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Operating Instructions VLT[®] OneGearDrive



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VLT[®]
THE REAL DRIVE

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1 Introduction

1.1 Purpose of these Operating Instructions

The purpose of these operating instructions is to describe the VLT® OneGearDrive. These operating instructions contain information about:

- Safety
- Installation
- Commissioning
- Maintenance and repair
- Specifications
- Options and accessories

NOTICE

For reasons of clarity, the operating instructions and safety information do not contain all information relating to all OneGearDrive types and cannot take into account every conceivable case of installation, operation, or maintenance. The information is limited to that which is required for qualified personnel in normal working situations. Contact Danfoss for further assistance.

These operating instructions are intended for use by qualified personnel. Read these operating instructions in full in order to use the OneGearDrive safely and professionally. Pay particular attention to the safety instructions and general warnings.

These operating instructions are an integral part of the OneGearDrive and also contain important service information. Keep these operating instructions available with the OneGearDrive at all times.

Compliance with the information in these operating instructions is a prerequisite for:

- Trouble-free operation.
- Recognition of product liability claims.

Therefore, read these operating instructions before working on or with the OneGearDrive.

VLT® is a registered trademark.

1.2 Document Version

This document is regularly reviewed and updated. All suggestions for improvement are welcome. *Table 1.1* shows the document version.

Edition	Remarks
MG75C4xx	Replaces MG75C3xx

Table 1.1 Document Version

1.3 Disclaimer

No liability is assumed for any damage or breakdown resulting from:

- Failure to observe the information in the instruction manuals.
- Unauthorised modifications to the OneGearDrive.
- Operator error.
- Improper work on or with the OneGearDrive.

1.4 Product Overview

1.4.1 Intended Use

The OneGearDrive is intended for commercial installations, unless otherwise expressly agreed. It complies with the standards of the series EN 60034/DIN VDE 0530. Use in a potentially explosive atmosphere is forbidden, if not expressly intended for this purpose. Increased safety precautions (for example protection against access by children's fingers) are required in special cases, such as use in non-commercial installations. Ensure these safety conditions when setting up the installation. The OneGearDrive is designed for ambient temperatures between -20 °C to 40 °C as well as for installation heights up to 1000 m above sea level. Any deviations found on the nameplate must be considered. Ensure that the conditions at the place of work correspond to all the nameplate data.

CAUTION

Low-voltage machines are components for installation in machines in the sense of the machinery directive 2006/42/EC.

- Do not use the machine until conformity of the final product with this directive is established (refer to EN 60204-01).

1.4.2 Foreseeable Misuse

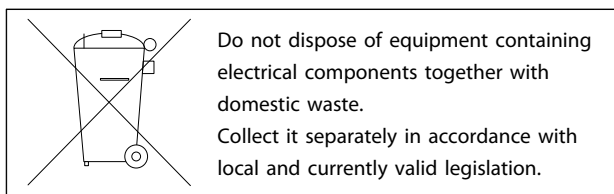
Any use not expressly approved by Danfoss constitutes misuse. This also applies to failure to comply with the specified operating conditions and applications.

Danfoss assumes no liability of any sort for damage attributable to improper use.

1.5 Approvals



1.6 Disposal



Dispose of oils as special waste.

1.7 Service and Support

Contact your local service representative for service and support:

www.danfoss.com/Contact/Worldwide/

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2 Safety

2.1 Safety Symbols

The following symbols are used in this document:



Indicates a potentially hazardous situation which could result in death or serious injury.



Indicates a potentially hazardous situation which could result in minor or moderate injury. It can also be used to alert against unsafe practices.

NOTICE

Indicates important information, including situations that can result in damage to equipment or property.

2.2 Qualified Personnel

All necessary work on electric drive units must only be performed by adequately qualified personnel (e.g. electrical engineers as specified in draft EN 50 110-1/DIN VDE 0105), who have the operating instructions provided and other product documentation available during any corresponding work and who are obliged to abide by the instructions contained therein. Qualified personnel are persons who are authorised due to training, experience, and instruction as well as their knowledge of relevant standards, rules, accident-prevention regulations, and operating conditions. The person responsible for the safety of the installation must perform the activities required in each case and be able to recognise and avoid potential hazards.

Knowledge of first-aid measures and of the available lifesaving equipment is also required.

Unqualified personnel are forbidden to work on the OneGearDrive.

2.3 Due Diligence

The operator and/or fabricator must ensure that:

- The OneGearDrive is only used as intended.
- The OneGearDrive is only operated in a perfect operational condition.
- The operating instructions are always available near the OneGearDrive in complete and readable form.
- The OneGearDrive is only fitted, installed, commissioned and maintained by adequately qualified and authorised personnel.
- These personnel are regularly instructed on all relevant matters of occupational safety and environmental protection, as well as the contents of the operating instructions and in particular the instructions it contains.
- The product markings and identification markings applied to the OneGearDrive, as well as safety and warning instructions, are not removed and are always kept in a legible condition.
- The national and international regulations regarding the control of machinery and equipment, which are applicable at the place of use, are complied with.
- The users always have all current information relevant to their interests about the OneGearDrive and its use and operation.

2.4 Safety Precautions



HIGH VOLTAGE

High voltage, which can lead to death or serious injury, is present on the connectors.

- **Before working on the power connectors (disconnecting or connecting the cable to the OneGearDrive), disconnect the power supply to the frequency converter and wait for the discharge time to elapse (see the frequency converter operating instructions).**
- **Installation, start-up, maintenance and decommissioning must only be performed by qualified personnel.**



DANGER OF BURNS

The surface of the OneGearDrive and the oil in the OneGearDrive can reach high temperatures during operation.

- **Do not touch the OneGearDrive until it has cooled down.**
- **Do not carry out an oil change until the oil has cooled down sufficiently.**

3 Mechanical Installation

3.1 Unpacking

3.1.1 Items Supplied

The items supplied with the OneGearDrive are:

- OneGearDrive
- These operating instructions
- Eyebolt
- Plastic cap for eyebolt opening
- Hollow shaft cover with 3 washers and fixing screws
- Disc and retaining ring

3.2 Transportation

3.2.1 Inspection on Receipt

After receiving the delivery, immediately check whether the scope of delivery matches the shipping documents. Danfoss will not honour claims for faults registered later.

Register a complaint immediately:

- With the carrier in case of visible transport damage.
- With the responsible Danfoss representative in case of visible defects or incomplete delivery.

Commissioning may have to be suspended if the unit is damaged.

Check the factory-fitted plugs in all entry holes on the terminal box for damage caused during transportation and for correct positioning. Replace if necessary.

3.2.2 Transport

Before transporting the OneGearDrive, the eyebolt provided must be firmly tightened down to its bearing surface. The eyebolt can only be used to transport the OneGearDrive unit and not for lifting attached machines.

3.3 Protection Rating

The OneGearDrive range complies with EN 60529 and IEC 34-5/529. The drives are totally enclosed and dust-tight as well as hose proof.

The OneGearDrive Standard is for use in aggressive areas and is supplied in protection rating IP67 as standard. The OneGearDrive Hygienic is rated for both IP67 and IP69K.

3.4 Protective Coating

NOTICE

Damage to the protective coating
Damage to the paint coating reduces its protective function.

- Handle the OneGearDrive with care and do not place it on any rough surfaces.

3.5 Mounting Arrangement

CAUTION

HIGH TORQUE AND FORCE

Depending on the reduction ratio, the OneGearDrive develops substantially higher torques and forces than high-speed motors of similar power.

- Rate the mounts, substructure and torque restraint for the high forces anticipated during operation. Secure them sufficiently against loosening.
- Cover the output shaft(s) and any 2nd motor shaft extension present, as well as the transmission elements mounted on it (couplings, chain wheels etc.), so that they cannot be touched.

Install the drive unit as free from vibration as possible.

Observe the special instructions for installation locations with abnormal operating conditions (for example high ambient temperatures >40 °C). The fresh air intake must not be restricted by unsuitable installation or build-up of dirt.

Use slip clutches if there is a risk of blocking.

Take care when fitting transmission elements onto the hollow shaft of the OneGearDrive, which is finished to ISO H7. Use the tapped end hole intended for this purpose according to DIN 332.

3

The maximum force based on bearing life is detailed in (Illustration 3.1 and Table 3.1).

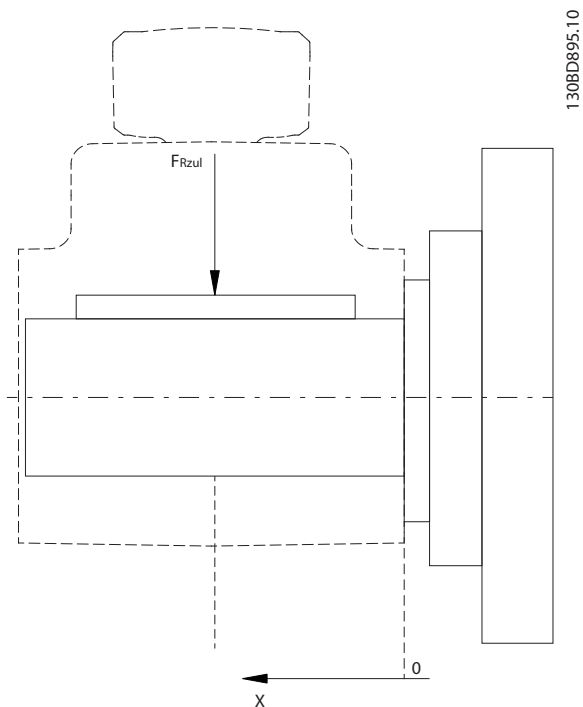


Illustration 3.1 Maximum Force

Up to n2 [RPM]	FRZUL [N] up to X [mm] ¹⁾				
	25	50	75	100	125
50	4319	3763	3335	2994	2716
100	3023	2634	2334	2096	1901
200	1727	1505	1334	1198	1086
360	1404	1223	1084	973	883

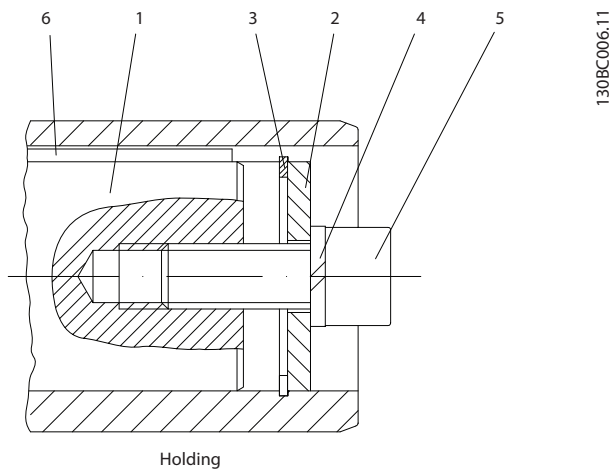
Table 3.1 Maximum Force

1) X is the distance from the surface of the hollow shaft to the force location.

3.5.1 Mounting Procedure

1. Fasten the drive unit by its flange using the torque arm (see chapter 8.6.1 Torque Arm Set).
2. Attach the OneGearDrive on to the driven shaft using the means provided.

3.6 Assembly Kit



1	Shaft
2	Disc
3	Retaining ring
4	Lock washer
5	Fixing screw (filister head)
6	Key

Illustration 3.2 Assembly Kit

Type	Dimensions [mm]			
	Retaining ring (3) DIN 472	Lock washer (4) DIN 7980	Fixing screw (5) DIN 912-8.8	Key (6) DIN 6885 Width x Height x Length
OGD-30	30x1.2	10	M10x30	A 8x7x100 ¹⁾
OGD-35	35x1.5	12	M12x35	A 10x8x100 ¹⁾
OGD-40	40x1.75	16	M16x35	A 12x8x100 ¹⁾

Table 3.2 Dimensions of Assembly Kit Items

1) Key length required for b_{min} in Table 3.3. Adapt the key length according to the shaft length used (b) in Table 3.3.

The dimensions shown could differ from the customer conditions and must potentially be changed by the customer.

Mounting instructions

Rotate the disc (2) and fit it against the retaining ring (3). Both items are included in every delivery.

The fixing screw (5) and lock washer (4) are not included in the delivery. The parts are dependent on the length and size of the shaft. For further information refer to the mounting arrangement (see chapter 3.5 Mounting Arrangement).

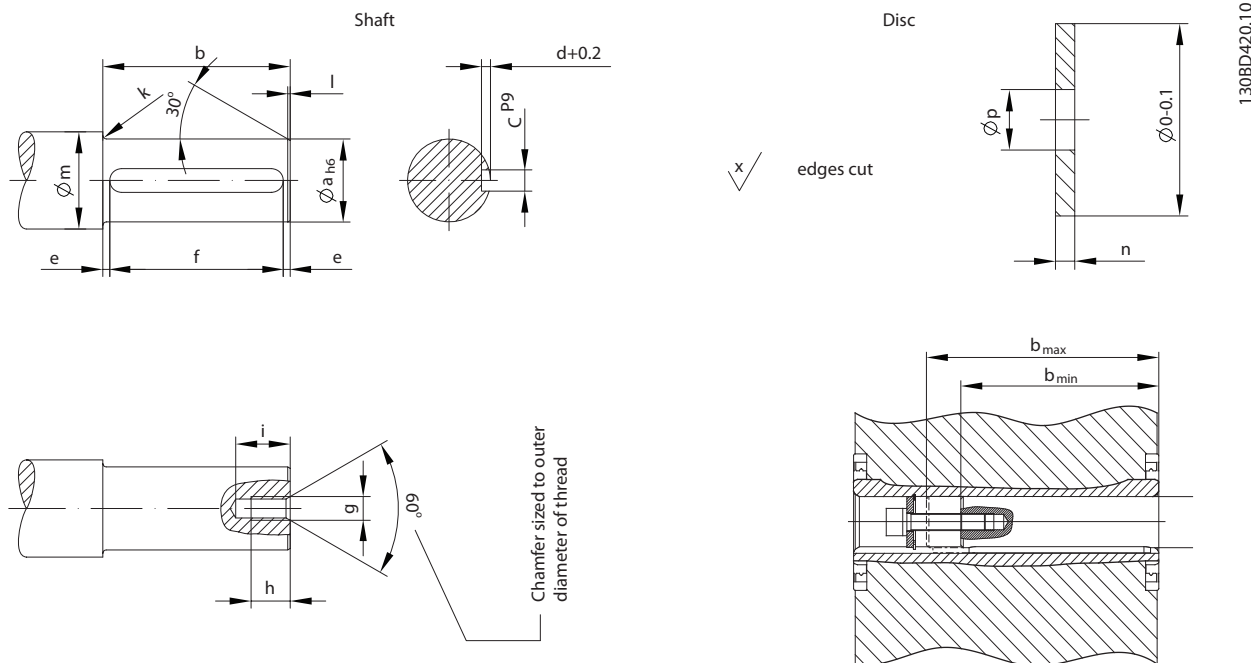


Illustration 3.3 Axial Fastening

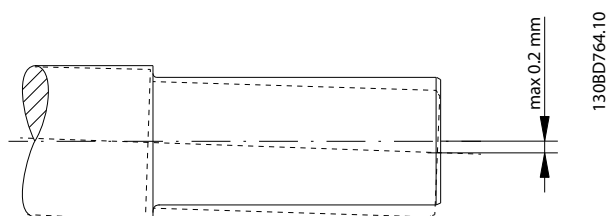


Illustration 3.4 Maximum Allowed Eccentricity of the Conveyor Shaft

Type	Dimensions [mm]															
	Shaft													Disc		
	a	b _{min}	b _{max}	c	d	e	f ¹⁾	g	h	i	k	l	m	n	o	p
OGD-30	30	120	140	8	4	5	100	M10	22	30	3	1.5	38	4	29.8	11
OGD-35	35	120	140	10	5	5	100	M12	28	37	3	1.5	43	4	34.8	13
OGD-40	40	120	140	12	5	5	100	M16	36	45	3	2	48	4	39.8	17

Table 3.3 Dimensions of the Shaft and Disc

1) Key length required for b_{min}. Adapt the key length according to the shaft length used (b).

The dimensions shown could differ from the customer conditions and must potentially be changed by the customer.

NOTICE

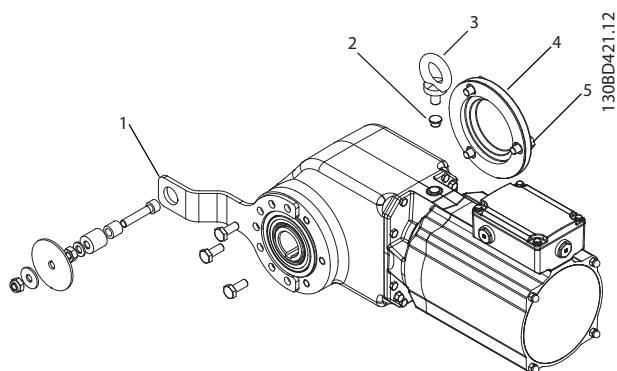
Use grease to mount the OneGearDrive onto the shaft. For example, CASTROL Obeen Paste NH1, ARAL Noco Fluid or similar. Use a key in the same material and quality as the hollow shaft.

3.7 Torque Restraint

The OneGearDrive requires a suitable torque restraint to resist the reaction torque. The torque arm with mounting set is available as an option (see *chapter 8.6.1 Torque Arm Set*). Ensure that the torque arm does not create excessive constraining forces, for example due to the driven shaft running untrue. Excessive backlash can result in excessive shock torques in switching or reversing operations.

3.8 Final Assembly

Always assemble the hollow shaft cover (4) with the delivered screws (5) as shown in *Illustration 3.5*.



1	Torque arm (optional)
2	Plastic cap
3	Eyebolt
4	Shaft cover
5	Shaft cover screws

Illustration 3.5 Final Assembly

1. Remove the eyebolt (3) and cover the hole with the plastic cap (2). This ensures the hygienic features of a smooth surface.
2. Assemble the hollow shaft cover (4) with the 3 screws (5) onto the OneGearDrive.
 - 2a Fasten the screws by hand.
 - 2b Using a flat spanner, turn the screws 180° clockwise.
The tightening torque is 4.5 Nm.

NOTICE

The OneGearDrive does not require breather vents. Never install breather vents instead of the oil screws.

4 Electrical Installation

4

4.1 EMC-compliant Installation

To guarantee electromagnetic compatibility (EMC) as defined in EMC Directive 2004/108/EC, all signal lines must use shielded cables. The cable sheath must be grounded at both ends. The frequency inverter operating instructions indicate whether a shielded cable is necessary for the motor supply line. A shielded motor cable is not required when connecting to a frequency inverter with an output filter. Always use shielded cables when laying signal cables and power cables parallel to each other.

The operation of the low-voltage machine in its intended application must meet the protection requirements of the EMC (electromagnetic compatibility) Directive 2004/108/EC. Correct installation (e.g. screened cables) is the responsibility of the system's installers. For systems with frequency converters and rectifiers, the manufacturer's electro-

magnetic compatibility information must also be considered. The electromagnetic compatibility directive in accordance with IEC/EN 61800-3 is complied with given proper use and installation of the OneGearDrive. This is also true in combination with Danfoss frequency converters and rectifiers.

4.2 Electrical Connection

When connecting the motor, take note of the data on the nameplate, the connection diagram and the relevant safety regulations and rules for the prevention of accidents. Unless a special design is concerned, the data on the nameplate refers to:

- A voltage tolerance of $\pm 5\%$.
- An ambient temperature of -20 to 40 °C.
- Altitudes up to 1000 m above sea level.

4.3 Terminal Box

Feed the motor cables (motor with or without brakes) into the motor terminal box and connect them.

Ensure a perfect seal when closing the terminal box.

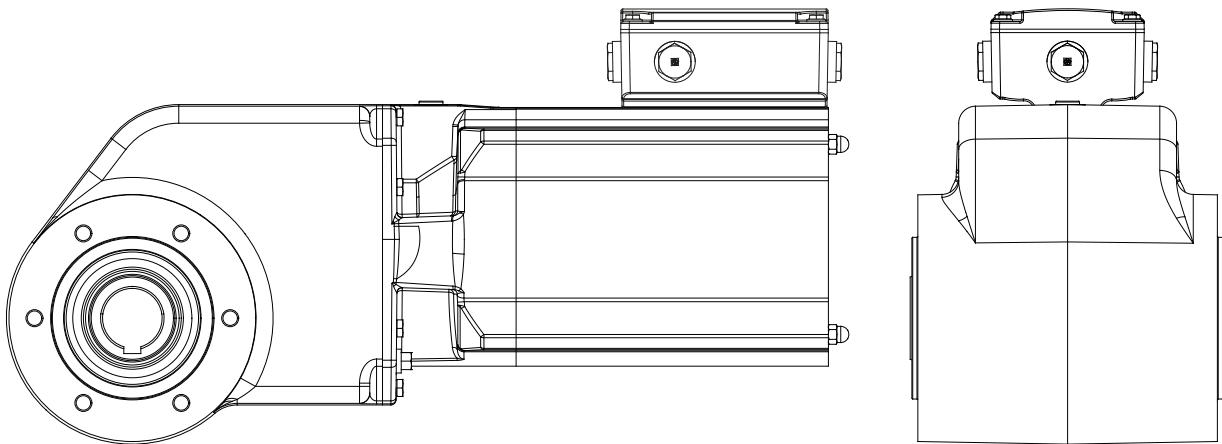


Illustration 4.1 Terminal Box

CAUTION

Never alter the position of the terminal box or open any screws unless instructed to in these operating instructions. Doing so may cause damage to the OneGearDrive and will invalidate the warranty.

Screw-on terminal boxes are supplied with a metric screw thread as standard.

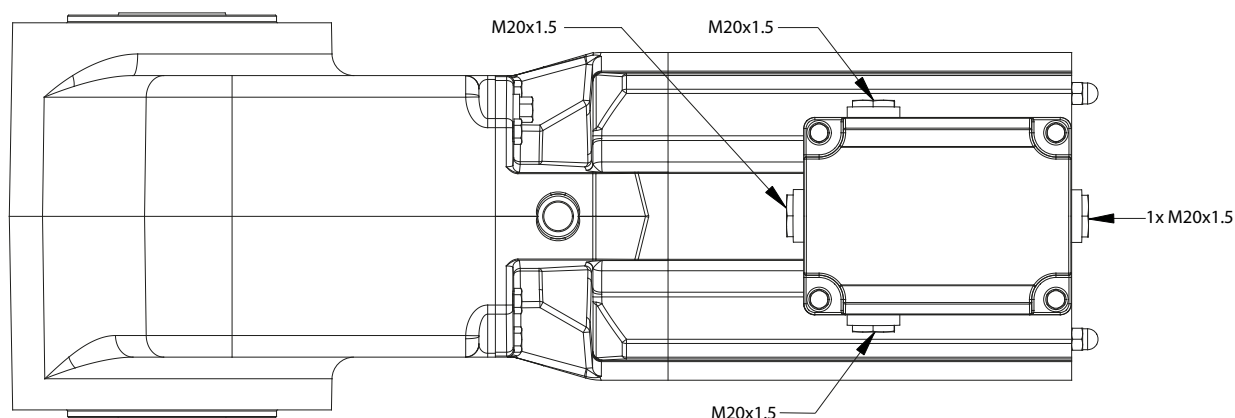


Illustration 4.2 Terminal Box Screws

4.3.1 Connection

The terminal box may only be opened once it has been ensured that the power is switched off. The information on voltage and frequency on the nameplate must correspond with the mains voltage under observance of the terminal circuit. Exceeding the tolerances as in EN 60034/DIN VDE 0530, i.e. voltages $\pm 5\%$, frequency $\pm 2\%$, cam form, symmetry, increases heating and reduces service life. Observe any accompanying connection diagrams, particularly for special equipment (e.g. thermistor protection etc.). The type and cross-section of the main conductors, as well as the protective conductors and any potential equalisation which may become necessary, must correspond to the general and local installation regulations. With switching duty, take the starting current into account. Protect the drive unit against overload and, in dangerous situations, against unintended starts. Lock the terminal box again to protect against contact with live components.

CAUTION

RISK OF SHORT-CIRCUITS

Short-circuits can occur if water penetrates through the cables into the terminal box. The installed end caps on the terminal box support the IP protection rating of the OneGearDrive (see also *chapter 3.3 Protection Rating*).

- Always use the adequate sealed components when removing the end caps and plugging the wire connection.
- Always ensure that the terminal box is closed properly.

NOTICE

Refer to the Operating Instructions for VLT® AutomationDrive FC 302 and VLT® Decentral Drive FCD 302 to connect the terminals. Do not connect the OneGearDrive directly to the power supply.

4.4 Cage Clamp Connection Diagram

Illustration 4.3 shows the OneGearDrive DA09LA10 with terminal box in Y-connection and the connection to the thermal protection.

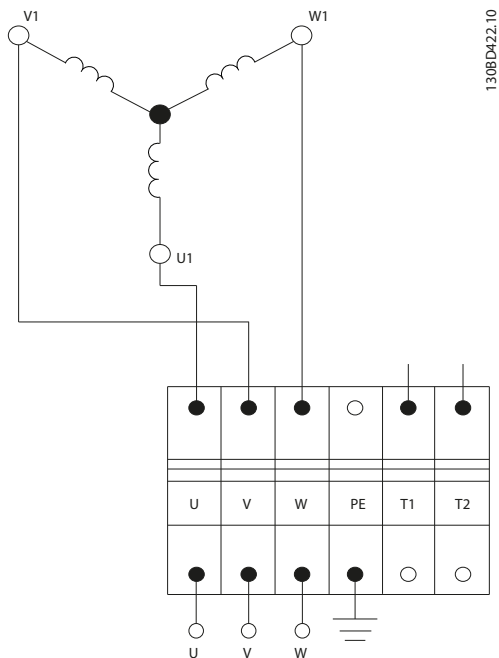


Illustration 4.3 Cage Clamp Connection Diagram

Description	Inverter output	Colour	Typical cross-section	Maximum cross-section
Motor winding	U	Black	1.5 mm ² /AWG 16	2.5 mm ² /AWG 14
	V	Blue		
	W	Brown		
Protective earth	PE	Yellow/green	1.5 mm ² /AWG 16	2.5 mm ² /AWG 14
Temperature protection ¹⁾ KTY 84-130	T1	White	0.75 mm ² /AWG 20	1.5 mm ² /AWG 16
	T2	Brown		

Table 4.1 Cage Clamp Connections

1) When connected to VLT® AutomationDrive FC 302 and VLT® Decentral Drive FCD 302, use analog input terminal 54, KTY sensor 1. For information about parameter setting and programming, refer to the corresponding operating instructions.

T1		VLT® AutomationDrive FC 302 ¹⁾	VLT® Decentral Drive FCD 302 ¹⁾
T2	KTY 84-130	KTY sensor 1 Analog input 54	

Table 4.2 Connections T1 and T2

1) Only if connected

NOTICE

After connection, tighten all 4 screws on the terminal box cover. The tightening torque is 3 Nm.

4.5 CleanConnect® Connection Diagram

Illustration 4.4 shows the connection power plug for OneGearDrive Hygienic DA09LA10 in Y-connection with thermistors.

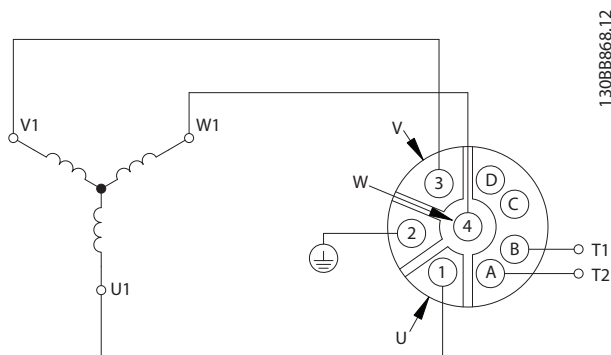


Illustration 4.4 CleanConnect® OneGearDrive Connection

Description	Inverter output	Pin	Typical cross-section	Maximum cross-section
Motor winding	U	1	1.5 mm ² /AWG 16	2.5 mm ² /AWG 14
	V	3		
	W	4		
Protective earth	PE	2	1.5 mm ² /AWG 16	2.5 mm ² /AWG 14
Temperature protection ¹⁾ KTY 84-130	T1	A	0.75 mm ² /AWG 20	1.5 mm ² /AWG 16
	T2	B		

Table 4.3 CleanConnect® OneGearDrive Connection

1) When connected to VLT® AutomationDrive FC 302 and VLT® Decentral Drive FCD 302, use analog input terminal 54, KTY sensor 1. For information about parameter setting and programming, refer to the corresponding operating instructions.

T1		VLT® AutomationDrive FC 302 ¹⁾	VLT® Decentral Drive FCD 302 ¹⁾
T2	KTY 84-130	KTY sensor 1 Analog input 54	

Table 4.4 Connections T1 and T2

1) Only if connected

4.6 Overload Protection

Take note of the relevant circuit diagram for motors with thermally activated winding protection (see chapter 4.4 Cage Clamp Connection Diagram).

Avoid automatic resetting after the winding has cooled.

The output of the motors is normally adequately rated. The rated current does not represent a measure of gear unit utilisation in these cases and cannot be used as overload protection for the gear unit. In some cases, the way in which the driven machine is loaded can exclude any overloading as a matter of course. In other cases, it is necessary to protect the gear unit by mechanical means (e.g. slip clutch, sliding hub etc.). This depends on the maximum permissible limit torque M_{LT} in continuous running duty specified on the nameplate.

5 Commissioning

5.1 Measures before Commissioning

5.1.1 Overview

If the OneGearDrive has been stored, take the measures detailed in *chapter 5.1.2 Motor Component* and *chapter 5.1.3 Gear Unit Component*.

5.1.2 Motor Component

Insulation measurement

Measure the insulation resistance of the winding with a commercially available measuring tool (for example, megger) between all winding parts and between the winding and the enclosure.

Measured value	Action/state
>50 MΩ	No drying necessary, new condition
<5 MΩ	Drying advised
approximately 50 MΩ	Lowest permissible threshold

Table 5.1 Insulation Measurement Values

5.1.3 Gear Unit Component

- **Oil**
Change the oil in the gear unit if the storage period exceeds 5 years or the temperatures were harsh throughout a shorter storage period. For detailed instructions and oil recommendations see *chapter 6.4.3 Oil Volume*.
- **Shaft seals**
Lubricate the hollow shaft seal with grease if the storage period exceeds 2 years. When changing the oil, the function of the shaft seals between the motor and gear unit as well as on the output shaft must also be checked. The shaft seals must be replaced if any change in shape, colour, hardness or sealing effect is detected.

5.2 Commissioning Procedure

1. Remove the protective films.
2. Disconnect the mechanical connection to the driven machine as far as possible and examine the direction of rotation in the no-load state.
3. Remove the feather keys or secure them in such a way that they cannot be ejected.
4. Ensure that the current draw in the loaded condition does not exceed the rated current indicated on the nameplate for any length of time.
5. After first commissioning, observe the OneGearDrive for at least 1 hour to detect any unusual heat or noise.

6 Maintenance, Diagnostics and Troubleshooting

⚠ WARNING

HIGH VOLTAGE

High voltage, which can lead to death or serious injury, is present on the connectors.

- Before working on the power connectors (disconnecting or connecting the cable), disconnect the power supply module from the mains and wait for the discharge time to elapse.
- Installation, start-up, maintenance, and decommissioning must be performed by qualified personnel only.

⚠ CAUTION

DANGER OF BURNS

The surface of the OneGearDrive and the oil in the OneGearDrive can reach high temperatures during operation.

- Do not touch the OneGearDrive until it has cooled down.
- Do not carry out an oil change until the oil has cooled down sufficiently.

6.1 Maintenance

To prevent breakdown, danger and damage, examine the OneGearDrive at regular intervals depending on the operating conditions. Replace worn or damaged parts using original spare parts or standard parts.

Contact your local service representative for service and support:

www.danfoss.com/Contact/Worldwide/

The OneGearDrives are largely maintenance free. The maintenance tasks listed in *Table 6.1* may be performed by the customer. No other tasks are required.

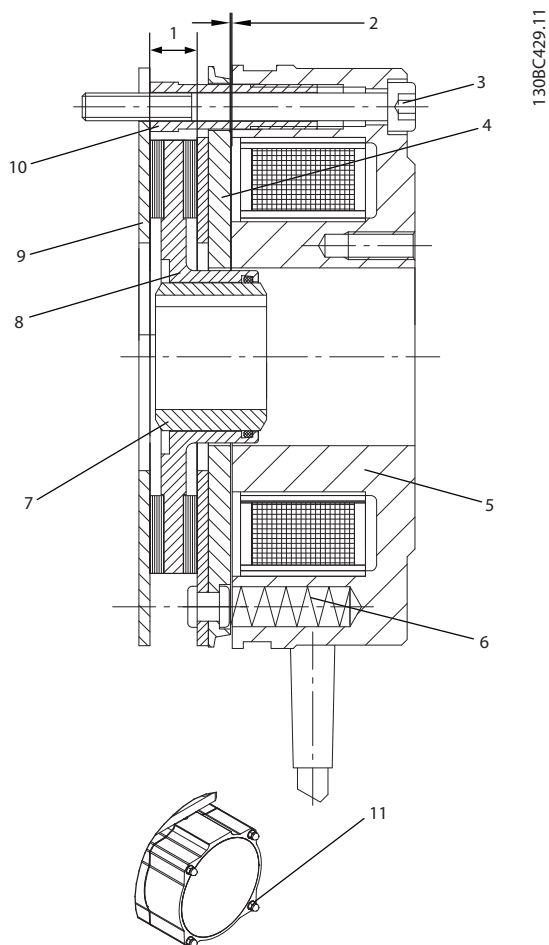
Component	Maintenance task	Maintenance interval	Instruction
OneGearDrive	Check for abnormal noise and vibration.	Every 6 months.	Contact Danfoss Service.
Protective coating	Check for damage.	Every 6 months.	Repair damage using the Danfoss paint repair set.
Hollow shaft seal (stainless steel shaft)	Check the condition and check for leakage.	Every 6 months.	If damaged, replace with a Viton seal.
Hollow shaft seal (mild steel shaft)	Check the condition and check for leakage.	Every 6 months.	If damaged, replace with an NBR seal.
Oil	Change the oil.	Standard oil: After 25000 operating hours. Food grade oil: After 35000 operating hours.	See <i>chapter 6.4.4 Changing the Oil</i> .
	Check for oil leakage on gear and motor housing.	Every 12 months.	Replace the OneGearDrive.

Table 6.1 Overview of Maintenance Tasks

6.1.1 Replacing the Brake and Rotor

All work must only be carried out by qualified technical personnel on a stationary machine, that has been protected against restarting. This also applies to auxiliary circuits.

6.1.1.1 Illustration



1	Rotor width, minimum 5.5 mm
2	Air gap, maximum 0.45 mm
3	Fastening screws
4	Armature plate
5	Magnet
6	Springs
7	Hub for rotor
8	Rotor
9	Friction plate
10	Hollow screws
11	Brake cover and nuts

Illustration 6.1 Brake and Rotor

1. Open the brake completely by turning the brake cover nuts (11) counter-clockwise.
2. Loosen the fastening screws (3) completely by turning them counter-clockwise.
3. Remove the installed brake and rotor from the hub of the rotor (7).
4. Assemble the new brake and rotor on the hub of the rotor (7).

5. Tighten the fastening screws (3).
6. Close the brake cover and tighten the covering nuts (11).

NOTICE

After the rotor has been exchanged, the complete braking torque will only be effective after the brake linings at the rotor have been run in. Check the brake cover seal before closing it and exchange the seal if any damage is detected.

6.1.2 Adjusting the Nominal Brake Torque and Replacing the Springs

The nominal brake torque can be adjusted and broken springs can be replaced. Follow the instructions in chapter 6.1.1 Replacing the Brake and Rotor to open the brake as reference for the nominal brake torque:

Nominal brake torque [Nm]	Number of springs
10	7
7	5
6	4
4	3

Table 6.2 Nominal Brake Torque

6.2 Inspection during Operation

Changes in relation to normal operation, such as higher temperatures, vibrations or noises, indicate that the function is impaired. To avoid faults that could lead, directly or indirectly, to injury to persons or damage to property, inform the maintenance staff responsible. If in any doubt, switch the OneGearDrive off immediately.

Carry out regular inspections during operation. Check the OneGearDrive at regular intervals for anything unusual.

Pay particular attention to:

- Unusual noises
- Overheated surfaces (temperatures up to 70 °C may occur in normal operation)
- Uneven running
- Strong vibrations
- Loose fastenings
- Condition of electrical wiring and cables
- Poor heat dispersion

If irregularities or problems occur, contact Danfoss Service.

6.3 Repair

NOTICE

Always return defective OneGearDrives to the local Danfoss sales company.

6.4 Oil

6.4.1 Oil Changes

The OneGearDrive is supplied with oil ready for operation.

Table 6.3 shows the oil change intervals based on normal operating conditions and an oil temperature of approximately 80 °C. The oil change interval must be reduced at higher temperatures (halve it for each 10 K increase in the oil temperature).

Oil type	Oil change interval
Standard oils	Up to 25000 operating hours.
Food grade oils	Up to 35000 operating hours.

Table 6.3 Oil Change Intervals

The OneGearDrive has drain and filling plugs, that make it possible to change the oil without disassembly.

When changing the oil, inspect and, if necessary, replace the seals.

It is necessary to flush the OneGearDrive if the oil grade or oil type is changed.

Flushing the OneGearDrive

1. Drain off the original oil.
2. Flush out the OneGearDrive with petroleum until all traces of oil have been removed.
3. Refill the OneGearDrive with the new oil as defined on the nameplate.

6.4.2 Oil Grade

Standard oils comply with DIN 51502 and DIN 51517 and are suitable for lubricating the gear unit. Food grade oils, which comply with NSF H1, can be used.

The oil must permit low-friction, wear-free continuous operation. The damage load level on the FZG test as specified in DIN 51354 should be in excess of load level 12, and the specific wear below 0.27 mg/kWh. The oil should protect against corrosion and should not foam or attack the interior paint, the rolling contact bearings, gearwheels, and seals.

Do not mix different oil types, as this may impair the characteristics of the oil. A long service life is only ensured by the use of oil listed in *Table 6.4* or equivalent.

If the OneGearDrive is stored for a long period before installation, refer to *chapter 8.2 Storage*.

6

Only the following wear-protecting EP gear oils fulfil the requirements for the specified maintenance intervals (see *chapter 6.4.1 Oil Changes*):

Oil manufacturer	Standard oil Synthetic oil PGLP 220	Food grade oil NSF USDA H1 oil
ARAL	Degol GS 220	Eural Gear 220
BP	Enersyn SP-XP 220	–
CASTROL	Alphasyn PG 220 OPTIFLEX A 220	OPTILEB GT 220
FUCHS	Renolin PG 220	Cassida Fluid GL 220
KLÜBER	Klübersynth GH 6-220	Klüberoil 4UH1-220N
MOBIL	Glygoyle HE 220 Glygoyle 30	SHC Cibus 220
SHELL	Omala S4 GX 220	–
TEXACO	–	NEVASTANE SL220

Table 6.4 Oil Grades

6.4.3 Oil Volume

The recommended oil quantity for the particular mounting position is indicated on the motor nameplate. When filling, ensure that the upper gear unit components are also well lubricated.

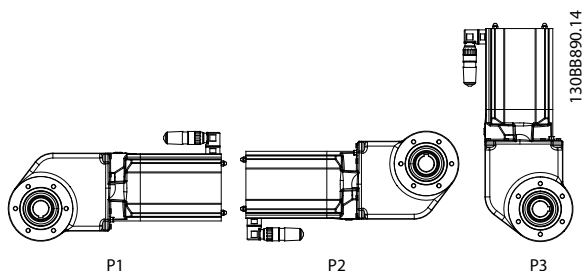


Illustration 6.2 Mounting Positions

	Mounting position		
	P1 ¹⁾	P2	P3
Oil volume for OneGearDrive	2.2 l		3.1 l

Table 6.5 Oil Volume in Litres

1) P1 is no longer available in the Danfoss DRIVECAT configurator. Use P2 also for P1 installations.

6.4.4 Changing the Oil

CAUTION

DANGER OF BURNS

The surface of the OneGearDrive and the oil in the OneGearDrive can reach high temperatures during operation.

- Do not touch the OneGearDrive until it has cooled down.
- Do not carry out an oil change until the oil has cooled down sufficiently.

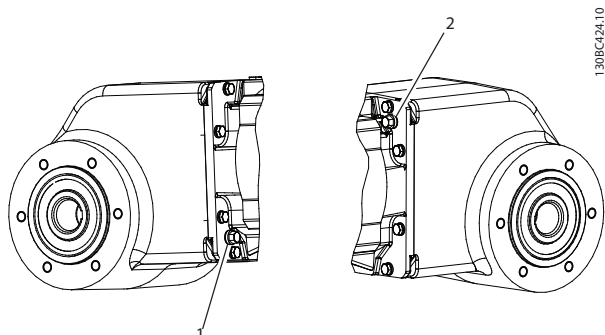


Illustration 6.3 OneGearDrive Oil Screws 1 and 2

Draining the oil

1. Once the OneGearDrive and the oil have cooled down, remove the OneGearDrive from your system.
2. Bring the OneGearDrive into a vertical position and remove oil screws (1) and (2).
3. Turn the OneGearDrive into a horizontal position and drain the oil through screw hole 1 into a suitable container.
4. Turn the OneGearDrive back into a vertical position.

Filling the oil

1. Fill the OneGearDrive with the appropriate amount of oil through screw hole (1).
2. Remove all traces of oil from the surface of the OneGearDrive using a soft cloth.
3. Re-insert and tighten oil screws (1) and (2).

NOTICE

The required oil quantities can be found on the nameplate and in *chapter 6.4.3 Oil Volume*.

NOTICE

The original Danfoss stainless steel oil screws can be reused. They do not require any additional seal.

NOTICE

The OneGearDrive does not require any breather vents. Never install a breather vent instead of the oil screws.

6.5 Spare Parts

Spare parts can be ordered via the Danfoss VLT Shop: vltshop.danfoss.com

7 Decommissioning

⚠ WARNING

HIGH VOLTAGE

Potentially lethal voltage is present on the connectors, which can lead to death or serious injury.

- Before working on the power connectors (disconnecting or connecting the cable to the OneGearDrive), disconnect the supply to the frequency converter and wait for the discharge time to elapse (see the frequency converter operating instructions).
- Installation, start-up, maintenance and decommissioning must be performed by qualified personnel only.

⚠ CAUTION

DANGER OF BURNS

The surface of the OneGearDrive and the oil in the OneGearDrive can reach high temperatures during operation.

- Do not touch the OneGearDrive until it has cooled down.
- Do not carry out an oil change until the oil has cooled sufficiently.

7.1 Dismounting

1. Disconnect the supply to the frequency converter and wait for the discharge time to elapse (see the frequency converter operating instructions).
2. Remove the electrical cable from the frequency converter to the OneGearDrive.
3. Dismount the OneGearDrive.

7.2 Product Returns

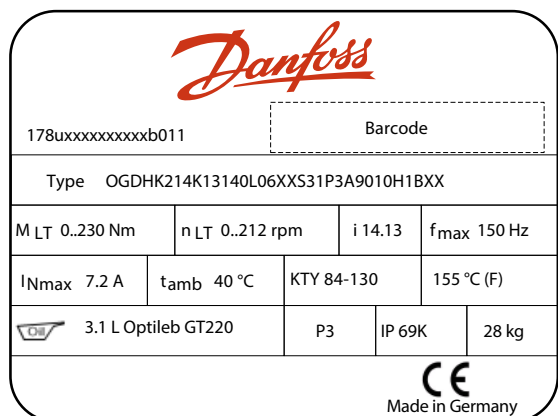
Danfoss products can be returned for disposal at no charge. A prerequisite for this is that they are free of deposits, such as oil, grease or other types of contamination.

Furthermore, no foreign materials or third-party components may be included with the returned product. Ship the products to the local Danfoss Sales Company.

8 Specifications

8.1 Nameplate

The nameplate on the OneGearDrive is corrosion-proof. It is made of a special plastic, approved for hazardous areas by the Physikalisch-Technische-Bundesanstalt (PTB).



1308851.13

Illustration 8.1 Example Nameplate

8.2 Storage

If the OneGearDrive is to be stored, ensure a dry, dust free, and well-ventilated environment with a low vibration rating of $v_{eff} < 0.2$ mm/s. If the temperature in the storage space exceeds the normal range of -20 °C to 40 °C for an extended period or varies frequently, employ the measures before start-up specified in *chapter 5.1 Measures before Commissioning*, even after short storage times.

Damage sustained during storage:

- The life of the oils and seals is reduced with longer storage times.
- There is a risk of fracture at low temperatures (under approximately -20 °C).
- If the transport eyebolts are replaced, use drop forged eyebolts as specified in DIN 580.

If the OneGearDrive is being stored for an extended time before start-up, increased protection against damage by corrosion or humidity can be achieved by observing the following information. The actual load depends strongly on local conditions, therefore the time period stated is only a guide value. This period does not include any extension of the warranty. If disassembly is necessary before start-up, contact Danfoss Service. The instructions contained in these operating instructions must be observed.

8.2.1 Measures during Storage

Turn the OneGearDrive 180° every 12 months so that the oil in the gear unit covers the bearings and gearwheels that were previously positioned on top. Also, turn the output shaft manually to churn the rolling-contact bearing grease and distribute it evenly.

The OneGearDrive does not need to be turned if it is completely filled with oil as the result of a special agreement. In this case, reduce the oil level before start-up to the desired value, as defined in *chapter 6.4.3 Oil Volume* and on the nameplate.

8.2.2 Measures after Storage

Repair any damage to the exterior paint layer or to the rust protection of the bright metal shafts, including hollow shafts.

Check that the OneGearDrive contains the correct amount of oil and that the oil quality has not diminished during storage. If so, follow the instructions in *chapter 6.4.4 Changing the Oil*.

8.3 Permanent Magnet 3-phase Synchronous Motor

Rated torque	12.6 Nm
Rated current	7.2 A
Rated speed	3000 RPM
Rated frequency	250 Hz
Motor circuit	Y
Stator resistance (Rs)	0.5 Ω
Inductivity – D axis (Ld)	5 mH
Inductivity – Q axis (Lq)	5 mH
Motor poles (2p)	10
Moment of inertia	0.0043 Kg ^m ²
Back EMF constant (ke)	120 V/1000 RPM
Torque constant (kt)	1.75 Nm/A

Table 8.1 Specifications

8.4 General Specifications and Environmental Conditions

Installation elevation	Refer to the Design Guide for the installed frequency converter.
Maximum backlash of gearbox unit	±0.07°

Table 8.2 General Specifications and Environmental Conditions

8.5 Dimensions

8.5.1 OneGearDrive Standard

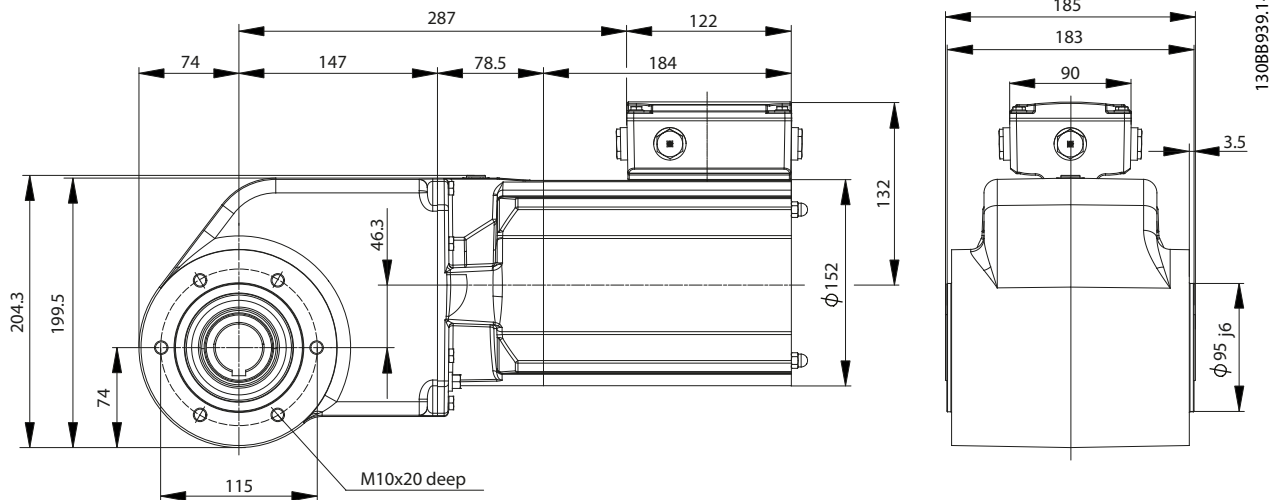


Illustration 8.2 OneGearDrive Standard

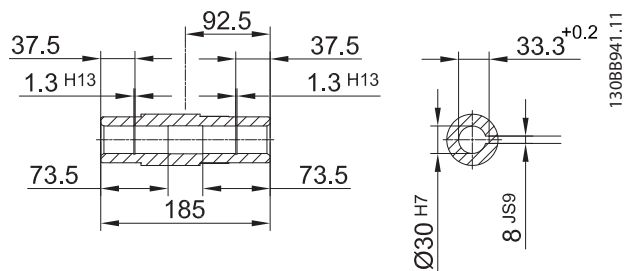


Illustration 8.3 Steel/Stainless Steel 30

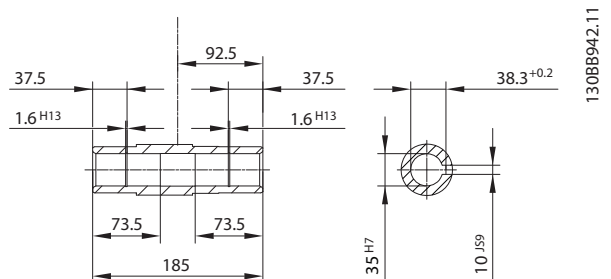


Illustration 8.4 Steel/Stainless Steel 35

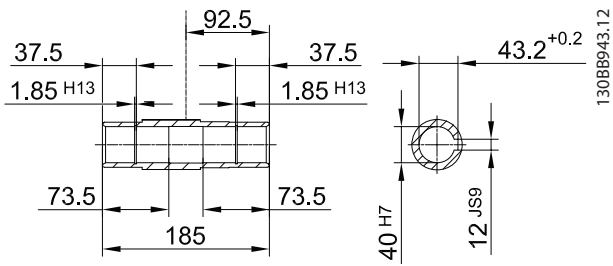


Illustration 8.5 Steel/Stainless Steel 40

8.5.2 OneGearDrive Standard with Torque Arm in Front Position (optional)

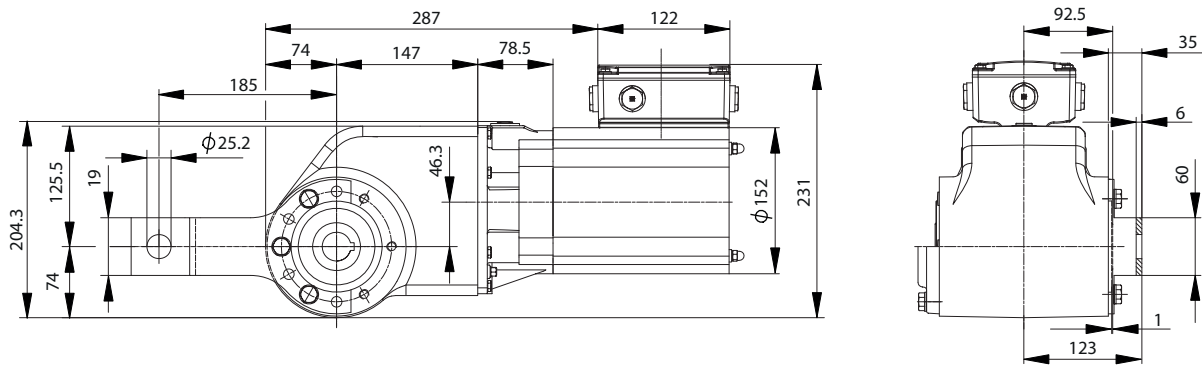


Illustration 8.6 Torque Arm in Front Position

8.5.3 OneGearDrive Hygienic

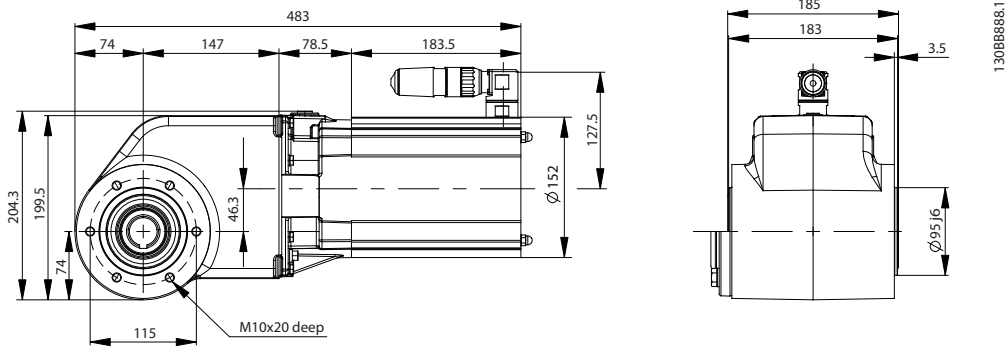


Illustration 8.7 OneGearDrive Hygienic

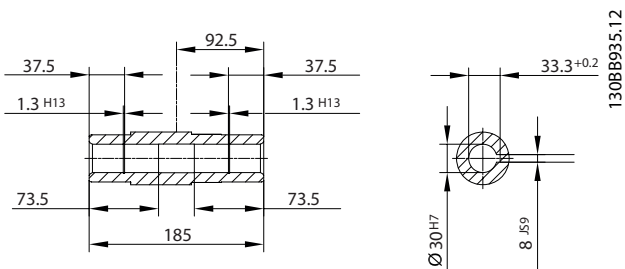
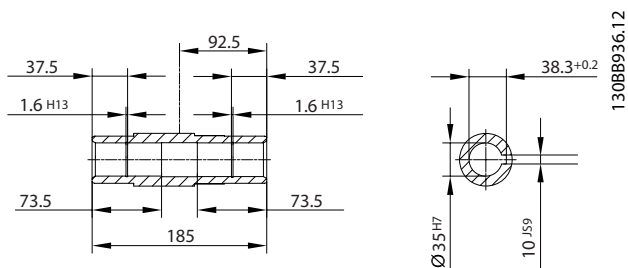
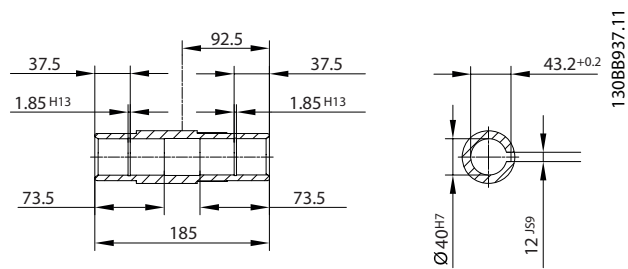


Illustration 8.8 Stainless Steel 30



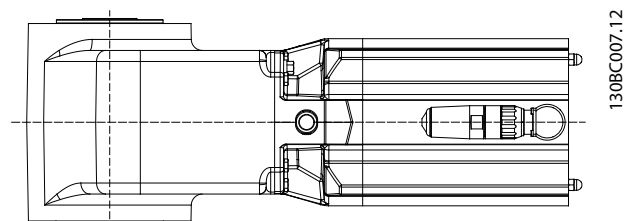
130BB936.12

Illustration 8.9 Stainless Steel 35



130BB937.11

Illustration 8.10 Stainless Steel 40



130BC007.12

Illustration 8.11 Connector Position

NOTICE

Never turn the CleanConnect® plug from the delivered position and do not use it to lift the OneGearDrive. If the plug is rotated, the cables could be damaged, causing a short circuit. Contact Danfoss Service if the plug is not fastened tightly.

8.5.4 OneGearDrive Hygienic with Torque Arm in Front Position (optional)

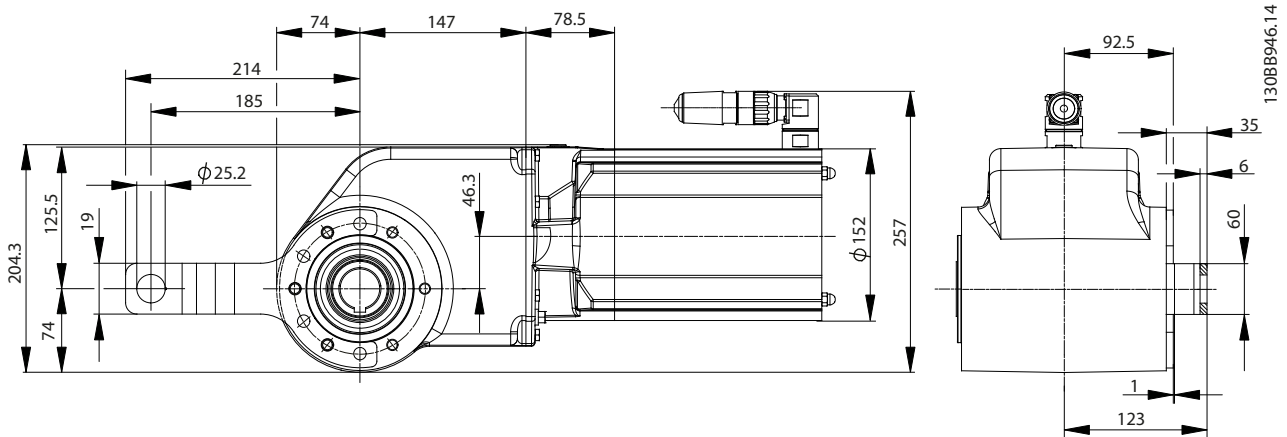


Illustration 8.12 Torque Arm in Front Position

8.6 Options

8.6.1 Torque Arm Set

Part number: 178H5006

The torque arm set consists of the torque arm (see *Illustration 8.13*) and the mounting set (see *Illustration 8.14*).

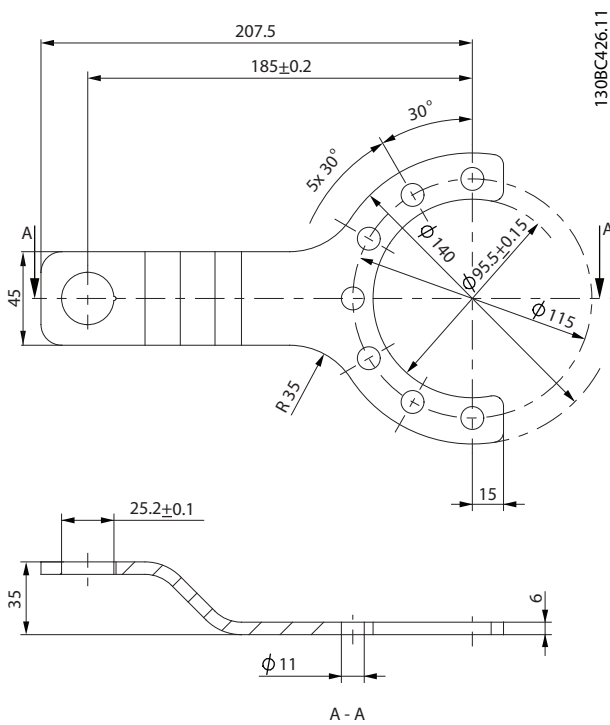
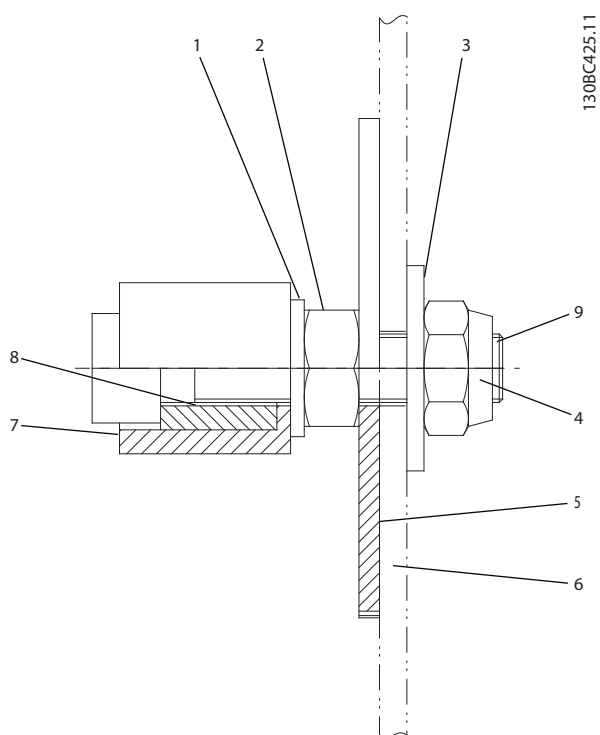


Illustration 8.13 Torque Arm



8

Position	Description	Specification
1	Disc	DIN 125-A10 5
2	Nut	DIN 934 M10
3	Disc	DIN 9021 10, 5x30x25
4	Nut	DIN 985 M10
5	Disc	Ø73x3 Stainless steel
6	Customer frame	-
7	Barrel	POM-C white
8	Bushing	Stainless steel
9	Screw	Stainless steel

Illustration 8.14 Mounting Set

NOTICE

The set also contains 3xDIN 933, M10x25, 8.8, stainless steel screws. The tightening torque is 49 Nm.

NOTICE

Only use the original Danfoss or comparable mounting set to mount the OneGearDrive to the conveyor. The mounting equipment used must ensure the same degree of flexibility as the original Danfoss mounting set. The torque arm cannot be screwed directly on to the conveyor frame.

8.6.2 Mechanical Brake

8.6.2.1 Overview

The OneGearDrive Standard is available with a 180 V DC brake option. This mechanical brake option is intended for emergency stop and park brake duty. Normal braking of a load is still controlled by the frequency converter dynamic brake.

Spring-loaded brakes are safety brakes that continue to work in the event of power failure or usual wear. Since other components could also fail, take suitable safety precautions to avoid any injury to persons or damage to objects caused by operation without a brake.

WARNING

Danger of fatal injury if the hoist falls. Severe or fatal injuries.

- Do not use the brake in vertical lifting and hoisting applications.

8.6.2.2 Technical Data

Voltage	V _{DC}	180 ±10%
P _{el}	W	14.4
Resistance	Ω	2250 ±5%
Current	A	0.08
Maximum brake torque	Nm	10

Table 8.3 Technical Data: Mechanical Brake Option

8.6.2.3 Dimensions

Illustration 8.15 shows the dimensions of the OneGearDrive with the mechanical brake option.

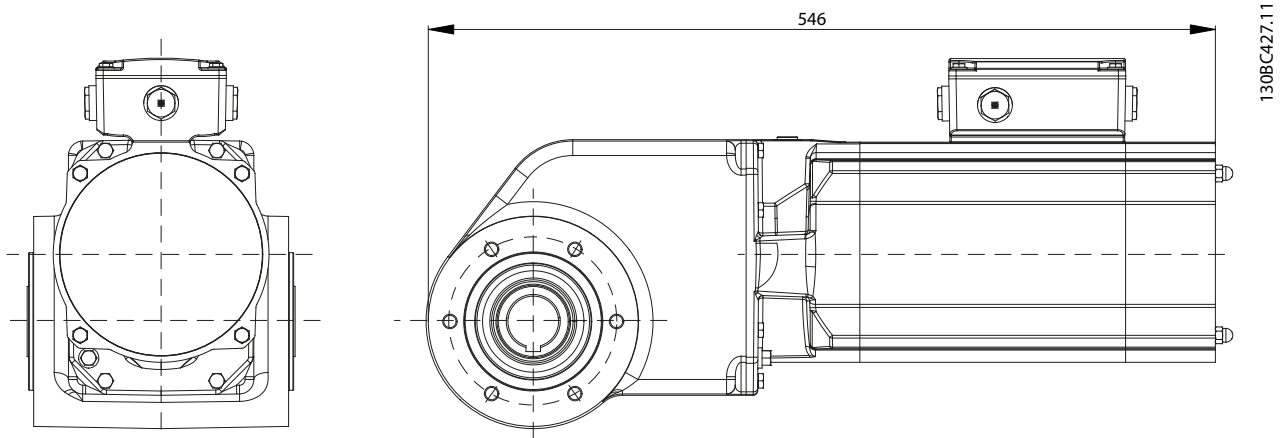


Illustration 8.15 Dimensions: OneGearDrive with Mechanical Brake Option

8.6.2.4 Connections

Illustration 8.16 shows the cage clamp and the connection to VLT® AutomationDrive FC 302.

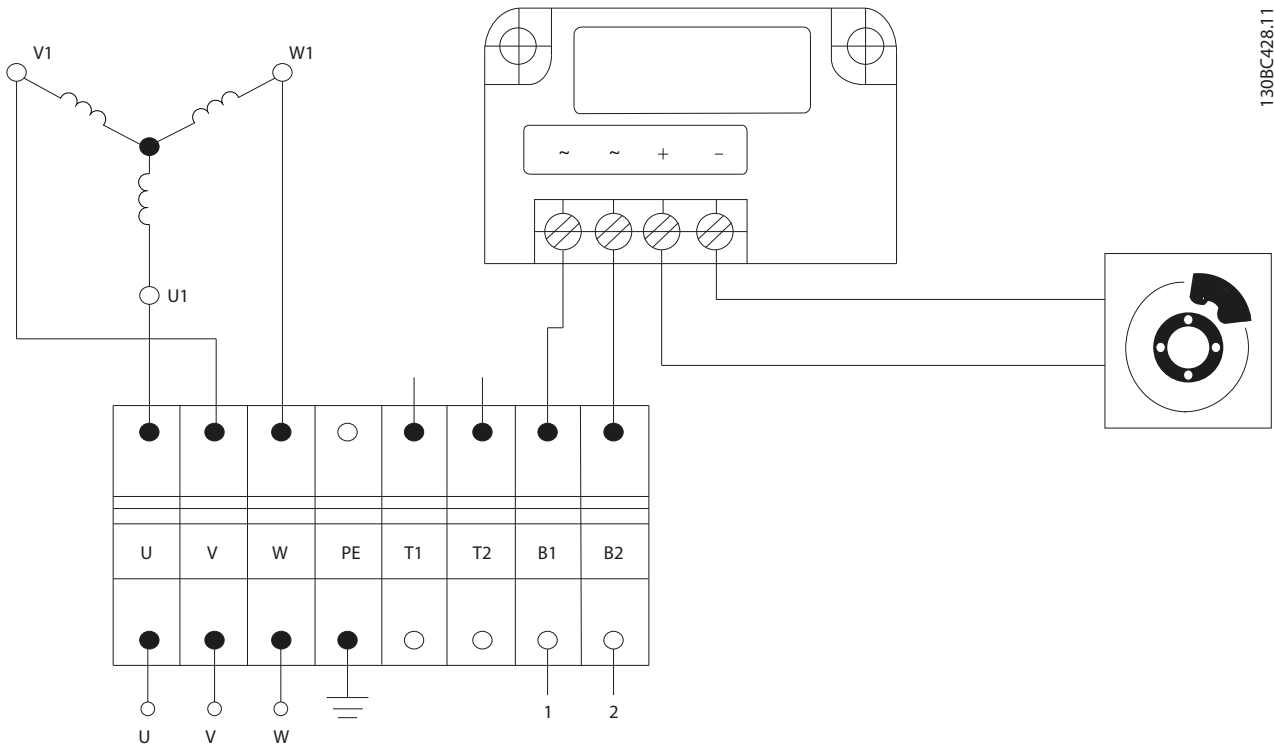


Illustration 8.16 Cage Clamp and Connection to VLT® AutomationDrive FC 302.

Description	Coding	Pin	Colour	Typical cross-section	Maximum cross-section	VLT® AutomationDrive FC 302	VLT® Decentral Drive FCD 302	External DC supply
Brake supply	B1	1	Brown	AWG 20/ 0.75 mm ²	AWG 14/ 2.5 mm ²	400 V AC supply	Terminal 122 (MBR+)	+
	B2	2	Black			Terminal 04	Terminal 123 (MBR-)	-

Table 8.4 Mechanical Brake Option Connections

NOTICE

Connect terminal 05 on the VLT® AutomationDrive FC 302 to the 400 V AC supply.

The connection and use of the mechanical brake has been tested and released with VLT® AutomationDrive FC 302 and VLT® Decentral Drive FCD 302. Any other frequency converter may require a different connection. Contact Danfoss Service for further information.

For information about parameter setting and programming when using VLT® AutomationDrive FC 302 or VLT® Decentral Drive FCD 302, refer to the corresponding operating instructions.

8.7 Accessories

8.7.1 Accessories for OneGearDrive Standard

OneGearDrive Standard	Ordering number
Torque arm, stainless steel	178H5006

Table 8.5 Accessories for OneGearDrive Standard

8.7.2 Accessories for OneGearDrive Hygienic

OneGearDrive Hygienic	Ordering number
Motor connector without cable	178H1613
Motor connector with 5 m cable	178H1630
Motor connector with 10 m cable	178H1631
Torque arm, stainless steel	178H5006

Table 8.6 Accessories for OneGearDrive Hygienic

9 Appendix

9.1 Glossary

Ambient temperature

The temperature in the immediate vicinity of the system or component.

Axial force

The force in newton-metres acting on the rotor axis in the axial direction.

CE

European test and certification mark.

CageClamp

Wire retention method without using special tools in the terminal box.

CleanConnect

EHEDG certified connection from Danfoss with a stainless steel connector.

CSA

Canadian test and certification mark.

EHEDG

European Hygienic Engineering and Design Group.

ExtensionBox

Optional part for VLT® OneGearDrive that increases the output torque.

f_{max}

Maximum frequency specified.

Gear ratio

The speed ratio of the input pinion and the output shaft of the gear unit.

Hygienic

Variant of the OneGearDrive for hygienic critical areas.

Installation elevation

Installation elevation above normal sea level, typically associated with a derating factor.

I_{Nmax}

Maximum nominal current specified.

IP

International protection codes.

M20x1.5

Thread specification in the terminal box.

Mechanical brake

Additional option for the OneGearDrive.

M_{LT}

Specified output torque under S1 duty conditions.

Motor shaft

Rotating shaft on the A side of the motor, typically without a key groove.

Mounting set

Additional components to fix the torque arm to the conveyor frame and included in the torque arm set.

n_{LT}

Specified output speed under S1 duty conditions.

Radial force

The force in newton-metres acting at 90° to the longitudinal direction of the rotor axis.

t_{amb}

Maximum ambient temperature specified.

Terminal box

Connection cage for the OneGearDrive Standard.

Torque arm set

Accessory for the OneGearDrive that includes a torque arm and a mounting-set

UL

Underwriters Laboratories.

9.2 Abbreviations and Conventions

9.2.1 Abbreviations

AC	Alternating current
AWG	American wire gauge
°C	Degrees Celsius
DC	Direct current
EMC	Electromagnetic compatibility
ETR	Electronic thermal relay
f _{M,N}	Nominal motor frequency
FC	Frequency converter
IP	Ingress protection
I _{M,N}	Nominal motor current
I _{VLT,N}	Rated output current supplied by the frequency converter
N.A.	Not applicable
P _{M,N}	Nominal motor power
PE	Protective earth
PELV	Protective extra low voltage
PM motor	Permanent magnet motor
RPM	Revolutions per minute
T _{LIM}	Torque limit
U _{M,N}	Nominal motor voltage

Table 9.1 Abbreviations

9.2.2 Conventions

- Numbered lists indicate procedures.
- Bulleted lists indicate other information and description of illustrations.
- Italicised text indicates:
 - Cross-reference
 - Link
 - Footnote
 - Parameter name, parameter group name or parameter option
- All dimension drawings are in mm.

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