

dertec[®]
Designed to Perform

Stainless steel
Motors & Gearboxes
Instruction Manual.

ENG



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01. General

The DERTEC stainless steel electric motors and drives manual covers the following product lines:

DERTEC Standard Line FP2SS/FP3SS	Stainless steel hygienic line asynchronous AC motors
DERTEC Standard Line FP2EJSS	Stainless steel hygienic line asynchronous AC motors with integrated brake
DERTEC Signature Line SL3SS	Stainless steel hygienic line asynchronous AC motors
DERTEC Signature Line SL3ENSS	Stainless steel hygienic line asynchronous AC motors with integrated encoder
DERTEC Signature Line SL3EJSS	Stainless steel hygienic line asynchronous AC motors with integrated brake
DERTEC DOL Signature Line SLP4SS	Stainless steel hygienic line synchronous AC motors
DERTEC DOL Signature Line SLP4ENSS	Stainless steel hygienic line asynchronous AC motors with integrated encoder
DERTEC DOL Signature Line SLP4EJSS	Stainless steel hygienic line asynchronous AC motors with integrated brake

DERTEC **FV** Serie Stainless steel hygienic Helical worm gearboxes
 DERTEC **FK** Serie Stainless steel hygienic Hypoid gearboxes
 DERTEC **FH** Serie Stainless steel hygienic Hypoid gearboxes
 DERTEC **FRC** Serie Stainless steel hygienic 2-stage coaxial gearboxes
 DERTEC **FKA** Serie Stainless steel hygienic Hypoid gearboxes
 DERTEC **FFA** Serie Stainless steel hygienic Parallel shaft gearboxes
 DERTEC **FRA** Serie Stainless steel hygienic 3-stage coaxial gearboxes
 DERTEC **FSA** Serie Stainless steel hygienic Helical worm gearboxes
 DERTEC **SAG** Serie Stainless steel hygienic Bevel gearboxes

DERTEC stainless steel electric motors, gearboxes and combinations thereof are intended for use in industrial installations and are compliant with the applicable standards and the requirements of Low Voltage Directive 2006/95/EC. The technical data and permissible values are stated on the nameplate. All stated specifications must be observed during installation.



Only qualified personnel may install the drive.
The use of electrical equipment, if improperly installed, can cause bodily injury and property damage and, in the worst case, lead to death.
The installations must be installed in accordance with the locally applicable standards.

02. Liability and warranty

DERTEC is not liable for damage or faulty operation that is the result of incorrect installation, failure to comply with these instructions or incorrectly performed repairs. We recommend that you use only original parts and accessories.

We expressly inform you that non-OEM replacement parts and accessories must be approved by the manufacturer before use.

The installation and application of non-OEM parts can have a negative impact on the characteristics of the drives and electric motors and affect the safety of persons, the drives, the electric motors and/or other operating parameters.

The manufacturer disclaims all liability for consequential damages resulting from any changes or modifications made to the drives/motors by third parties. Independent devices, such as encoders or brakes, which are attached to or placed in the drives have their own instructions for use that must be followed during installation and commissioning.

03. Delivery and storage

Packaging

The drives or motors are shipped in sturdy packaging. Depending on the weight, a suitable box (possibly foam-filled) is chosen, which may be placed on a pallet. The packaging is labelled with the necessary stickers, such as 'this end up', 'fragile' and, if applicable, 'do not stack'.

Delivery

On receipt of goods, check that the packaging is undamaged. Also check the drive for shipping damage. If there is shipping damage, the person directly responsible within your company must be notified and the drive may not be used until further notice.

Transport

If you do not install the DERTEC stainless steel drives/motors but rather transport them further, it is recommended to reuse the original packaging. After acceptance of the goods at your location, DERTEC cannot be held liable for any damage resulting from inadequate packaging.

Storage

The product may be stored for up to 12 months after delivery under the following conditions:

- To minimise degradation of the insulation resistance the environment must be dry and dust-free.
- The ambient temperature must be between -20 °C and +40 °C, with a relative humidity of less than 70% and a maximum daily temperature fluctuation of ±10°C.
- To prevent damage during storage, effective vibration (Veff) must not exceed 0.2 mm/s.

04. Installation

The DERTEC stainless steel electric motor must be earthed in accordance with local regulations. The key mounted in the secondary shaft must be secured before the electric motor is mounted, connected and started. The motor voltage and frequency must correspond to the local line voltage and be adequate for the machine load (see figure 4a).

The DERTEC stainless steel electric motor and/or gearbox is labelled with a laser-applied type designation (see figures 4a and 4b). The nameplate is attached to the housing such that it cannot be removed. This is done, in part, for hygienic reasons, as it eliminates the possibility of contaminant accumulation and bacteria growth behind the nameplate.

Figure 4a Name plate stainless steel motor

FP2SS 8024 B14A TENV		3- Stainless Steel Hygienic Washdown Motor		www.derotec.nl		
IP66	IE3	Ins. Cl. F 155C ¹	PTC 135 ²	TP-NC 135 ³	21,0 Kg	S1 100%
Voltage	Frequency	Power	Speed	COS φ	Eff. @ 100%	Current
Δ230V	50 Hz	0,75 kW	1440 min-1	0,70	84,1%	3,20 A
Y400V	50 Hz	0,75 kW	1440 min-1	0,70	84,1%	1,84 A
Δ276V	60 Hz	0,75 kW	1730 min-1	0,68	83,8%	2,87 A
Y480V	60 Hz	0,75 kW	1730 min-1	0,68	83,8%	1,65 A
IEC / EN60034	UL E506337	S. Nr.:	Prod.Date:			

Figure 4b Name plate stainless steel gearbox

Type:	FK 28B.10:1.IEC71	Ratio:	10:1
N1:	1440 Min ⁻¹	N2:	144 Min ⁻¹
M2n:	15 Nm	F.S.:	2.0
Shaft:	20mm	Mounting Pos.:	B3/KK1
Lubrication Type	Matrix Foodmax 460	Quantity:	210 ML
Prod. Date:		S/No.:	

Before installation



Live or rotating parts of electrical machines can cause serious injury or death.

- Bring your installation to a complete standstill
- Completely de-energise the installation.
- Take measures to protect against unintended reconnection.
- Verify the absence of voltage.
- Adjacent current-carrying parts must be shielded.
- Follow the instructions in the installation manual.
- The electrical installation must be carried out in accordance with the locally applicable regulations (e.g. correct cable diameters, cable glands, fuses, earthing cable, connection).



The drive may not be opened without the manufacturer's permission. Doing so will void the warranty. This does not apply to the opening the junction box.

- Transport, installation, commissioning and maintenance must be performed by qualified personnel.
- The personnel must be instructed to act carefully and in accordance with the instructions during transport, lifting, positioning, re-commissioning and repair of the motor.
- If a high-voltage test is desired, the procedures and precautions provided in EN 60034-1 must be followed.
Special drives may have a higher surface temperature due to certain aspects of their construction, such as enclosure design, installation arrangement and cooling. In such cases, special additional provisions around the drive may be required, such as:
 - Protection against accidental contact with the surface of the motor
 - Special cable connections for higher ambient temperatures

Mechanical inspection before installation

Although all drives are inspected before leaving production, a lot can happen during transport.

We therefore recommend inspecting every drive before commissioning. In the case of an electric motor, the motor shaft must be easy to turn by hand and no parts should rub. In the case of a drive assembly (electric motor with attached gearbox), we recommend a visual inspection of parts such as shaft seals and filler plugs as well as an overall visual inspection for damage.

Environment

DERTEC stainless steel drives are suitable for use in extreme (washdown) environments such as those found in the food and pharmaceutical industries. DERTEC stainless steel drives are not intended and are not intrinsically suitable for underwater use. Installation in the open air, in direct intense sunlight will need to be carefully considered to avoid overheating.

Installation arrangement

The drives are exclusively intended for use in industrial installations, where they may be exposed to dirt, moisture and normal conditions based on their protection class (see nameplate, figure 4a, page 4).

The drives can be used in locations with an ambient temperature of -20 °C to a maximum of +40 °C and up to 1000 metres above sea level.



If a fan cap is present (TEFC series), the intake and exhaust openings may not be obstructed and the airflow may not be restricted. Reduced cooling can drastically reduce the service life of the windings. In addition, regular inspection and cleaning of the intake and exhaust openings of the fan cap is recommended. To allow optimum cooling, a minimum distance of 25% of the diameter of the air intake opening in the fan cap must be maintained between the air intake opening in the fan cap and the machine frame.

05. Installation of drive assemblies

Drive assemblies can be attached to the installation by means of a foot mounting or mounting flange. Foot-mounted drives must be mounted on a solid foundation to prevent undesirable vibration. Flange-mounted drives must be correctly aligned. It is recommended to check the mounting bolts periodically.

The gearbox is factoryfilled with the right amount of food-grade lubricant suitable for the design and frame designation stated on the nameplate. If it is necessary to top up, the correct lubricant (as stated on the nameplate) must be used.

All gearboxes must be fitted with the supplied spring-loaded pressure-relief valve.

This valve opens as soon as the pressure in the gearbox rises (>0.5 bar) and closes immediately after the overpressure has been eliminated. This prevents oil leaks and seals from being forced out. It is very important that the pressure-relief valve is installed in the correct location. If the pressure-relief valve is not installed in accordance with the instructions, we are not liable for any resulting damage. For the installation location of the pressure-relief valve on the gearbox, see pages 19 to 25.

All the electric motors are equipped with deep groove ball bearings and can be mounted either horizontally or vertically.

Due to their unique design, DERTEC stainless steel electric motors may develop a higher motor temperature than standard aluminium or cast iron motors. The DERTEC stainless steel motors are indeed of high quality and have a relatively low surface temperature, partly due to their high efficiency.

However, in order to counteract the effects of suction (condensation formation), each motor is fitted with a stainless steel valve specially developed by DERTEC. This valve is mounted on the B-bearing shield and ensures that the pressure inside the motor is equal to the pressure outside the motor housing. This minimises the likelihood of condensate formation. The valve is fitted as standard and may not be removed without consultation with DERTEC. It is recommended that this valve be replaced during maintenance, every 10,000 hours is the guideline, but the actual interval depends on the local conditions.

Mounting

If the DERTEC stainless steel electric motor is not delivered as an assembly but rather is used as a stand-alone motor, the motor must be aligned in accordance with the instructions from the coupling or belt manufacturer. To prevent stress in the base plate, the mounting feet must be affixed to a perfectly flat surface.

Balancing

All the stainless steel electric motors are balanced with a half key. We recommend that you balance any belt pulleys or couplings you install in the same way. Failure to properly balance parts mounted on the shaft can cause unacceptable vibration and bearing damage.

- During installation, use the correct diameter mounting bolts, which must be carefully tightened and secured to prevent loosening during operation as a result of vibration and to avoid damage to the drive.
- If the drive/electric motor is installed vertically, measures must be taken to prevent small particles from falling through the fan cap, either by the way the installation is constructed or by installation of a canopy. This must not impede the flow of cooling air through the motor.



Pulleys or couplings may only be secured in place by means of the tapped hole in the face side of the shaft. If hammer blows are used to install pulleys or couplings on the shaft, the bearings may be irreparably damaged. Mount only carefully, dynamically balanced pulleys or couplings on the shaft end. Machines that are connected to the motor by a coupling must be aligned in accordance with the instructions provided by the coupling manufacturer.



Gearbox debreather



Electric motor debreather



06. Power supply and connections

The electric motor must be earthed in accordance with local regulations. The key mounted in the secondary shaft must be secured before the electric motor is started. The motor voltage and frequency must correspond to the local line voltage and be adequate for the machine load.

Disconnect all connections, de-energize the installation and bring it to a standstill.



The electrical connections to the electric motor must be made by a qualified electrician working in accordance with the applicable safety instructions. This must be done in accordance with the current national guidelines and the installation and operating instructions. The electric motors operate in accordance with EN 60034-1, with voltage fluctuations of up to $\pm 10\%$ and/or frequency variations of up to $\pm 2\%$. The mains data must correspond to the voltage and frequency data shown on the nameplate.



Perform connection of the motor, control circuit, overload protection and earthing in accordance with the local installation guidelines. Do not use motor protection devices that automatically reset. Unexpectedly starting the motor can cause serious injury or death.

07. Cable and clamps

Connect the electric motors with the appropriate cable and clamps. Unused openings must be sealed with the supplied stainless steel plugs and matching O-rings.



Applied wire clamps, connecting sleeves and cable glands must be suitable for the applied cable diameters. Follow the recommendations in the instructions for use provided by the manufacturer of the cable and cable glands.

08. Wiring instructions

The following guidelines must be followed to prevent electrical interference with the motor protection devices:

- Shielded cables may be run next to a power cable.
- Unshielded cables may not be run next to a power cable.

Power cables include:

- Output cables from frequency and servo regulators, rectifiers, soft starters, brakes and phases of braking resistors etc.

09. Electrical connection of DERTEC stainless steel electric motors

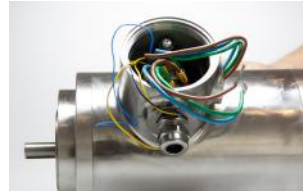
DERTEC stainless steel electric motors are not equipped as standard with the usual terminal strip for connection to the motor power cable. The main reason for this is that mounting by means of terminal strips and cable lugs can often lead to undesired voltage flashover and short circuits. In the junction box you will find the winding connections as separate wires, which should be connected to the motor power cable with moisture-proof crimp connections in accordance with the wiring diagram. The shrink connections are not included in the scope of delivery but can be ordered from DERTEC.

DERTEC FP2SS Serie AC motors

Open the cover of the junction box using an appropriate tool.
Prevent damage to the threads and O-ring.



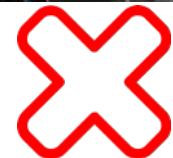
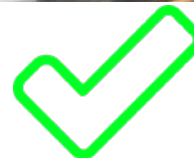
The connection cable and conductor ferrule must be suitable for temperatures up to 120 °C. Prepare the leads of the motor winding for the correct connection (Y or Δ) according to the motor nameplate. The red/black marked wires are for the PTCs. The yellow marked wires are for the bimetal thermal protectors.



Carefully remove the insulation from the earthing cable and get an eye-type cable lug suitable for the cable used, with the corresponding diameter. Fit the cable lug onto the earthing cable. Crimp the cable eye to the earthing cable.



Route the cable through a suitable stainless steel cable gland into the terminal box. In the example a stainless steel cable gland is used.
Check that the cable gland diameter matches the cable diameter you are using.
Ensure that the assembly and connection are performed so as to maintain the protection class.
If the second cable entry will not be used, it must be thoroughly sealed with the supplied stainless steel blind nut and O-ring.



Connect the motor winding leads and the motor wires with suitable crimp connections in accordance with the wiring diagram.
The same instructions apply for the built-in PTCs and bimetal thermal protectors.
Connect the earth wire to the earth connection in the motor.



Lightly grease the O-ring and close the terminal box. Prevent any damage to the O-ring and make sure the cap is closed firmly.





DERTEC Signature line SL3SS serie AC motors

Open the cover of the junction box using an appropriate tool.
Prevent damage to the threads and O-ring.



Carefully remove the insulation from the earthing cable and get an eye-type cable lug suitable for the cable used, with the corresponding diameter. Fit the cable lug onto the earthing cable. Crimp the cable eye to the earthing cable.



The power cable must correspond with the size of the cable gland. It must fit perfectly to ensure protection against moist.



Connect the motor winding leads and the motor wires with suitable crimp connections in accordance with the wiring diagram.
The same instructions apply for the built-in PTCs and bimetal thermal protectors.
Connect the earth wire to the earth connection in the motor.



Lightly grease the O-ring and blue hygiene ring. Grease the O-rings on the central mounting pin. Place the terminal box cover over the central mounting pin and make sure that the cable gland is positioned so that the cable gland is facing down. Take the mounting bolt, grease the blue sanitizer and place it around the mounting bolt.



Insert the mounting bolt into the center pin and tighten securely.
The O-rings offer sufficient protection against moisture penetration, the blue hygiene rings ensure a hygienic seal.



10. Test run

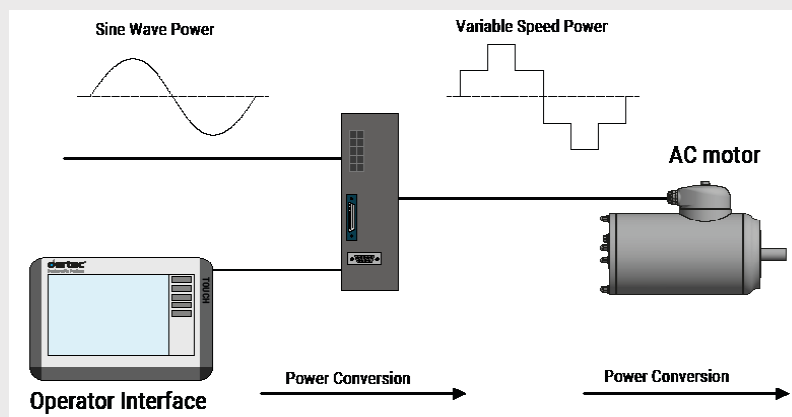
When the drive/electric motor is connected and activated, it should start up smoothly and quietly. Otherwise, the motor must be de-energized immediately. Under normal circumstances, the drive will generate approx. 60 dB of noise at no load; at full load this can be up to approx. 65 dB. Higher values may indicate overload or damage to bearings or gears. We recommend stopping the drive and determining the cause before reconnecting the motor/drive. Check first whether the motor is connected correctly.

Also check things such as:

- Correct connections (star or delta)
- Overload/prevented from turning
- Connections made properly
- Does the connection voltage match the locally available values?

11. The use of frequency inverters

All DERTEC stainless steel drives and electric motors between 20 and 70 Hz are suitable for use in combination with frequency inverters.



For operation with frequency inverters, we recommend that the motors be protected with PTC sensors. The PTCs and/or bimetal thermal protectors (135 °C) installed by DERTEC as standard are only suitable for use in control circuits and must never be connected in series with the motor.

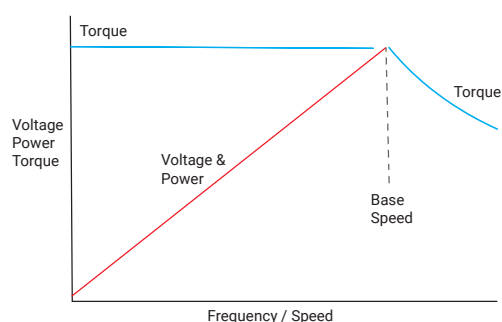
When used in combination with a frequency inverter, the electromagnetic compatibility of the drive must be tested in accordance with EMC directive 89/336/EEC.



Cable lengths in excess of approx. 30 metres must be avoided in order to prevent damage caused by harmonic peaks to the motor or frequency inverter. Consult the instructions for use of the frequency inverter used or consult your installer about the use of filters.

Basic rules when using frequency inverters and DERTEC stainless steel electric motors

- Above 50/60 Hz the torque will decrease (see graph below).
- For uncooled motors (TENV), the set frequency should be between 20 and 70 Hz
- For cooled motors (TEFC), the set frequency should be between 40 and 70 Hz. The main reason for this is that the fan must have some speed to cool the motor. DERTEC offers the possibility of using water-cooled motors if lower frequencies are desired.



Considering the efficiency curve of AC motors at lower speeds, the motor will develop more heat at lower frequencies.

In order to achieve the highest achievable efficiency of a drive, we advise you to match the motor speed and gearbox ratio such that the secondary speed is very close to your desired speed.

If a drive is used at partial load, the drive will generate more heat than at full load. This is a result of reduced efficiency of an electric motor at partial load. This applies to all motors, not just those from DERTEC. However, due to the lack of cooling fins, this is more noticeable in stainless steel motors.

In some cases, the use of DERTEC Pm synchronous motors may be worth considering.

These motors have a different efficiency curve in partial load and are therefore ideal for use in partial load.

All DERTEC stainless steel drives and electric motors are suitable for use in combination with frequency inverters.

Consult DERTEC if TENV versions are used below 20 Hz.

For operation with frequency inverters, we recommend that the motors be protected with PTC sensors. The PTCs and/or bimetal thermal protectors installed by DERTEC as standard are only suitable for use in control circuits and must never be connected in series with the motor. When used in combination with a frequency inverter, the electromagnetic compatibility of the drive must be tested in accordance with EMC directive 89/336/EEC. When the motors are used in combination with frequency converters, check the permissible peak voltage for standard windings using the diagram below.

12. Cooling

It is your responsibility to determine which version is suitable for your application.

The product range includes:

- TEFC (Totally Enclosed, Fan-Cooled) motors, designed to be cooled by a stream of air or sufficient ambient cooling.
- TENV (Totally Enclosed, Non-Ventilated) motors, not equipped with cooling fins. Application is based on the Delta K values and local ambient temperature.
- TEWC (Totally Enclosed, Water-Cooled) motors, equipped with water cooling.

The free flow of water through an externally fitted jacket contributes to proper functioning and prevents damage due to overheating.

Motors with water cooling

The water inlet and outlet must be connected to the couplings on the motor jacket. The cooling jacket must be bled; no air bubbles may remain in the housing. Trapped air will have a negative impact on cooling. The motor must be connected so it can only operate when the water cooling is running. Make sure the cooling jacket is always fully ventilated. The maximum cooling water temperature is 40 °C.

13. Electric motors with optional anti-condensation heater

The connection data for the anti-condensation heater are listed on the nameplate or an extra data plate.

One of two different heating systems may be used:

- Heat supplied by heating elements connected to separate terminals
- Heat supplied by a winding by applying an AC voltage to terminals U1-V1

The electrical circuit must be connected so as to ensure that the motor and the anti-condensation heater are never powered at the same time.

Motor on = heating off

Motor off = heating on



anti-condensation heater



14. Electric motors with built-in temperature monitoring elements

The PTC thermistors for protecting the motor windings, built in by DERTEC as standard, meet the requirements of DIN EN 60947-8, DIN 44081 and DIN 44082. Switching value **TC=135 °C**

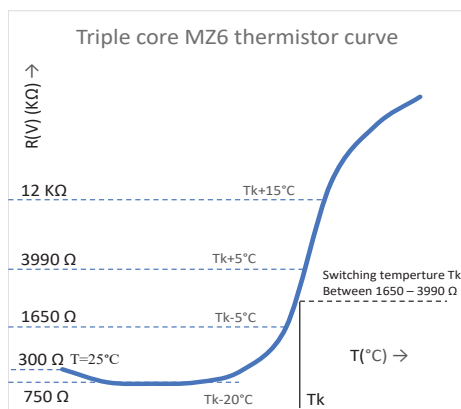


PTC thermistors may only be operated by corresponding switching units.
A connection voltage in excess of 2.5 V can lead to destruction of the PTC thermistors and damage to the motor winding.

Specifications of the standard used thermistors

Technical parameter		Triple PTC	Units
Max. working voltage	U _{max}	30	V
normal using voltage	V	≤ 2,5	V
Rated action temperature	T _k	60 ~ 180	°C
TK tolerance		± 5	°C
TK repeatability	ΔT	± 0,5	°C
Resistance in normal temperature T=25°C±1°C (V<2.5V)	R ₂₅	≤ 300	Ω
PTC resistance at some temperature (V≤2.5V)	T _k -5°C	≤ 1650	Ω
PTC resistance at some temperature (V≤2.5V)	T _k +5°C	≥ 3990	Ω
PTC resistance at some temperature (V≤2.5V)	T _k +15°C	≥ 12	k Ω
-20°C ~ T _k -20°C		≤ 750	Ω
T _k reaction time	T _d	< 5	S
Insulation strength	V	2,5	KV
Maximum storage temperature	T _I max	125	°C
Minimum storage temperature	T _I min	-25	°C

Reaction temperature (T _k)	135°C
Wire color	Red
Wire color	Black



The built-in PTCs are installed to monitor the maximum motor temperature and are not intended to measure the exact motor temperature. If you want to measure the exact motor temperature, the installation of PT100 or PT1000 elements is necessary. Please contact our sales department.

Specifications of the bimetal thermal protectors installed as standard

Built-in bimetal thermal protectors: NC U=250VAC 50/60Hz 1.6A



After the motor has cooled, the temperature monitoring elements automatically reset.
It is possible that an automatic restart will occur.
For safety reasons, you must ensure that the motor is connected in such a way that this cannot happen.

Reaction temperature (T _k)	135°C
Wire color	Yellow
Wire color	Yellow

15. Commissioning

Preparatory work

- Make sure that the motor shaft/drive shaft is clean and undamaged. If necessary, use standard cleaning agents. The cleaning agent must not come into contact with the bearings or shaft seals. This can result in damage of the bearings and seals.
- Check whether the motor has become damp during transport or storage. If so, the insulation resistance must be measured (test voltage: 500 V). The insulation resistance is highly dependent on the temperature. At normal motor temperature (20-25 °C) this will not be less than 5 MΩ.
- If the insulation resistance is insufficient, the motor must be dried. To ensure that the moisture exits the motor we recommend that the motor be opened (consult the assembly/disassembly instructions). The motor can be dried faster in a drying oven at a maximum temperature of 100 °C. Before doing so, contact the manufacturer in connection with the validity of the warranty.



Without prior approval you will void the warranty.

- This work must be performed by qualified personnel. See the applicable repair instructions for re-assembly.
- Check the direction of rotation and operation at no load. If it is necessary to change the direction of rotation, swap two phases.
- If the motor has just come out of storage and has not run in a long time, we recommend running the motor at no load for 30 minutes. This is to ensure adequate grease distribution and thereby prevent overheating of the bearings.
- Compare the operating current with the current data on the nameplate. The motor protection devices must be set to the current levels corresponding to those on the nameplate. The current value indicated on the nameplate must not be exceeded under continuous load.



Run the motor under load for at least one hour while listening for unusual noises and checking for an increase in temperature. Vibrations of $V_{eff} < 3.5$ mm/s at PN <15 kW and $V_{eff} < 4.5$ mm/s at PN >15 kW do not pose a problem during operation. If there are deviations from normal operation, such as elevated temperatures, noises or vibrations, we recommend contacting the manufacturer.

16. Cleaning general

Switch off the installation and ensure that the motors are de-energized. Clean the drive in accordance with the locally applicable regulations, but observe the following:

- Preferably use warm water (approx. 40 °C) with mild detergents. Cold water contributes to condensation due to pressure differences.
- Condensation can damage the motor winding and ball bearings, and moisture in the lubricant can cause damage to the gearboxes.
- From an environmental point of view, it is advisable to use gentle, diluted chemical detergents.
- Before cleaning is started the drive temperature must have dropped to approx. 25 °C.
- Check that all junction boxes are closed.
- Avoid directing a high pressure stream of water towards the cable glands or seals. These can be damaged and cause electrical or other problems. Prevention is better than cure!

17. Maintenance/inspection of DERTEC stainless steel electric motors

General requirements

- Check the motors regularly, regardless of the operating conditions.
- Keep the motors clean; this also applies to the ventilation openings, if applicable.
- Regularly check the shaft seals for damage, and replace them if necessary.
- Regularly check that the air vent on the gearbox, or the breather valve on the electric motor, is working properly.
- Check and retorque the mounting bolts. Make sure that the motors or drives are firmly and correctly attached to the installation or each other.

The DERTEC stainless steel electric motors are equipped with double-sided sealed deep groove ball bearings. The ball bearings are lubricated with food-grade lubricant (NSF H1). Under normal operating conditions the lubricant is adequate for 40,000 hours of operation for 4- and 6-pole motors and 20,000 hours for 2-pole motors.

In order to achieve a long service life after repair, we recommend that you only use OEM replacements for the bearings.

The fast-running secondary shaft is fitted with a special coated shaft sleeve and is sealed with a special food-grade shaft seal to prevent the ingress of moisture and dirt. We recommend always replacing these parts during maintenance.

Contact DERTEC for the correct shaft seal for your application.

DERTEC stainless steel electric motors have a unique, non-standard seal to keep out moisture and dirt.

In order to preserve this seal, we recommend that the motors should only be repaired by DERTEC qualified technicians.

If in doubt, we advise you to always contact our service department: 0031 71 409 2 409 or service@dertec.com

Bearing types DERTEC stainless steel motors

Motor Frame	Bearing
IEC 56	6201 2RS C3
IEC 63	6202 2RS C3
IEC 71	6203 2RS C3
IEC 80	6204 2RS C3
IEC 90	6205 2RS C3
IEC 100	6206 2RS C3
IEC 112	
IEC 132	6208 2RS C3
	6308 2RS C3
IEC 160	6210 2RS C3

DERTEC stainless steel motors are fitted with ball bearings according to the table. The ball bearings are filled with a special hydrophobic lubricant, which is also resistant to higher temperatures that may occur. If replacement is necessary, the use of OEM bearings is recommended.

18. Disassembly of stainless steel motors

To disassemble the motor, all four cap nuts on the rear shield must be loosened several turns. Several gentle taps on the cap nuts with a plastic hammer will push the front shield out of the motor housing. Once the O-ring is free of the motor housing, the shield can be pulled out of the motor together with the rotor.



It is absolutely prohibited to open the electric motor by placing a screwdriver or other sharp tool between the shield and the housing to pry them apart. Doing so will permanently damage the mating edges, making it impossible to obtain a good seal upon reassembly. The only correct way is as shown above: using a plastic hammer, carefully tap the cap nuts and thereby loosen the front shield of the motor, after which the rear shield can be removed.



19. Installation and service of electric motors

The electric motor must be earthed in accordance with local regulations. The key mounted in the secondary shaft must be secured before the electric motor is started. The motor voltage and frequency must correspond to the local line voltage and be adequate for the machine load. Disconnect all connections, de-energize the drive and bring the drive to a standstill.

Seals

The stainless steel drives and electric motors are fitted with shaft seals and O-rings made of special food-grade sealing material. We recommend replacing the removed seals with factory-original ones during all maintenance work. Failure to use OEM parts may adversely affect the operation of the machine. Disassembly and assembly must be performed with care; minor damage to the stainless steel parts can prevent seals from functioning properly, resulting in a high risk of moisture entering or condensation forming in the motors.

Condensation

Depending on the environment and operating conditions, condensation may form in the motors. This is generally not harmful in small amounts, but it may lead to corrosion damage in the motor. If there is too much condensate it should definitely be drained off. Contact DERTEC for recommendations.

20. Breather valve

DERTEC stainless steel electric motors are standard equipped with a special valve, intended to prevent condensate formation in non-standard/specific applications. When rapid temperature changes are likely to occur during cleaning of motors at operating temperature, we recommend the use of special stainless steel cable glands with protection class IP69K, which are equipped with an integrated membrane. These special glands provide a means of equalising the air and temperature inside and outside the motor (also called 'vent glands'). As an alternative or addition to this special gland, the motors can be fitted with threaded breather valves on request. These special breather valves reduce the pressure differences between the inside and outside of the motor, yet do not allow moisture to enter, which prevents additional condensate formation. Under extreme conditions, such as very rapid cooling of motors at operating temperature, with low ambient temperatures, the effectiveness of the breather valves is limited (dew point).



We recommend allowing the motors to cool as much as possible before cleaning.

21. Condensate drain plug

DERTEC stainless steel motors are not fitted with a condensate drain plug as standard. The special seal and the use of a special pressure valve help to reduce condensate in the motor. In special cases, such as freezer situations, it may be necessary to prevent excessive accumulation of condensate. In that case, contact the DERTEC service department. We will then offer you a good solution for easily draining excess condensate. The required service intervals are highly dependent on the specific operating conditions. It is impossible to provide any general guidelines for this. It is therefore advisable to perform an initial inspection after the first 80-200 hours to determine how much condensate has accumulated



22. Gearbox maintenance

DERTEC gearboxes are low-maintenance. A regular visual inspection of the drives, particularly the shaft seals, is sufficient for the first 40,000 hours. Regular inspection can reveal any unexpected leaks or external damage and prevent damage to the drive.

23. Gearbox lubrication

All DERTEC stainless steel gearboxes are equipped with high quality, food-grade lubricant that meets NSF H1 requirements. Depending on the type of gearbox, we use a PAO (polyalphaolefin) or PAG (polyalkylene glycol) lubricant. We fill the gearboxes exclusively with Matrix Foodmax 460. This lubricant is suitable for approx. 10,000 hours of use under normal operating conditions. Check the drive seals regularly for leaks, and remove any dirt on and around the seals. We recommend filling the drives with Matrix Foodmax 460 after repairs. If this is not available locally, good alternatives are:

PAO Series	PAG Series
Matrix Foodmax PAO	Matrix Foodmax PAG
Bechem Berusynth	Bechem berusynth PG
Shell Cassida Fluid	Fuchs Cassida fluid WG
Mobil SHC Cibus	Mobil Glycoyle
Castrol Optileb	



It is not permitted to mix PAG lubricants with PAO lubricants. This degrades the performance of the drive system and can lead to major internal damage. We recommend having the drives serviced by DERTEC or by DERTEC-qualified maintenance companies. Make sure that OEM parts are always used and that, in particular, the seals used are of the prescribed quality.

24. Maintenance

Every six months or 3,000 operating hours (whichever comes first) we recommend that you:

- Check amount of lubricant
- Check for running noise (bearings)
- Check damping element in the torque arm (if present)
- Inspect the shaft seals
- Remove dirt on and around the shaft seals

Every five years:

- Replace synthetic lubricant (see point 26)
- Replace shaft seals with original DERTEC seals

After maintenance, we recommend filling the drives with lubricant as stated on the nameplate.



**PAO and PAG lubricants may never be mixed.
Mixing these types will lead to internal damage.**

We recommend having the drives serviced by DERTEC or by DERTEC-qualified maintenance companies. Make sure that OEM parts are always used and that, in particular, the seals used are of the prescribed quality.





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