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# Instruction Manual VLT<sup>®</sup> OneGearDrive



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**VLT**<sup>®</sup>  
THE REAL DRIVE



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# 1 Introduction

## 1.1 Purpose of this Instruction Manual

The purpose of this instruction manual is to describe the VLT® OneGearDrive. This instruction manual contains information about:

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

### **NOTICE!**

For reasons of clarity, the instruction manual 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 what is required for qualified personnel in normal working situations. Contact Danfoss for further assistance.

This instruction manual is intended for use by qualified personnel. Read this instruction manual in full in order to use the OneGearDrive safely and professionally. Pay particular attention to the safety instructions and general warnings.

These instruction manual is an integral part of the OneGearDrive and also contains important service information. Keep this instruction manual available with the OneGearDrive at all times.

Compliance with the information in this instruction manual is a prerequisite for:

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

Therefore, read this instruction manual before working on or with the OneGearDrive.

VLT® is a registered trademark.

## 1.2 Document Version

This document is reviewed and updated regularly. 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.
- Unauthorized 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 unless expressly intended for this purpose. Increased safety precautions (for example, protecting children from inserting their 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 -4 °F [-2 °C] to 104 °F [40 °C] as well as for installation heights up to 3,300 ft [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

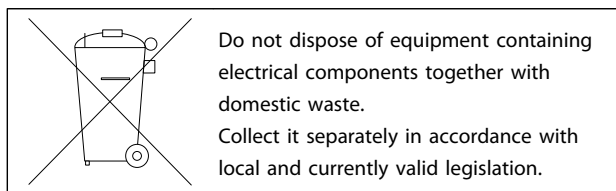
Any use not expressly approved by Danfoss constitutes misuse. This also applies to failure to comply with the specified operating conditions and applications.

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/](http://www.danfoss.com/Contact/Worldwide/)

## 2 Safety

### 2.1 Safety Symbols

The following symbols are used in this document:

#### **⚠ WARNING**

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

#### **⚠ CAUTION**

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 may only be performed by adequately qualified personnel (e.g., electrical engineers as specified in draft EN 50 110-1/DIN VDE 0105), who have access to the instruction manual 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 have authorization based on training, experience, and instruction as well as 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 recognize and avoid potential hazards. Knowledge of First Aid and of the necessary lifesaving equipment available 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 instruction manual is always available near the OneGearDrive in complete and readable form.
- The OneGearDrive is only fitted, installed, commissioned and maintained by adequately qualified and authorized personnel.
- These personnel are regularly instructed on all relevant matters of occupational safety and environmental protection, as well as the contents of the instruction manual 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 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

#### **⚠ 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 to the OneGearDrive), disconnect the power supply to the adjustable frequency drive and wait for the discharge time to elapse (see the adjustable frequency drive instruction manual).
- Installation, start-up, maintenance and decommissioning must only be performed by qualified personnel.

#### **⚠ 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.



## 3 Mechanical Installation

### 3.1 Unpacking

#### 3.1.1 Items Supplied

The items supplied with the OneGearDrive are:

- OneGearDrive
- This instruction manual
- Eyebolt
- Plastic cap for eyebolt opening
- Hollow shaft cover with three 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 honor claims for defects 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 second 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 >104 °F [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.

3

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.

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

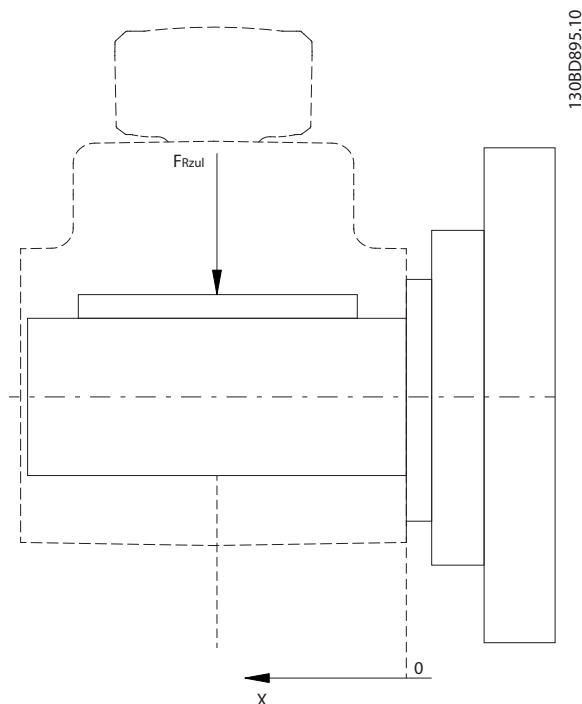


Figure 3.1 Maximum Force

Up to n2 [RPM]	FRZUL [N] up to X (in [mm]) <sup>1)</sup>				
	0.98 [25]	1.97 [50]	2.95 [75]	3.94 [100]	4.92 [125]
50	170 [4319]	148.2 [3763]	131.3 [3335]	117.9 [2994]	106.9 [2716]
100	119 [3023]	103.7 [2634]	91.9 [2334]	82.5 [2096]	74.8 [1901]
200	68 [1727]	59.3 [1505]	52.5 [1334]	47.2 [1198]	42.8 [1086]
360	55.3 [1404]	48.2 [1223]	42.8 [1084]	38.3 [973]	34.8 [883]

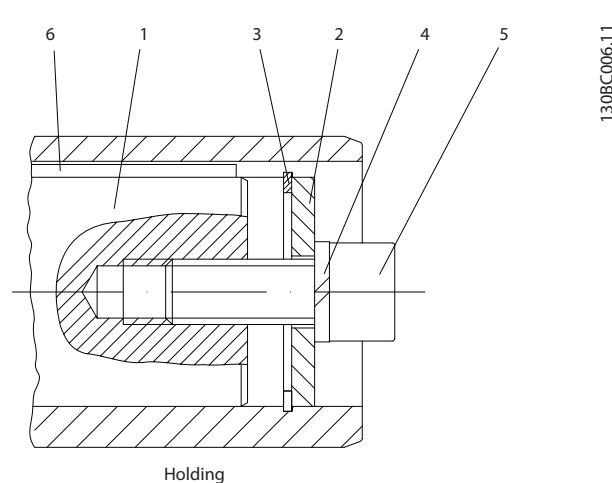
Table 3.1 Maximum Force

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

Figure 3.2 Assembly Kit

Type	Dimensions (inch)			
	Retaining ring (3) ANSI B17.1	Lock washer (4) ANSI B17.1	Fixing screw (5) ANSI B17.1	Key (6) ANSI B17.1 Width x Height x Length
OGD-L1	1.250 x 0.050	0.375	0.500-13 x 1.1875 [M12 x 30]	0.2500 x 0.2500 x 3.937 <sup>1)</sup>
OGD-L2	1.4375 x 0.050	0.500	0.500-13 x 1.3750 [M12 x 35]	0.3750 x 0.3750 x 3.937 <sup>1)</sup>
OGD-L3	1.500 x 0.050	0.625	0.625-11 x 1.6250 [M16 x 35]	0.3750 x 0.3750 x 3.937 <sup>1)</sup>

**Table 3.2 Dimensions of Assembly Kit Items**

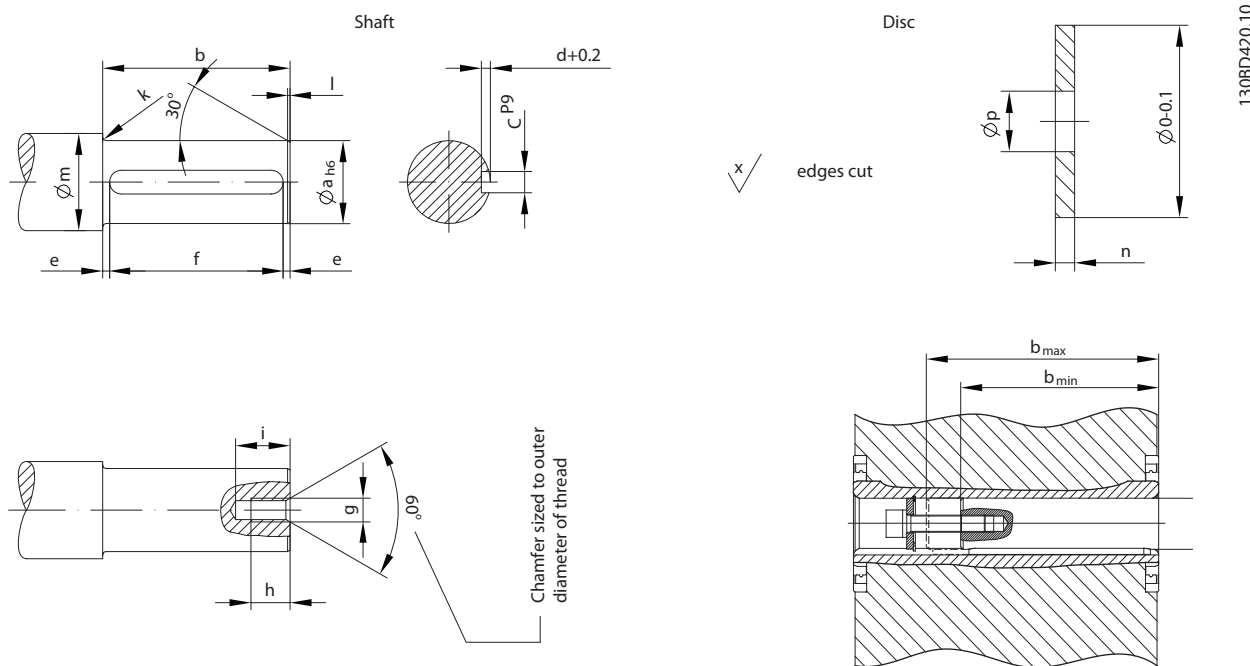
1) Key length required for  $b_{min}$  in Table 3.3. Adapt the key length according to the shaft length used ( $b$ ) in Table 3.3.

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*).


**Figure 3.3 Axial Fastening**

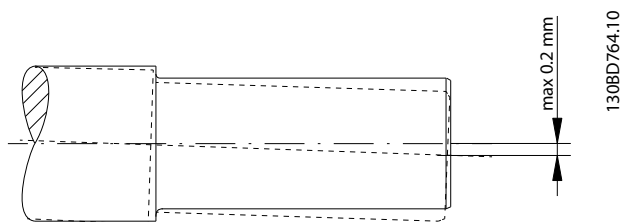


Figure 3.4 Maximum Allowed Eccentricity of the Conveyor Shaft

Type	Dimensions [inch]															
	Shaft													Disc		
	a	b <sub>min</sub>	b <sub>max</sub>	c	d	e	f <sup>1)</sup>	g	h	i	k	l	m	n	o	p
OGD-L1	1.250	4.724	5.512	0.250	0.138	0.195	5.122 <sup>+0.02</sup>	0.500-13 [M12]	0.866	1.181	0.118	0.059	1.496	0.1575	1.236	0.512
OGD-L2	1.4375	4.724	5.512	0.375	0.214	0.195	5.122 <sup>+0.02</sup>	0.500-13 [M12]	1.102	1.457	0.118	0.059	1.693	0.1575	1.425	0.512
OGD-L3	1.500	4.724	5.512	0.375	0.211	0.195	5.122 <sup>+0.02</sup>	0.625-11 [M16]	1.417	1.772	0.118	0.079	1.890	0.1575	1.488	0.669

Table 3.3 Dimensions of the Shaft and Disc

1) Key length required for b<sub>min</sub>. 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!**

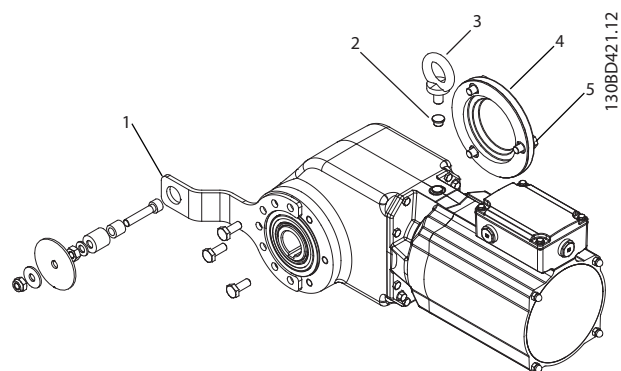
Use grease to mount the OneGearDrive onto the shaft. For example, CASTROL Obeen Paste NH1, ARAL Noco Fluid or similar. Use a key in the same material and quality as the hollow shaft.

## 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 *Figure 3.5*.



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

**Figure 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 three screws (5) onto the OneGearDrive.
  - 2a Fasten the screws by hand.
  - 2b Using a flat wrench, 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 instruction manual indicates 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., shielded cables) is the responsibility of the system's installers. For systems with adjustable frequency drives and rectifiers, the manufacturer's electromagnetic 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 adjustable frequency drives and rectifiers.

### 4.2 Electrical Connection

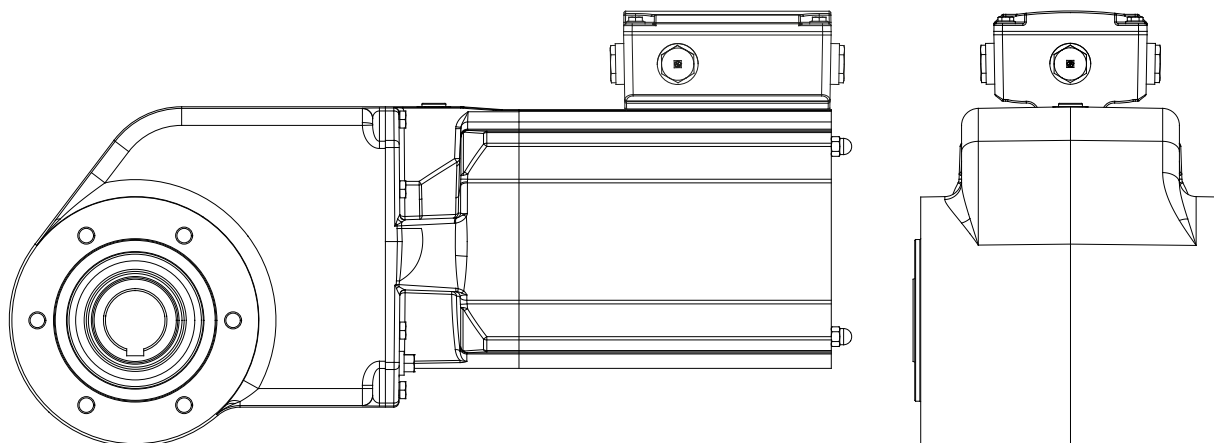
When connecting the motor, take note of the data on the nameplate, the connection diagram and the relevant safety regulations and rules for the prevention of accidents. Unless a special design is concerned, the data on the nameplate refers to:

- A voltage tolerance of  $\pm 5\%$ .
- An ambient temperature of  $-4\text{ °F}$  [ $-20$ ] to  $104\text{ °F}$  [ $40\text{ °C}$ ].
- Altitudes up to 3,300 ft [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.



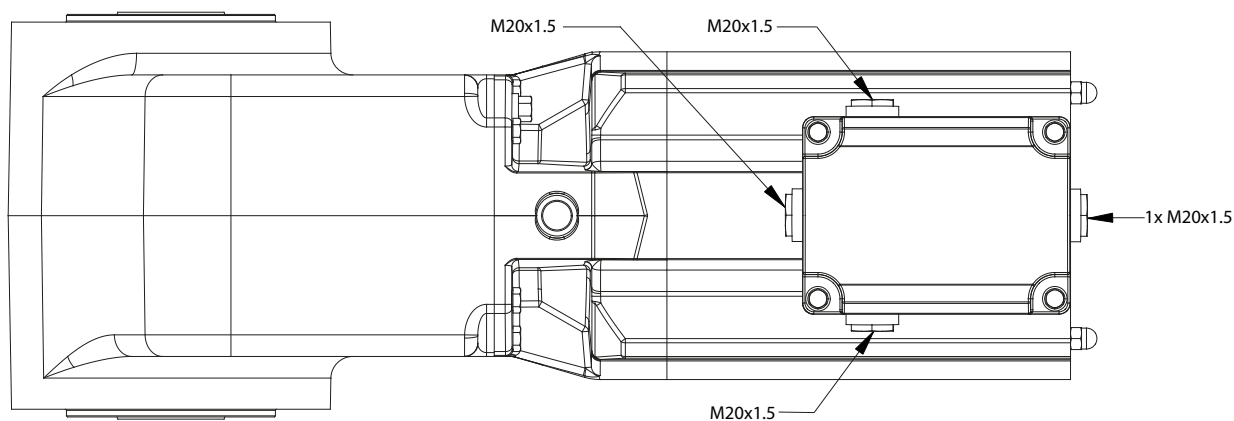
1308B498.13

Figure 4.1 Terminal Box

## CAUTION

Never alter the position of the terminal box or open any screws unless instructed to in this instruction manual. 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.



1308C003.12

Figure 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 AC line 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 equalization 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 Instruction Manual 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

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

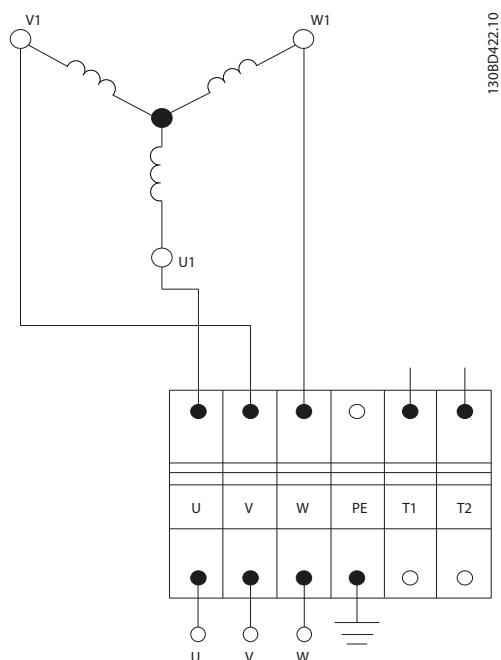


Figure 4.3 Cage Clamp Connection Diagram

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

Table 4.1 Cage Clamp Connections

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

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

Table 4.2 Connections T1 and T2

1) Only if connected

**NOTICE!**

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

### 4.5 CleanConnect® Connection Diagram

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

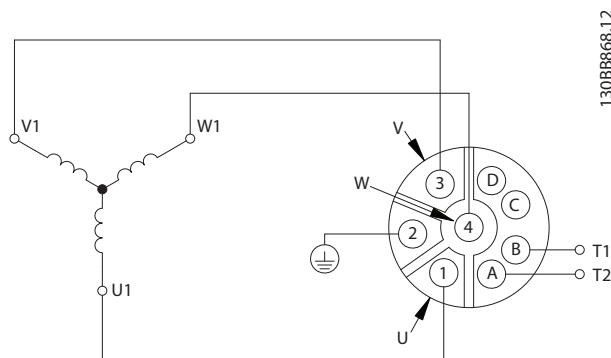


Figure 4.4 CleanConnect® OneGearDrive Connection

Description	Inverter output	Pin	Typical cross-section	Maximum cross-section
Motor winding	U	1	1.5 mm <sup>2</sup> /AWG 16	2.5 mm <sup>2</sup> /AWG 14
	V	3		
	W	4		
Protective ground	PE	2	1.5 mm <sup>2</sup> /AWG 16	2.5 mm <sup>2</sup> /AWG 14
Temperature protection <sup>1)</sup> KTY 84-130	T1	A	0.75 mm <sup>2</sup> /AWG 20	1.5 mm <sup>2</sup> /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 instruction manual.

T1	KTY 84-130	VLT® AutomationDrive FC 302 <sup>1)</sup>	VLT® Decentral Drive FCD 302 <sup>1)</sup>
T2		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 utilization in these cases and cannot be used as overload protection for the gear unit. In some cases, the way in which the machine being driven 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 five 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 two 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, color, hardness or sealing effect is detected.

### 5.2 Commissioning Procedure

- Remove the protective films.
- Disconnect the mechanical connection to the machine being driven as far as possible and examine the direction of rotation in the no-load state.
- Remove the feather keys or secure them in such a way that they cannot be ejected.
- Ensure that the current draw in the loaded condition does not exceed the rated current indicated on the nameplate for any length of time.
- After first commissioning, observe the OneGearDrive for at least hour 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 line power 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/](http://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.

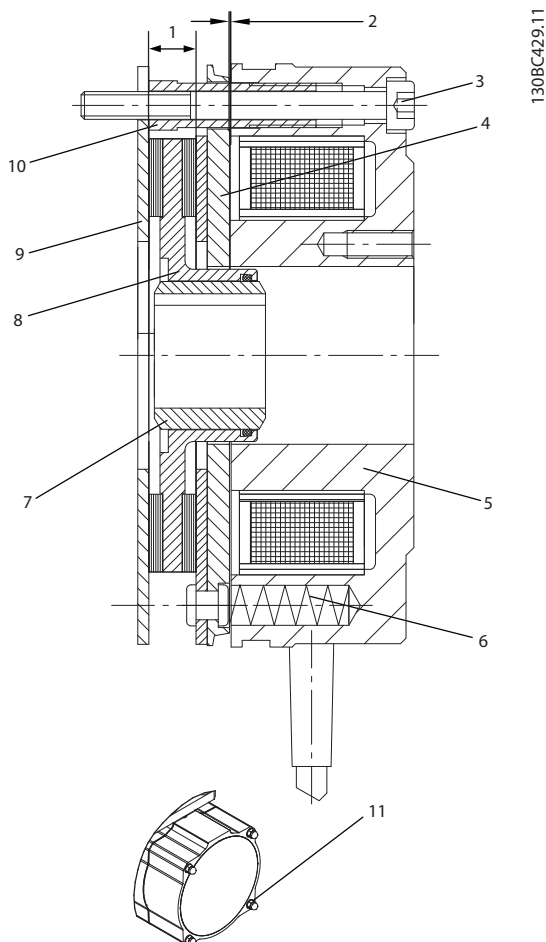
Component	Maintenance task	Maintenance interval	Instruction
OneGearDrive	Check for abnormal noise and vibration.	Every 6 months.	Contact Danfoss Service.
Protective coating	Check for damage.	Every 6 months.	Repair damage using the Danfoss paint repair set.
Hollow shaft seal (stainless steel shaft)	Check 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 25,000 operating hours. Food grade oil: After 35,000 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 Figure



1	Rotor width, minimum 0.217 in [5.5 mm]
2	Air gap, maximum 0.018 in [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

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

Figure 6.1 Brake and Rotor

## 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 158 °F [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 176 °F [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 25,000 operating hours.
Food grade oils	Up to 35,000 operating hours.

Table 6.3 Oil Change Intervals

The OneGearDrive has drain and filling plugs which 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, or seals.

Do not mix different oil types since 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 an equivalent.

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

Only the following wear-protecting EP gear oils fulfill 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.

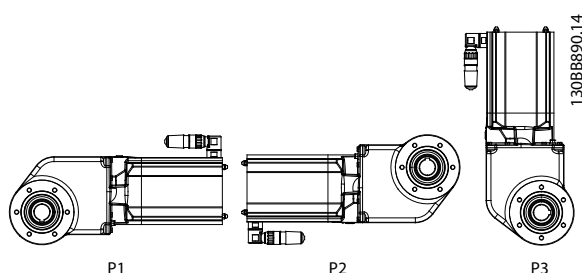


Figure 6.2 Mounting Positions

	Mounting position		
	P1 <sup>1)</sup>	P2	P3
Oil volume for OneGearDrive	74.4 fl oz [2.2 l]		105 fl oz [3.1 l]

Table 6.5 Oil Volume in Fluid Ounces

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

- 32 fl oz = 1 US Quart
- 128 fl oz = 1 US Gallon

### 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.

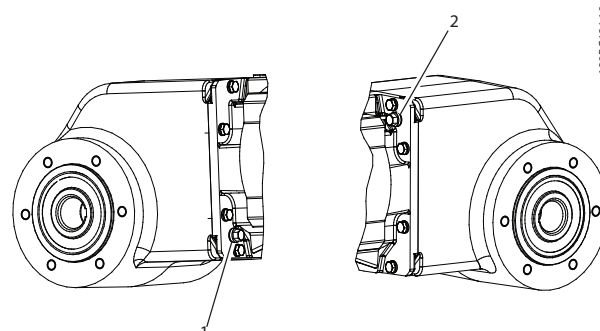


Figure 6.3 OneGearDrive Oil Screws 1 and 2

#### 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](http://vltshop.danfoss.com)



## 7 Decommissioning and Disposal

### **⚠ 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 adjustable frequency drive and wait for the discharge time to elapse (see the adjustable frequency drive instruction manual).
- 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 adjustable frequency drive and wait for the discharge time to elapse (see the adjustable frequency drive instruction manual).
2. Remove the electrical cable from the adjustable frequency drive 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 Motor Datasheet

### 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).

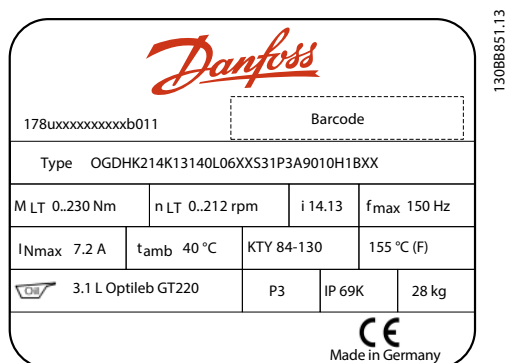


Figure 8.1 Example Nameplate

### 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  $-4$  °F to  $104$  °F [ $-20$  °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  $-4$  °F [ $-20$  °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 this instruction manual must be observed.

### 8.2.1 Measures during Storage

Turn the OneGearDrive  $180^\circ$  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 <sup>m</sup> <sup>2</sup>
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 adjustable frequency drive.
Maximum backlash of gearbox unit	±0.07°

Table 8.2 General Specifications and Environmental Conditions

### 8.5 Dimensions

#### 8.5.1 OneGearDrive Standard

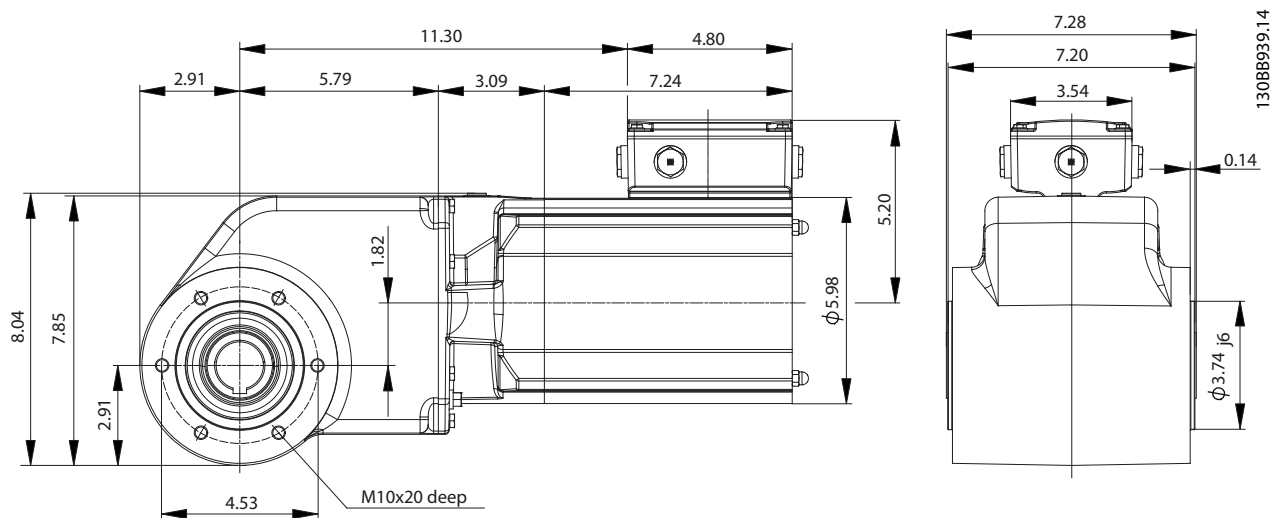


Figure 8.2 OneGearDrive Standard

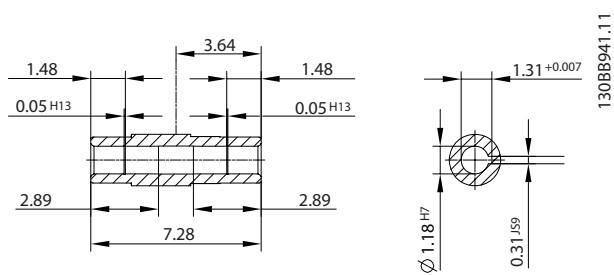


Figure 8.3 Steel/Stainless Steel 30

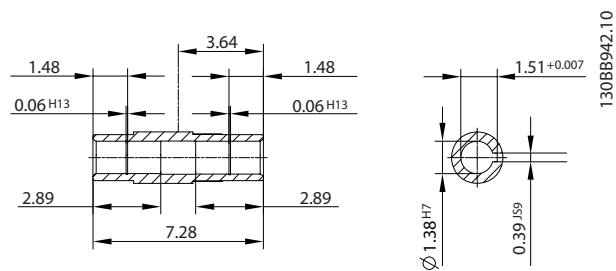


Figure 8.4 Steel/Stainless Steel 35

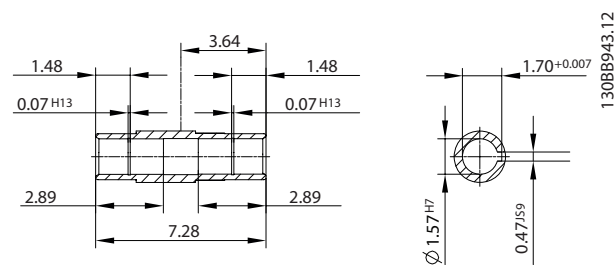


Figure 8.5 Steel/Stainless Steel 40

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

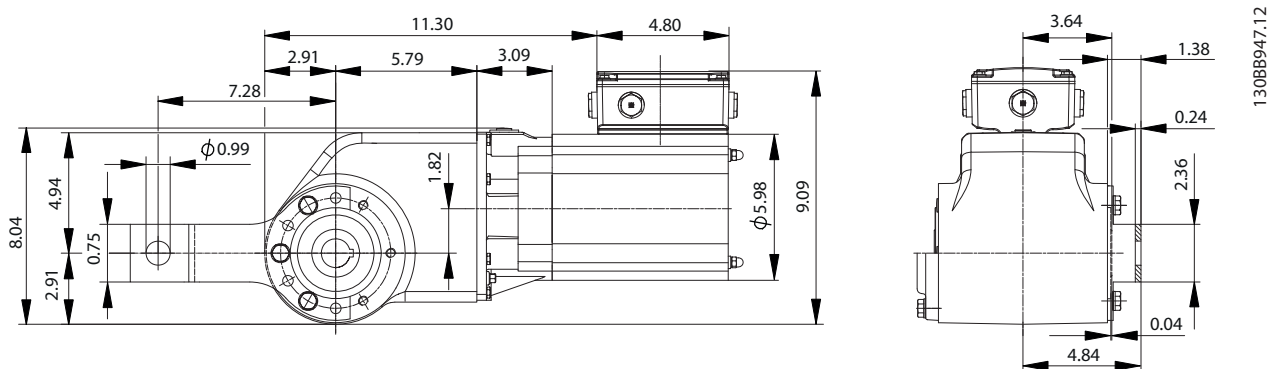


Figure 8.6 Torque Arm in Front Position

8.5.3 OneGearDrive Hygienic

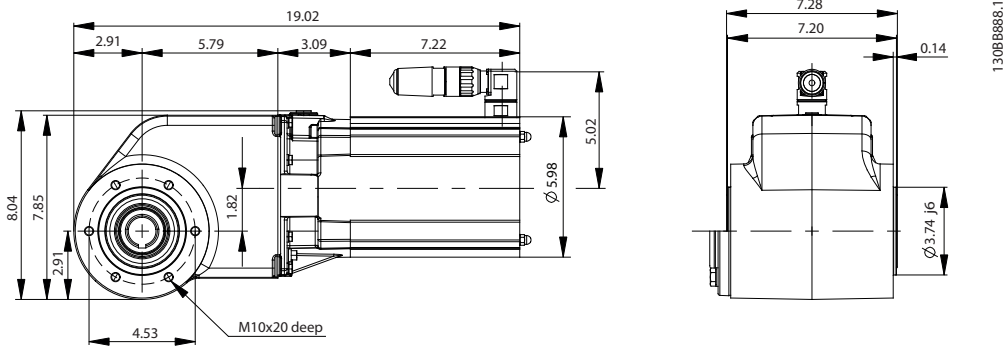


Figure 8.7 OneGearDrive Hygienic

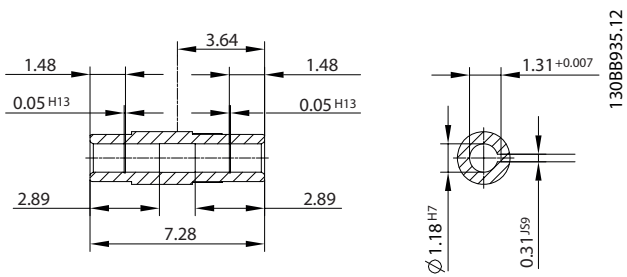


Figure 8.8 Stainless Steel 30

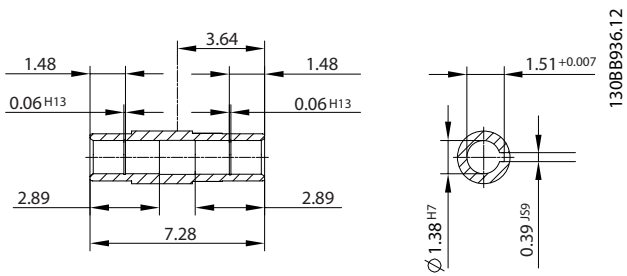


Figure 8.9 Stainless Steel 35

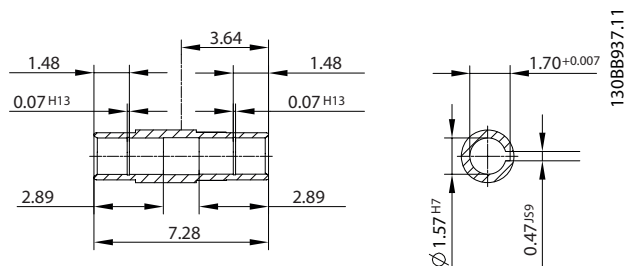


Figure 8.10 Stainless Steel 40

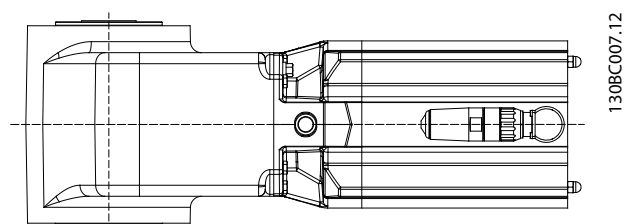


Figure 8.11 Connector Position

**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)

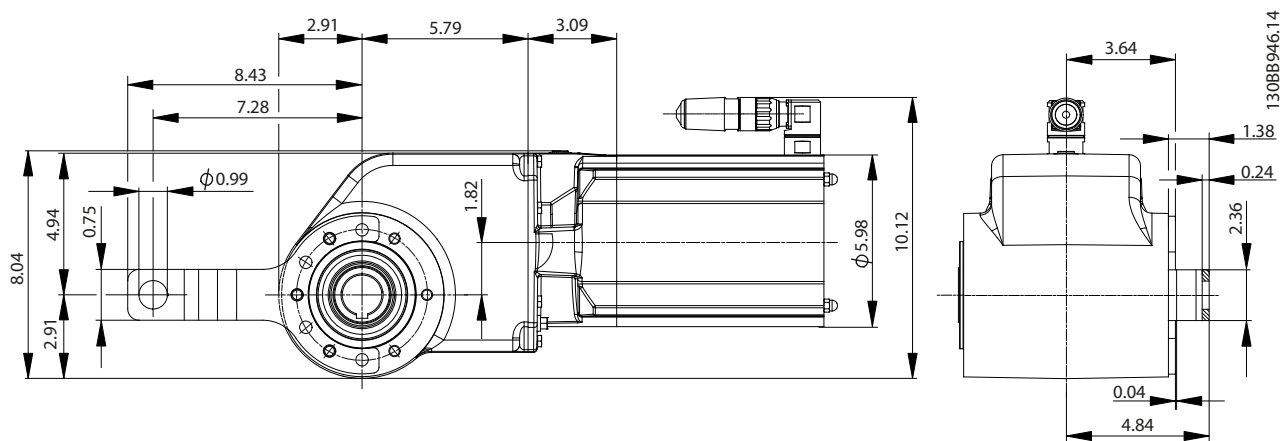


Figure 8.12 Torque Arm in Front Position

## 8.6 Options

### 8.6.1 Torque Arm Set

Part number: 178H5006

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

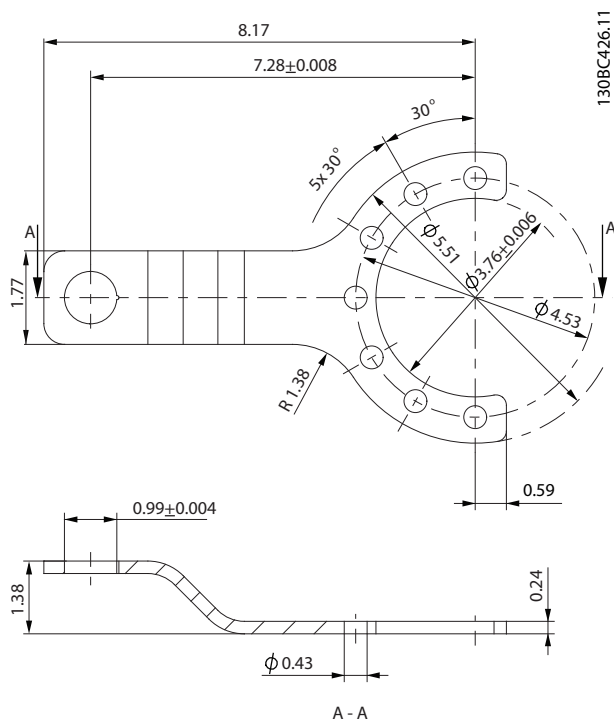
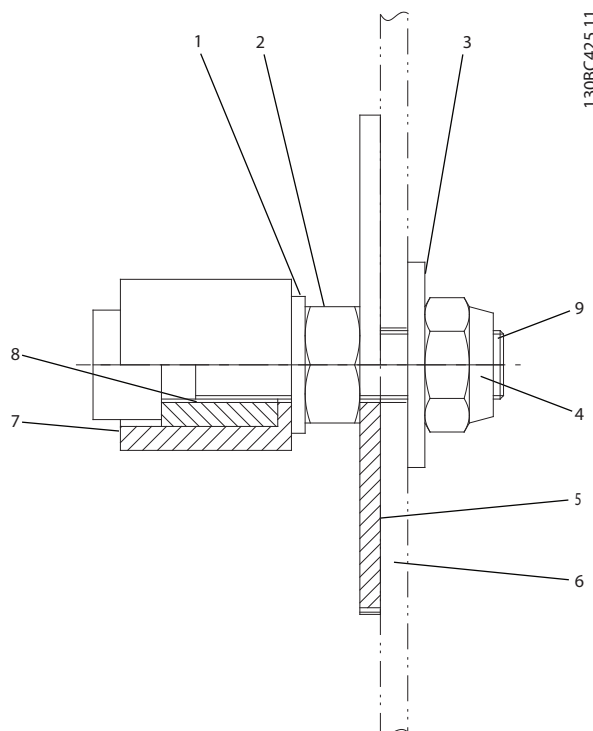


Figure 8.13 Torque Arm



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

Figure 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 adjustable frequency drive 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 <sub>DC</sub>	180 ±10 %
P <sub>el</sub>	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

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

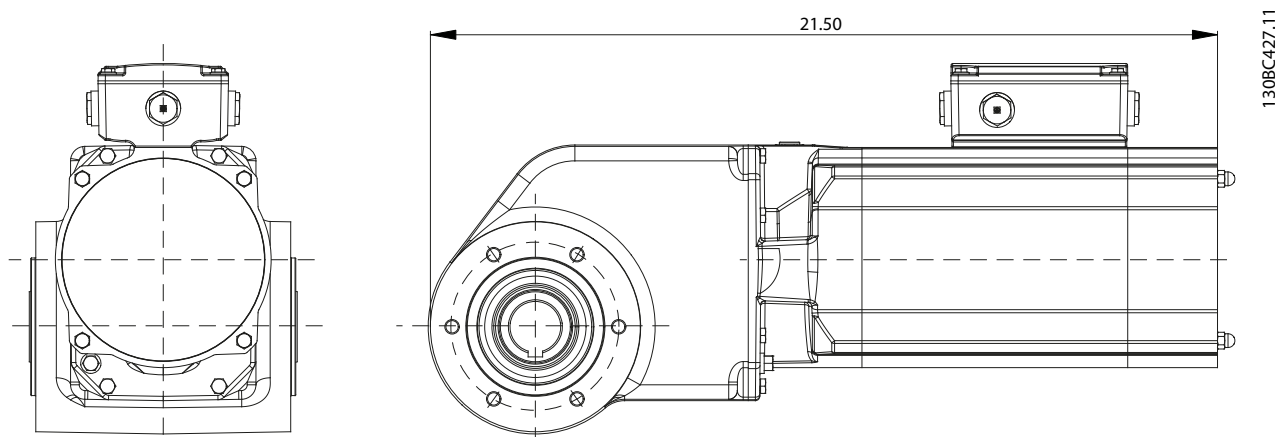
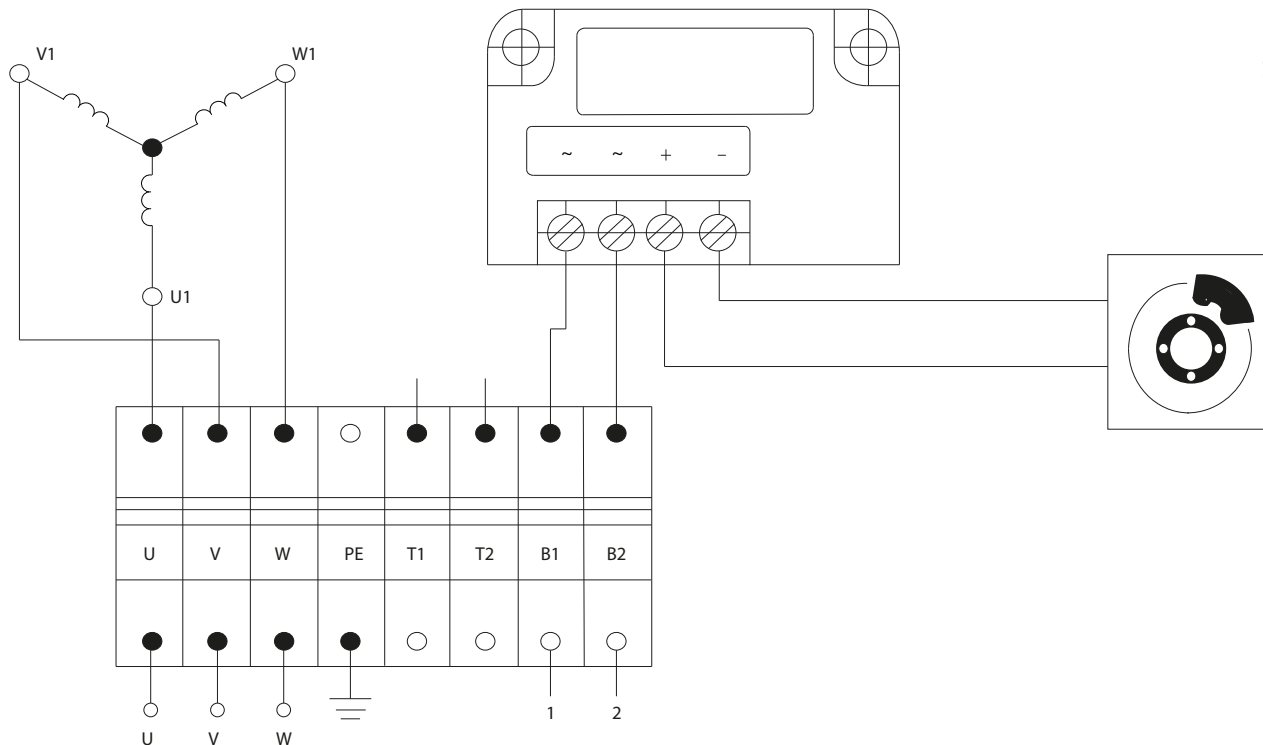


Figure 8.15 Dimensions: OneGearDrive with Mechanical Brake Option



### 8.6.2.4 Connections

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



130BC428:11

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

Description	Coding	Pin	Color	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 <sup>2</sup>	AWG 14/ 2.5 mm <sup>2</sup>	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 adjustable frequency drive 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 instruction manual.

## 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-meters 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<sub>max</sub>**

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<sub>Nmax</sub>**

Maximum nominal current specified.

**IP**

International protection codes.

**M20x1.5**

Thread specification in the terminal box.

**Mechanical brake**

Additional option for the OneGearDrive.

**M<sub>LT</sub>**

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<sub>LT</sub>**

Specified output speed under S1 duty conditions.

**Radial force**

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

**t<sub>amb</sub>**

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 <sub>M,N</sub>	Nominal motor frequency
FC	Adjustable frequency drive
IP	Ingress protection
I <sub>M,N</sub>	Nominal motor current
I <sub>VLT,N</sub>	Rated output current supplied by the adjustable frequency drive
N.A.	Not applicable
P <sub>M,N</sub>	Nominal motor power
PE	Protective ground
PELV	Protective extra low voltage
PM motor	Permanent magnet motor
RPM	Revolutions per minute
T <sub>LIM</sub>	Torque limit
U <sub>M,N</sub>	Nominal motor voltage

Table 9.1 Abbreviations

## 9.2.2 Conventions

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

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