PMCtendo AC

Motors

more than automation
safe automation

Operating Manual – Item No. 21 894-02

Suggestions and comments for improving this documentation will be gratefully received.

Contents

Contents

Introduction

This operating manual describes the 3-phase synchronous servo motors PMCtendo AC. The servo motors PMCtendo AC are divided into the following series:

- **PMCtendo AC1**
  Servo motors for universal use, for large power ratings
- **PMCtendo AC2**
  Servo motors for universal use
- **PMCtendo AC3**
  Servo motors with low moment of inertia, dynamic version
- **PMCtendo AC4**
  Compact servo motors, highly dynamic version

Please also refer to the operating manual for the servo amplifier you are using.

This operating manual is intended for instruction and should be retained for future reference.

Introduction

Validity of documentation

This documentation is valid for

- PMCtendo AC1 from Version 1.0
- PMCtendo AC2 from Version 1.0
- PMCtendo AC3 from Version 1.0
- PMCtendo AC4 from Version 1.0

It is valid until new documentation is published. The latest documentation is always enclosed with the unit.

Overview of documentation

1 Introduction
The introduction is designed to familiarise you with the contents, structure and specific order of this operating manual.

2 Overview
This chapter provides information on the most important features of the servo motors PMCtendo AC.

3 Safety
This chapter **must** be **read** as it contains important information on safety regulations and intended use.

4 Function Description
This chapter describes the servo motors PMCtendo AC and their components.

5 Transport, Unpacking, Storage
This chapter describes the procedures required when handling the servo motors.

6 Installation
This chapter explains how to install the servo motors PMCtendo AC.

7 Wiring
This chapter contains information and requirements for the electrical installation and the servo motor connection.

8 Commissioning
This chapter describes the different requirements and options during commissioning.

9 Maintenance and Repair
This chapter contains information and requirements for maintaining and repairing a servo motor.

10 Glossary
This section explains the most important specialist terms that are used.

11 Appendix

12 Technical Details

Definition of symbols

Information in this manual that is of particular importance can be identified as follows:

DANGER!

This warning must be heeded! It warns of a **hazardous situation that poses an immediate threat of serious injury and death** and indicates preventive measures that can be taken.

WARNING!

This warning must be heeded! It warns of a **hazardous situation** which could lead to **serious injury or death** and indicates preventive measures that can be taken.

CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.

NOTICE

This describes a situation in which the unit(s) could be damaged and also provides information on preventive measures that can be taken.

INFORMATION

This gives advice on applications and provides information on special features, as well as highlighting areas within the text that are of particular importance.

Overview

View of servo motor

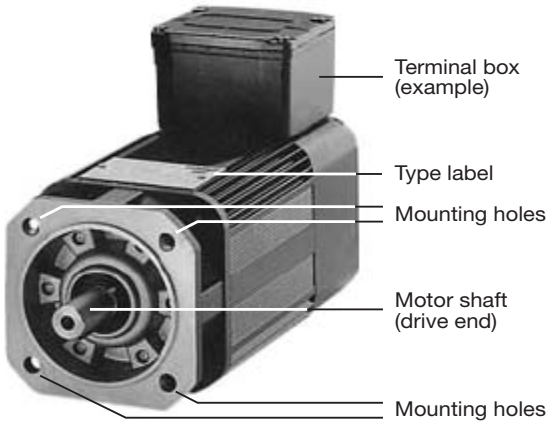


Fig. 2-1: Servo motor PMCtendo AC (example)

Features

The servo motors PMCtendo AC are particularly suitable for

- Printing and packaging machines
- Minor axes on machine tools
- Woodworking machines
- Lift drives and travelling drives
- Robotics and palletising systems
- Applications with high requirements for dynamics and controllability

The servo motors PMCtendo AC have the following features:

- 3-phase synchronous motors with permanently energised rotor (rare earth permanent magnet)
- Sinusoidal electromotive force (EMF)
  The 3 lines are connected internally in star configuration
- Motor feedback system, either
  - 2-pole resolver
  - Hiperface single-turn for SinCos encoder
  - Hiperface multi-turn for SinCos encoder
- Drive shaft, either
  - With feather key groove
  - Without feather key groove, smooth shaft
- Overload protection through motor temperature monitoring
  - Thermal switch (N/C contact) in the motor winding

- Holding brake (optional)
  - Backlash-free permanent magnet holding brake for safe standstill of the axis when the supply to the servo motor is switched off
- Type B5

Type label

The type label contains all the key data for a servo motor.

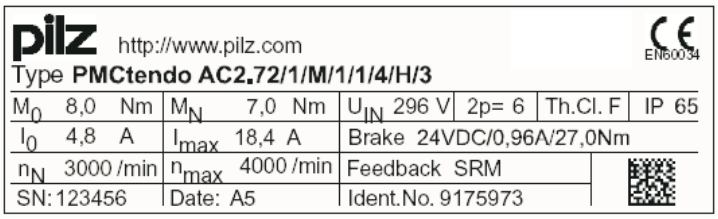
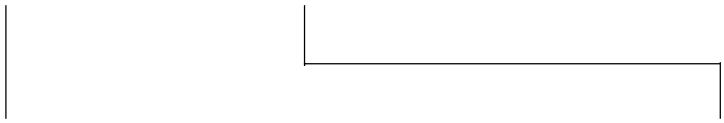


Fig. 2-2: Type label for a servo motor PMCtendo AC (example)

Description	Key	Information in the example
Type	Type of servo motor and servo motor's order reference (see section entitled “Order references”)	PMCtendo AC 2.72/1/M/1/1/4/H/3
M_0	Constant standstill torque	8.0 Nm
I_0	Constant standstill current	4.8 A
n_N	Rated speed	3000/min
SN	Serial number	123456
M_N	Rated torque	7.0 Nm
I_{max}	Peak current	18.4 A
n_{max}	Maximum speed	4000/min
Date	Code for the date of manufacture (see table: “Code for the date of manufacture”)	A5
U_{IN}	Regenerated voltage	296 V
2p	Number of motor poles	6 (3 pairs of poles)
Th.Cl.	Heat class	F
IP	Protection type	65
Brake	Data for holding brake (see chapter entitled “Technical Details”)	24 VDC/0.96A/27.0Nm
Feedback	Encoder type (see table: “Encoder types”)	SRM
Ident.No.	Material number	9175973

Code for the data of manufacture
The 2-digit code on the type label is structured as follows:

<Code for the year> <Code for the month>



Code	Year
A	2000
B	2001
C	2002
D	2003
E	2004
F	2005
H	2006
J	2007
K	2008
L	2009
M	2010
N	2011
P	2012
R	2013
S	2014
T	2015
U	2016
V	2017
W	2018
X	2019
A	2020

Code	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
O	October
N	November
D	December

Encoder types
The type label distinguishes between the following encoder types:

Description	Encoder type
Res2	2-pole resolver
SRS	Encoder system for Hiperface single-turn
SRM	Encoder system for Hiperface multi-turn

Order references

Type	Motor size	Brake	Feedback	Type	Con-nection	Connection direction	Voltage	Speed
PMCtendo AC...								

Series	Code
PMCtendo AC1	1
PMCtendo AC2	2
PMCtendo AC3	3
PMCtendo AC4	4

Code for motor size
21 ... AB

Brake	Code
Without brake	0
With brake	1

Feedback	Code
2-pole resolver (standard)	5
Hiperface single-turn	L
Hiperface multi-turn	M

Type	Code
B5, shaft end with feather key (standard)	1
B5, shaft end without feather key	2

Code	Speed
1	1200 min^{-1}
2	2000 min^{-1}
3	3000 min^{-1}
4	4000 min^{-1}
6	6000 min^{-1}

Code	Voltage
M	230 V
H	400 V

Code	Connection direction [1]
1	To right
2	To left
4	Upwards
5	To B-end
6	To A-end

Code	Connection
1	Connector for motor and feedback on housing
2	Terminal box with cable for motor and connector for feedback
3	Terminal box with connector for motor and feedback
4	Cable for motor and feedback
6	Angled connector for motor and feedback
7	Angled swivel connector for motor and feedback

[1] Connection direction: see section entitled “Definition of motor ends”

Safety

Intended use

The servo motors are designed for incorporation into a machine or for assembly with other components to form a plant or machine. They must be operated in conjunction with servo amplifiers with speed, torque or position control.

The servo motors may not be operated directly on the mains. The servo motors must be operated via a suitable servo amplifier which has been set with the correct parameters (e.g. PMCtendo DD, PMCprimo Drive from Pilz).

The thermal switch incorporated into the motor winding must be monitored and evaluated.

The following is deemed improper use:

- Any component, technical or electrical modification
- Use outside the areas described in this manual
- Use outside the documented technical details (see chapter entitled “Technical Details”).

Safety guidelines

Failure to keep to these guidelines will render all warranty and liability claims invalid:

- All health and safety / accident prevention regulations for the particular area of application must be observed.
- The unit must not be put into service until it can be guaranteed that the plant or machine into which the servo motor has been incorporated meets the requirements of the EU Directive 98/37/EC (Machinery Directive) as a whole.

Use of qualified personnel

Assembly, installation, commissioning, operation, maintenance and decommissioning may only be undertaken by qualified personnel. Qualified personnel are people who, because they are:

- Qualified electrical engineers
- And/or have received training from qualified electrical engineers,

are suitably experienced to operate devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

EMCD

The servo motors are designed for use in an industrial environment. Interference may occur if used in a domestic environment in conjunction with servo amplifiers.

Warranty and liability

All claims to warranty and liability will be rendered invalid if:

- The servo motor is used contrary to the purpose for which it was intended
- Damage can be attributed to not having followed the guidelines in the manual
- Operating personnel are not suitably qualified
- Any type of modification has been made.

Disposal

The servo motor must be disposed of properly when it reaches the end of its service life.

Function Description

Structure

PMCtendo AC servo motors are 3-phase, brushless synchronous motors with permanently energised rotor. The rotor contains rare earth permanent magnets made of neodymium iron boron. The rare earth magnetic material is a major factor in enabling these servo motors to be operated with high dynamics.
The 3-phase, stator winding is designed for sinusoidal commutation and enables a high efficiency factor, while at the same time having optimum true running characteristics.
PMCtendo AC servo motors are totally enclosed, self-cooled motors and correspond to type IC410 (in accordance with IEC 60034-6).

Servo amplifier

A suitable servo amplifier is required for commutation (e.g. PMCtendo DD, PMCprimo Drive from Pilz). Commutation occurs electronically within the servo amplifier.

The servo motor and servo amplifier should always be regarded as one cohesive system. The most important selection criteria are:

- Constant standstill torque M_0 [Nm]
- Constant standstill current I_0 [A]
- Rated speed n_N [min-1]
- Mass moment of inertia of motor and load J [kgcm²]
- Effective torque (calculated) M_{rms} [Nm]
- Regenerative energy in braking mode

When selecting the servo amplifier, please consider both the static **and** the dynamic load (acceleration/braking).

Function Description

Motor feedback system

PMCtendo AC servo motors may be equipped with one of the following motor feedback systems:

- Resolver (2-pole)
  The resolver determines the absolute position of the rotor to the stator within a revolution and signals this information to the servo amplifier. This feeds sinusoidal currents to the winding on the servo amplifier, depending on the rotor position.
- Hiperface-compatible feedback system for SinCos encoder
  A Hiperface-compatible feedback system operates with differential signals in accordance with the RS 485 specification.
  The absolute position of the rotor to the stator is determined on power up and is signalled to the counter in the servo amplifier via the parameter channel. The counter then continues to count incrementally, based on this absolute value. For this purpose the analogue sine/cosine voltage is transmitted via the process data channel and is converted within the servo amplifier.
  - Hiperface single-turn for SinCos encoder
    With the Hiperface single-turn, only one shaft revolution is triggered. One shaft resolution is transmitted in 32 768 steps.
  - Hiperface multi-turn for SinCos encoder
    With the Hiperface multi-turn, several shaft revolutions are triggered. A maximum of 4096 revolutions can be transmitted, each in 32 768 steps.

Operating mode

PMCtendo AC servo motors are designed for continuous duty. This corresponds to operating mode S1 (in accordance with DIN EN 60 034-1).

Overload protection

PMCtendo AC servo motors have overload protection, which protects the stator winding from damage in the case of constant overload. The motor temperature is monitored via a thermal switch in the stator winding. The contact on the thermal switch is opened when the winding temperature is exceeded. The switch does not protect against temporary high overload.

The thermal switch incorporated into the motor winding must be monitored and evaluated by the servo amplifier.

Holding brake

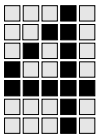
As an option, the PMCtendo AC servo motors may be supplied with a built-in holding brake, for backlash-free holding of the axis at standstill or when the supply to the plant or machine is switched off. The permanent magnet brake blocks the rotor when the supply voltage is switched off. Once the brake is released, the rotor can move without residual torque.

INFORMATION
Only use the holding brake when the axes are at standstill!
It may **not** be used for dynamic braking mode. Make sure you read the holding brake information provided in the chapters entitled “Wiring” and “Technical Details”.
The holding brake does not guarantee personal protection!
Personal protection can only be achieved by using a second brake and through additional higher level design measures (e.g. guard).

Motor shaft and bearings

PMCtendo AC servo motors are available with two different types of shaft end (drive end):

- Shaft end with feather key groove
  Rotor balancing is performed using a half feather key. These shaft ends are suitable for low loads. Under continuous duty with varying torques or strong reverse mode, the feather key may become unseated. If this is the case the true running quality is reduced; there is backlash. Increasing deformation can break the feather key and damage the drive shaft.
- Smooth shaft end
  With a frictional connection, torque transfer must only be achieved through surface pressure. This guarantees a safe, backlash-free force transfer.
- Bearings
  The bearings are lubricated with maintenance-free grease which is resistant to high temperatures.



Notes

Transport and Storage

Transport

The servo motors must be transported in such a way that no damage can occur.

INFORMATION
Be sure to avoid any impact, jerky movements or heavy vibration during transportation.

Storage

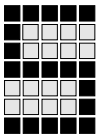
If a servo motor is not to be put into service immediately upon delivery, make absolutely sure that it is stored correctly.

The servo motors should only be stored in an enclosed room that is dry, dust free and ventilated. Please refer to the information provided under “Technical Details”.

Do not remove anti-corrosion coatings on the shaft ends, flange surfaces, etc. While in storage, these should be inspected at defined intervals and any damage made good.

The storage site should not be liable to vibration. When servo motors are kept in storage we recommend that the rotor is rotated at defined intervals to prevent corrosion on the bearings.

If the servo motor has been in storage for more than 3 months, rotate the servo motor in both directions at low speed (< 100 min^{-1}) to ensure that the lubricant on the bearings is distributed equally.



Notes

Preparing for installation

Secure the installation site in accordance with the regulations (barrier, warning signs etc.). Installation may only be carried out by qualified personnel.

Mounting location

Please note the following when selecting the location:

- The mounting location must be free from conductive and aggressive materials.
- The unit may only be mounted on a flat, vibration-free and warp-resistant substructure.
- It is essential to comply with the ambient temperature (see chapter entitled “Technical Details”).
  Ensure there is sufficient heat dissipation; if necessary, additional ventilation should be provided for the servo motor.

Mounting position

Permitted mounting positions:

Design	Permitted mounting positions		
B5	 IM B5	 IM V1	 IM V3

INFORMATION

- The mounting position **IM V3** (DIN EN 60034-7) is **not** recommended in conjunction with gear units!
- With the mounting position **IM V3** (DIN EN 60034-7), ensure that liquids cannot penetrate into the bearings, whether during installation or during operation.

Installation

Motor

- Check the servo motor for any transport damage. Never install a servo motor that shows clear signs of damage!
- Ensure that any anti-corrosion agents and/or contamination on the shaft end (drive end) are thoroughly removed. This can be done using a standard solvent. Make sure that the solvent cannot come into contact with the gaskets and/or bearings, otherwise materials may be damaged!

Carrying out the installation

WARNING!

Electric shock
Contact with live parts will result in serious injury.
The motor should **always** be installed with the supply voltage switched off. Switch off the supply voltages to all connected devices!
Hazardous values may still be present up to 5 minutes after the voltage is switched off, due to residual charges in the servo amplifier's capacitors.
When the shaft is rotating (externally driven, running down) the motor acts as a generator. This means that hazardous voltages will be present at the connection terminals.

If possible, only use backlash-free, frictionally engaged chucks or clutches.
Use the tightening thread provided in the motor shaft to tighten the clutches, gears or belt pulleys and, if possible, warm up the drive elements. Do not use excessive force as this will damage bearings, feedback and the motor shaft.

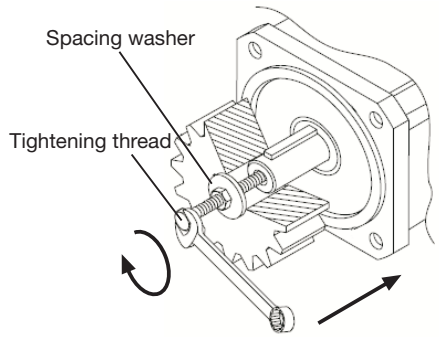


Fig. 6-1: Tightening thread in the motor shaft

Please note:

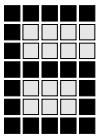
- Align the clutch correctly
  Misalignment can cause undue vibration and can damage the ball bearings and clutch!

- Mechanical overdefinition of the motor shaft bearing should be avoided
  A rigid clutch and/or an external additional bearing (e.g. in the gear unit) can cause excess mechanical stress on the motor shaft.
- Do not fasten or attach temperature-sensitive components to the motor

CAUTION!

Burns

Contact with the motor surface during operation will result in injury.
During operation, the surface temperature of the servo motor can exceed 65 °C!
Safety measures should be put in place to protect against contact during operation, whether accidental or intentional.



Notes

Wiring

General requirements

Secure the site in accordance with the regulations (barrier, warning signs etc.). Wiring may only be carried out by qualified personnel.

- Please refer to the information and specifications stated in the operating manual of the servo amplifier you are using.

CAUTION!

Uncontrolled movements of the servo motor will result in injury
Incorrect wiring of the servo motor and/or motor feedback can trigger uncontrolled movements and result in material and/or personal injury.

- If necessary, consider the trailing capability of the cables you are using.

Cabling

It is possible to differentiate between cables according to their function. The following groups exist:

- Group 1: Data and supply lines for DC voltages below 60 V and AC voltages below 25 V
- Group 2: Data and supply lines for DC voltages from 60 V to 400 V and AC voltages from 25 V to 400 V.
- Group 3: Supply lines above 400 V

Cabling inside buildings:

- The cable groups listed above should be laid separately.
- Cables of the same group can be laid within the same cable duct.
- Cables from group 1 and group 2 should be laid in separate groups or in cable ducts which are at least 10 cm apart.
- Cables from group 1 and group 3 should be laid in separate groups or in cable ducts which are at least 50 cm apart.
- Data lines and control lines should be laid as close as possible to an earthed surface.

Cable cross sections

Please refer to the information stated in the operating manual of the servo amplifier you are using. The cable cross sections you select should depend on the current supplied by the servo amplifier.

Wiring

Earthing, shielding and EMC

- On the servo motors, the connection to PE is established via the supply voltage cable (see section entitled “Connections for supply voltage, thermal switch and holding brake”).
- If necessary, use a toroidal core for the supply voltage cable, or a motor throttle close to the servo amplifier. Please refer to the information stated in the operating manual of the servo amplifier you are using.
- You will need shielded cable for data and control lines.
  - Earth the cable shield connection on both sides (e.g. on a bus bar).
  - If you are using longer cables and there is the possibility of transient currents, these can be prevented by using equipotential bonding cables. If you are unable to use equipotential bonding cables, connect the shield at one end.
- Shields should be connected over a wide surface area (low impedance), using metallised connector housings or EMC-compliant cable screw connections. Use the EMC cable screw connection supplied with the unit.

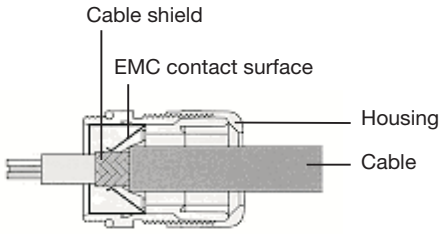


Fig. 7-1: EMC screw connection

- An appropriate connection material (e.g. shielded terminals) should be used to connect the cable shield to the earth bar or bus bar.

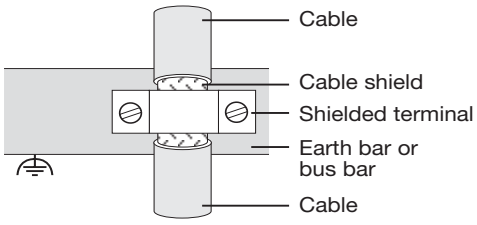


Fig. 7-2: Earthing the cable shield (example)

Pin assignment and connection

The sections below describe all the connections on a PMCtendo AC servo motor plus their layout. The connections that your servo motor actually has at its disposal will depend on the code stated in the order reference (see section entitled “Overview”).

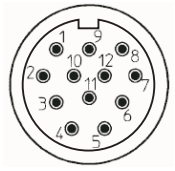
INFORMATION
Only used shielded cable. Pre-assembled cable in various lengths and cross sections is available from Pilz.

Motor feedback connections

Resolver

To connect the resolver (see Fig. 7-3) to the servo amplifier you will need a cable with a layout as shown in Fig. 7-4.

Round connector
12-pin, male



1:	S1 (Cos1)	7:	R1 (Ref1)
2:	S2 (Sin1)	8:	Internal shield
3:	S4 (Sin2)	9:	Thermal switch
4:	n.c.	10:	Thermal switch
5:	n.c.	11:	R2 (Ref2)
6:	S3 (Cos2)	12:	n.c.

n.c. = not connected

Fig. 7-3: Pin assignment of the round resolver connector

Resolver (servo motor) **Servo amplifier**

12-pin round connector, female

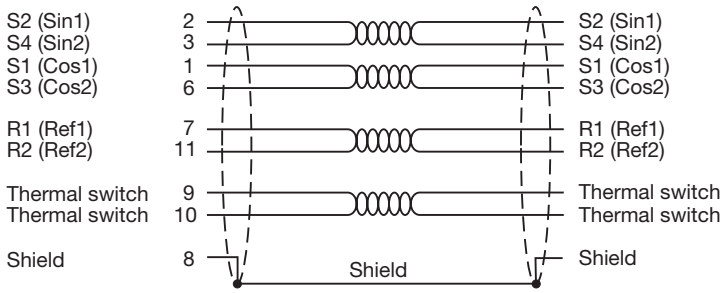


Fig. 7-4: Connection cable for resolver

Cable features:

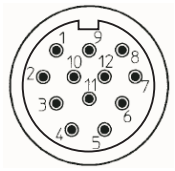
- Round connector type:
  - M23 connector (e.g. made by Intercontec), 12-pin
- Cable cross section and cable runs:
  - Depend on the requirements of the servo amplifier you are using

Hiperface encoder

To connect the Hiperface rotary encoder (see Fig. 7-5) to the servo amplifier you will need a cable with a layout as shown in Fig. 7-6.

Round connector

12-pin, male



1:	Us (7 ... 12 V)	7:	+ SIN
2:	GND	8:	+ COS
3:	REFSIN	9:	n.c.
4:	REFCOS	10:	n.c.
5:	Data + (RS485)	11:	Thermal switch
6:	Data - (RS485)	12:	Thermal switch

n.c. = not connected

Fig. 7-5 Pin assignment of the round Hiperface connector

Hiperface rotary encoder (servo motor) **Servo amplifier**

12-pin round connector, female

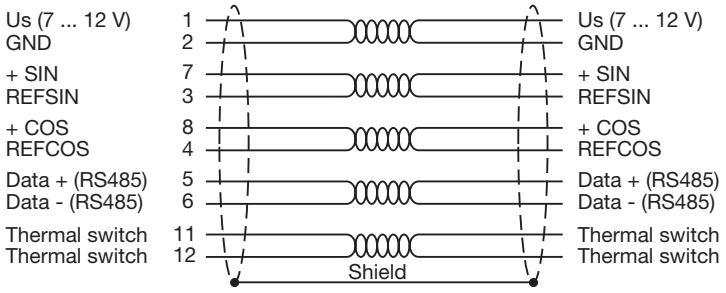


Fig. 7-6: Connection cable for Hiperface rotary encoder

Cable features:

- Round connector type:
  - M23 connector (e.g. made by Intercontec), 12-pin
- Cable cross section and cable runs:
  - Depend on the requirements of the servo amplifier you are using

Connections for supply voltage, thermal switch and holding brake

General

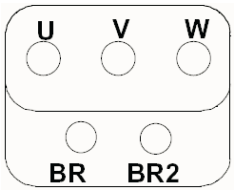
If you are using a cable that incorporates the wires for the holding brake, the wires for the holding brake must be shielded.

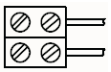
Terminal box on servo motors AC1 and AC2

To supply the voltage to the servo motor (see Fig. 7-7) via the servo amplifier you will need a cable with a layout as shown in Fig. 7-8.

INFORMATION
The thermal switch is dual wired. It is carried in the motor feedback cable (see sections entitled “Resolver” and “Hiperface rotary encoder”), as well as the supply voltage cable.

Connection terminals





Supply voltage for servo motor:
U: Phase U
V: Phase V
W: Phase W

Thermal switch:
BR: Thermal switch
BR2: Thermal switch

PE: Earth connector

Holding brake (optional):
Red: + 24 VDC
Blue: 0 V

Fig. 7-7: Pin assignment within the terminal box (servo motors AC1 and AC2)

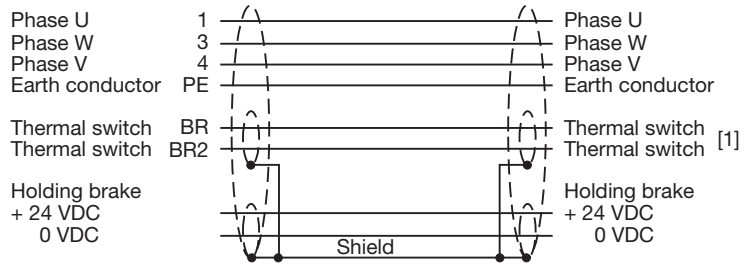


Fig. 7-8: Connection cable for the terminal box (servo motors AC1 and AC2)

[1] Depends on the servo amplifier you are using

Cable features:

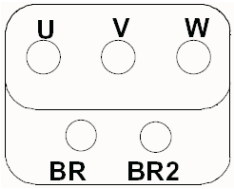
- Cable cross section: max. 14 mm
  - Wires for supply voltage: max. 3 x 2.5 mm^2
  - Wire for earth conductor PE: max. 1 x 2.5 mm^2
  - Wires for thermal switch: max. 2 x 1 mm^2
  - Wires for holding brake: max. 2 x 1 mm^2
- Cable runs:
  - Depend on the requirements of the servo amplifier you are using

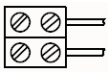
Terminal box on servo motors AC3 and AC4

To supply the voltage to the servo motor (see Fig. 7-9) via the servo amplifier you will need a cable with a layout as shown in Fig. 7-10.

INFORMATION
Please note that the thermal switch connection is only available via the motor feedback cable (see sections entitled “Resolver” and “Hiperface rotary encoder”).

Connection terminals





Supply voltage for servo motor:
U: Phase U
V: Phase V
W: Phase W

Thermal switch:
BR: Not connected
BR2: Not connected

PE: Earth conductor

Holding brake (optional):
Red: + 24 VDC
Blue: 0 V

Fig. 7-9: Pin assignment within the terminal box (servo motors AC3 and AC4)

Connection cable (servo motor) **Servo amplifier**

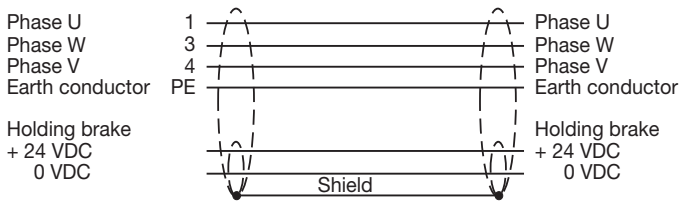


Fig. 7-10: Connection cable for the terminal box (servo motors AC3 and AC4)

Cable features:

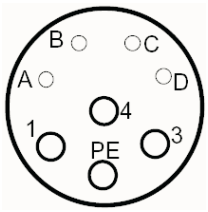
- Cable cross section: max. 14 mm
  - Wires for supply voltage: max. 3 x 2.5 mm^2
  - Wire for earth conductor PE: max. 1 x 2.5 mm^2
  - Wires for holding brake: max. 2 x 1 mm^2
- Cable runs:
  - Depend on the requirements of the servo amplifier you are using

Round connector for servo motors AC1 and AC2

Round connectors are used when I_0 < 20 A. To connect the servo motor (see Fig. 7-11) to the servo amplifier you will need a cable with a layout as shown in Fig. 7-12.

INFORMATION
The thermal switch is dual wired. It is carried in the motor feedback cable (see sections entitled “Resolver” and “Hiperface rotary encoder”), as well as the supply voltage cable.

Round connector
8-pin, male



Supply voltage
Servo motor:
1: Phase U
3: Phase W
4: Phase V

PE: Earth conductor

Holding brake:
A: + 24 VDC
B: 0 VDC

Thermal switch:
C: Thermal switch
D: Thermal switch

Fig. 7-11: Pin assignment of the round connector (servo motors AC1 and AC2)

Connection cable (servo motor) **Servo amplifier**
8-pin round connector, female

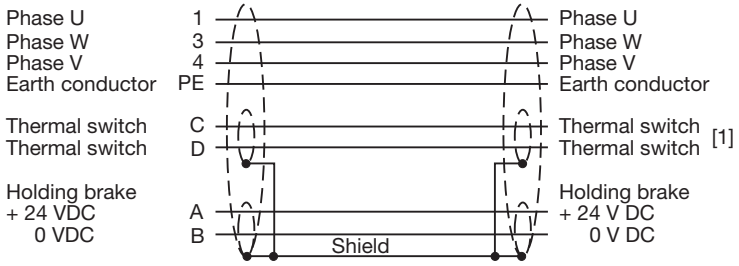


Fig. 7-12: Connection cable for the round connector (servo motors AC1 and AC2)

[1] Depends on the servo amplifier you are using

Cable features:

- Round connector type:
  - Connector with 28 mm diameter (e.g. made by Intercontec), 8-pin
- Cable cross section:
  - Wires for supply voltage: max. 3 x 2.5 mm²
  - Wire for earth conductor PE: max. 1 x 2.5 mm²

- Wires for thermal switch: max. 2 x 1 mm²
- Wires for holding brake: max. 2 x 1 mm²

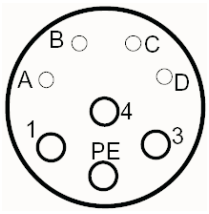
• Cable runs:
- Depend on the requirements of the servo amplifier you are using

Round connector for servo motors AC3 and AC4

Round connectors are used when I_0 < 20 A. To connect the servo motor (see Fig. 7-13) to the servo amplifier you will need a cable with a layout as shown in Fig. 7-14.

INFORMATION
Please note that the thermal switch connection is only available via the motor feedback cable (see sections entitled “Resolver” and “Hiperface rotary encoder”).

Round connector
8-pin, male



Supply voltage
Servo motor:
1: Phase U
3: Phase W
4: Phase V

PE: Earth conductor

Holding brake:
A: + 24 VDC
B: 0 VDC

Thermal switch:
C: Not connected
D: Not connected

Fig. 7-13: Pin assignment of the round connector (servo motors AC3 and AC4)

Connection cable (servo motor) **Servo amplifier**
8-pin round connector, female

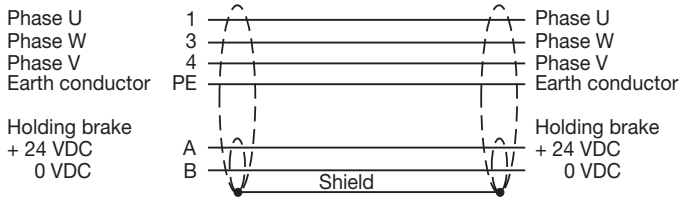


Fig. 7-14: Connection cable for the round connector (servo motors AC3 and AC4)

Cable features:

• Round connector type:
- Connector with 28 mm diameter (e.g. made by Intercontec), 8-pin

- Cable cross section:
  - Wires for supply voltage: max. 3 x 2.5 mm²
  - Wire for earth conductor PE: max. 1 x 2.5 mm²
  - Wires for thermal switch: max. 2 x 1 mm²
  - Wires for holding brake: max. 2 x 1 mm²
- Cable runs:
  - Depend on the requirements of the servo amplifier you are using

Connecting the supply voltage

Never remove or attach the connections while voltage is applied.

WARNING!

Electric shock
Contact with live parts will result in serious injury.
Switch off the supply voltages to all connected devices!
Hazardous values may still be present up to 5 minutes after the voltage is switched off, due to residual charges in the servo amplifier's capacitors. When the shaft is rotating (externally driven, running down) the motor acts as a generator. This means that hazardous voltages will be present at the connection terminals.

The direction of rotation of the servo motor is determined by the phase sequence of the supply voltage. The servo motor is designed so that the motor shaft rotates to the right when it is connected as shown in Fig. 7-15.
Any change to the direction of rotation must be made via the servo amplifier. Servo amplifiers can change the direction of rotation of the servo motor by changing the phase sequence electronically.

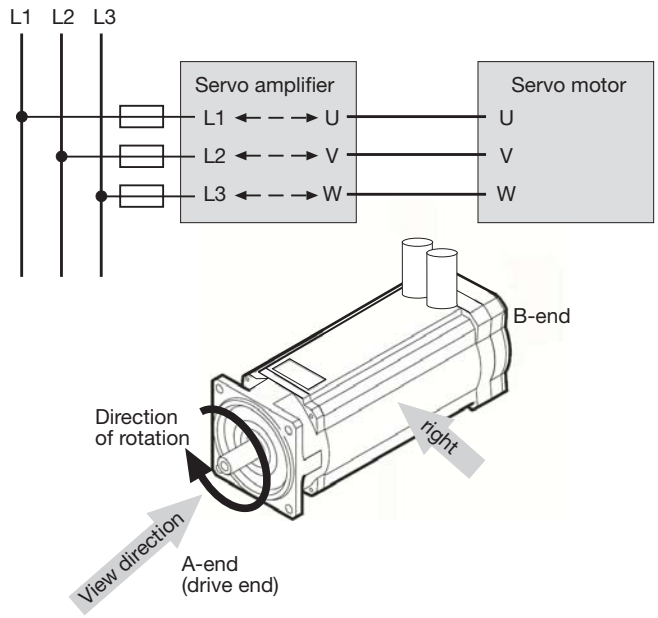


Fig. 7-15: "Clockwise" direction of rotation, viewed from the drive end (principle)

Connecting the holding brake

The holding brake can be controlled directly by the servo amplifier. In this case, the braking action is suppressed within the servo amplifier. No additional wiring is required within the braking circuit. Servo amplifiers from Pilz are fitted with a brake control as standard.

If the holding brake is not controlled by the servo amplifier, the brake circuit must be fitted with a suppression device through additional wiring (e.g. varistor).

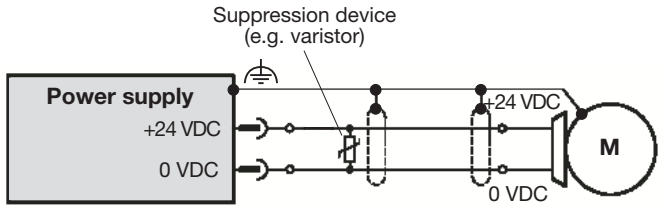


Fig. 7-16: Suppression device within the holding brake circuit (principle)

If the operation of the holding brake is to include personal safety, an extra N/O contact is required for the holding brake within the brake circuit, as well as the additional suppression device (e.g. varistor). Control of this N/O contact must be safety-related.

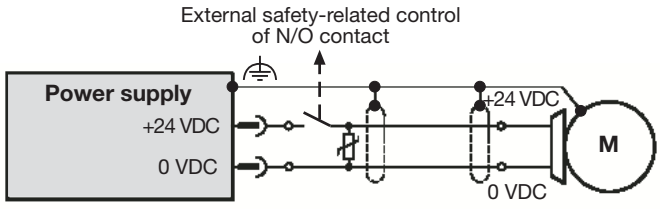


Fig. 7-17: Safety-related control of the holding brake circuit (principle)

INFORMATION
The holding brake is operated with DC voltage (24 VDC). When you connect it, make sure that the polarity is correct.

Commissioning

General requirements

Secure the site in accordance with the regulations (barrier, warning signs etc.).
Commissioning may only be carried out by qualified personnel.

- Please refer to the information and specifications stated in the operating manual of the servo amplifier you are using.
- During commissioning, make sure that no personal injury and/or material damage can occur, even if the drive moves unintentionally.

CAUTION!

Uncontrolled movements of the servo motor will result in injury
Incorrect wiring of the servo motor and/or motor feedback can trigger uncontrolled movements and result in material and/or personal injury.

Commissioning

Check installation and wiring

Installation	
Check the installation and orientation of the servo motor.	- - -
Check the drive elements (clutch, gear unit, belt pulley) to ensure that they are firmly seated and set up correctly.	**WARNING!** Risk of life-threatening injury when operating the servo motor Servo motors with feather key must not be operated unless the drive pulley is fully installed! Make sure that the drive connection between the shaft and the machine has been fully installed.
Check that the motor surface is protected against contact during operation, whether accidental or intentional.	**CAUTION!** Burns During operation, the surface temperature of the servo motor can exceed 65 °C!
Check that the rotor of the servo motor can rotate freely.	**INFORMATION** If a holding brake is present, this must first be released (see “Holding brake”). Check the polarity!

Wiring	
Check that the units are earthed correctly.	 **WARNING!** Electric shock Life-threatening voltages are present at the supply voltage connections.
Check that all live parts are safely protected against contact during operation, whether accidental or intentional.	
Check the wiring and the connections to the servo motor, brake and servo amplifier.	 **CAUTION!** Uncontrolled movements of the servo motor will result in injury Incorrect wiring of the servo motor and/or motor feedback can trigger uncontrolled movements and result in material and/or personal injury.
Check the direction of rotation of the servo motor.	Activate the servo motor via the servo amplifier.
Holding brake	
Check the function of the holding brake.	Apply the 24 V control voltage: The holding brake must release. Check the polarity!

Then carry out all the other checks required specifically for your plant.

Commissioning the drive unit

Do not commission the drive unit (servo motor and servo amplifier) until you have performed all the checks.

When commissioning, please note the following:

- Make sure that you follow the commissioning instructions for the servo amplifier you are using.
- With multi-axis systems, each drive unit should be commissioned separately.

Troubleshooting guidelines

The table below only lists the errors that directly affect the servo motor. You should also refer to the error messages for the servo amplifier you are using. Multi-axis systems with higher level position control systems may also have additional error causes.

Fault	Potential error cause	Remedy
Motor does not rotate	• Servo amplifier has not been enabled • Set point cable is broken • Motor phases transposed (incorrect phase sequence) • Brake has not been released • Drive is mechanically blocked	• Apply the enable signal from the servo amplifier • Check the set point cable • Connect the motor phases correctly • Check the brake control • Check the mechanics
	• Torque is too low	Lift the current limitation in the servo amplifier or Use a larger motor or servo amplifier
Motor spins (positive feedback)	• Incorrect feedback offset • Motor phases transposed (cyclically transposed, correct phase sequence)	• Check feedback offset and set the parameters correctly • Change the direction of rotation in the servo amplifier • Connect the motor phases correctly
Motor vibrates	• Shield on the feedback line is broken • Invalid control parameters	• Change the feedback line • Adjust the controller
Error message Output stage error	• Motor cable has a short circuit or earth fault • Motor has a short circuit or earth fault	• Swap the cable • Swap the motor
Error message Feedback	• Feedback connector is not inserted correctly • Feedback line is broken, crushed or similar	• Check the plug-in connection • Check the wiring
Error message Motor temperature	• Thermal switch has energised • Connection to the thermal switch is broken	Wait for the motor to cool down, then: • Check the connector and cable • Possibly use a new cable
Holding brake doesn't catch	• Required holding torque is too high • Holding brake is defective • Motor shaft axially overloaded	• Check the specification of the holding brake • Swap the motor • Check the axial load and reduce if necessary, also swap the motor because the bearings are damaged

General guidelines for maintenance and repair

Before starting maintenance or repair work, please note the following:

- Maintenance and repair work may only be carried out by qualified personnel.
- Make sure that the plant or machine is isolated in accordance with the regulations.
- The plant or machine should be safeguarded against inadvertent reconnection.
- Check that the voltage is disconnected.

WARNING!

Electric shock

Control and power connections may carry voltage, as residual charges in the servo amplifier's capacitors may still show hazardous values up to 5 minutes after the voltage is switched off.

- A servo motor may only be repaired by Pilz GmbH & Co. KG. If the servo motor is opened without authorisation and handled improperly the warranty will be rendered invalid.

Maintenance and Repair

Maintenance intervals

If suitably installed, the servo motors are largely maintenance free. As operating conditions can vary greatly, maintenance intervals must be adapted to suit the local conditions (e.g. pollution degree, switch on frequency, load).

Maintenance interval	What to do?	What to consider?
Regularly	Clean the servo motor	Cleaning intervals should depend on the local pollution degree • Let the motor cool down • Do not use solvents • Select a cleaning method that's appropriate for the servo motor's protection type, otherwise the ingress of liquid could damage the motor.
Every 500 operating hours, or min. once per year	Check the electrical and mechanical connections and retighten if necessary	- - -
	Check that the servo motor is running quietly and, if necessary, check the installation; if necessary, change the servo motor	See section entitled "Changing the servo motor"
	Check the noise level of the ball bearings and, if there is any deterioration, check the installation; if necessary, send in the servo motor to have the ball bearings changed	The ball bearings may only be exchanged by Pilz GmbH & Co. KG! (refer also to the section entitled "Changing the servo motor")
Every 2500 operating hours, or min. once per year	Check the noise level of the ball bearings and, if necessary, send in the servo motor to have the ball bearings changed	
After 20000 operating hours (under rated conditions)	Send in the servo motor to have the ball bearings changed	

Changing the servo motor

When uninstalling you must use the tightening thread provided in the motor shaft and, if possible, warm up the drive elements. Do not use excessive force as this will damage bearings, feedback and the motor shaft. Use a suitable extraction tool.

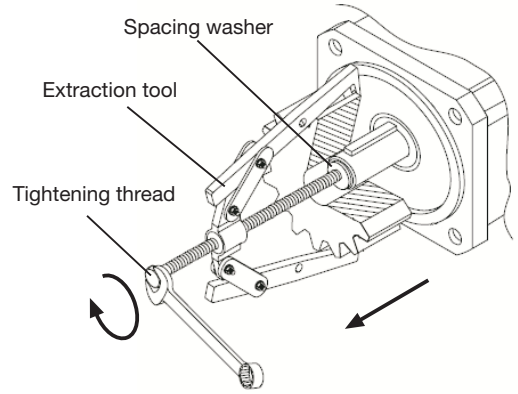


Fig. 9-1: Tightening thread in the motor shaft

INFORMATION
You must read the information in the section entitled “General guidelines for maintenance and installation” before changing the servo motor.

Please note the following when changing the motor:

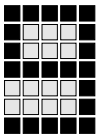
- If servo motors have been in storage for longer than 2 years, the holding brake must be resurfaced before the servo motor is used.
  - Only resurface the holding brake while the servo motor is uninstalled!
  - With the holding brake in a closed condition, turn the servo motor by hand for approx. 50 revolutions.

  The holding brake is now ready for operation.
- Please refer to the information in the chapter entitled “Installation”, under “Installing the servo motor”.
- On servo axes with indirect position measuring via the encoder, the reference to the machine coordinate system is lost.

CAUTION!

Injury due to unintended axis movements!

Once the unit has been exchanged, restore the reference to the machine coordinate system.



Notes

Glossary

C

Constant standstill current

Current (sinusoidal effective value) that is required to generate constant standstill torque M_0 when speed n = 0

Abbreviation: I_0
Unit: A

Constant standstill torque

Torque that can be applied for an unlimited time when speed n = 0

Abbreviation: M_0
Unit: Nm

M

Mass moment of inertia

Mass moment of inertia of the servo motor (with/without holding brake)
1 $kgcm^2$ = 1 x 10^{-4} kgm^2

Abbreviation: J
Unit: kgm^2

P

Peak current

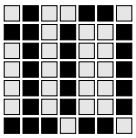
Short-term maximum permitted current (sinusoidal effective value), at which the servo motor is undamaged

Abbreviation: I_{max}
Unit: A

Peak torque

Torque produced at peak current I_{max}

Abbreviation: M_{max}
Unit: Nm



R

Rated current

Current (sinusoidal effective value) consumed by the servo motor when subject to rated speed n_N and rated torque M_N

Abbreviation: I_N
Unit: A

Rated power

Mechanical output at the servo motor shaft when it is subject to rated torque M_N at rated speed n_N

Abbreviation: P_N
Unit: W

Rated speed

Speed at which the rated torque M_N can be achieved as a minimum, at rated voltage U_N

Abbreviation: n_N
Unit: min^{-1}

Rated torque

Torque that can be applied for an unlimited time at rated speed n_N

Abbreviation: M_N
Unit: Nm

Rated voltage

Output voltage (sinusoidal effective value) of servo amplifier

Abbreviation: U_N
Unit: V

T

Thermal time constant

When there is a load change, the period after which 63 % of the corresponding temperature change is achieved
After 5 x t_{th} the temperature change is complete.

Abbreviation: T_{th}
Unit: min

Torque constant

Factor for the relationship between current and torque.
When K_t = 1Nm/A, the servo motor generates torque of 1Nm at 1 A current (sinusoidal effective value)

Abbreviation: K_T
Unit: Nm/A

Appendix

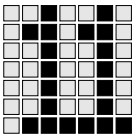
Changes in the documentation

Changes in Version 21 894-01:

Old page	New page	Change
- - -	- - -	The operating manual was completely revised

Changes in Version 21 894-02:

Old page	New page	Change
12-8 to 12-37	12-8 to 12-37	Technical details updated



Notes

General technical details

Electrical data	
Supply voltage Type M Type H	 230 V 400 V
Current consumption	see section entitled “Performance data”
Current form	Sinusoidal
Insulation material class (IEC 60085)	H Performance measurement to F
Environmental data	
Protection type (IEC 60034-5) without shaft seal with shaft seal motor size 21 ... 25 with shaft seal	 IP44 IP44 IP65
Mounting position (IEC 60034-7)	 IM B5, IM V1, IM V3
Ambient temperature (IEC 60034-1)	 +5 ... +40 °C
Storage temperature (IEC 60034-1)	 -15 ... +40 °C
Cooling (IEC 60034-6)	 Self-cooling IC410
Condensation	Not permitted
Installation height	≤ 1000 m above sea level
Shaft end	
Option with feather key groove Balancing (DIN ISO 8821) Feather key groove assembly	With feather key With half feather key DIN 6885-1
Option without feather key groove	Smooth shaft
Fit (IEC 60072-1)	 k6
Flange	
Design (IEC 60034-7)	 IM B5
Fit (DIN 42948)	 j6
Accuracy (DIN 42955)	 Increased

Technical Details

Mechanical data	
Weight	See section entitled “Mechanical data”
Dimensions	See section entitled “Dimensions”

Derating

When dimensioning the drive you should take into account the factor K_{total} . It is calculated from the factors K_{height}, K_{temp} and K_{duty}:

$$K_{total} = K_{height} * K_{temp} * K_{duty}$$

The factor K_{total} can be used to calculate the permitted torque:

$$\text{Permitted torque} = K_{total} * \text{Rated torque } M_N$$

Derating diagram: Installation height

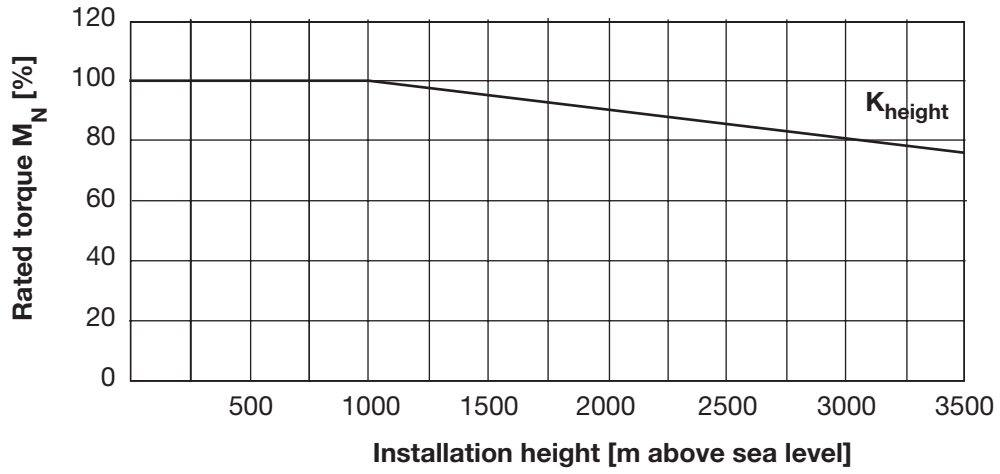


Fig. 12-1: Permitted torque in relation to installation height

Example:

Installation height = 2000 m above sea level

According to the diagram (Fig. 12-1), at this installation height the permitted torque is approx. 90 % of the rated torque M_N.

This gives the following for factor K_{height}:
$K_{height} = 0.9$.

Derating diagram: Ambient temperature

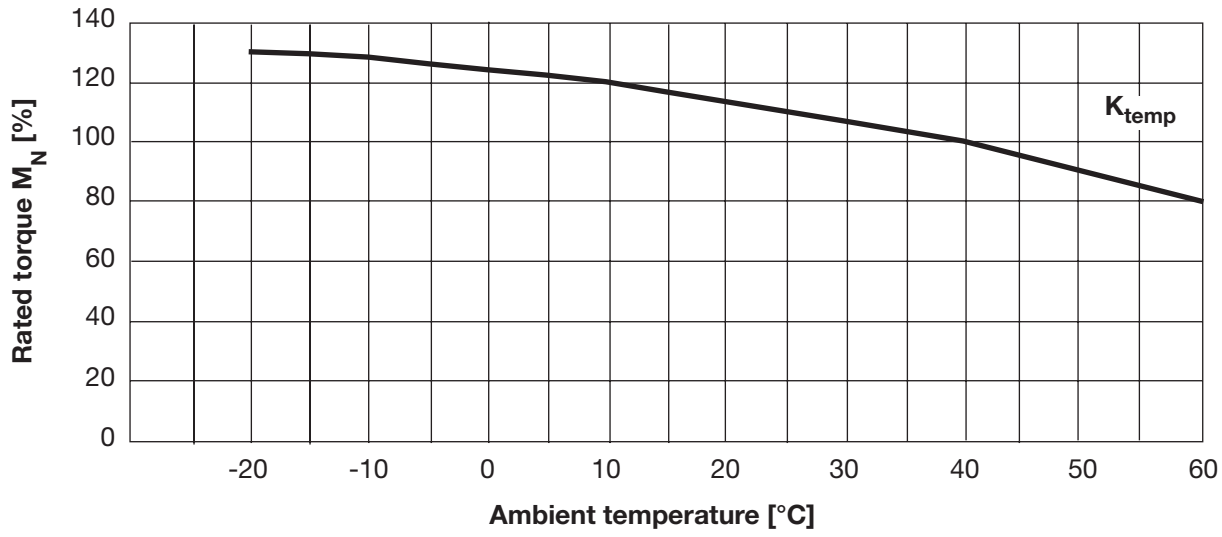


Fig. 12-2: Permitted torque in relation to ambient temperature

Example:

Ambient temperature = 50 °C

According to the diagram (Fig. 12-2), at this ambient temperature the permitted torque is approx. 90 % of the rated torque M_N.

This gives the following for factor K_{temp}:
$K_{temp} = 0.9$.

Derating diagram: Operating time

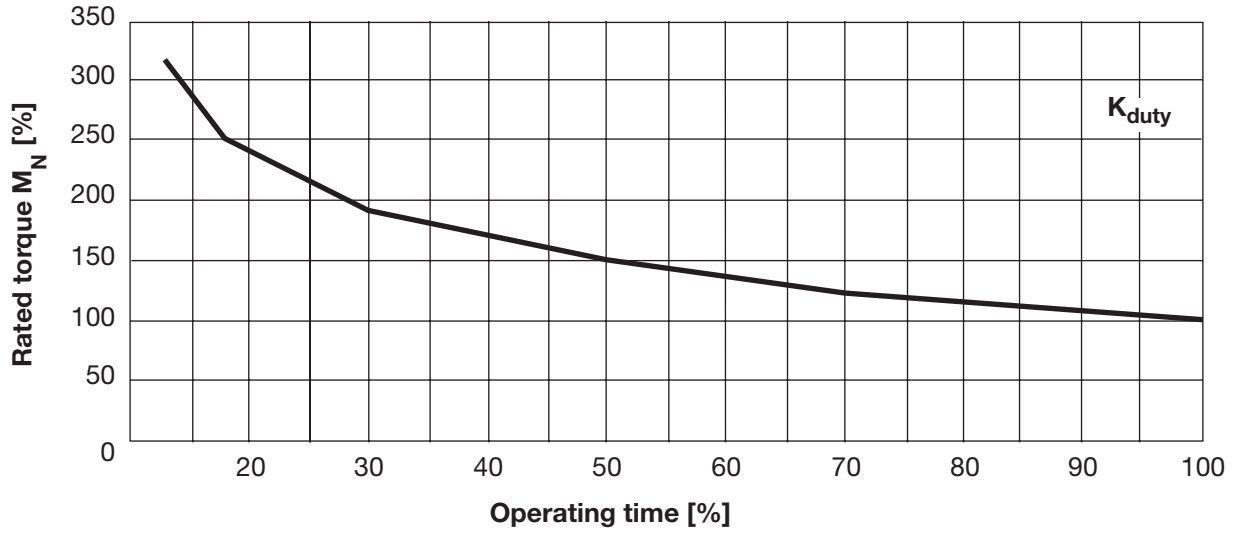


Fig. 12-3: Permitted torque in relation to operating time

Example:

Operating time = 70 %

According to the diagram (Fig. 12-3), at this operating time the permitted torque is approx. 125 % of the rated torque M_N.

This gives the following for factor K_{duty}:
K_{duty} = 1.25.

Technical Details

Type-specific technical details

Key to the designations used in the table header

The table below contains the key to the designations used in the table header for the performance data (see section entitled “Performance data”).

Designation used in the table header	Unit	Key
Msize	- - -	Motor size
UN [V]	V	Ratedvoltage
Mmax [Nm]	Nm	Peak torque
nN [min-1]	min-1	Rated speed
M0 [Nm]	Nm	Constant standstill torque
I0 [A]	A	Constant standstill current
IN [A]	A	Rated current
Imax [A]	A	Peak current
nmax [min-1]	min-1	Peak speed
2p	- - -	Number of poles
Uin [V]	V	Regenerated voltage
Tth [min]	min	Thermal time constant
KE [Vs]	Vs	Voltage constant
KT [Nm/A]	Nm/A	Torque constant
R20 [Ohm]	Ohm	Winding resistance phase/phase
L [mH]	mH	Winding inductance

Table 12-1: Key for performance data

The table below contains the key to the designations used in the table header for the mechanical data (see section entitled “Mechanical data”).

Designation used in the table header	Unit	Key
Msize	- - -	Motor size
BR	- - -	Brake
BrValues	- - -	Brake connection values
J [kgcm²]	kgcm²	Mass moment of inertia
L [mm]	mm	Overall motor length
MFB	- - -	Motor feedback
mNet	kg	Net weight
Fan	- - -	Separate ventilation

Table 12-2: Key for mechanical data

The table below contains the key to the designations used in the table header for the dimensions (see section entitled “Dimensions”).

Designation used in the table header	Unit	Key
Msize	- - -	Motor size
a1 [mm]	mm	Motor flange
a2 [mm]	mm	Motor flange
b1 [mm]	mm	Centre diameter
c1 [mm]	mm	Flange strength
d [mm]	mm	Shaft diameter information
e1 [mm]	mm	Pitch circle diameter
f1 [mm]	mm	Pitch circle collar
l [mm]	mm	Wavelength
l1 [mm]	mm	Feather key spacing
l2 [mm]	mm	Feather key length
s1 [mm]	mm	Screw hole
s2 [mm]	mm	Shaft centering thread
t [mm]	mm	Shaft diameter with feather key
u [mm]	mm	Feather key width

Table 12-3: Key for dimensions

Performance data

Performance data: PMCtendo AC1

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
21	400 V	0,13 Nm	0,11 Nm	0,41 Nm	0,17 A	0,14 A	0,52 A	3000 rpm	6000 rpm	4	142 V	32 min	0,45 V	0,78 Nm	536,00 Ohm	635,00 mH
22	400 V	0,25 Nm	0,22 Nm	0,81 Nm	0,32 A	0,28 A	1,00 A	3000 rpm	6000 rpm	4	142 V	35 min	0,45 V	0,78 Nm	180,00 Ohm	284,00 mH
24	230 V	0,50 Nm	0,39 Nm	1,63 Nm	2,22 A	1,73 A	7,23 A	6000 rpm	6000 rpm	4	82 V	40 min	0,13 V	0,23 Nm	5,00 Ohm	11,00 mH
24	400 V	0,50 Nm	0,45 Nm	1,63 Nm	0,64 A	0,57 A	2,10 A	3000 rpm	6000 rpm	4	142 V	40 min	0,45 V	0,78 Nm	59,00 Ohm	130,00 mH
25	400 V	0,70 Nm	0,65 Nm	2,20 Nm	0,89 A	0,83 A	2,80 A	3000 rpm	6000 rpm	4	142 V	43 min	0,45 V	0,78 Nm	45,00 Ohm	97,00 mH
51	400 V	0,60 Nm	0,50 Nm	1,70 Nm	0,40 A	0,30 A	1,20 A	3000 rpm	6000 rpm	4	263 V	50 min	0,84 V	1,45 Nm	160,00 Ohm	446,00 mH
52	230 V	1,30 Nm	0,90 Nm	3,30 Nm	3,10 A	2,10 A	7,90 A	6000 rpm	6000 rpm	4	152 V	45 min	0,24 V	0,42 Nm	4,60 Ohm	16,40 mH
52	230 V	1,30 Nm	1,00 Nm	3,30 Nm	1,50 A	1,20 A	3,90 A	3000 rpm	6000 rpm	4	152 V	45 min	0,48 V	0,84 Nm	17,80 Ohm	64,00 mH
52	400 V	1,30 Nm	1,00 Nm	3,30 Nm	0,90 A	0,68 A	2,30 A	3000 rpm	6000 rpm	4	263 V	45 min	0,84 V	1,45 Nm	52,70 Ohm	187,20 mH
52	400 V	1,30 Nm	1,00 Nm	3,30 Nm	1,20 A	0,90 A	3,00 A	4000 rpm	6000 rpm	4	263 V	45 min	0,63 V	1,09 Nm	29,80 Ohm	105,80 mH
53	230 V	1,90 Nm	1,60 Nm	4,80 Nm	2,30 A	1,90 A	5,70 A	3000 rpm	6000 rpm	4	152 V	76 min	0,48 V	0,84 Nm	9,46 Ohm	40,90 mH
53	400 V	1,90 Nm	1,50 Nm	4,80 Nm	1,70 A	1,40 A	4,40 A	4000 rpm	6000 rpm	4	263 V	76 min	0,63 V	1,09 Nm	15,90 Ohm	68,90 mH
53	400 V	1,90 Nm	1,60 Nm	4,80 Nm	1,30 A	1,10 A	3,30 A	3000 rpm	6000 rpm	4	263 V	76 min	0,84 V	1,45 Nm	27,80 Ohm	121,70 mH
53	400 V	1,90 Nm	1,60 Nm	4,80 Nm	1,30 A	1,10 A	3,30 A	3000 rpm	6000 rpm	4	264 V	76 min	0,84 V	1,45 Nm	27,80 Ohm	121,70 mH
54	400 V	2,80 Nm	1,90 Nm	6,60 Nm	3,90 A	2,60 A	9,10 A	6000 rpm	6000 rpm	4	263 V	95 min	0,42 V	0,73 Nm	4,41 Ohm	18,40 mH
61	400 V	2,00 Nm	1,50 Nm	8,80 Nm	2,50 A	1,80 A	10,80 A	6000 rpm	6000 rpm	6	296 V	20 min	0,47 V	0,82 Nm	8,80 Ohm	30,00 mH
61	400 V	2,00 Nm	1,70 Nm	8,80 Nm	1,60 A	1,40 A	7,20 A	4000 rpm	6000 rpm	6	296 V	20 min	0,71 V	1,22 Nm	20,10 Ohm	68,00 mH
61	400 V	2,00 Nm	1,80 Nm	8,80 Nm	1,20 A	1,10 A	5,40 A	3000 rpm	6000 rpm	6	296 V	20 min	0,94 V	1,63 Nm	35,60 Ohm	122,00 mH

Performance data

Performance data: PMCtendo AC1

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
62	230 V	4,00 Nm	3,50 Nm	17,10 Nm	4,20 A	3,70 A	18,10 A	3000 rpm	4000 rpm	6	171 V	25 min	0,54 V	0,94 Nm	3,50 Ohm	16,00 mH
62	400 V	4,00 Nm	3,30 Nm	17,10 Nm	3,30 A	2,70 A	14,00 A	4000 rpm	4000 rpm	6	296 V	25 min	0,71 V	1,22 Nm	5,70 Ohm	25,00 mH
62	400 V	4,00 Nm	3,30 Nm	17,10 Nm	3,30 A	2,70 A	14,00 A	4000 rpm	6000 rpm	6	296 V	25 min	0,71 V	1,22 Nm	5,70 Ohm	25,00 mH
62	400 V	4,00 Nm	3,50 Nm	17,10 Nm	2,50 A	2,10 A	10,50 A	3000 rpm	4000 rpm	6	296 V	25 min	0,94 V	1,63 Nm	11,10 Ohm	48,70 mH
62	400 V	4,00 Nm	3,60 Nm	17,10 Nm	1,60 A	1,50 A	7,00 A	2000 rpm	4000 rpm	6	296 V	25 min	1,14 V	2,45 Nm	24,80 Ohm	108,40 mH
63	400 V	6,00 Nm	5,00 Nm	24,40 Nm	4,90 A	4,10 A	20,00 A	4000 rpm	6000 rpm	6	296 V	30 min	0,71 V	1,22 Nm	3,00 Ohm	15,80 mH
63	400 V	6,00 Nm	5,30 Nm	24,40 Nm	3,70 A	3,30 A	15,00 A	3000 rpm	4000 rpm	6	296 V	30 min	0,94 V	1,63 Nm	5,50 Ohm	28,50 mH
63	400 V	6,00 Nm	5,30 Nm	24,40 Nm	3,70 A	3,30 A	15,00 A	3000 rpm	4000 rpm	6	297 V	30 min	0,94 V	1,63 Nm	5,50 Ohm	28,50 mH
63	400 V	6,00 Nm	5,30 Nm	24,40 Nm	3,70 A	3,30 A	15,00 A	3000 rpm	4000 rpm	6	298 V	30 min	0,94 V	1,63 Nm	5,50 Ohm	28,50 mH
64	230 V	8,00 Nm	6,60 Nm	33,10 Nm	11,30 A	9,30 A	46,80 A	4000 rpm	6000 rpm	6	171 V	30 min	0,41 V	0,71 Nm	0,68 Ohm	4,10 mH
64	400 V	8,00 Nm	6,60 Nm	33,10 Nm	6,50 A	5,40 A	27,10 A	4000 rpm	6000 rpm	6	296 V	30 min	0,71 V	1,22 Nm	2,00 Ohm	11,90 mH
64	400 V	8,00 Nm	7,10 Nm	33,10 Nm	4,90 A	4,40 A	20,30 A	3000 rpm	4000 rpm	6	296 V	30 min	0,94 V	1,63 Nm	3,70 Ohm	22,50 mH
65	400 V	10,00 Nm	7,70 Nm	40,50 Nm	12,30 A	9,40 A	49,70 A	6000 rpm	6000 rpm	6	296 V	35 min	0,47 V	0,82 Nm	0,68 Ohm	4,23 mH
73	230 V	11,70 Nm	10,50 Nm	48,00 Nm	12,20 A	11,10 A	50,90 A	3000 rpm	4000 rpm	6	171 V	45 min	0,54 V	0,94 Nm	0,76 Ohm	5,41 mH
73	400 V	11,70 Nm	10,10 Nm	48,00 Nm	9,60 A	8,30 A	39,20 A	4000 rpm	4000 rpm	6	296 V	45 min	0,71 V	1,22 Nm	1,20 Ohm	7,70 mH
73	400 V	11,70 Nm	10,50 Nm	48,00 Nm	7,20 A	6,40 A	29,40 A	3000 rpm	4000 rpm	6	296 V	45 min	0,94 V	1,63 Nm	2,30 Ohm	15,10 mH
74	230 V	15,60 Nm	14,10 Nm	60,00 Nm	16,60 A	15,00 A	63,70 A	3000 rpm	4000 rpm	6	171 V	45 min	0,54 V	0,94 Nm	0,42 Ohm	3,59 mH
74	400 V	15,60 Nm	13,50 Nm	60,00 Nm	9,60 A	8,60 A	49,00 A	4000 rpm	4000 rpm	6	296 V	45 min	0,71 V	1,22 Nm	0,86 Ohm	7,00 mH

Performance data

Performance data: PMCtendo AC1

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
74	400 V	15,60 Nm	14,10 Nm	60,00 Nm	12,70 A	11,00 A	36,80 A	3000 rpm	4000 rpm	6	296 V	45 min	0,94 V	1,63 Nm	1,61 Ohm	13,00 mH
74	400 V	15,60 Nm	14,10 Nm	60,00 Nm	9,60 A	8,60 A	36,80 A	3000 rpm	4000 rpm	6	296 V	45 min	0,94 V	1,63 Nm	1,61 Ohm	13,00 mH
75	230 V	19,50 Nm	17,60 Nm	80,00 Nm	20,70 A	18,70 A	84,90 A	3000 rpm	4000 rpm	6	171 V	50 min	0,54 V	0,94 Nm	0,32 Ohm	2,84 mH
76	400 V	23,40 Nm	20,10 Nm	92,00 Nm	19,10 A	16,40 A	75,20 A	4000 rpm	4000 rpm	6	296 V	55 min	0,71 V	1,22 Nm	0,35 Ohm	2,90 mH
76	400 V	23,40 Nm	21,10 Nm	92,00 Nm	14,30 A	12,90 A	56,40 A	3000 rpm	4000 rpm	6	296 V	55 min	0,94 V	1,63 Nm	0,64 Ohm	5,40 mH
A2	400 V	12,00 Nm	10,10 Nm	41,00 Nm	12,80 A	10,70 A	43,60 A	3000 rpm	4000 rpm	6	296 V	50 min	0,94 V	1,63 Nm	1,70 Ohm	20,50 mH
A4	400 V	24,00 Nm	20,90 Nm	89,00 Nm	14,70 A	12,80 A	54,50 A	3000 rpm	4000 rpm	6	296 V	55 min	0,94 V	1,63 Nm	0,55 Ohm	6,80 mH
A4	400 V	24,00 Nm	21,80 Nm	89,00 Nm	9,80 A	8,90 A	36,30 A	2000 rpm	3000 rpm	6	296 V	55 min	1,41 V	2,45 Nm	1,10 Ohm	13,60 mH
A5	400 V	30,00 Nm	26,20 Nm	99,00 Nm	18,40 A	16,00 A	60,60 A	3000 rpm	4000 rpm	6	296 V	60 min	0,94 V	1,63 Nm	0,37 Ohm	5,30 mH
A7	400 V	43,00 Nm	39,10 Nm	139,00 Nm	17,60 A	16,00 A	56,70 A	2000 rpm	3000 rpm	6	296 V	65 min	1,41 V	2,45 Nm	0,55 Ohm	7,60 mH
A9	400 V	54,00 Nm	49,10 Nm	163,00 Nm	22,00 A	20,00 A	66,50 A	2000 rpm	4000 rpm	6	296 V	70 min	1,41 V	2,45 Nm	0,39 Ohm	5,90 mH

Mechanical data

Mechanical data: PMCtendo AC1

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
21	no		0,16 kgcm²	129 mm	Resolver 2-pole	1.350 g	no
22	no		0,21 kgcm²	149 mm	Resolver 2-pole	1.650 g	no
24	no		0,32 kgcm²	189 mm	Resolver 2-pole	2.250 g	no
24	no		0,32 kgcm²	190 mm	Resolver 2-pole	2.250 g	no
25	no		0,38 kgcm²	209 mm	Resolver 2-pole	2.550 g	no
51	no		0,73 kgcm²	185 mm	Resolver 2-pole	3.700 g	no
52	yes	24VDC/0,51A/3,5Nm	1,40 kgcm²	238 mm	Resolver 2-pole	5.200 g	no
52	no		1,40 kgcm²	210 mm	Resolver 2-pole	4.600 g	no
53	yes	24VDC/0,51A/3,5Nm	2,22 kgcm²	263 mm	Hiperface single-turn	6.200 g	no
53	yes	24VDC/0,51A/3,5Nm	2,22 kgcm²	263 mm	Resolver 2-pole	6.200 g	no
53	no		1,84 kgcm²	235 mm	Hiperface multi-turn	5.600 g	no
53	no		1,84 kgcm²	235 mm	Hiperface single-turn	5.600 g	no
53	no		1,84 kgcm²	235 mm	Resolver 2-pole	5.600 g	no
54	no		2,28 kgcm²	260 mm	Resolver 2-pole	6.500 g	no
61	yes	24VDC/0,71A/9,5Nm	6,85 kgcm²	229 mm	Resolver 2-pole	7.800 g	no

Mechanical data

Mechanical data: PMCtendo AC1

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
61	no		3,25 kgcm²	199 mm	Resolver 2-pole	6.000 g	no
62	yes	24VDC/0,71A/9,5Nm	9,41 kgcm²	255 mm	Resolver 2-pole	9.300 g	no
62	no		5,81 kgcm²	224 mm	Resolver 2-pole	7.100 g	no
63	yes	24VDC/0,71A/9,5Nm	12,15 kgcm²	280 mm	Resolver 2-pole	10.800 g	no
63	no		8,55 kgcm²	249 mm	Resolver 2-pole	9.000 g	no
63	no		8,55 kgcm²	313 mm	Ext. encoder mount-ready	9.000 g	no
64	yes	24VDC/0,71A/9,5Nm	14,80 kgcm²	305 mm	Resolver 2-pole	12.200 g	no
64	no		11,20 kgcm²	274 mm	Resolver 2-pole	10.100 g	no
64	no		11,20 kgcm²	338 mm	Ext. encoder mount-ready	10.100 g	no
65	no		13,65 kgcm²	331 mm	Hiperface multi-turn	12.000 g	no
73	yes	24VDC/0,96A/27,0Nm	33,10 kgcm²	289 mm	Resolver 2-pole	16.100 g	no
73	no		23,60 kgcm²	259 mm	Resolver 2-pole	14.100 g	no
74	yes	24VDC/0,96A/27,0Nm	41,03 kgcm²	314 mm	Resolver 2-pole	18.300 g	no
74	no		31,53 kgcm²	284 mm	Resolver 2-pole	16.400 g	no
74	no		31,53 kgcm²	330 mm	Ext. encoder mount-ready	16.400 g	no

Mechanical data

Mechanical data: PMCtendo AC1

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
75	no		38,44 kgcm²	309 mm	Resolver 2-pole	18.600 g	no
76	no		45,35 kgcm²	334 mm	Resolver 2-pole	20.800 g	no
A2	no		6,80 kgcm²	276 mm	Resolver 2-pole	26.000 g	no
A4	no		136,00 kgcm²	301 mm	Resolver 2-pole	26.000 g	no
A4	no		136,00 kgcm²	328 mm	Hiperface multi-turn	26.000 g	no
A4	no		136,00 kgcm²	328 mm	Hiperface single-turn	26.000 g	no
A5	no		170,00 kgcm²	353 mm	Hiperface single-turn	30.000 g	no
A5	no		170,00 kgcm²	353 mm	Resolver 2-pole	30.000 g	no
A7	yes	24VDC/0,90A/48,0Nm	269,80 kgcm²	376 mm	Resolver 2-pole	44.600 g	no
A9	yes		331,80 kgcm²	490 mm	Resolver 2-pole	52.600 g	no

Dimensions

Dimensions: PMCtendo AC1

Msize	a1 [mm]	a2 [mm]	b1 [mm]	c1 [mm]	d [mm]	e1 [mm]	f1 [mm]	l [mm]	l1 [mm]	l2 [mm]	s1 [mm]	s2 [mm]	t [mm]	u [mm]
21	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
22	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
24	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
25	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
51	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
52	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
53	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
54	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
61	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
62	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
63	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
64	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
65	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
73	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
74	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm

Dimensions

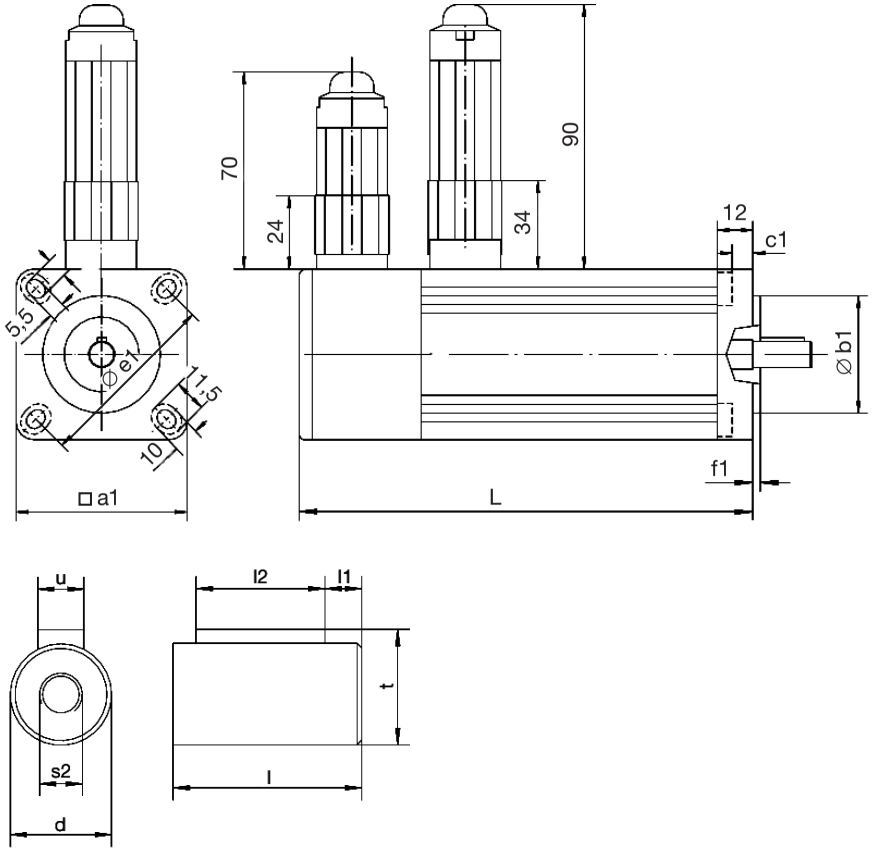
Dimensions: PMCtendo AC1

Msize	a1 [mm]	a2 [mm]	b1 [mm]	c1 [mm]	d [mm]	e1 [mm]	f1 [mm]	l [mm]	l1 [mm]	l2 [mm]	s1 [mm]	s2 [mm]	t [mm]	u [mm]
75	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
76	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
A2	190 mm		180 mm	16 mm	32 mm	215 mm	4,0 mm	58 mm	6,5 mm	45 mm	13,0 mm	M12 x 20	35,5 mm	10 mm
A4	190 mm		180 mm	16 mm	32 mm	215 mm	4,0 mm	58 mm	6,5 mm	45 mm	13,0 mm	M12 x 20	35,5 mm	10 mm
A5	190 mm		180 mm	16 mm	32 mm	215 mm	4,0 mm	58 mm	6,5 mm	45 mm	13,0 mm	M12 x 20	35,5 mm	10 mm
A7	190 mm		180 mm	16 mm	32 mm	215 mm	4,0 mm	58 mm	6,5 mm	45 mm	13,0 mm	M12 x 20	35,5 mm	10 mm
A9	190 mm		180 mm	16 mm	32 mm	215 mm	4,0 mm	58 mm	6,5 mm	45 mm	13,0 mm	M12 x 20	35,5 mm	10 mm

Dimensioned drawing

Dimensioned drawing: PMCtendo AC1

Msize: 2x



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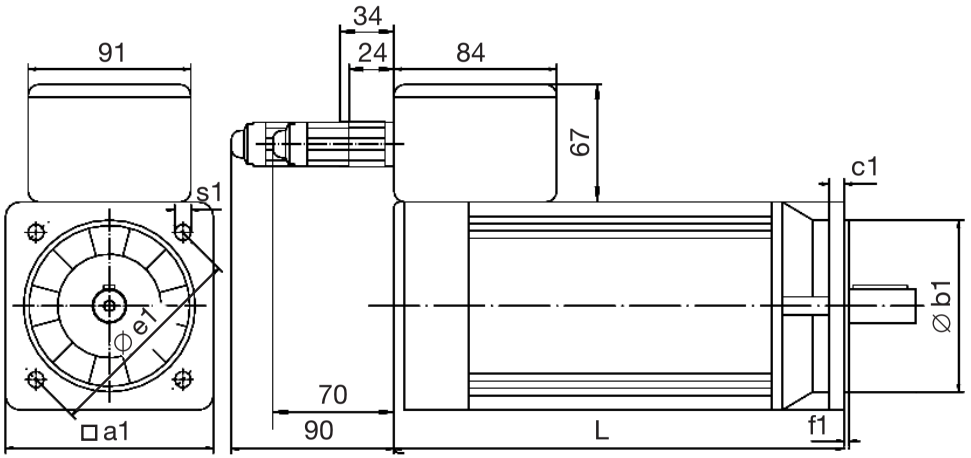


Performance data

Performance data: PMCtendo AC2

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
21	400 V	0,20 Nm	0,16 Nm	0,70 Nm	0,28 A	0,22 A	0,97 A	6000 rpm	6000 rpm	4	263 V	32 min	0,42 V	0,73 Nm	203,00 Ohm	172,00 mH
22	400 V	0,40 Nm	0,32 Nm	1,40 Nm	0,55 A	0,44 A	1,93 A	6000 rpm	6000 rpm	4	263 V	35 min	0,42 V	0,73 Nm	51,00 Ohm	71,80 mH
22	400 V	0,40 Nm	0,38 Nm	1,40 Nm	0,28 A	0,26 A	0,97 A	3000 rpm	6000 rpm	4	263 V	35 min	0,84 V	1,45 Nm	229,00 Ohm	289,00 mH
23	400 V	0,60 Nm	0,57 Nm	2,10 Nm	0,41 A	0,39 A	1,45 A	3000 rpm	6000 rpm	4	263 V	38 min	0,84 V	1,45 Nm	114,00 Ohm	173,00 mH
24	400 V	0,80 Nm	0,64 Nm	2,80 Nm	1,10 A	0,88 A	3,86 A	4000 rpm	6000 rpm	4	263 V	40 min	0,63 V	1,09 Nm	41,20 Ohm	73,60 mH
24	400 V	0,80 Nm	0,64 Nm	2,80 Nm	1,10 A	0,88 A	3,86 A	6000 rpm	6000 rpm	4	263 V	40 min	0,42 V	0,73 Nm	18,80 Ohm	32,40 mH
31	400 V	0,82 Nm	0,70 Nm	2,10 Nm	1,13 A	0,97 A	2,83 A	6000 rpm	6000 rpm	4	263 V	32 min	0,42 V	0,73 Nm	23,00 Ohm	55,60 mH
31	400 V	0,82 Nm	0,80 Nm	2,10 Nm	0,57 A	0,55 A	1,41 A	3000 rpm	6000 rpm	4	263 V	32 min	0,84 V	1,45 Nm	91,80 Ohm	222,20 mH
32	400 V	1,64 Nm	1,40 Nm	4,10 Nm	1,50 A	1,30 A	3,80 A	4000 rpm	6000 rpm	4	263 V	35 min	0,63 V	1,09 Nm	17,20 Ohm	62,50 mH
32	400 V	1,64 Nm	1,40 Nm	4,10 Nm	2,20 A	1,93 A	5,60 A	6000 rpm	6000 rpm	4	263 V	35 min	0,42 V	0,73 Nm	7,70 Ohm	27,80 mH
32	400 V	1,64 Nm	1,50 Nm	4,10 Nm	1,50 A	1,30 A	3,80 A	4000 rpm	6000 rpm	4	263 V	35 min	0,63 V	1,09 Nm	17,20 Ohm	62,50 mH
32	400 V	1,64 Nm	1,60 Nm	4,10 Nm	1,13 A	1,10 A	2,83 A	3000 rpm	6000 rpm	4	263 V	35 min	0,84 V	1,45 Nm	30,60 Ohm	111,10 mH
33	400 V	2,35 Nm	2,00 Nm	5,90 Nm	2,20 A	1,80 A	5,40 A	4000 rpm	6000 rpm	4	263 V	38 min	0,63 V	1,09 Nm	9,90 Ohm	41,70 mH
33	400 V	2,35 Nm	2,00 Nm	5,90 Nm	3,20 A	2,70 A	8,10 A	6000 rpm	6000 rpm	4	263 V	38 min	0,42 V	0,73 Nm	4,40 Ohm	18,50 mH
33	400 V	2,35 Nm	2,25 Nm	5,90 Nm	1,62 A	1,55 A	4,10 A	3000 rpm	6000 rpm	4	263 V	38 min	0,84 V	1,45 Nm	17,60 Ohm	74,10 mH
52	400 V	2,00 Nm	1,60 Nm	7,10 Nm	1,35 A	1,08 A	4,81 A	3000 rpm	6000 rpm	8	268 V	35 min	0,85 V	1,48 Nm	13,50 Ohm	22,80 mH
53	400 V	3,20 Nm	2,60 Nm	10,00 Nm	1,97 A	1,60 A	6,13 A	3000 rpm	9000 rpm	8	296 V	38 min	0,94 V	1,63 Nm	9,70 Ohm	18,30 mH
55	400 V	5,30 Nm	4,54 Nm	18,00 Nm	2,39 A	2,05 A	8,12 A	2000 rpm	6000 rpm	8	268 V	40 min	1,28 V	2,22 Nm	10,40 Ohm	20,60 mH

Performance data

Performance data: PMCtendo AC2

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
62	400 V	4,00 Nm	3,20 Nm	20,00 Nm	4,90 A	3,90 A	24,50 A	6000 rpm	6000 rpm	8	296 V	25 min	0,47 V	0,82 Nm	1,75 Ohm	5,50 mH
62	400 V	4,00 Nm	3,40 Nm	20,00 Nm	3,30 A	2,60 A	16,40 A	4000 rpm	4000 rpm	8	296 V	25 min	0,71 V	1,22 Nm	3,60 Ohm	11,90 mH
62	400 V	4,00 Nm	3,40 Nm	20,00 Nm	3,30 A	2,60 A	16,40 A	4000 rpm	6000 rpm	8	296 V	25 min	0,71 V	1,22 Nm	3,60 Ohm	11,90 mH
62	400 V	4,00 Nm	3,50 Nm	20,00 Nm	2,50 A	2,20 A	12,30 A	3000 rpm	4000 rpm	8	296 V	25 min	0,94 V	1,63 Nm	6,40 Ohm	21,20 mH
62	400 V	4,00 Nm	3,60 Nm	20,00 Nm	2,50 A	2,20 A	12,30 A	3000 rpm	4000 rpm	8	296 V	25 min	0,94 V	1,63 Nm	6,40 Ohm	21,20 mH
63	400 V	6,00 Nm	4,80 Nm	30,00 Nm	4,90 A	3,90 A	24,50 A	4000 rpm	4000 rpm	8	296 V	30 min	0,71 V	1,22 Nm	1,85 Ohm	7,80 mH
63	400 V	6,00 Nm	4,80 Nm	30,00 Nm	7,40 A	5,90 A	37,00 A	6000 rpm	4000 rpm	8	296 V	30 min	0,47 V	0,82 Nm	0,98 Ohm	3,80 mH
63	400 V	6,00 Nm	4,80 Nm	30,00 Nm	7,40 A	5,90 A	37,00 A	6000 rpm	6000 rpm	8	296 V	30 min	0,47 V	0,82 Nm	0,98 Ohm	3,80 mH
63	400 V	6,00 Nm	5,10 Nm	30,00 Nm	4,90 A	3,90 A	24,50 A	4000 rpm	4000 rpm	8	296 V	30 min	0,71 V	1,22 Nm	1,85 Ohm	7,80 mH
63	400 V	6,00 Nm	5,40 Nm	30,00 Nm	3,70 A	3,30 A	18,40 A	3000 rpm	4000 rpm	8	296 V	30 min	0,94 V	1,63 Nm	3,10 Ohm	13,20 mH
64	400 V	8,00 Nm	6,40 Nm	40,00 Nm	6,50 A	5,20 A	32,70 A	4000 rpm	6000 rpm	8	296 V	30 min	0,71 V	1,22 Nm	1,18 Ohm	5,30 mH
64	400 V	8,00 Nm	7,20 Nm	40,00 Nm	4,90 A	4,40 A	24,50 A	3000 rpm	4000 rpm	8	296 V	30 min	0,94 V	1,63 Nm	2,10 Ohm	8,70 mH
65	400 V	10,00 Nm	8,00 Nm	50,00 Nm	8,20 A	6,50 A	41,00 A	4000 rpm	6000 rpm	8	296 V	30 min	0,71 V	1,22 Nm	0,86 Ohm	4,20 mH
65	400 V	10,00 Nm	9,00 Nm	50,00 Nm	6,10 A	5,50 A	30,70 A	3000 rpm	4000 rpm	8	296 V	30 min	0,94 V	1,63 Nm	1,60 Ohm	7,70 mH
72	400 V	8,00 Nm	7,00 Nm	40,00 Nm	4,90 A	4,30 A	24,50 A	3000 rpm	4000 rpm	8	296 V	40 min	0,94 V	1,63 Nm	2,59 Ohm	13,30 mH
73	400 V	12,00 Nm	10,50 Nm	60,00 Nm	7,40 A	6,40 A	36,80 A	3000 rpm	4000 rpm	8	296 V	45 min	0,94 V	1,63 Nm	1,49 Ohm	7,65 mH
73	400 V	12,00 Nm	9,00 Nm	60,00 Nm	9,80 A	7,40 A	49,10 A	4000 rpm	4000 rpm	8	296 V	45 min	0,71 V	1,22 Nm	0,83 Ohm	4,22 mH
74	400 V	16,00 Nm	12,00 Nm	80,00 Nm	13,10 A	9,80 A	65,40 A	4000 rpm	4000 rpm	8	296 V	45 min	0,71 V	1,22 Nm	0,53 Ohm	3,91 mH

Performance data

Performance data: PMCtendo AC2

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
74	400 V	16,00 Nm	14,00 Nm	80,00 Nm	6,50 A	5,60 A	32,70 A	2000 rpm	4000 rpm	8	296 V	45 min	1,41 V	2,45 Nm	2,02 Ohm	14,90 mH
74	400 V	16,00 Nm	14,00 Nm	80,00 Nm	9,80 A		49,10 A	3000 rpm	4000 rpm	8	296 V	45 min	0,94 V	1,63 Nm	0,90 Ohm	6,60 mH
74	400 V	16,00 Nm	14,00 Nm	80,00 Nm	9,80 A	10,70 A	49,00 A	3000 rpm	4000 rpm	8	296 V	45 min	0,94 V	1,63 Nm	0,90 Ohm	6,60 mH
74	400 V	16,00 Nm	14,00 Nm	80,00 Nm	9,80 A	8,60 A	49,10 A	3000 rpm	4000 rpm	8	296 V	45 min	0,94 V	1,63 Nm	0,90 Ohm	6,60 mH
75	400 V	20,00 Nm	15,00 Nm	100,00 Nm	16,40 A	12,30 A	81,80 A	4000 rpm	4000 rpm	8	296 V	50 min	0,71 V	1,22 Nm	0,39 Ohm	3,03 mH
75	400 V	20,00 Nm	15,00 Nm	100,00 Nm	24,50 A	18,40 A	123,00 A	6000 rpm	4000 rpm	8	296 V	50 min	0,47 V	0,82 Nm	0,24 Ohm	2,09 mH
75	400 V	20,00 Nm	17,50 Nm	100,00 Nm	12,30 A	10,70 A	61,30 A	3000 rpm	4000 rpm	8	296 V	50 min	0,94 V	1,63 Nm	0,68 Ohm	5,22 mH
75	400 V	20,00 Nm	17,50 Nm	100,00 Nm	12,30 A	10,70 A	61,50 A	3000 rpm	4000 rpm	8	296 V	50 min	0,94 V	1,63 Nm	0,68 Ohm	5,22 mH
76	400 V	24,00 Nm	19,50 Nm	120,00 Nm	19,50 A	16,40 A	86,00 A	4000 rpm	4000 rpm	8	296 V	50 min	0,71 V	1,22 Nm	0,45 Ohm	3,92 mH
76	400 V	24,00 Nm	21,00 Nm	120,00 Nm	14,70 A	12,90 A	74,00 A	3000 rpm	4000 rpm	8	296 V	50 min	0,94 V	1,63 Nm	0,49 Ohm	3,75 mH
76	400 V	24,00 Nm	21,00 Nm	120,00 Nm	9,80 A	8,60 A	49,10 A	2000 rpm	4000 rpm	8	296 V	50 min	1,41 V	2,45 Nm	1,14 Ohm	8,77 mH
77	400 V	27,30 Nm	24,60 Nm	108,00 Nm	16,70 A	15,10 A	66,20 A	3000 rpm	4000 rpm	8	296 V	55 min	0,94 V	1,63 Nm	0,74 Ohm	5,30 mH
77	400 V	28,00 Nm	24,50 Nm	140,00 Nm	17,20 A	15,00 A	85,90 A	3000 rpm	4000 rpm	8	296 V	55 min	0,94 V	1,63 Nm	0,67 Ohm	5,97 mH

Mechanical data

Mechanical data: PMCtendo AC2

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
21	no		0,10 kgcm²	118 mm	Resolver 2-pole	1.500 g	no
21	no		0,10 kgcm²	150 mm	Hiperface single-turn	1.500 g	no
22	yes	24VDC/0,35A/1,2Nm	0,23 kgcm²	161 mm	Resolver 2-pole	1.850 g	no
22	no		0,16 kgcm²	133 mm	Resolver 2-pole	1.700 g	no
22	no		0,16 kgcm²	165 mm	Hiperface multi-turn	1.700 g	no
23	no		0,21 kgcm²	148 mm	Resolver 2-pole	1.900 g	no
24	yes		0,32 kgcm²	191 mm	Resolver 2-pole	2.400 g	no
24	no		0,26 kgcm²	163 mm	Resolver 2-pole	2.100 g	no
24	no		0,26 kgcm²	195 mm	Hiperface multi-turn	2.100 g	no
31	yes	24VDC/0,51A/3,5Nm	1,00 kgcm²	199 mm	Resolver 2-pole	3.400 g	no
31	no		0,62 kgcm²	172 mm	Resolver 2-pole	2.800 g	no
31	no		0,62 kgcm²	207 mm	Hiperface multi-turn	2.800 g	no
31	no		0,62 kgcm²	207 mm	Hiperface single-turn	2.800 g	no
32	yes	24VDC/0,51A/3,5Nm	1,14 kgcm²	239 mm	Resolver 2-pole	3.300 g	no
32	yes	24VDC/0,51A/3,5Nm	1,14 kgcm²	274 mm	Hiperface multi-turn	3.300 g	no

Mechanical data

Mechanical data: PMCtendo AC2

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
32	yes	24VDC/0,51A/3,5Nm	1,52 kgcm²	239 mm	Resolver 2-pole	3.300 g	no
32	yes	24VDC/0,51A/3,5Nm	1,52 kgcm²	274 mm	Hiperface single-turn	3.300 g	no
32	no		1,14 kgcm²	212 mm	Resolver 2-pole	4.000 g	no
32	no		1,14 kgcm²	247 mm	Hiperface multi-turn	4.000 g	no
32	no		1,14 kgcm²	247 mm	Hiperface single-turn	4.000 g	no
33	yes	24VDC/0,51A/3,5Nm	2,04 kgcm²	279 mm	Resolver 2-pole	5.700 g	no
33	yes	24VDC/0,51A/3,5Nm	2,04 kgcm²	314 mm	Hiperface multi-turn	5.700 g	no
33	yes	24VDC/0,51A/3,5Nm	2,04 kgcm²	314 mm	Hiperface single-turn	5.700 g	no
33	no		1,66 kgcm²	253 mm	Resolver 2-pole	5.100 g	no
33	no		1,66 kgcm²	287 mm	Hiperface multi-turn	5.100 g	no
33	no		1,66 kgcm²	287 mm	Hiperface single-turn	5.100 g	no
52	no		1,40 kgcm²	289 mm	Ext. encoder mount-ready	4.400 g	no
53	yes		2,22 kgcm²	236 mm	Resolver 2-pole	6.000 g	no
53	no		1,84 kgcm²	236 mm	Resolver 2-pole	5.400 g	no
55	no		2,72 kgcm²	285 mm	Hiperface multi-turn	7.400 g	no

Mechanical data

Mechanical data: PMCtendo AC2

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
62	yes	24VDC/0,71A/9,5Nm	9,80 kgcm²	255 mm	Resolver 2-pole	10.100 g	no
62	yes	24VDC/0,71A/9,5Nm	9,80 kgcm²	287 mm	Hiperface multi-turn	10.100 g	no
62	no		6,20 kgcm²	224 mm	Resolver 2-pole	7.100 g	no
62	no		6,20 kgcm²	256 mm	Hiperface multi-turn	7.100 g	no
62	no		6,20 kgcm²	256 mm	Hiperface single-turn	7.100 g	no
63	yes	24VDC/0,71A/9,5Nm	11,61 kgcm²	280 mm	Resolver 2-pole	10.100 g	no
63	yes	24VDC/0,71A/9,5Nm	11,61 kgcm²	312 mm	Hiperface multi-turn	10.100 g	no
63	yes	24VDC/0,71A/9,5Nm	11,61 kgcm²	312 mm	Hiperface single-turn	10.100 g	no
63	no		8,01 kgcm²	249 mm	Resolver 2-pole	9.000 g	no
63	no		8,01 kgcm²	281 mm	Hiperface multi-turn	9.000 g	no
63	no		8,01 kgcm²	281 mm	Hiperface single-turn	9.000 g	no
64	yes	24VDC/0,71A/9,5Nm	13,60 kgcm²	305 mm	Resolver 2-pole	12.000 g	no
64	yes	24VDC/0,71A/9,5Nm	13,60 kgcm²	337 mm	Hiperface multi-turn	12.000 g	no
64	yes	24VDC/0,71A/9,5Nm	13,60 kgcm²	337 mm	Hiperface single-turn	12.000 g	no
64	no		10,00 kgcm²	274 mm	Resolver 2-pole	10.100 g	no

Mechanical data

Mechanical data: PMCtendo AC2

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
64	no		10,00 kgcm²	306 mm	Hiperface multi-turn	10.100 g	no
64	no		10,00 kgcm²	306 mm	Hiperface single-turn	10.100 g	no
65	yes	24VDC/0,71A/9,5Nm	15,50 kgcm²	330 mm	Resolver 2-pole	13.900 g	no
65	yes	24VDC/0,71A/9,5Nm	15,50 kgcm²	362 mm	Hiperface multi-turn	13.900 g	no
65	yes	24VDC/0,71A/9,5Nm	15,50 kgcm²	362 mm	Resolver 2-pole	13.900 g	no
65	no		11,90 kgcm²	299 mm	Resolver 2-pole	12.000 g	no
65	no		11,90 kgcm²	331 mm	Hiperface single-turn	12.000 g	no
72	no		12,70 kgcm²	234 mm	Hiperface multi-turn	12.000 g	no
72	no		12,70 kgcm²	234 mm	Resolver 2-pole	12.000 g	no
73	yes	24VDC/0,96A/27,0Nm	26,90 kgcm²	289 mm	Hiperface multi-turn	16.000 g	no
73	yes	24VDC/0,96A/27,0Nm	26,90 kgcm²	289 mm	Resolver 2-pole	16.000 g	no
73	yes	24VDC/0,96A/27,0Nm	26,90 kgcm²	311 mm	Hiperface multi-turn	16.000 g	no
73	no		17,40 kgcm²	259 mm	Resolver 2-pole	14.100 g	no
74	yes	24VDC/0,96A/27,0Nm	31,60 kgcm²	314 mm	Resolver 2-pole	18.300 g	no
74	yes	24VDC/0,96A/27,0Nm	31,60 kgcm²	336 mm	Hiperface multi-turn	18.300 g	no

Mechanical data

Mechanical data: PMCtendo AC2

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
74	no		22,10 kgcm²	284 mm	Hiperface multi-turn	16.400 g	no
74	no		22,10 kgcm²	284 mm	Hiperface single-turn	16.400 g	no
74	no		22,10 kgcm²	284 mm	Resolver 2-pole	16.400 g	no
75	yes	24VDC/0,96A/27,0Nm	36,30 kgcm²	339 mm	Resolver 2-pole	20.500 g	no
75	yes	24VDC/0,96A/27,0Nm	36,30 kgcm²	361 mm	Hiperface multi-turn	20.500 g	no
75	no		26,80 kgcm²	309 mm	Hiperface mult-iturn	18.600 g	no
75	no		26,80 kgcm²	309 mm	Hiperface single-turn	18.600 g	no
76	no		31,50 kgcm²	334 mm	Resolver 2-pole	20.300 g	no
76	no		31,50 kgcm²	334 mm	Resolver 2-pole	20.800 g	no
76	no		31,50 kgcm²	356 mm	Hiperface single-turn	20.800 g	no
77	no		36,20 kgcm²	359 mm	Hiperface multi-turn	23.000 g	no
77	no		52,26 kgcm²	472 mm	Hiperface multi-turn	25.800 g	yes

Dimensions

Dimensions: PMCtendo AC2

Msize	a1 [mm]	a2 [mm]	b1 [mm]	c1 [mm]	d [mm]	e1 [mm]	f1 [mm]	l [mm]	l1 [mm]	l2 [mm]	s1 [mm]	s2 [mm]	t [mm]	u [mm]
21	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
22	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
23	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
24	58 mm		40 mm	8 mm	9 mm	63 mm	2,5 mm	20 mm	2,5 mm	15 mm	5,5 mm		10,5 mm	3 mm
31	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
32	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
33	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
52	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
53	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
55	92 mm		80 mm	11 mm	14 mm	100 mm	3,0 mm	30 mm	5,0 mm	20 mm	6,6 mm	M5 x 10	16,0 mm	5 mm
62	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
63	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
64	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
65	115 mm		95 mm	8 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 20	21,0 mm	6 mm
72	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm

Dimensions

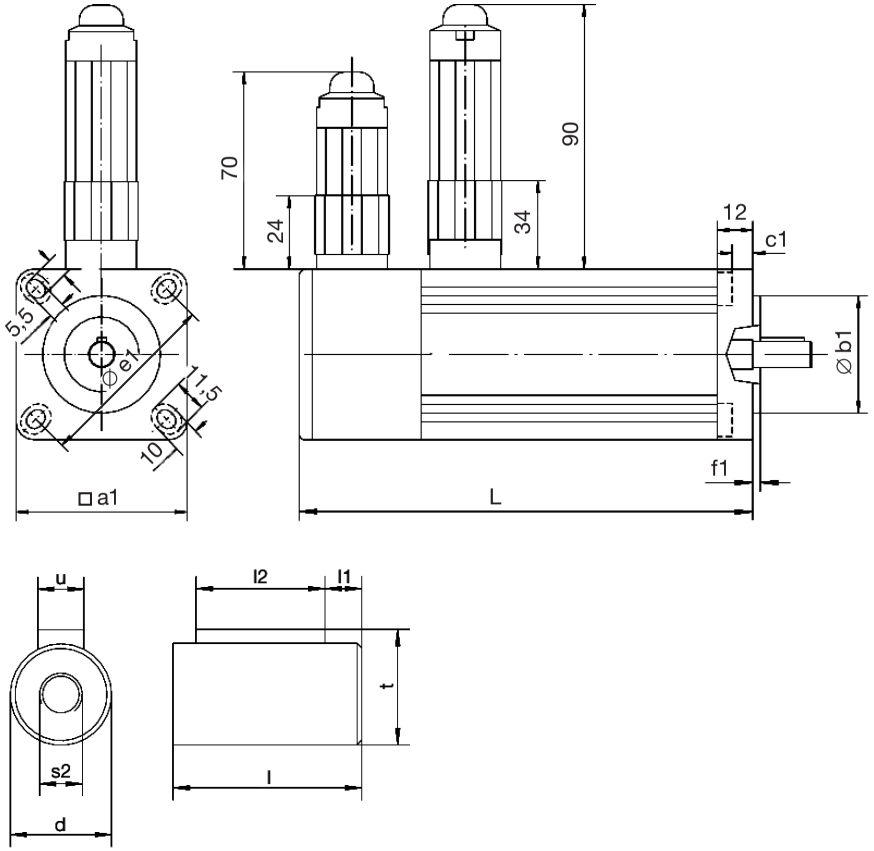
Dimensions: PMCtendo AC2

Msize	a1 [mm]	a2 [mm]	b1 [mm]	c1 [mm]	d [mm]	e1 [mm]	f1 [mm]	l [mm]	l1 [mm]	l2 [mm]	s1 [mm]	s2 [mm]	t [mm]	u [mm]
73	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
74	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
75	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
76	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
77	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm

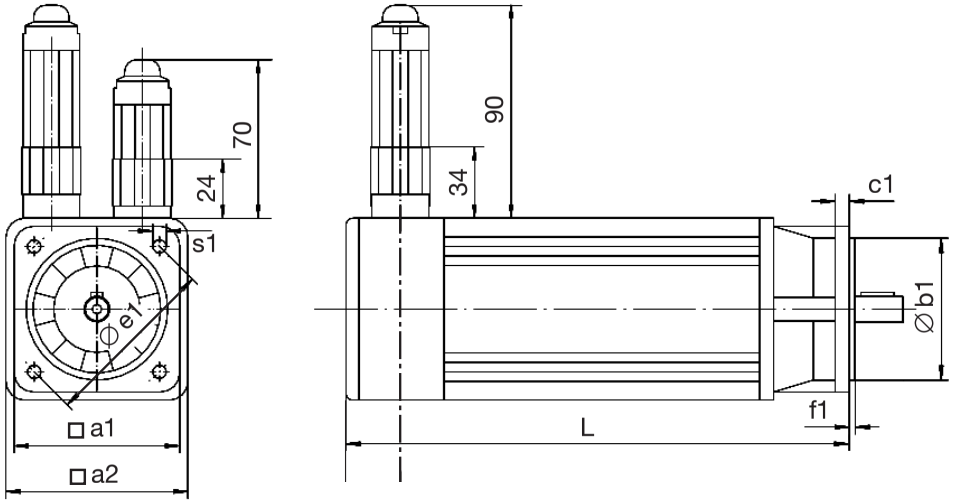
Dimensioned drawing

Dimensioned drawing: PMCtendo AC2

Msize: 2x



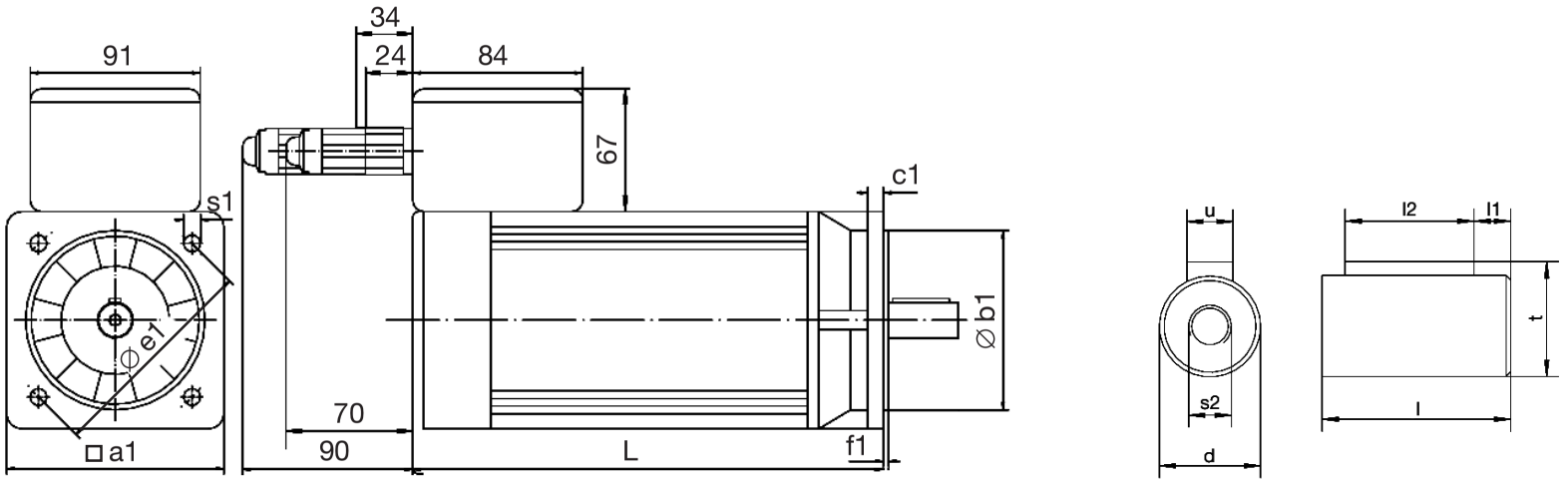
Msize: 3x



Dimensioned drawing

Dimensioned drawing: PMCtendo AC2

Msize: 5x ... 7x



Performance data

Performance data: PMCtendo AC3

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
31	400 V	0,60 Nm	0,50 Nm	2,10 Nm	0,82 A	0,69 A	2,89 A	6000 rpm	6000 rpm	4	264 V	32 min	0,42 V	0,73 Nm	25,10 Ohm	48,60 mH
31	400 V	0,60 Nm	0,55 Nm	2,10 Nm	0,41 A	0,38 A	1,44 A	3000 rpm	6000 rpm	4	264 V	32 min	0,84 V	1,45 Nm	97,50 Ohm	82,30 mH
32	400 V	1,20 Nm	1,00 Nm	4,20 Nm	1,65 A	1,37 A	5,77 A	6000 rpm	6000 rpm	4	264 V	35 min	0,42 V	0,73 Nm	8,10 Ohm	20,60 mH
32	400 V	1,20 Nm	1,06 Nm	4,20 Nm	1,10 A	0,76 A	3,85 A	4000 rpm	6000 rpm	4	264 V	35 min	0,84 V	1,09 Nm	32,20 Ohm	82,30 mH
32	400 V	1,20 Nm	1,10 Nm	4,20 Nm	0,82 A	0,76 A	2,89 A	3000 rpm	6000 rpm	4	264 V	35 min	0,84 V	1,45 Nm	32,20 Ohm	82,30 mH
33	400 V	1,80 Nm	1,65 Nm	6,30 Nm	1,24 A	1,13 A	4,33 A	3000 rpm	6000 rpm	4	264 V	38 min	0,84 V	1,45 Nm	17,60 Ohm	53,70 mH
34	400 V	2,50 Nm	2,00 Nm	8,75 Nm	3,44 A	2,75 A	12,03 A	6000 rpm	6000 rpm	4	264 V	40 min	0,42 V	0,73 Nm	3,30 Ohm	10,50 mH
34	400 V	2,50 Nm	2,10 Nm	8,75 Nm	2,29 A	1,92 A	8,02 A	4000 rpm	6000 rpm	4	264 V	40 min	0,63 V	1,09 Nm	7,40 Ohm	24,20 mH
34	400 V	2,50 Nm	2,20 Nm	8,75 Nm	1,72 A	1,51 A	6,01 A	3000 rpm	6000 rpm	4	264 V	40 min	0,84 V	1,45 Nm	13,60 Ohm	42,80 mH
35	400 V	3,00 Nm	2,60 Nm	10,50 Nm	2,75 A	2,38 A	9,62 A	4000 rpm	6000 rpm	4	264 V	43 min	0,63 V	1,09 Nm	5,10 Ohm	15,80 mH
35	400 V	3,00 Nm	2,75 Nm	10,50 Nm	2,06 A	1,89 A	7,22 A	3000 rpm	6000 rpm	4	264 V	43 min	0,84 V	1,45 Nm	8,80 Ohm	28,10 mH
73	400 V	11,00 Nm	9,50 Nm	46,00 Nm	6,80 A	5,80 A	28,19 A	3000 rpm	6000 rpm	8	296 V	35 min	0,94 V	1,63 Nm	1,60 Ohm	14,00 mH
74	400 V	15,00 Nm	12,80 Nm	62,00 Nm	9,20 A	7,90 A	38,00 A	3000 rpm	6000 rpm	8	296 V	38 min	0,94 V	1,63 Nm	1,17 Ohm	10,50 mH
74	400 V	15,00 Nm	12,86 Nm	62,00 Nm	6,10 A	5,30 A	25,30 A	2000 rpm	6000 rpm	8	296 V	38 min	1,41 V	2,45 Nm	2,90 Ohm	32,20 mH
76	400 V	23,00 Nm	16,89 Nm	94,00 Nm	18,79 A	13,80 A	76,80 A	4000 rpm	6000 rpm	8	296 V	40 min	0,71 V	1,22 Nm	0,40 Ohm	4,40 mH

Mechanical data

Mechanical data: PMCtendo AC3

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
31	yes	24VDC/0,45A/3,2Nm	0,80 kgcm²	219 mm	Hiperface multi-turn	2.000 g	no
31	no		0,42 kgcm²	126 mm	Resolver 2-pole	1.400 g	no
31	no		0,42 kgcm²	172 mm	Hiperface multi-turn	1.400 g	no
31	no		0,42 kgcm²	172 mm	Hiperface single-turn	1.400 g	no
32	yes	24VDC/0,45A/3,2Nm	1,15 kgcm²	198 mm	Resolver 2-pole	2.800 g	no
32	yes	24VDC/0,45A/3,2Nm	1,15 kgcm²	244 mm	Hiperface multi-turn	2.800 g	no
32	no		0,77 kgcm²	151 mm	Resolver 2-pole	2.200 g	no
32	no		0,77 kgcm²	197 mm	Hiperface multi-turn	2.200 g	no
32	no		0,77 kgcm²	197 mm	Hiperface single-turn	2.200 g	no
33	no		1,10 kgcm²	222 mm	Hiperface multi-turn	3.100 g	no
34	yes	24VDC/0,45A/3,2Nm	1,80 kgcm²	248 mm	Resolver 2-pole	4.600 g	no
34	no		1,42 kgcm²	201 mm	Resolver 2-pole	4.000 g	no
34	no		1,42 kgcm²	247 mm	Hiperface multi-turn	4.000 g	no
34	no		1,42 kgcm²	247 mm	Hiperface single-turn	4.000 g	no
35	yes	24VDC/0,45A/3,2Nm	2,12 kgcm²	273 mm	Resolver 2-pole	5.500 g	no

Mechanical data

Mechanical data: PMCtendo AC3

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
35	no		1,74 kgcm²	226 mm	Resolver 2-pole	4.900 g	no
35	no		1,74 kgcm²	272 mm	H iperface multi-turn	4.900 g	no
73	no		8,10 kgcm²	259 mm	Hiperface multi-turn	14.100 g	no
74	no		10,00 kgcm²	284 mm	Hiperface single-turn	16.400 g	no
74	no		10,00 kgcm²	284 mm	Resolver 2-pole	16.400 g	no
76	yes	24VDC/0,96A/27,0Nm	23,30 kgcm²	334 mm	Hiperface multi-turn	22.700 g	no

Dimensions

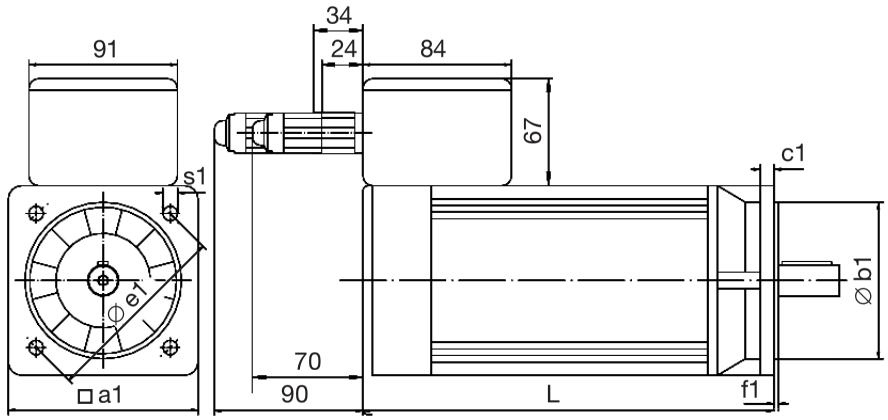
Dimensions: PMCtendo AC3

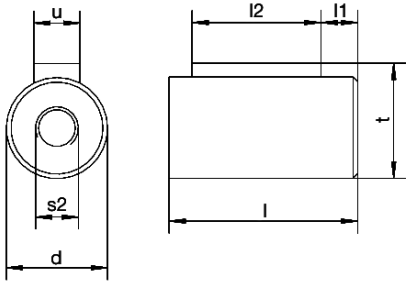
Msize	a1 [mm]	a2 [mm]	b1 [mm]	c1 [mm]	d [mm]	e1 [mm]	f1 [mm]	l [mm]	l1 [mm]	l2 [mm]	s1 [mm]	s2 [mm]	t [mm]	u [mm]
31	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
32	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
33	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
34	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
35	70 mm	77 mm	60 mm	6 mm	11 mm	75 mm	2,5 mm	23 mm	4,0 mm	14 mm	5,8 mm	M4 x 9	12,5 mm	4 mm
73	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
74	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm
76	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm

Dimensioned drawing

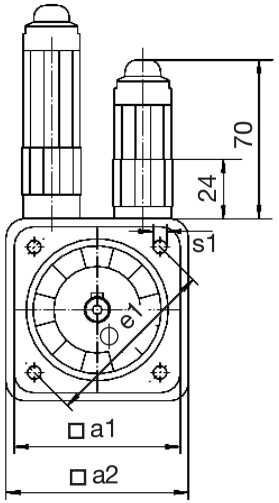
Dimensioned drawing: PMCtendo AC3

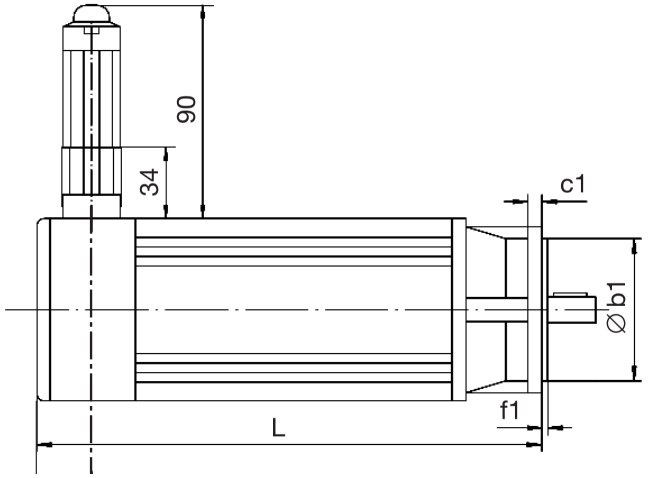
Msize: 7x





Msize: 3x





Performance data

Performance data: PMCtendo AC4

Msize	UN [V]	M0 [Nm]	MN [Nm]	Mmax [Nm]	I0 [A]	IN [A]	Imax [A]	nN [min-1]	nmax [min-1]	2p	Uin [V]	Tth [min]	KE [Vs]	KT [Nm/A]	R20 [Ohm]	L [mH]
62	400 V	4,00 Nm	3,00 Nm	10,00 Nm	2,50 A	1,80 A	6,10 A	3000 rpm	9000 rpm	10	296 V	25 min	0,94 V	1,63 Nm	5,43 Ohm	36,50 mH
62	400 V	4,00 Nm	3,50 Nm	12,00 Nm	2,50 A	2,10 A	7,40 A	3000 rpm	9000 rpm	8	296 V	25 min	0,94 V	1,63 Nm	4,80 Ohm	33,00 mH
63	400 V	6,00 Nm	4,50 Nm	20,00 Nm	3,70 A	2,80 A	9,20 A	3000 rpm	9000 rpm	10	296 V	30 min	0,94 V	1,63 Nm	3,45 Ohm	24,00 mH
65	400 V	10,00 Nm	7,50 Nm	25,00 Nm	6,10 A	4,60 A	15,30 A	3000 rpm	9000 rpm	10	296 V	35 min	0,94 V	1,63 Nm	1,90 Ohm	17,40 mH
65	400 V	10,00 Nm	8,75 Nm	30,00 Nm	6,10 A	5,40 A	18,40 A	3000 rpm	9000 rpm	8	296 V	35 min	0,94 V	1,63 Nm	1,96 Ohm	13,20 mH
75	400 V	20,00 Nm	7,50 Nm	18,50 Nm	8,20 A	7,60 A	28,30 A	2000 rpm	9000 rpm	8	296 V	40 min	1,41 V	2,44 Nm	1,34 Ohm	17,40 mH

Mechanical data

Mechanical data: PMCtendo AC4

Msize	BR	BrValues	J [kgcm²]	L [mm]	MFB	mNet	Fan
62	no		1,75 kgcm²	160 mm	Resolver 2-pole	4.500 g	no
62	no		1,87 kgcm²	160 mm	Resolver 4-pole	4.500 g	no
63	no		2,51 kgcm²	215 mm	Hiperface single-turn	5.500 g	no
65	no		4,07 kgcm²	259 mm	Hiperface single-turn	7.500 g	no
65	no		4,27 kgcm²	224 mm	Resolver 4-pole	7.500 g	no
75	no		13,10 kgcm²	248 mm	Hiperface single-turn	17.200 g	no

Dimensions

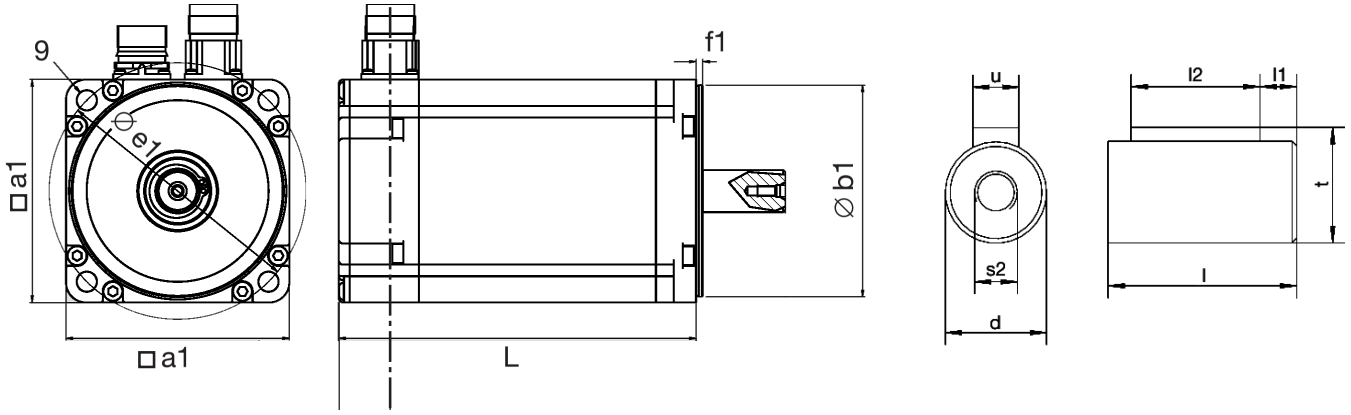
Dimensions: PMCtendo AC4

Msize	a1 [mm]	a2 [mm]	b1 [mm]	c1 [mm]	d [mm]	e1 [mm]	f1 [mm]	l [mm]	l1 [mm]	l2 [mm]	s1 [mm]	s2 [mm]	t [mm]	u [mm]
62	100 mm		95 mm	18 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 16	21,5 mm	6 mm
63	100 mm		95 mm	18 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 16	21,5 mm	6 mm
65	100 mm		95 mm	18 mm	19 mm	115 mm	3,0 mm	40 mm	5,0 mm	30 mm	9,0 mm	M6 x 16	21,5 mm	6 mm
75	142 mm		130 mm	12 mm	24 mm	165 mm	3,5 mm	50 mm	5,0 mm	40 mm	12,0 mm	M8 x 20	27,0 mm	8 mm

Dimensioned drawing

Dimensioned drawing: PMCtendo AC4

Msize: 6x



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