



Sociedad Industrial de Transmisiones S.A.

Instrucciones de instalación y mantenimiento Reductores PARAMAX SFC
para Torres de Refrigeración

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Sumitomo Drive Technologies
Always on the Move

PARAMAX SFC

Industriegetriebe für Kühltürme
Industrial Gears for
Cooling Towers

Betriebsanleitung
Operation Manual

Nr. 991131
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PARAMAX SFC Operating Manual

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1. General Information

Please always follow the safety instructions indicated below in this document.



Danger due to Electricity

Incorrect use of the machine can lead to physical injury, serious injury and/or life-threatening situations.



Danger

Incorrect use of the machine can lead to physical injury, serious injury and/or life-threatening situations.



Dangerous Situation

Slight injuries may result.



Possible Damage Situation

Damage to the drive or the environment may result.



Helpful Information



Disposal

Please follow the applicable regulations.



Important Information about Explosion Protection



Information applying to PARAMAX SFC Gear Unit

Replacement Parts

Use only original replacement parts. All warranties are void if non-approved replacement parts are used.

2. Safety Information



Before working with the machine (assembly, operation, maintenance, inspection, etc.), read through these operating instructions carefully, so that you understand exactly how to operate the PARAMAX SFC gear unit, and know the safety regulations to be followed and warning information to be observed. Keep this manual near the machine, so that it can be referred to at any time when necessary.



Transport, installation, lubrication, operation, maintenance, and inspection should be carried out only by properly trained technical personnel; otherwise there is a risk of injuries, or damage to the machine. Never attempt to grasp moving parts, and keep foreign objects away from such parts; otherwise there is a risk of injuries, or damage to the machine. The system should be used only for its intended purpose; otherwise there is a risk of injuries, or damage to the machine.

Do not disassemble PARAMAX SFC gear unit for cooling towers during operation. Even at a standstill, with the exception of the oil inlet/outlet, no parts should be removed while the input and output shaft of the PARAMAX SFC gear unit are coupled to a motor or other work machine. Otherwise malfunction, uncontrolled operation, serious injury or damage to the machine may occur as a result of decoupling of the gears.

The PARAMAX SFC gear unit for cooling towers should not be used for any purposes other than those indicated on the rating plate or in the manufacturer's specifications. Otherwise there is a risk of electric shocks, injuries or damage to the machine.

2.1 Safety Instructions for Operation with Motor/Frequency Converter

If a drive motor is connected to the PARAMAX SFC gear unit, it should be put into operation only after checking that the data on the gear unit model plate match the data in the documentation supplied (drawings, parts lists, etc.).

- There should be no signs of damage on the gear.
- The lubricants provided must correspond to the ambient conditions, and must be prepared where necessary.



If a motor is connected to the PARAMAX SFC gear unit, it should be used with the frequency converter only if it conforms to the data on the model plate of the PARAMAX SFC gear unit. The PARAMAX SFC gear unit is designed for industrial installations and must be used only in accordance with the data in the technical documentation and on the model plate. It meets the current standards and regulations, and the requirements of directive 94/9EC.

3. Instructions for Transport and Inspection at Delivery



After Delivery, check whether:

1. The delivery goods correspond to those ordered (see also the descriptions on the model plate). If there is any doubt that the delivery does not match your order, contact our nearest agency, dealer or service centre.
2. Any parts have been damaged during transport. Any damage during transport must be reported to the shipping company immediately. If it has to be assumed that transport damage is going to prevent correct operation, then startup must be suspended.

3.1 Transport



Never stand under the unit when it is suspended from a crane or similar lifting device; there is a risk of serious or fatal injuries.

Unpack the unit so that it is taken out the right way up; otherwise there is a risk of injury.

Take care to prevent PARAMAX SFC gear unit from falling over.

When lifting, always use the eye-bolts or holes provided. Use only the appropriate and sufficiently dimensioned slings, which should be attached to the eye-bolts provided, or placed around the flange joints. Screw-in eye-bolts are designed to support only the weight of the drive unit. No additional loads should be attached.

In general: Do not use the centering holes in the shaft ends for lifting the PARAMAX SFC gear unit using eye-bolts etc. This can cause damage during storage.

Once the PARAMAX SFC gear unit has been installed in the system, never lift the whole machine using the suspension hooks or holes; this can cause injuries, damage to the equipment, or damage to the lifting device.



Before lifting, check the weight of the PARAMAX SFC gear unit by referring to the data on/in the packaging, the accompanying drawing, the catalogue, etc. Never lift a unit if its weight exceeds the maximum permitted load of the crane or lifting device; this can cause injuries, damage to the equipment, or damage to the lifting device.

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3.2 Paramax SFC Gear Unit Model Plate



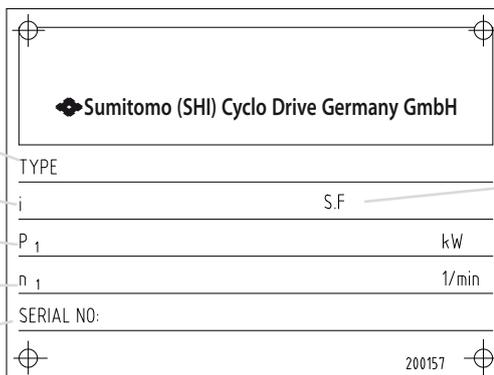
Transmission type
(see below for details)

Gear reduction

Input power

Input rpm

Serial number



Service factor

Fig. 1



Do not remove the Model Plate.

3.3 Nomenclature



Symbols are explained here. At the inspection following delivery, please check that the goods supplied correspond to those ordered.

Series	Size	Output torque (kNm)	Transmission stages	Lubrication	Shaft arrangement	Accessories	Nominal ratio
SFC	045	10.0	R2 Right angle	S: Splash lubrication (standard) P: Shaft driven pump	RR	F: with fan (standard) FB: with fan and counter holder N: No fan NB: No fan with counter holder	6.3
	055	18.0					7.1
	060	21.7	8				
	065	27.5	9				
	070	35.5	10				
	075	44.0	11.2				
	075	44.0	12.5				



4. Storage before StartUp



The PARAMAX SFC gearbox must be stored in a clean dry area, protected by a roof. The PARAMAX SFC gearbox should not be stored in the open, or in damp areas.

4.1 Long-Term Storage



The quality of the oil seal deteriorates when exposed to high temperatures and UV radiation. After long periods of storage, inspect the oil seal and replace it if there are any signs of damage or cracking.

After starting the PARAMAX SFC gear unit, check for unusual noises, vibrations or heating. If any anomalies are found, please contact our nearest agent, dealer or service centre immediately.

Following delivery, put the PARAMAX SFC gear unit into operation for 5 to minutes every 2 to 3 months, using the recommended lubricant. If this is not possible, or if the PARAMAX SFC gear unit is to be stored for more than 6 months, fill the gearbox with the appropriate quantity of vapor phase inhibitor (JIS NP20 or equivalent product), following the recommendations of the product manufacturer.

If the PARAMAX SFC gear unit is fitted with a reverse lock and is being left out of operation for a long period, the unit should be started for at least 5 minutes every 200 hours.

5. Installation of the Paramax SFC Transmission

5.1 Required Aids



- Wrench set
- Torque wrench for mounting bolts on foot/flange housing, motor lanterns, clamp couplings etc.
- Retractor
- Compensating elements
- Corrosion protection (e.g. MoS2 paste, Molykote, copper paste)



The corrosion protection applied to shaft ends, hollow shafts and centering seats during storage and transport must be removed before startup. The corrosion protection can be removed using an alkaline solvent. Never use mechanical methods for removal (e.g. abrasive materials etc.). The alkaline solvent should not be allowed to come into contact with the seals.



When handling lubricants, solvents and anti-corrosion agents, follow the human and environmental safety instructions given on the corresponding DIN 52 900 safety data sheets.

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5.2 Installation



The drive unit is to be set up so that inspection, maintenance, and other operations such as lubricant top-ups, can be carried out easily.

In order to prevent overheating and risk of fire, ventilation of the PARAMAX SFC gearbox should not be obstructed.

Tighten the mounting bolts to the specified torque only after carefully establishing perfect evenness over the entire surface of the mounting base, which should provide torsional stiffness and vibration damping, and after aligning the drive. After about 4 weeks, all mounting bolts should be checked again to ensure the correct tightening torque.

We recommend using mounting bolts of DIN quality 10.9.

If the drive is to be loaded up to maximum output torque or maximum transverse force, positive-fit connections (e.g. DIN 6325 cylinder pins) should be provided in addition to the foot mounting bolts.

Table 1 Mounting screw torques

Installation size		SFC045	SFC055	SFC060	SFC065	SFC070	SFC075
Screw size *		M24	M30	M30	M30	M36	M36
Torque	Nm	706	1400	1400	1400	2430	2430
	in lbs	6250	12390	12390	12390	21510	21510

* Screw class ISO 898-1/8.8



Mos2 paste is recommended for preventing electrochemical corrosion between the PARAMAX SFC gear and the work machine when different metals are connected together, for example cast iron and stainless steel.

The housing should also be grounded, using the grounding screws on the motor.



If the drive is to be painted over or partially re-finished, first ensure that the vent valve and shaft seals are carefully masked off. Remove the masking tape after the painting work is completed.



PARAMAX SFC gear units should not be used for any purposes other than those indicated on the model plate or in the manufacturer's documentation; otherwise there is a risk of electric shocks, injuries, or damage to the equipment.



Do not place any inflammable objects near the unit, otherwise there is a risk of fire.

Do not place near the PARAMAX SFC gear unit any objects that obstruct the ventilation. Insufficient ventilation can lead to overheating, and therefore a risk of burning or fire.



Do not step on or hold onto the PARAMAX SFC gear unit, as this may cause injuries.



Do not touch the shaft end of the PARAMAX SFC gearbox, or the inner gearing, or the edges of the motor fan with bare hands, otherwise there is a risk of injury.



If the unit is used in food processing applications where there is a risk of oil contamination, install an oil pan or similar device to collect any oil leaks if there is a stoppage or equipment failure. Food products may be contaminated by oil leakage.



Damaged systems should be switched off immediately and not put back into operation until they have been repaired.

If any modifications are made to the system, or non-original spare parts are used, then the warranty is void and no liability can be accepted.

5.3 Installation Angle



The installation angle should be within the limits indicated below.

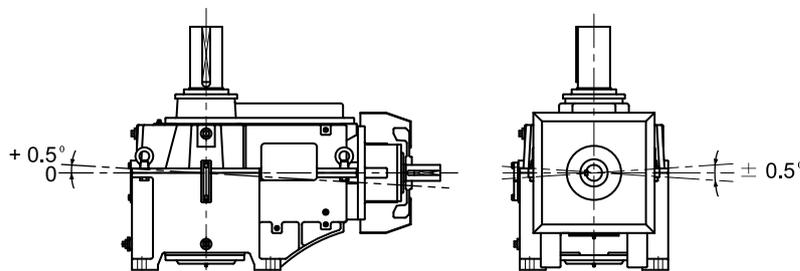


Fig.2
Limit values for installation angle



Standard units in the PARAMAX SFC gears and gear motors should not be used in areas where there is a risk of explosion (ATEX).

In conditions like this, the special explosion-proof PARAMAX SFC gear unit should be used. Otherwise there is a risk of electric shocks, injuries, explosions or damage to equipment (see Section 14.).

Since the converter itself is not explosion-proof, converter-driven motors (even though they themselves may be explosion-proof) should be set up only in an environment that is free of explosive gas mixtures or dust concentrations: otherwise there is a risk of electric shocks, injuries, explosions or damage to equipment, and even physical injuries.

5.4. Range of Application



Ambient Temperature: 0°C to +40°C

Approval should be obtained from the factory if operating in ambient temperatures below 0 °C or above +40 °C.

If an oil heater is used (ambient temperature -15 °C), it must have a voltage present continuously. An integrated thermostat starts the oil heater when necessary.



Ambient Air Humidity: max. 100 %

Height: max. 1000 m above sea level

Ambient Air: should be free of corrosive or explosive gases, and vapor. (Applications in ATEX are possible if agreement is obtained from the factory. (See Section 14.)

Assembly: Interior or exterior location

6. Connection to other Machines

Cover rotating parts with suitable protective devices; otherwise there is a risk of injury.



Check the direction of rotation before connecting the PARAMAX SFC gear unit to a drive motor. An unexpected direction of rotation can cause injuries or damage to the system, especially if a reverse lock is installed.



Check the direction of rotation of the connected motor. If the directions of rotation are different, there is a risk of injuries, or damage to the machine.

If the PARAMAX SFC gear unit is coupled to a load, check to ensure that any deviations in alignment are within the limits indicated on the drawings and in the catalogue. Otherwise the misalignment may cause damage to the system.

Tighten the bolts correctly to the specified torque, otherwise cooling tower systems may be damaged or personnel injured by flying parts.

If the output shaft of the PARAMAX SFC gear unit is to be left to turn freely (i.e. without load), first remove the feather key; otherwise there is a risk of injury.

6.1 Attaching a Coupling Element



When attaching a coupling element, check that there are no impact forces or excessive pressure forces acting on the shaft; otherwise the bearing may be damaged.

The coupling is produced by means of a shrink-fit, or a thread connection fitted to the shaft end (Fig. 8).

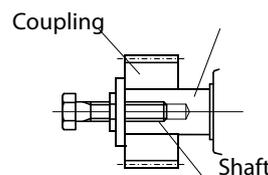


Fig.3

Thread

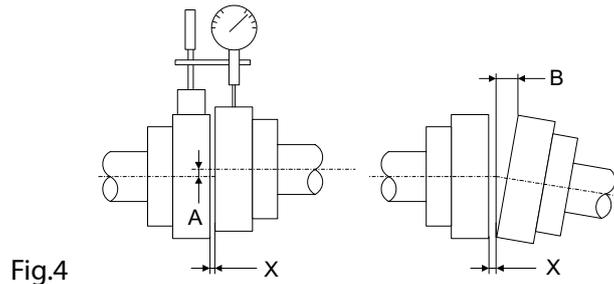
6.2 Using the Gear Unit Element

The dimensions (A, B, and X) shown in Fig. 4 should be within the tolerance indicated in Table 2.



Table 2

Tolerance for dimension A	See manufacturer's data for the coupling
Tolerance for dimension B	
Dimension X	See manufacturer's specifications for the coupling elements



7. Lubrication



Please follow the lubrication instructions. Insufficient maintenance shortens the life of the gear unit.

PARAMAX SFC gear units are supplied without oil and must be filled with oil as specified before startup.

7.1 Standard

For standard input speeds of 450 - 1800 rpm, oil bath or oil spray lubrication is used.

In certain conditions, grease lubrication or oil circuit lubrication may be required.

Please follow the lubrication instructions. Insufficient maintenance shortens the life of the gear unit.

7.2 Oil Circuit Lubrication/Optional



In systems where a separate pump assembly is provided to supply the lubricant, the pump motor must be switched on before the PARAMAX SFC gear motor. This ensures that the bearings are correctly lubricated before the transmission is started. Otherwise there may be damage to the unit.

An oil flow switch and/or inspection glass should be installed, in order to check that lubricant is circulating correctly. In case of emergencies, switch off the motor.

7.3 Grease lubrication of Bearings/Optional



In certain operating conditions, grease lubrication may be required. In this case, the location and number of lubricating nipples should be confirmed in advance. Bearings are fully greased at the time of delivery.

Depending on the rotational speed of the input shaft, grease should be topped up:
every 1500 operating hours for speeds below 750 rpm
every 1000 operating hours for speeds up to 1800 rpm.

8. Starting up the Drive and Operation



During operation, keep at a safe distance from rotating parts (output shaft, etc.) and/or avoid touching them. Loose clothing can get caught up, causing serious or even fatal injuries.

If the power supply is interrupted, set the main switch to OFF. If power is restored unexpectedly, this can cause electric shocks, injuries, or damage to the equipment.

Do not place fingers or any other foreign objects at the opening to the gear motor of the PARAMAX SFC gear unit. This can cause electric shocks, injuries, risk of fire or damage to the equipment.

Never loosen the oil filler screw during operation, as hot oil spray may cause burn injuries.

If any anomalies occur during operation, switch off the unit immediately. Otherwise there is a risk of fire, burn injuries, or damage to the PARAMAX SFC gear unit.



PARAMAX SFC Gear Unit are Supplied without Oil. All Units must be Filled with the Required Quantity of oil Before the Initial StartUp.

If any abnormalities are found, stop the unit immediately and contact our nearest agent, dealer or sales centre.

Oil Filling/Checking the Oil Level



Add oil through the filler neck at the top of the main unit, checking the oil level with an oil gauge (see Fig. 5).

Filter the oil before filling.

During oil-filling, take care to ensure that no loose nuts, bolts, washers, dust, water or other foreign objects are allowed to enter the unit.

If the oil level is below the specified range, then there is insufficient lubrication. If the oil level is above the range, then loss of oil quality is accelerated due to the rise in oil temperature.

Oil Change and Used Oil



Remove the oil drain plug at the bottom of the main unit to drain off the oil while it is still warm (i.e. shortly after the unit is put out of operation, but not immediately after.) Please dispose used oil according to rules of environmental protection.

Please pay also attention to chapters 10.1 and 14.

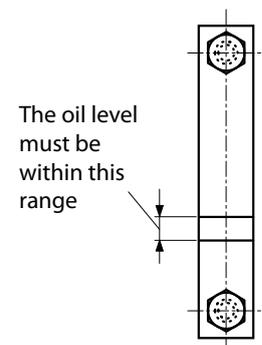


Fig.5



If dual speed electric motors are used for changing from high to low speeds, the fan speed must be adjusted so that the recovery brake torque does not affect the reduction gear.

The PARAMAX SFC gear unit becomes very hot during operation, and there is a risk of burn injuries - do not touch the surface.

The specified power criteria should not be exceeded.



Because of the risk of burns due to hot oil spray or physical injuries due to rotating components, do not remove any of the covers or open the PARAMAX SFC gearbox while the gear unit is running.

To avoid exposure to oil spray, do not loosen the oil filler screw during operation.

If the direction of rotation is to be reversed, first bring the unit to a complete standstill, then restart. Reversing the rotation direction while the unit is running can cause damage to the machine.

After installation is complete, and before startup, check whether:

- oil level is correct
- the transmission has been correctly connected to the other machines
- the anchor bolts are correctly tightened
- direction of rotation is as indicated in the specification
- all electrical monitoring devices (optional) are correctly connected

Then put the PARAMAX SFC gear unit into operation without load. As soon as the PARAMAX SFC gear unit is running, slowly apply load up to the specified value. Through a trial run, check at full load.



Possible fault	Possible cause
Abnormal noises or vibrations	Deformation of housing due to unevenness in the substructure
	Resonance due to insufficient rigidity of the substructure
	Shaft axis incorrectly aligned with the motor.
	Vibrations transmitted from the connected machine to the PARAMAX SFC gear unit
Unusual rise in temperature	Motor current has exceeded the rated current value indicated on the model plate
	Rise and fall in motor voltage is too sharp
	Ambient temperature too high
	Oil level not as indicated in the specification (too low or too high).

If faults are found, stop the machine and contact the nearest service centre.

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9. Lubricant



Please follow the lubrication instructions. Insufficient maintenance shortens the life of the gear unit

Use of mineral oil or synthetic oil as indicated in Table 3.
Tables 4 and 5 show the recommended lubricants.

Tab. 3

Ambient temperature	<-15 ~ 40°C	-15 ~ 40°C	0 ~ 40°C	>40°C
Oil heating	with	without	without	without
Lubricant	Mineral oil	Synthetic oil	Mineral oil	Synthetic oil
ISO* / AGMA	VG 320 / 6EP	VG 320 / 6S	VG 320 / 6EP	VG 320 / 6S

* ISO kinetic viscosity (mm²/s) at 40°C

Recommended Lubricant

Tab. 4 - Mineral oil

Brand	ARAL	BP	CASTROL	CHEVRON	EXXOMOBIL		GULF	OPTIMOL	SHELL	TEXACO	TOTAL FINA ELF	TRIBOL
ISO VG320 AGMA 6EP	DEGOL BG320	ENERGOL GR-XP-320	ALHPA SP320	GEAR COMPOUNDS EP320	SPARTAN EP320	MOBIL- GEAR 632	EP LUBRI- CANT HD320	OPTIGEAR BM 320	OMALA 320	MEROPA WM 320	CARTER EP320	TRIBOL 110/320

Tab. 5 - Synthetic oil

Brand	EXXOMOBIL	
ISO VG320 AGMA 6S	MOBIL GEAR SHC XMP 320	MOBIL- GEAR SHC 320

The oil quantities indicated in Table 6 are the values estimated for standard specifications.
The data in this table are different from the data in the catalogue.
Please check the oil level using a dipstick or oil level gauge.

Tab. 6 Oil quantities

Size	SFC045	SFC055	SFC060	SFC065	SFC070	SFC075
Oil quantity in liters	24	34	55	75	90	110

9.1 Lubricant - Initial Filling, Top-Ups and Changes



Oil changes as indicated in Table 7, depending on which time occurs first.

Table 7 Initial oil filling, replacement with mineral oil

	Oil change intervals	Operating conditions
Initial filling	Before startup	-----
1. Oil change	Up to 500 hours or 6 months*	-----
2. Oil change	Every 4000 hours or 6 months*	-----
	Every 8000 hours or once per year*	If operated at oil temperature of < 80°C
Subsequent oil changes:	Every 2500 hours or 6 months*	If operated at oil temperatures > 80°C

* according to which occurs first.

Deterioration of the oil quality accelerates if there is rapid variation of the ambient temperature, or the ambient atmosphere contains corrosive gases. In these cases, please contact the lubricant manufacturer for more information.

If the system is equipped with a motor pump, the motor for the pump must be started before starting the gear motor or PARAMAX SFC drive unit. After lubricating oil is circulated through the bearings, start the gear motor or PARAMAX SFC drive unit; otherwise there may be damage to the system.

Use a flow switch or inspection glass to check the oil flow. If any irregularities are occurring, stop the gear motor or PARAMAX SFC gear unit motor immediately.

10. Inspection Intervals

10.1. Inspection and Maintenance Instructions



Do not touch the unit when live. Always switch off the power supply first; otherwise there is a danger of electric shock and injuries due to rotating parts.

During maintenance or inspection, keep away from rotating parts (output shaft, etc.), and do not touch them. Loose clothing can get caught up, causing serious or even fatal injuries.

Never place fingers or any other foreign objects at the opening to the SFC transmission. This can cause electric shocks, injuries, risk of fire or damage to the equipment.



The gear motor and/or SFC transmission become extremely hot during operation. Touching the unit with bare hands may result in serious burn injuries.



Never operate the unit with the protective cover removed; loose clothing can get caught up, causing serious or even fatal injuries.

Any anomalies observed during operation must be immediately identified and corrected according to the instructions in this operating manual. Do not restart operation until the anomaly has been corrected.



The lubricants are to be replaced as indicated in the operating instructions. Always use the lubricant recommended by the manufacturer.



Lubricants must never be replaced during operation or shortly afterwards; otherwise there is a risk of burn injuries. Before being changed, the lubricant must be allowed to settle.

Never use the PARAMAX SFC gear unit if damaged; otherwise there is a risk of injuries, fire, or damage to the equipment.

We cannot accept any liability for damage or injuries that result from unauthorized modification of the equipment by the customer.



Used lubricants from the PARAMAX SFC gear unit are to be disposed of as industrial waste. Please follow the applicable local regulations.

10.2 Daily Inspections

To ensure correct and optimal operation at all times, carry out daily inspections as indicated in Table 8.



Table 8

Noise	Are there any unusual noises during operation, or does the sound suddenly change?
Vibration	Are there unusually strong vibrations, or do the vibrations suddenly change?
Surface temperature	Is the surface temperature abnormally high, or is there a sudden rise in temperature? The increase in temperature varies according to the transmission type. Surface temperature should be around 80°C (176°F) maximum.
Oil level	Is the oil level falling? Check the oil level when the transmission is switched off, using the dipstick or oil level gauge.
Oil loss	Is any oil leaking from the oil seal or other sections?
Anchor bolts	Check that the bolts are firmly seated.

If any anomalies are found during daily inspection, these must be corrected as described at Point 13 "Fault repair". If it is not possible to correct the anomaly, please contact our nearest agent, dealer, or sales office.

10.3 Yearly Inspections



Yearly inspection	
Gears	Examine the gears to check for damage
Inner case of gearbox	Check if contaminated with sludge or abrasives and clean if indicated by oil flush

To Inspect the Gears:

- Drain the oil
- Loosen the mounting bolts on the inspection cover
- Check the gear teeth visually for pitting and wear
- When placing the inspection cover, check that the sealing surfaces are clean
- Replace damaged seals
- Tighten the bolts (8.8) to the correct torque
- Oil filling
- Check for leaks after startup

If damage to the gears is found, and operation can therefore not be ensured until the next maintenance interval, please obtain the corresponding original spare parts. **Gears to be replaced in sets.** We recommend also replacing the corresponding roller bearings and seals at the same time.

11 Special Instructions for ATEX approved PARAMAX SFC Transmissions and Gear Motors

11.1. Safety Instructions applying to ATEX Areas



Explosive gas mixtures or dust concentrations, when combined with the hot, live and moving parts in the PARAMAX SFC gear unit, may lead to serious damage to equipment and physical or even fatal injuries.

Standard units in the PARAMAX SFC gears and gear motors should not be used in areas where there is a risk of explosion.

In conditions like this, the special explosion-proof PARAMAX SFC gear units should be used.

PARAMAX SFC gear units that are ATEX-certified always carry the ATEX mark. The ATEX mark is located on the model plate (see Section 11.2).

The assembly, connection, startup, maintenance and repair work on the PARAMAX SFC gear unit, and additional electrical fittings should be carried out only by qualified technical personnel, taking account of:

- These instructions.
- The warning and information signs on the PARAMAX SFC transmission.
- All other design documents and circuit diagrams related to the drive.
- The system-specific regulations and requirements.
- National/regional standards and regulations (regarding explosion protection, safety, accident prevention).
- Dust deposits should be no thicker than 1 mm and should be removed where necessary.
- The customer's installed configuration should not obstruct the heat flow from the PARAMAX SFC gear unit due to convection and heat conduction.
- Operation with excessive loads is not permitted.
- External heat inputs into the PARAMAX SFC gear unit are not permitted.
- Oil temperature should not exceed.
- The drive rotational speed should not go above 1800 rpm.
- All electrical and mechanical components attached to the PARAMAX SFC gear unit must be accompanied by an ATEX certificate.

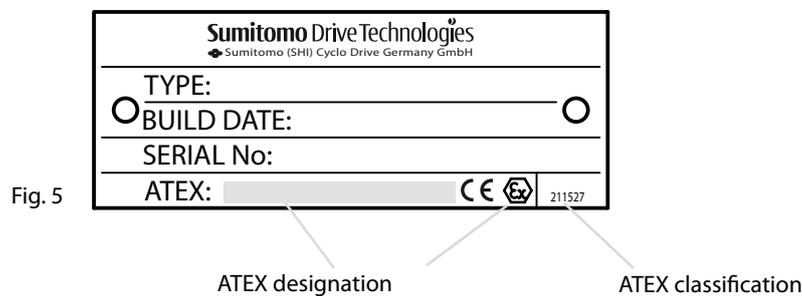
Since the converter itself is not explosion-proof, converter-driven motors (even though they themselves may be explosion-proof) should be set up only in an environment that is free of explosive gas mixtures or dust concentrations. Otherwise there is a risk of electric shocks, injuries, explosions or damage to equipment.

11.2 Checklist for ATEX approved PARAMAX SFC Gearboxes and Gear Motors before StartUp



- Does the data on the model plate on the gearbox or gear motor correspond to the required ATEX operating conditions at the site?
- Does the model plate show the correct data?
- Is the drive undamaged (check for any shipping damage/damage during storage)?
- Is there an unobstructed flow of cooling air? Is any hot exhaust air being drawn in from any other assemblies? The cooling air temperature should not exceed 40°C.
- Are all input/output drive elements ATEX-approved, and identified with the correct designation?

PARAMAX Model Plate with ATEX Designation (In Addition to Model Plate)



Where possible, the gearbox is to be started when not under load. If it is running smoothly with no abnormal noises, the PARAMAX SFC unit can be loaded with the work machine.



After about 3 hours, measure the surface temperature. Check the maximum permissible difference relative to ambient temperature. If the difference is greater than the value indicated for the model concerned, stop the drive immediately and contact Sumitomo Drive Technologies.



Damaged systems must be switched off immediately and should not be put back in operation until they have been repaired.

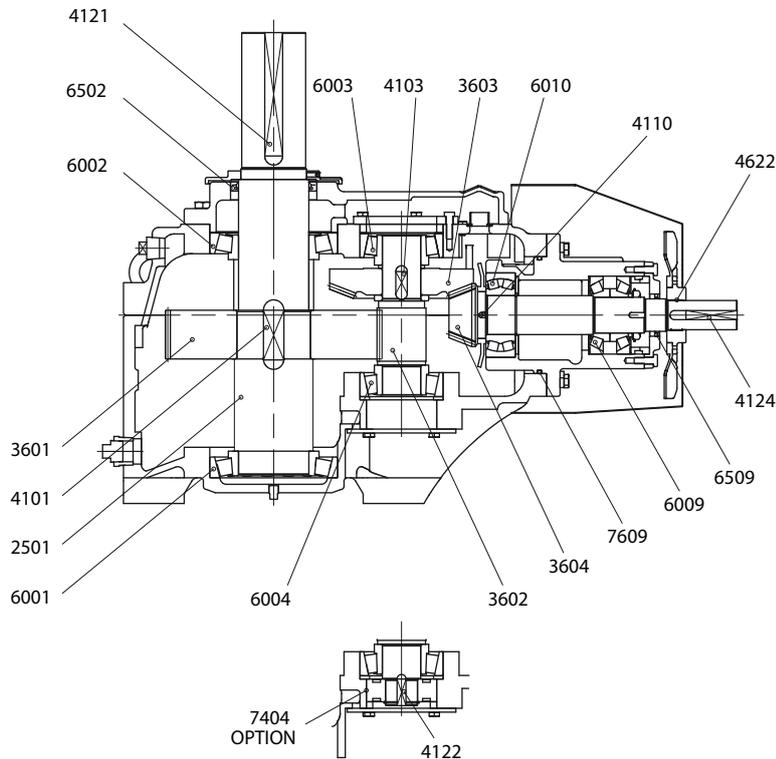


If any modifications are made to the system or non-original parts are used, the warranty is invalid and no liability can be accepted.

Do not remove the model plate.

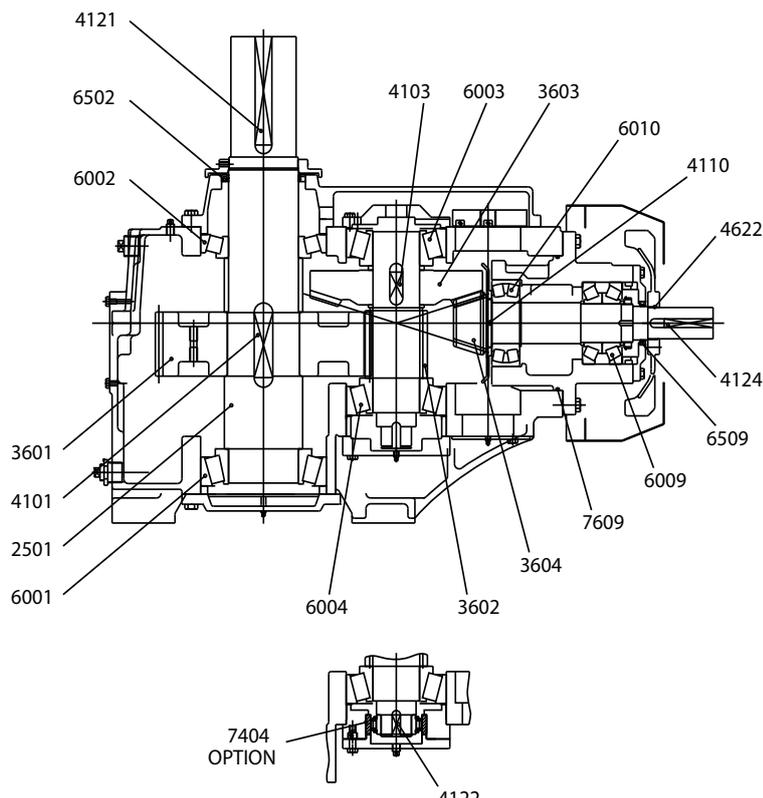
12. Sectional Drawings

Fig.6 SFC045 . SFC055



Item No.	Part Name
2501	Slow speed shaft
3601	Helical gear
3602	Helical pinion shaft
3603	Bevel gear
3604	Bevel pinion shaft
4101	Key
4103	Key
4110	Key
4121	Key
4122	Key (Option)
4124	Key
4622	Tolerance ring
6001	Tapered roller bearing
6002	Tapered roller bearing
6003	Tapered roller bearing
6004	Tapered roller bearing
6009	Tapered roller bearing
6010	Spherical roller bearing
6502	Oil seal
6509	Oil seal
7404	Backstop (Option)
7609	O-ring

Fig.7 SFC060 . SFC065 . SFC070 . SFC075



Item No.	Part Name
2501	Slow speed shaft
3601	Helical gear
3602	Helical pinion shaft
3603	Bevel gear
3604	Bevel pinion shaft
4101	Key
4103	Key
4110	Key
4121	Key
4122	Key (Option)
4124	Key
4622	Tolerance ring
6001	Tapered roller bearing
6002	Tapered roller bearing
6003	Tapered roller bearing
6004	Tapered roller bearing
6009	Tapered roller bearing
6010	Spherical roller bearing
6502	Oil seal
6509	Oil seal
7404	Backstop (Option)
7609	O-ring

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13. Troubleshooting



Any anomalies found during operation must be immediately identified and corrected according to the instructions in this maintenance manual. The unit must be re-started only after repairs are completed.

Fault		Cause	Troubleshooting
The input shaft is turning, but the output shaft is not.		Damage due to overloading on gears or shafts	Have repaired at an authorized workshop
The output shaft turns only when there is no load.	It seizes as soon as a load is applied	Feather key is aligned incorrectly	Align the feather key
		Bearing charred	Have repaired at an authorized workshop
		Safety device incorrectly adjusted	Adjust safety device
	Counter rotation is possible.	Motor incorrectly connected	Correct the motor connection
Temperature rises too sharply		Overload	Reduce load to the value indicated in specifications
		Bearing charred	Have repaired at an authorized workshop
		Ambient temperature too high	Improve the ventilation
		Damage to gears, bearings, etc. due to overloading	Have repaired at an authorized workshop
Oil leakage	In input/output shaft section	Damaged oil seal	Replace oil seal
		Scratches or abrasion in oil scraper contact area	Have repaired at an authorized workshop
	At joint surface of housing	Loose clamping screw	Tighten clamping screws to the correct torque
Abnormal noise. Vibrations are too strong.		Damaged gears, shafts, or bearings	Have repaired at an authorized workshop
		Deformation of housing due to installation on uneven surface	Even out the installation surface, or use shim plates to correct the unevenness
		Resonance due to insufficient rigidity in the installation base	Reinforce the installation base to improve the rigidity
		Incorrect alignment with the connected machine	Align the shaft axis
		Vibrations transmitted from the connected machine to the PARAMAX SFC unit	Run the PARAMAX SFC unit separately, to identify the source of the abnormal noise

14. Location of Oil Filler Neck and Drain Plug

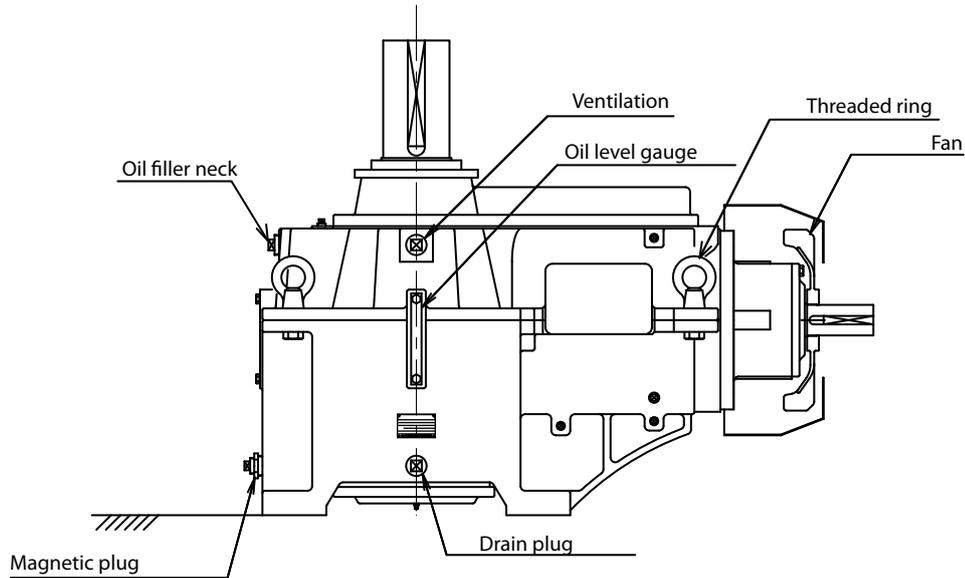


Fig.6 Location of oil filler neck and drain plug

15. EC Machinery Directive

Gear Units

Gear units are considered a "machine component" and do not therefore come under EC machinery directive 2006/42/EC.



By the terms of the EC directive, startup is forbidden until it has been established that the machine in which the gear unit is installed conforms to the conditions of this directive.

For gear units starting from 2010, manufacturer's declarations or installation statements are no longer displayed.

Gear Motors

A declaration of conformity is displayed for gear motors in accordance with the low voltage directive.

		Machinery directive 2006/42/EC	Low voltage directive 73/23/EC	EMC 89/336/EC	ATEX 94/9/EC
Transmission	CE mark	no	no	no	yes
	Declaration of conformity	no	no	no	yes
	Installation statement	no	no	no	no
Gear motor	CE mark	no	yes (on motor)	no	yes (gear unit)
	Declaration of conformity	no	yes (on motor)	no	yes (gear unit)
	Installation statement	no	no	no	no
Frequency-converter	CE mark	no	yes (converter)	yes	no
	Declaration of conformity	no	yes (converter)	yes	no
	Installation statement	no	no	no	no