective and waterproofing products to avoid deterioration of shafts and rubber parts.

Before starting up the unit, carry out the following checks:

Check the data shown on the name plate of the reduction unit and/or the electric motor;

Check for any leaks of lubricant

If possible, remove any traces of dirt from the shaft and from the areas around the oil seal.

If the oil seal is not immersed in the lubricant inside the assembly during particularly long storage periods (4/6 months) it is recommended that it should be replaced as the rubber might stick to the shaft or even have lost the elasticity it needs to work.

Installation

Particular care must be taken when installing drives, as this often the source of damage and of down time. Careful choice of the type of drive and mounting position can often avoid the need for protection of sensitive areas, particularly underneath the unit from oil leaks, however limited they may be.

- The machine must be firmly fastened in place in order to prevent any vibrations.
- Whenever possible, protect the reduction unit from direct sunlight and bad weather, especially when it is mounted on its vertical axis.
- Make sure the air intake on the fan side is unobstructed in order to ensure that the motor is correctly cooled.
- In the case of temperatures of $< -5\text{ }^{\circ}\text{C}$ or $> +40\text{ }^{\circ}\text{C}$, contact Technical Assistance.
- If the motor is to be started up very often under load, the use of a heat probe inserted into the motor is recommended.
- The various machine members (pulleys, gear wheels, couplings, etc.) must be mounted on the shafts using special threaded holes or other systems that ensure correct operation without risk of causing damage to the bearings or the external parts of the assemblies (fig.1).
- Lubricate the surfaces that come into contact in order to prevent oxidation or seizure.

Installation

Example of a pulley mounted correctly on the slow shaft of a reduction unit

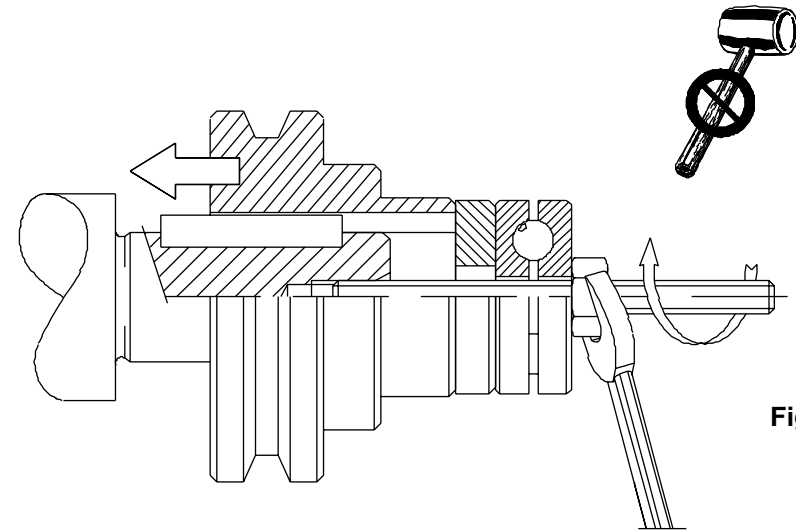


Fig.1

Correct and incorrect examples of pulleys mounted on the main shaft of a reduction unit.

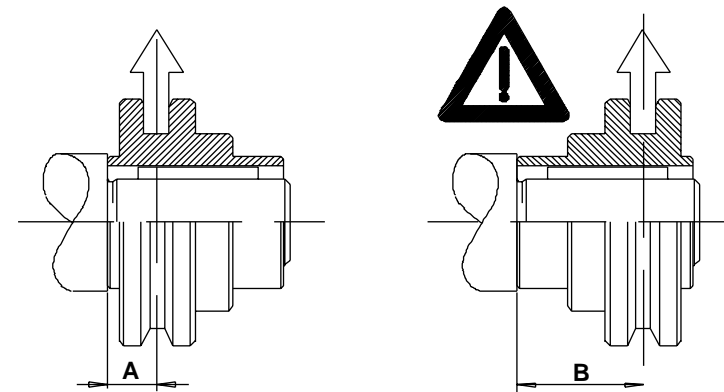
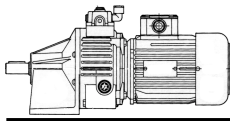


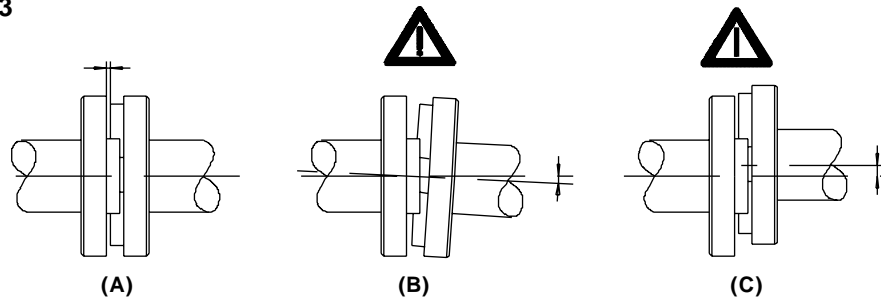
Fig.2



Installation

Correct and incorrect examples of coupling connections

Fig.3



The pulley must be mounted on the main shaft as close as possible to the shoulder so that it does not cause excessive radial load on the bearings (fig. 2). Great care must be taken when connecting the couplings to ensure that they are well aligned, so as not to cause excessive radial load on the bearings (fig.3). When it is applied, paint must never be used on rubber parts: oil seal, etc. It must never be applied to any breather holes in plugs if they are mounted on the unit. In the case of assemblies with oil plugs, remove the closed cap used for transport and fit it with the breather plug that is supplied with the reduction unit. When the assembly is supplied without a motor, the following precautions must be followed in order to ensure that connections are properly made

Mounting the motor on the pam B5/B14 flange

Check that the tolerance of the motor shaft and the motor flange comply with at least one 'normal' class of quality. Carefully clean off any trace of dirt or paint from the shaft, the spigot and the face of the flange. Carry out mounting operations making sure not to use force. If this is not possible, check the tolerance of the motor key and ensure that it is correctly fitted. Apply assembly grease to the shaft in order to prevent oxidation or seizure caused by contact. Good quality motors should be used in order to ensure that the unit works correctly, without vibrations or noise.

Before mounting the unit on the machine, check that the principal shaft of the reduction unit rotates in the right direction.

Use the oil window, if present, to check that the lubricant reaches the correct level required for the mounting position used.

Starting up

The unit should be started up gradually: do not immediately apply the maximum load the machine is able to take ; look for and correct any malfunction that may be caused by incorrect mounting.

Running-in is not essential for the reduction unit to run properly since modern construction techniques for the gears and castings, the extreme cleanliness of the internal parts, and the excellent qualities of the lubricants used, ensure that the internal parts receive a high degree of protection even during the first moments.

Servicing

The high degree of finish of the internal parts ensures that the unit will work correctly with only a minimum amount of servicing

Generally speaking, the following rules should be followed: periodically check that the exterior of the assembly is clean, especially in the cooling areas; periodically check to see if there are any leaks, especially in the areas around the oil seals.

Assemblies that are lubricated for life and thus do not have any oil plugs do not require any special maintenance except as stated above.

For other assemblies, low maintenance is required with an oil change at 8/10,000 hours of use. The change of oil naturally depends on the type of environment and use to which the unit is put.

Apart from the normal maintenance rules given above, make sure the breather hole in the plug is clean and, using the oil window, periodically check that there is sufficient lubricant.

Should it be necessary to top up with lubricant, use the same type that is already in the reducer or one that is compatible with it.

In case of doubtful incompatibility between lubricants, we recommend you empty out the oil from the gearbox completely and, before refilling with new oil, wash out the unit to remove any residue.

When changing the oil, follow the previous instructions.

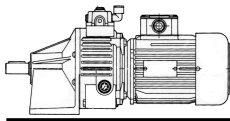
Troubleshooting

If any problems should arise when starting up the unit or during its first few hours of operation, contact the after sales service unit of Motovario.

The table shows a series of problems with a description of possible remedies.

It should be borne in mind however that the information given is for reference only as all the drives manufactured by Motovario are thoroughly tested and checked before they leave the factory.

Please note that tampering with the assembly without prior authorization from Motovario immediately invalidates the warranty and often makes it impossible to ascertain the causes of a defect or malfunction.



Troubleshooting

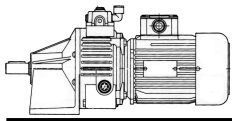
Gearbox

PROBLEMS	CAUSES	ACTION (1)	ACTION (2)
<i>The motor does not start.</i>	Problems with power supply. Defective motor. Wrong size of motor.	Check power supply.	Replace electric motor.
<i>Current absorbed by the motor is greater than shown on the data plate.</i>	Wrong size of motor.	Check the application.	Replace the electric motor and, if necessary, the reduction unit.
<i>Temperature of the motor housing is very high.</i>	Defective motor. Wrong size of motor. Incorrect mounting of motor	Check the application.	Replace the electric motor and, if necessary, the reduction unit.
<i>Temperature of the reduction unit housing is very high.</i>	Wrong size of reduction unit. Mounting position does not comply with the order. Incorrect mounting of motor	Check the application.	Correct the working conditions: mounting position and/or lubricant level.
<i>Incorrect rotation speed of the main reducer unit shaft.</i>	Incorrect reduction ratio. Incorrect polarity of motor.	Check reduction ratio. Check polarity of motor.	Replace reduction unit and/or electric motor.
<i>Oil leak from oil seal.</i>	Defective oil seal. Oil seal damaged during shipment. Defective motor shaft.	Replace the oil seal. Repair motor shaft (if possible).	Replace the part or return the assembly to Motovario.
<i>Oil leak from joint.</i>	Flat gasket or O-ring damaged.	Replace damaged gasket or O-ring.	Return the assembly to Motovario.
<i>The main shaft rotates the wrong way.</i>	Incorrect connection of the electric motor.	Swap two phases of the motor supply.	
<i>Intermittent noise from the gears.</i>	Dents in the gear wheels.	No practical problem if the noise has no effect on the application.	Return the assembly to Motovario if there is significant noise when loaded.

Troubleshooting

Gearbox

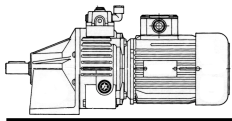
PROBLEMS	CAUSES	ACTION (1)	ACTION (2)
<i>No intermittent noise from the gears.</i>	Dirty inside the gearbox.	No practical problem if the noise has no effect on the application.	Return the assembly to Motovario if there is significant noise when loaded.
<i>Noise (whine) from the drive assembly.</i>	Bearings incorrectly adjusted. Gears with mesh errors. Insufficient lubricant.	Check correct quantity of lubricant.	Return the assembly to Motovario.
<i>Electric motor vibrates.</i>	Measurement of the assembly coupling.	Check geometric tolerance of flange on electric motor. Check tolerance and geometry of key on motor shaft.	Replace electric motor.



Troubleshooting

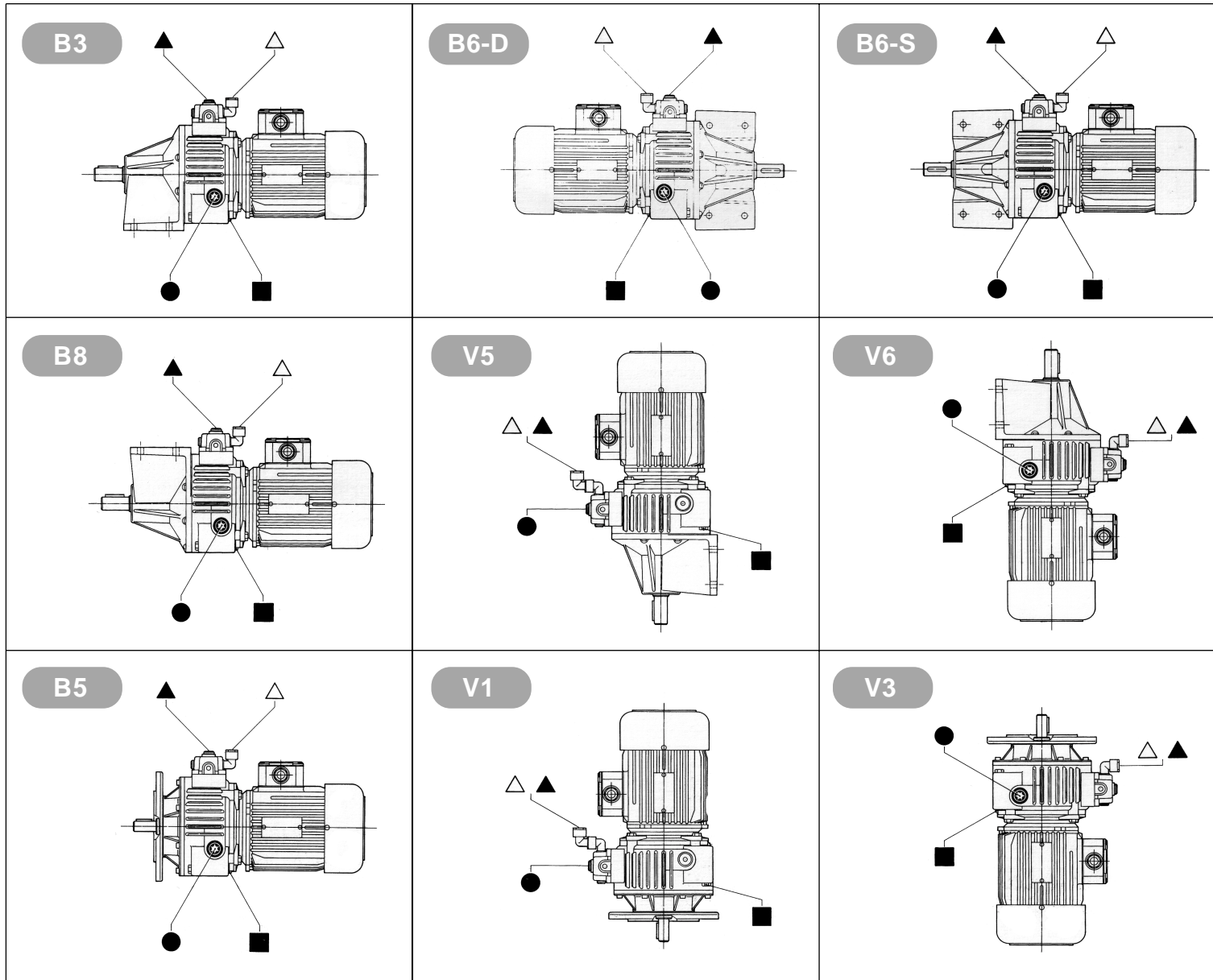
Variator

PROBLEMS	CAUSES	ACTION 1	ACTION 2
<i>The motor does not start.</i>	Problems with power supply. Defective motor. Wrong motor size.	Check power supply.	Replace electric motor.
<i>Current absorbed by the motor is higher than shown on the data plate.</i>	Wrong motor size.	Check the application.	Replace the electric motor and, if necessary, the variator.
<i>Very high temperature of the motor housing.</i>	Defective motor. Wrong motor size.	Check the application.	Replace the electric motor and, if necessary, the variator.
<i>Very high temperature of the variator housing.</i>	Wrong variator size. Mounting position does not comply with the order.	Check the application.	Correct the working conditions: mounting position and/or lubricant level.
<i>Oil leakages from oil seal.</i>	Defective oil seal. Oil seal damaged during shipment. Defective motor shaft seat.	Replace the oil seal. Repair motor shaft seat (if possible).	Replace the part or return the unit to Motovario.
<i>Oil leakages from joints.</i>	Flat gasket or O-ring damaged.	Replace damaged gasket or O-ring.	Return the unit to Motovario.
<i>The output shaft rotates in the wrong way.</i>	Incorrect connection of the electric motor.	Reverse two phases of the power supply of the motor.	-
<i>Intermittent noise from the gears.</i>	Dents in the internal components.	No practical problem if the noise has no effect on the application.	Return the unit to Motovario if there is significant noise in the application.
<i>No intermittent noise from the gears.</i>	Dirty inside the variator.	No practical problem if the noise has no effect on the application.	Return the unit to Motovario if there is significant noise in the application.
<i>Electric motor vibrates.</i>	Geometrical errors on the coupling.	Check geometric tolerances of electric motor flange. Check tolerances and geometry of key on motor shaft.	Replace the electric motor.

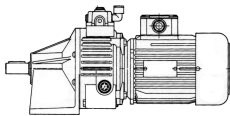


Mounting position

Normal motor-variator



- △ - Breather
- ▲ - Oil fill
- - Oil level
- - Oil drain



Lubrication

Variator

All moving parts of the variator are metal, and therefore require constant lubrication. This is achieved by oil splash or jet. Once the variator has been installed on the driven machine, proceed with these checks:

- 1 Once the mounting position has been established, arrange the filler plug, drain plug, breather and level plugs as shown in the mounting position tables.
- 2 Make sure that the oil is visible up to half way up the level indicator plug when the variator is not the case, top up with oil until this level is reached.

The oil must be changed after the first 100 hours of duty. Successive oil change intervals are every 1000 hours. Always check that the variator is filled to half way up the level plug after changing the oil. Variators are supplied with oil of the following type.

	Variator
	Recommended oils
IP	TRANSMISSION V.E.
IP	A.T.F. DEXRON FLUID
AGIP	A.T.F. DEXRON
BP	AUTRAN DX
CHEVRON	A.T.F. DEXRON
ESSO	A.T.F. DEXRON
FINA	A.T.F. DEXRON
MOBIL	A.T.F. 220
SHELL	A.T.F. DEXRON
CASTROL	TQ DEXRON II

Variator VSA-VSAT-VSF-VST

	03	05	10	20	30/50	100
B3-B5	0,15	0,21	0,36	0,6	1,2	2
B8						
B6-B7						
V5-V1	0,21	0,33	0,68	1,07	2,15	3,58
V6-V3	0,225	0,33	0,36	0,6	2,15	3,84

Quantity of oil in liters