ToolDrives

Intelligent services for smart processes

Operating Manual

Compact Line Module

CV064

Revision history

Revision	Date	Comment	Chapter
01	25.02.14	Creation – DRAFT	All
02	15.09.14	Wegfall LCM-V2 Platine - DRAFT	All
03	08.01.19	Company name **ToolDrives GmbH&Co.KG**	All
04	14.01.20	Operating speed adjusted	All
05	08.03.20	Formats, No. of the operation instructions	All
06	18.01.21	Table order code adjusted	3.3
07	03.02.23	Table order code adjusted + chapter numbers	3
08	11.01.24	Sealing air / cooling	9.1.1
09	27.01.26	Temperature sensor PT (formerly KTY)	9.1.4

Service

If you have any technical questions, please contact the following address:

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CONTENTS

1. About this manual

1.1 General

- These instructions are intended for all people who work with the Compact Module. During their work, they must have the operating instructions available and observe the information and notes that apply to them.
- These instructions help you to work safely with the "Compact Module" of the Module Compact Line. It contains safety instructions that you must observe.
- The operating instructions must always be complete and in a perfectly legible condition.
- If supplementary sheets (e.g. for special applications) are enclosed with these instructions, the information contained therein is valid. Contradicting information in this manual is therefore invalid.

The original of this manual was created in German, all other language versions are Translations of these instructions.

1.2 Safety symbols

The following safety symbols are used to draw your attention to dangers, prohibitions and important information:

Danger!

Danger of personal injury from dangerous electrical voltage.
Indicates an imminent danger that can result in death or serious injuries if appropriate actions are not taken.

Danger!

Danger of personal injury from a general source of danger. Indicates an imminent danger that can result in death or serious injuries if appropriate actions are not taken.

Stop!

Risk of property damage.
Indicates a possible danger that could result in property damage if the corresponding actions are not taken.

Hot surface

Risk of burns.
Indicates possible burns when touched with the bare hand.

Information

Important information.
Instructions for trouble-free function and useful tip for easy handling.

2. Safety

2.1 General Information

- The Compact Module has dangerous, electical parts, rotating parts and hot surfaces during operation.
- All work on transport, connection, commissioning and maintenance must be carried out by qualified, responsible specialist personnel who have read and understood these operating instructions. Improper behavior can cause bad personal injury and property damage.
- The safety instructions and the rules and regulations applicable to the place of use / country of use must be observed. In addition to the safety instructions, the generally applicable legal and other rules and regulations for accident prevention (e.g. personal protective equipment) and environmental protection must be followed.

2.2 EC - Low Voltage Directive

The Compact Module was built in accordance with directive 2006/95 / EC. The electrical installation must be carried out in accordance with the relevant regulations (e.g. cable cross-sections, protection).
Compliance with the requirements for an entire system is the responsibility of the manufacturer of the complete system.
The declaration of conformity can be found in the appendix chap. 10th.

2.3 Dangers

The Compact Module has been developed and built in accordance with the current state of the art and recognized safety regulations. It may only be used and operated in a technically perfect condition.

Read the information about the general safety instructions before starting work (see chapter 2.7 "General safety instructions").

2.4 Intended use

The Compact Module

- is intended for use in commercial machines and must **not be used outdoors**.
- is only intended **for use in machining centers** for stationary and pass trough technology and is used for the production of holes or saw cuts in wood materials, wood composite materials and other materials in dry machining.
- may only be operated with the tool holder or kit "BO30" installed on delivery. The saw module may **only** be operated in the **correct direction**, see chapter 6.3.
- should be operated on the sensorless servo controller (Dual Servo Controller - DSC) type ToolDrives (Control Box). Use on other controllers requires the recommendation or approval of **ToolDrives GmbH & Co.KG**, otherwise the warranty will expire.

2.5 Reasonably foreseeable misuse

- Any use that exceeds the maximum permissible values in the technical data, see chapter 9.2 "Technical data", is considered improper and is therefore prohibited.
- The Compact Module must not be operated in potentially explosive areas.
- For safe operation: the necessary protective devices must be in place, properly installed and fully functional. They may not be removed, changed, bypassed or rendered ineffective.
- In case of emergency stop situations, power supply malfunctions and / or damage to the electrical equipment, the Compact Module has to
  - be switched off immediately,
  - secured against uncontrolled restart and
  - secured against uncontrolled overrun.

2.6 Warranty and liability

Warranty and liability claims for personal injury or property damage are excluded if

- Failure to observe the instructions for transport and storage;
- improper use (misuse);
- improper or not performed maintenance or repair work;
- opening the Compact Module;
- improper assembly / disassembly or improper operation;
- operation of the Compact Module with defective protective devices;
- operation of a heavily dirt Compact Module;
- changes or conversions without the written approval of **ToolDrives GmbH & Co.KG** were executed.

2.7 General safety instructions

Danger!

Faulty electrical connections or unauthorized electrical components lead to serious injuries and even death.

- Only have all electrical connection work carried out by specialist personnel.
- Replace damaged cables or plugs immediately.

Danger!

Tool movements can pull in body parts and cause serious injuries and even death.

- Do not enter the machine in which the Compact Module is installed until the machine is completely switched off.
- Secure the machine against restart and unwanted movements during assembly and maintenance work.

Danger!

Loose or overloaded screw connections can cause serious injuries or even death and / or substantial property damage.

- Use a calibrated torque wrench to assemble and check all screw connections for which a tightening torque is specified.

Cutting injuries on tool cutting tools.

- Wear protective gloves when changing tools.
- Note other tools on the machine.

Hot surface

Hot Compact Module can cause bad burns.

- Only touch the Compact Module with protective gloves or after a long switch-off time.

2.8 Safety label on the Compact Module

There is a safety label on the Compact Module that warns of hot surfaces. This safety sign must **not be removed**.

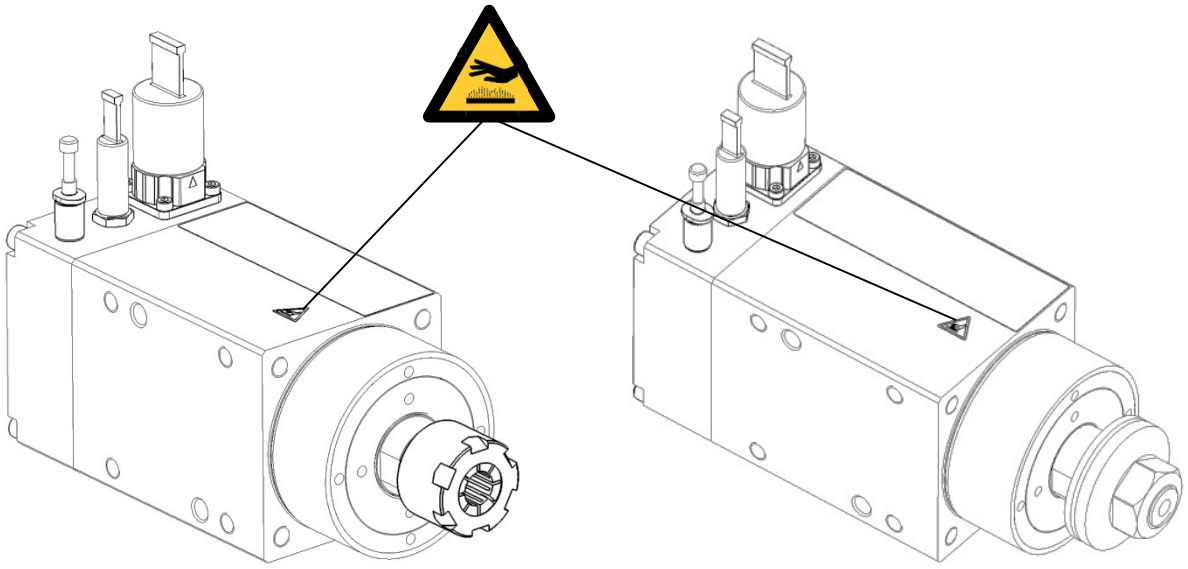


Illustration 1 Module collet

Illustration 2 Module saw blade

3. Description of the Compact Module

The Compact Module contains an efficiency-optimized high-performance servo motor.

The Compact Module is designed with two different **tool holders**:

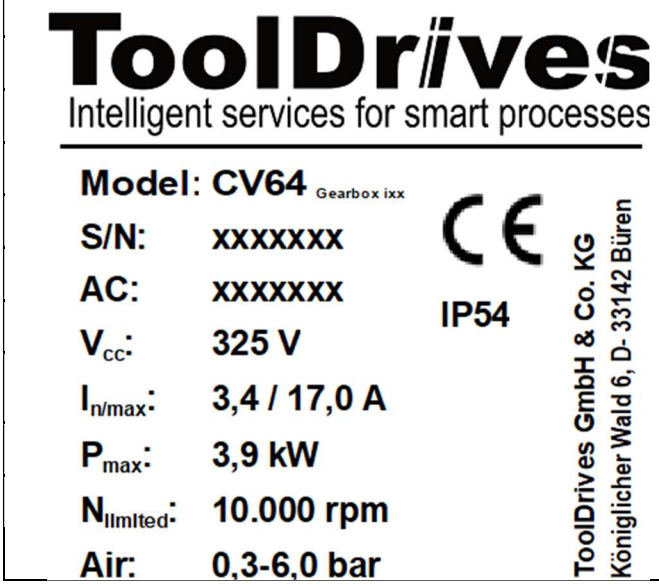
1. **Tool holder ER 20 (collet),** dimension sheet see chapter 9.2.2 "Dimension sheet Compact Module with one ER 20 tool holder".
2. **BO 20 saw blade holder (optionally with BO 30 conversion kit),** for dimension sheet, see chapter 9.2.1 "Dimension module Compact Module with a saw blade holder".

3.1 General data

Dimensions and connection data of the Compact Module can be found in the appendix in chapter 9.1 "Technical data", "Tbl-6" and chapter 9.2 "Dimension sheets".

3.2 Identificaten plate

A nameplate is located on each Compact Module housing and provides detailed information about its properties.

Nameplate		Designation
	A	Company logo
	B	Model nomenclature CV064
	C	Serial number
	D	Article code
	E	DC link voltage
	F	Nominal and maximum voltage
	G	Maximum power
	H	Speed (limited)
	i	Operating pressure of sealing/cooling air
	J	CE marking
	K	IP protection class
	L	Address

Identificaten plate

3.3 Type code for easy selection

Excample for a possible selection: **ER20 230V Variant A**

Saw

ER20

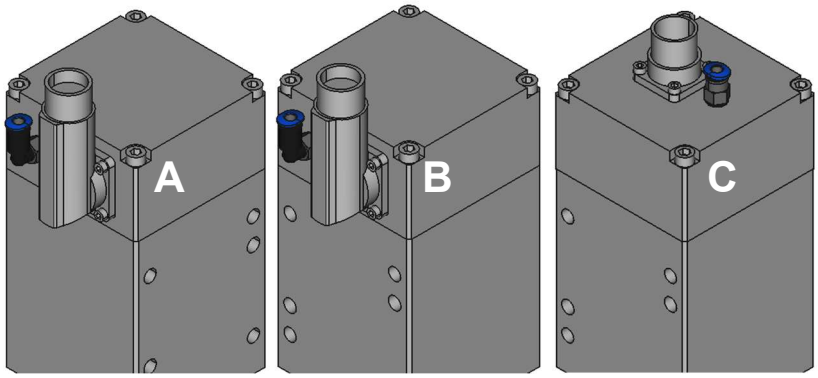
Quick Change

Quick Change with 10mm Stroke

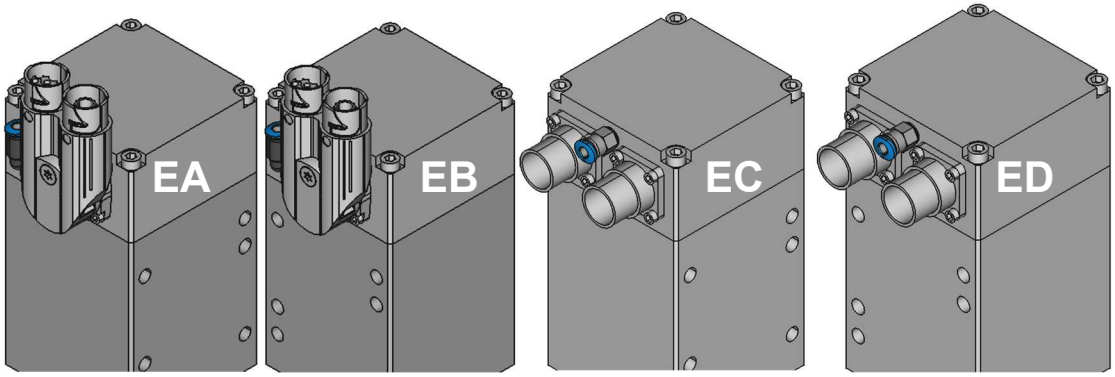
230V

400V

Connector variant in relation to the screw-on surface



Specials: Connector variant in relation to the screw-on surface for encoder versions



4. Transport and storage

4.1 Scope of delivery

Scope of delivery include:

1. Compact Module with ER20 holder incl. mini clamping nut with M24x1 or Quick Change

   or

2. Compact Module with saw blade holder including support washer BO 20 & clamping nut M14x1.5.

3. Operating instructions.

Check the completeness of the delivery against the delivery note immediately after delivery. Missing parts or damage must be reported immediately to the carrier, insurance company or **ToolDrives GmbH & Co.KG** in written form.

4.2 Optional accessories

For Compact Module with saw blade:

▶ BO BO 30 kit (mounting hole = 30mm, saw blade diameter max. 200mm). If necessary, see chap. 3.3 "Order key".

4.3 Packaging

The Compact Module is delivered packed in boxes.

▶ Dispose of the packaging materials at the designated disposal points. Observe the applicable national regulations for disposal.

4.4 Transport

Stop!

Hard impacts, e.g. dropping or dropping it too hard can damage the Compact Module.

- Transport the Compact Module with appropriate care and avoid hard impacts.
- Put the Compact Module carefully down.

No special mode of transport is prescribed for the transport of the Compact Module.

For dimensions, see chapter 9.1 "Technical data", table "Tbl-6".

4.5 Storage

Store the Compact Module

▶ in a horizontal position and in a dry environment at a temperature of +5 ° C to +60 °C,

▶ in an environment without condensing moisture

▶ in the original packaging

▶ maximum 2 years.

For warehouse logistics, we recommend the "first in - first out" principle.

5. Assembly

5.1 Preparations

Incorrectly installed Compact Module can cause serious injuries.

Danger!

- Mount and operate the Compact Module only in a suitable holder (mounting frame) and machine, according to the possible uses of the Compact Module.
- Comply with the required installation specifications.

Information

To reduce the exposure to dust and chips, we recommend providing an extraction system on the machine.

- Find out about the general safety instructions before starting work. (See chapter 2.7)

5.2 Manufacture and install a mounting frame or a suitable screw-on platform

Information

Build a mounting frame or a screw-on platform.
The material of the mounting frame or the screw-on platform must have a tensile / compressive strength of 400 N / mm2 to ensure a secure screw connection.

- You can find the dimensional drawing with drilling pattern in the appendix, chapters 9.2.1 and 9.2.2.
- Make sure that the mounting frame or screw-on platform meets the technical requirements (e.g. rigidity, accuracy, etc.) and contact **ToolDrives GmbH & Co.KG** if necessary.
- Fasten the mounting frame or the screw-on platform.

Mounting frame

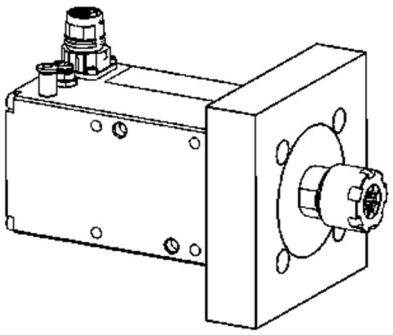


Illustration 3 Mounting frame

Screw-on platform

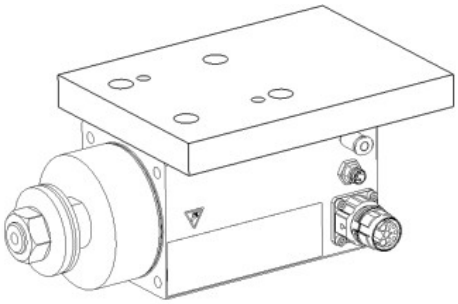


Illustration 4 Screw-on platform

5.3 Install Compact Module

Information

Observe the safety and processing instructions for the screw locking adhesive use.

- Clean the Compact Module with a brush or a clean, lint-free cloth.
- Do not use compressed air.
- Clean / degrease and dry the following components with a grease-dissolving, non-aggressive cleaning supply:
  - Mounting frame
  - Compact Module fastening screws
- Dry all contact surfaces of the components to be assembled in order to obtain the correct coefficient of friction for the screw connections.
- Also check the contact surfaces for damage and foreign bodies.

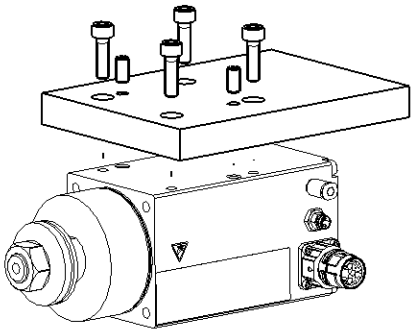


Illustration 5 Assembly -1

When **mounting** the Compact Module **on a screw-on platform**, please use two cylindrical pins DIN 6325 6x12mm for fixing and four screws M6, strength class 8.8 for fastening (max. Screw-in depth: 12mm). Please refer to the dimension sheet in chapter 9.2.1 for the drilling pattern.
For a secure screw connection, please coat the threaded holes with a screw locking adhesive (e.g. Loctite® 243).

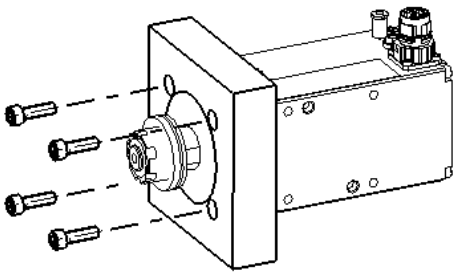


Illustration 6 Assembly-2

When **mounting** the Compact Module **on a mounting frame**, the diameter D60 is used for centering and four screws DIN 912 M6, strength class 8.8, for fastening (max. Screw-in depth: 8mm). Please take the drilling pattern from the dimension sheet in chapter 9.2.2.
For a secure screw connection, please coat the threaded holes with a screw locking adhesive (e.g. Loctite® 243)

- Tighten the screws crosswise in at least two passes (approx. 15%, 100%) to the specified tightening torque.

Information

Tightening torque fastening screws	
M6	5Nm ±10%

Tbl-1: Tightening torque fastening screws

- If you do **not** reach the specified tightening torque when tightening a screw, contact **ToolDrives GmbH & Co.KG**.
- Check that the Compact Module is firmly seated and lies on the mounting frame or screw-on platform without gaps.

5.4 Install electrical connectors (A)

Danger!

Electrical parts lead to electric shocks when touched, causing serious injuries and even death.

- Before electrical installation work, observe the five safety rules for electrical engineering:
  1. Unlock
  2. Secure against restart
  3. Check that there is no voltage
  4. Ground and short-circuit
  5. Cover close electrical parts
- Check whether the protective caps are on the plugs. If the protective caps are missing, check the connectors for damage and dirt.

Danger!

Electrical work in wet conditions can lead to electric shock, which can lead to serious injuries and even death.

- Only carry out the electrical installation in dry rooms.
- Connect the motor connector (A) of the Compact Module (M17, 9-pin) to the motor connection cable of the sensorless servo controller (control box).
- You can find the cable assignment in chapter 9.1.3 "Pin assignment motor connector M17, 9-pin (on the Compact Module side)".

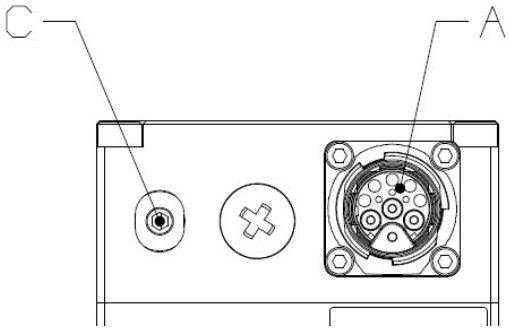


Illustration 7 Connector-1

5.5 Connect pneumatics (sealing air) (C)

Danger!

Risk of injury from tearing off compressed air hoses.

- Wear safety glasses when working on the pneumatic system.
- Make sure that the compressed air hose is long enough.
- Connect the sealing air to the connector (C).
- For sealing air specification, see chapter 9.1.1 "Sealing air.

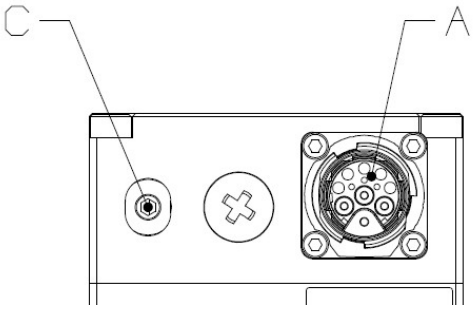


Illustration 8 Connector-1

6. Commissioning and operation

Before starting work, inform yourself about the general safety instructions (see chapter 2.7 "General safety instructions ").

Danger!

Tools that are thrown out due to high speeds or insufficient fastening can cause serious injuries and even death.

- Always operate the Compact Module with a clamped tool or saw blade.
- Do not enter the machine in which the Compact Module is installed until the machine is completely switched off.
- Observe the specified maximum speeds of the Compact Module, see chapter 9.1 "Technical data" and the maximum speed of the clamped tool.
- Suitable protective devices must be available and fully functional. The provision is the responsibility of the manufacturer of an complete system.

Danger!

Hearing damage due to noise pollution.

- Wear suitable protective equipment during commissioning and operation.

Stop!

Damage caused by imbalance and dirt particles.

- Always operate the Compact Module with sealing air and only use sealing air that is free of dirt, water and oil, see chapter 9.1.1 "Sealing air ".

Stop!

Improper operation can damage the Compact Module.

- Use the Compact Module only up to its maximum limit values, see chapter 9.1 "Technical data", tables "Tbl-6", "Tbl-8" and "Tbl-11".
- For other operating conditions, please contact **ToolDrives GmbH & Co.KG**.
- Use the Compact Module only in a clean and dry environment.
- Do not use the Compact Module outdoors.
- Only operate the Compact Module when it is permanently installed.
- Check whether all plugs are firmly attached.

6.1 EMC-measurements

Only when operating with the sensorless servo controller type ToolDrives (Control Box) do we assure you that the limit values and the requirements regarding interference emission and immunity to interference according to EN 61800-3: 2004 are met.

When operating the Compact Module with another servo drive, EMC measurements must be carried out and evaluated.

6.2 Set up and change tools

Danger

Objects thrown around by rotating components can cause serious injuries and even death.

- Remove objects and assembly tools from the Compact Module before putting it into operation.

Danger!

Unsuitable tools can lead to excessive heat development during material processing (risk of fire).

- Use saw blades only in clockwise rotation.
- Only set up suitable tools to keep drive torques low. Replace worn and encrusted tools immediately.

Information

The Compact Module is designed for the following tools:

- Drill with max. Shank Ø 13 mm
- Fitting drill with max. Tool Ø 35 mm
- The drill shank must not be flattened
- Saw blades with BO 20mm up to max. Ø 160mm
- Sägeblätter mit BO 30mm bis max. Ø 200mm

Note the different tool holders when setting up the tools:

- ER20 tool holder (DIN ISO 15488)
- Saw blade holder
- If you have any questions, please contact **ToolDrives GmbH & Co.KG.** on.

6.2.1 ER 20 tool holder

Mount the collet

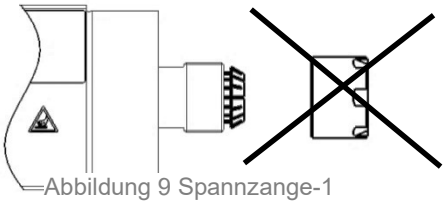


Abbildung 9 Spannzange-1

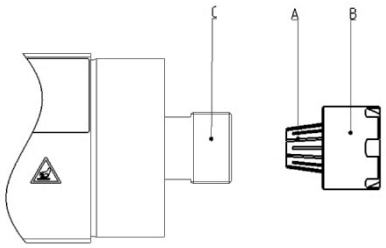


Illustration 10 Collet-2

- **Do not** insert the collet directly into the motor shaft holder.
- Clean the collet, clamping nut and the motor shaft holder with a brush or a lint-free cloth.
- Do not use compressed air.
- Place the collet (A) in the mini lock nut (B).
- Turn the collet until the eccentric ring of the mini clamping nut snaps into the groove of the collet.
- Only mount the collets in the motor shaft holder when they are locked (C).
- Screw the clamping nut together with the collet into the tool holder.

Insert and clamp the tool

Danger!

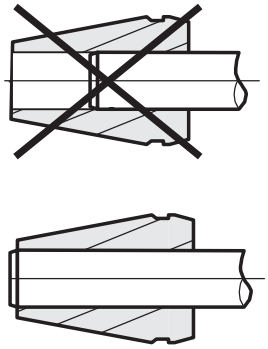
Tools that are not properly tightened can be thrown out and cause serious injuries and even death.

- Only operate the motor with a clamped tool.
- Assemly according the specified tightening torques.
- Note the clamping range of the collet.
- Check that the tool is firmly positioned in the spindle.

Information

Damage to the collet due to unsuitable tools.

- Only use tools with straight shanks and **without Clamping surface.**



- Insert the tool (drill) with the complete shaft length into the collet.
- Check that the tool is firmly fitting.
- Hold the motor shaft with an SW 21 wrench
- Tighten the clamping nut with the key for ER 20 mini clamping nuts, for tightening torques see table "Tbl-2".
- Follow the instructions of the manufacturer of the collet.

Illustration 11 Collet-3

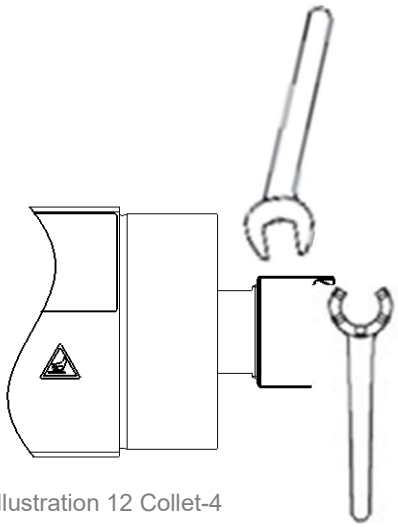


Illustration 12 Collet-4

Clamping diameter	Tightening torque
1,0 mm	16 Nm ±10 %
1,5 - 13,0 mm	28 Nm ±10 %

Tbl-2: Tightening torque ER 20 mini clamping nut

Check whether the direction of rotation of the motor matches the clamped tool.

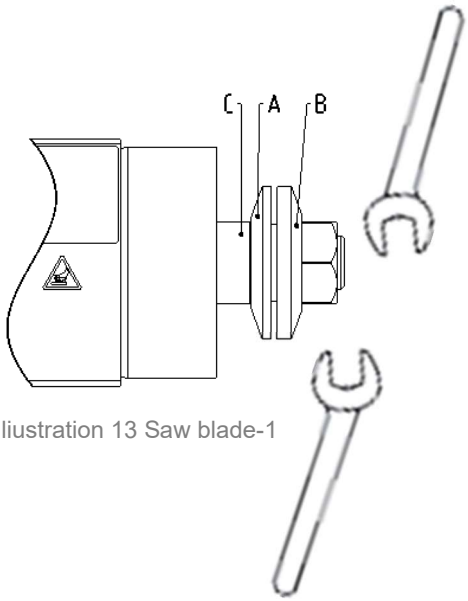
6.2.2 Saw blade holder

Information

The following points are to be observed in principle:

- Do not open any saw blades that have cracks or other damage.
- Only saw blades with a max. clamp diameter of 160mm (BO 20), with the additionally available BO 30 set, saw blades with a max. diameter of 200mm can be clamped.
- The maximum speed indicated on the saw blade n_{max} must not be exceeded.

Saw blade assembly



Illiustration 13 Saw blade-1

- Before installing the saw blade, make sure that the shaft (C) and also the contact surface for the support disc (A) are clean, correct and free of damage.
- Put the support disc on the shaft.
- Place the saw blade on the support disc (note the direction of rotation).
- Screw the clamping nut (B) with the thread M14x1.5 in the correct position on the shaft.
- Hold the shaft with an SW 21 spanner, and then tighten the nut with a second SW 21 spanner. Tightening torques see table "Tbl-3“.
- Make absolutely sure that all parts fit without gaps and that the support washer (A) and the clamping nut (B) have the same outer diameter.
- Never operate the Compact Module with the saw holder without a suitable protective hood. **Compliance with the requirements for an overall system is the responsibility of the manufacturer of the overall system**.

Saw blade holder	Tightening torque
BO 20mm	50 Nm ±10 %
BO 30mm	50 Nm ±10 %

Tbl-3: Tightening torque

6.3 Direction of rotation of the motor

Danger!

If the motor rotates in the wrong direction, parts can be thrown out and cause serious injuries and even death.

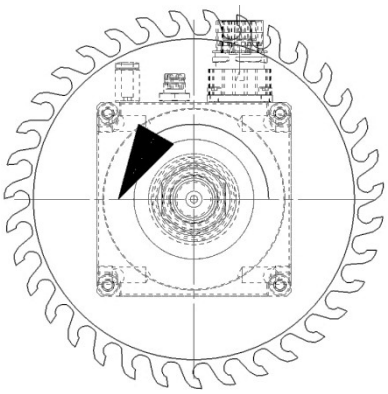


Illustration 14 Drection of rotation

- The Compact Module with the **ER 20** tool holder can be operated in the **left**-hand rotating field and also in the **right**-hand rotating field.
- The Compact Module with the **saw blade** holder may **only** be operated in the **left**-hand rotating field
- Only operate the motor in the correct phase.
- Check that the motor is rotating in the specified direction.
- Check the installed tool or saw blade to ensure that it is correctly installed in the direction of rotation.

6.4 Compact Module with Encoder

Information

The following points are to be observed in principle:

- When replacing a Compact Module without encoder with a Compact Module with encoder, the controller may need to be replaced or at least re-parameterized.
- For changed operating conditions (with encoder) please contact **ToolDrives GmbH & Co.KG**.

Danger!

If used without suitable control technology, severe injuries or death can occur depending on the application.

- Only use suitable control technology recommended by ToolDrives.
- Coordinate the parameterization with ToolDrives.
- If the application with encoder is intended to ensure the standstill of the Compact Module in terms of occupational safety, this must be secured with additional protection or linked to a second condition.
- Suitable protective devices must be available and fully functional. The provision is the responsibility of the manufacturer of an complete system.

Stop!

Property damage due to external influences.

- Avoid external shocks, magnetism and heat.
- Do not open the Compact Module.
- In case of trouble or failure, contact **ToolDrives GmbH & Co.KG.**

7. Maintenance and disposal

Find out about the general safety instructions before starting work (see chapter 2.7 "General safety instructions ").

Stop!

Parts damage due to incorrectly performed maintenance work.

- Repair and maintenance work may only be carried out by qualified specialists.
- During repair and maintenance work, pull the supply plug on the Compact Module to de-energize it.
- Do not use a steam jet, compressed air or similar to clean the Compact Module.
- Never bring cleanser inside the Compact Module.
- Clean tool holders including ER 20 collets and mini clamping nuts or support washer and clamping nut with a brush or a lint-free cloth.
- Do not open the Compact Module.

Danger!

Cut injuries on tool cutting edges.

- Disassemble the tools before maintenance.
- Note other tools on the machine.
- Wear protective gloves when dismantling the tools.

7.1 Maintenance work

The Compact Module maintenance free Regular visual inspection and maintenance is still necessary to identify any damage that may occur.

7.1.1 Ball bearings

The spindle bearings are equipped with lifetime grease lubrication. They are maintenance-free, but they do not mean that they will last forever. See maintenance schedule chap. 7.2.

Stop!

Do not lubricate the ball bearings. Do not put greases, oils or cleaning agents in the openings of the Compact Module.

7.1.2 Visual inspection

Danger!

Risk of injury from tearing off compressed air hoses.

- Maintain and check compressed air hoses and screw connections regularly.
- Wear safety glasses when working on the pneumatic system.
- Check the Compact Module, all supply lines and connectors for external damage.
- Check whether the type plate and the safety plate (see chapter 3.1 "Type plate" and chapter 2.8 "Safety plate") are present and legible.

7.1.3 Cleaning

Only clean the outside of the Compact Module with a brush or with a clean, lint-free cloth. Remove any chips from the Compact Module.

7.1.4 Check the tightening torques of the fastening screws

Check the tightening torques of the Compact Module fastening screws on the module and on the tool holder.

Danger!

Parts can be thrown out by loosening the Compact Module fastening screws and cause serious injuries.

- The tightening torque of the fastening screws is **5 Nm ± 10%** (see also chapter 5.3 Tbl-1).
- If you check the tightening torques that a Compact Module fastening screw can be turned further than is permitted, follow the instructions in section 5.3.

7.1.5 Check the tightening torque of the mini clamping nut

Danger!

An improperly tightened mini clamping nut can be thrown out and cause serious injuries and even death.

Too strong tightening torques lead to damage to the thread.

- Regularly check the tightening torque of the mini clamping nut.
- **Tightening torque:**
  See chap. 6.2.1 "ER 20 tool holder“.
- If you have any questions or uncertainties, please contact **ToolDrives GmbH & Co.KG.**

7.1.6 Checking the tightening torque of the clamping nut for saw blades

Danger!

An incorrectly tightened clamping nut can be thrown out and cause serious injuries and even death.

Too strong tightening torques lead to damage to the thread.

- Check the tightening torque of the clamping nut regularly.
- **Tightening torques: 50Nm ± 10%** (chap. 6.2.2)
- If you have any questions or uncertainties, please contact **ToolDrives GmbH & Co.KG**.

7.2 Maintenance schedule

Maintenance work	When starting up	Weekly	Every 500 operating hours or every 3 months	Every 5000 operating hours
Visual inspection (see chapter 7.1.2)	X		X	
Check the tightening torques (see chap. 7.1.4 - 7.1.5)	X	X		
Cleaning (see chapter 7.1.3)	X	X*		
Ball bearing lubrication (To be carried out only by the manufacturer				X
* or more, depending on the location and the operating conditions				

Tbl-4: Maintenance schedule

7.3 Disposal

Additional information on disassembly and disposal of the Compact Module is available from our customer service.

- ▶ Please dispose of cardboard boxes in the waste paper, other packaging materials in the designated disposal points.
- ▶ Dispose of the Compact Module at the designated disposal points (electronic components included).
- ▶ Observe the applicable national regulations for disposal.

8. Interruption

8.1 In general

Stop!

A changed operating behavior can be an indication of existing damage to the Compact Module or cause damage to the Compact Module.

- Do not put the Compact Module back into operation until the cause of the error has been eliminated.
- Faults may only be repaired by trained specialists.

8.2 Errors - possible causes - remedies

Errors	Possible causes	Remedies
Increased operating temperature	Ambient temperature too high, cooling too low	Provide adequate cooling and remove chip accumulation.
	Overload	Reduce the feed, extend the machining cycle.
	Tool worn, damaged, encrusted	Exchange the tool.
	Sealing air is missing or the flow rate is too low	Provide the sealing air supply according to the instructions.
Increased operating noise	Tool defective	Exchange the tool.
	Tool holder loose	Check the tool holder (note the tightening torques).
	Bearing damage	Get in touch with our Customer service
	Compact Module fastening screws loosened	Check the screw connections and, if necessary, pull them according to Instructions according to.
Collision	-	Get in touch with our Customer service.
Motor does not turn	no electrical connection	Check the plug position and the motor cable.
	increased operating temperature due to lack of sealing air	Provide the sealing air supply according to the instructions.
	Dirt entry in the sealing system	Get in touch with our Customer service.
Motor stops during processing	Overload	Reduce the burden. Check the machining parameters.
The required tightening torque is not reached	Thread damaged	Get in touch with our Customer service.
Temperature sensor shows wrong values	no electrical connection	Check the plug seat and the motor cable.

Tbl-5: Interruptions

9. Appendix

9.1 Technical data

Type code		Saw Module	ER20 Module
Tool holder		Saw blade (BO 20)	ER 20 (collet)
Direction of motor rotation (against clockwise with a view of the tool holder)		Counterclockwise rotation (ccw)	Left / right rotating field (ccw & cw)
Max. Acceleration during operation	m/s^2	19,6 (2G)	
Max. Radial force on the motor spindle	N	305	
Hight	mm	63,8	
Width	mm	63,8	
Length	mm	170,2 (+5 with Encoder)	168,25 (+5 with Encoder)
Weight	Kg	2,3	2,2
Housing temperature	°C	< 86	
Degree of protection		IP 54	
Operating and environmental conditions			
Ambient temperature	°C	+15 bis +40	
Relative humidity not condensing		≤ 85%	
Use over NN	m	≤ 1000	

Tbl-6: Technical data

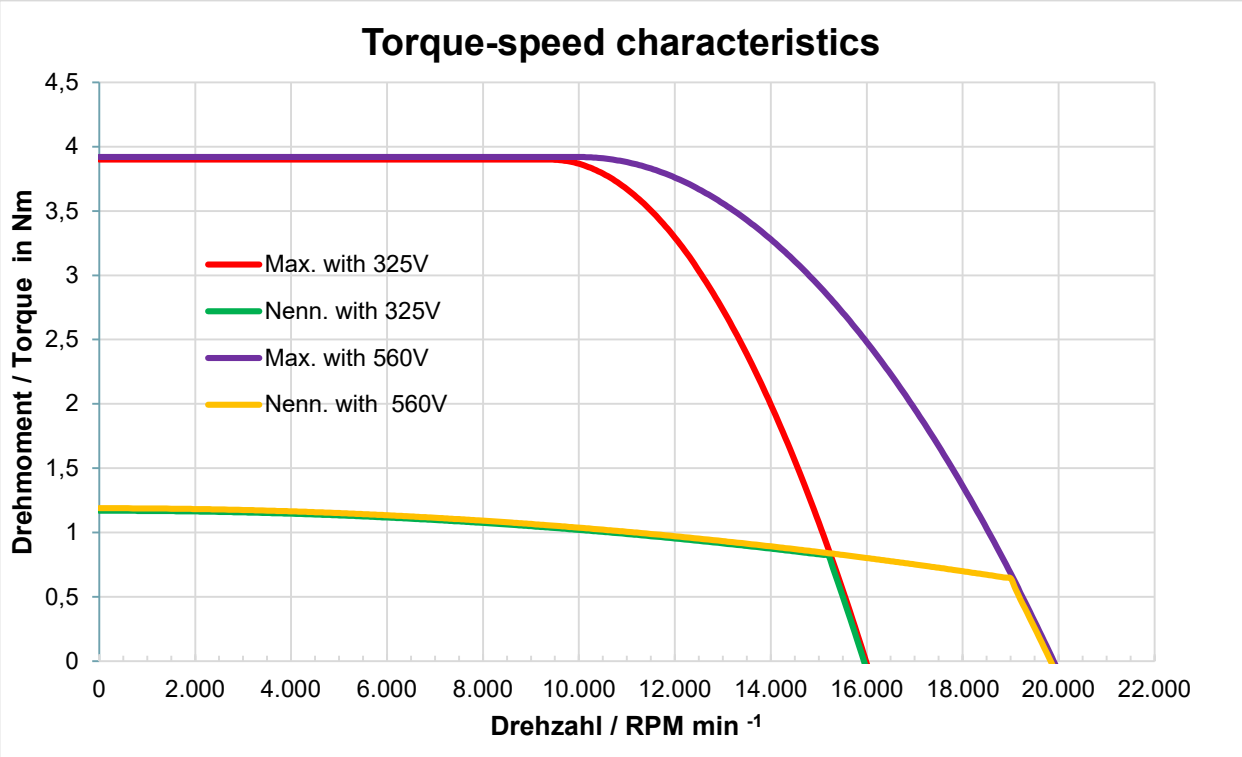
9.1.1 Sealing air / cooling (specification)

Connector for sealing air hose outside diameter **4mm**

Naming	Unit	Data
Operating pressure (sealing air) on the input side of the connector	bar	0,3 - 1,5
Operating pressure (cooling) for continuous operation, high speed/load	bar	up to 6.0
Water content DIN ISO 8573-1 class 4	°C	max pressure dew point +3°C
Total oil content DIN ISO 8573-1 class 3	mg/m^3	max 1 mg/m3
Filter class DIN ISO 8573-1 class 3	µm	Solids filter degree better 5 µm
Sealing Air Volume Flow Q_N	l/min	25

Tbl-7: Sealing air specification

9.1.2 Motor data

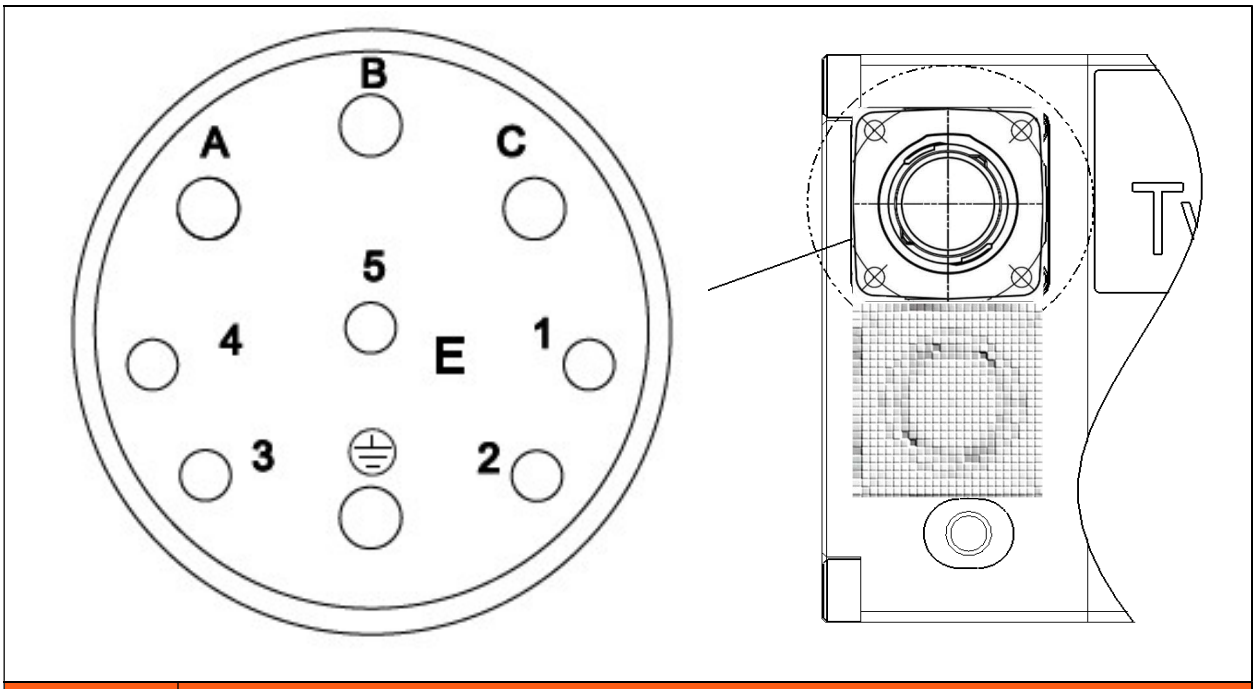


Description	Unit	Performance Data
Motor type		Three-phase synchronous motor
DC link voltage U_{zk}	V	325 (560)
Max. Power P_{max} (short-term)	W	3,9
Max. Current I_{max} (short-term)	A_{eff}	17
Max. Torque M_{max} (short-term)	Nm	4
Max. Speed n_{max}	min^{-1}	16.000 *1 / 20.000 *2
Nominal current I_{nenn}	A_{eff}	3,37
Nominal torque M_{nenn}	Nm	0,80*1 / 0,64*2
Nominal speed n_{nenn} *	min^{-1}	15.000*1 / 19.000*2
Nominal speed n_{nenn} * (Robot use)	min^{-1}	14.000*1 / 18.000*2
Frequence at n_{nenn}		1.000 bei 15.000 min^{-1} / 1.267 bei 19.005 min^{-1}
Connection resistance R_{tt} (Phase - Phase)	Ω	2,05
Connection inductance L_{tt} (Phase - Phase)	mH	2,346
Torque constant K_t	Nm/A	0,236
Number of pole pairs p		4
*1 = 325V usage; *2 = 560V usage		

Tbl-8: Motor data

9.1.3 Pin assignment motor connector M17 – 9-pin (on Compact Module side)

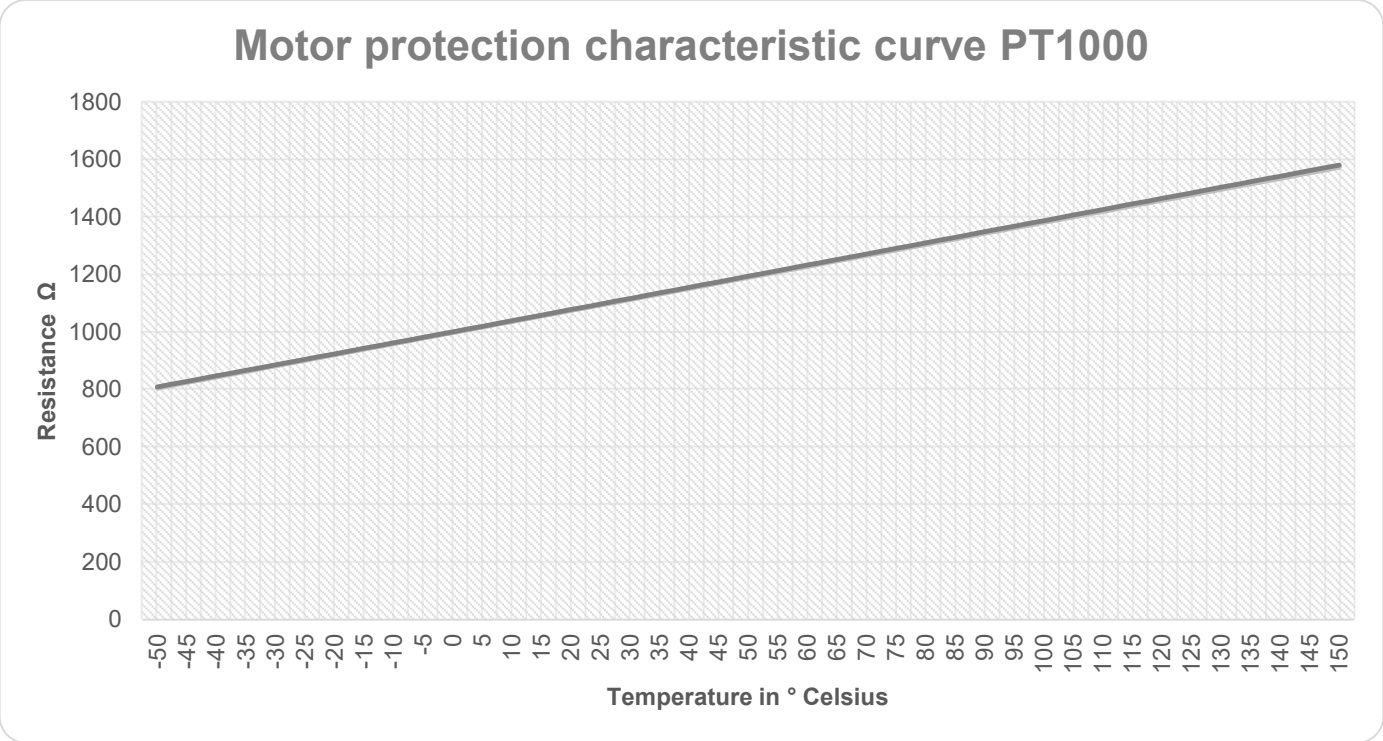
- Manufacturer: Intercontec
- Order No. connector M 17 9-pin (3 +PE; 5 signal) EEG A 201 NN 00 0500 000
- 4x contact pin 61.231.11 & 2x contact pin 61.232.11
- Pin assignment also valid when using Y and / or angled plugs



Pin	Assignment
A	Motor / Phase U red
B	Motor / Phase V white
C	Motor / Phase W black
⏚	PE
1	Temperature sensor (KTY) red
2	Temperature sensor (KTY) blue
3	option break+
4	option break-
5	not assigned

Tbl-9: Pin assignment motor connector M17 – 9-pin (on Compact Module side)

9.1.4 Motor protection PT1000



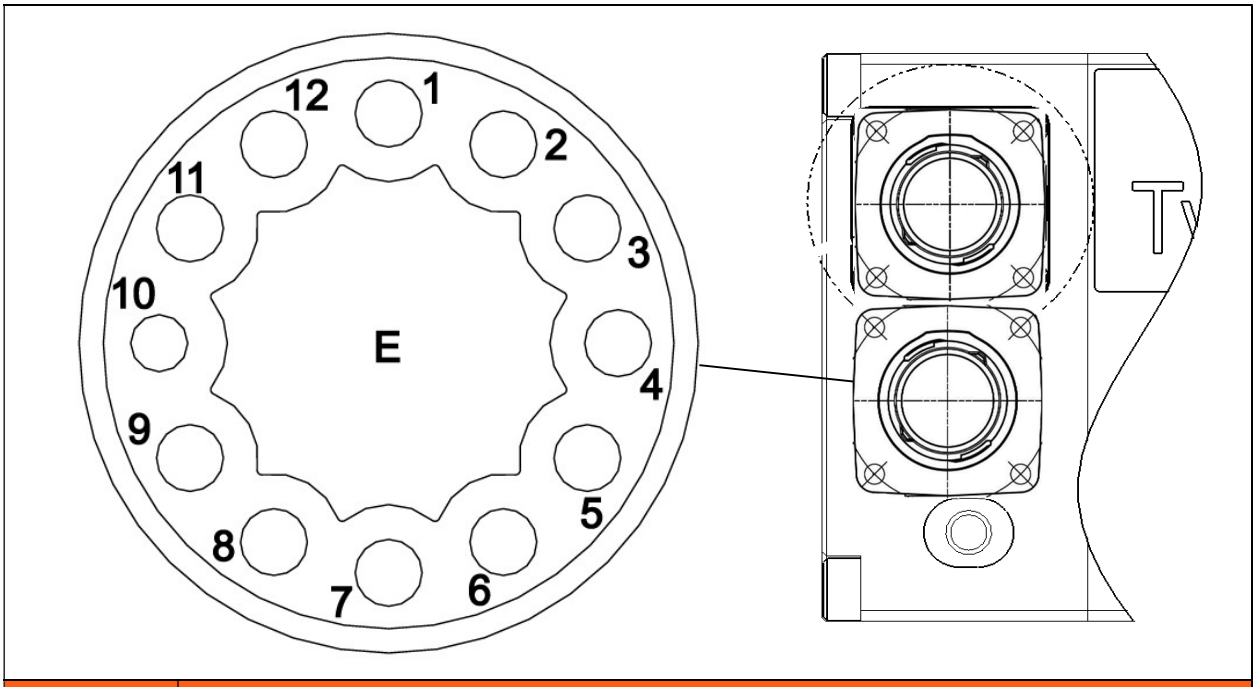
Tbl-10: Characteristics

Temperatur e (°C)	R_nom (Ohm)	R_min (Ohm)	R_max (Ohm)	Temperature (°C)	R_nom (Ohm)	R_min (Ohm)	R_max (Ohm)
-50	807,5	805,38	809,62	55	1211,75	1209,54	1213,96
-45	826,75	824,73	828,77	60	1231	1228,69	1233,31
-40	846	844,08	847,92	65	1250,25	1247,84	1252,66
-35	865,25	863,42	867,08	70	1269,5	1267	1272
-30	884,5	882,77	886,23	75	1288,75	1286,15	1291,35
-25	903,75	902,11	905,39	80	1308	1305,31	1310,69
-20	923	921,46	924,54	85	1327,25	1324,46	1330,04
-15	942,25	940,81	943,69	90	1346,5	1343,61	1349,39
-10	961,5	960,15	962,85	95	1365,75	1362,77	1368,73
-5	980,75	979,5	982	100	1385	1381,92	1388,08
0	1000	998,85	1001,15	105	1404,25	1401,07	1407,43
5	1019,25	1018	1020,5	110	1423,5	1420,23	1426,77
10	1038,5	1037,15	1039,85	115	1442,75	1439,38	1446,12
15	1057,75	1056,31	1059,19	120	1462	1458,54	1465,46
20	1077	1075,46	1078,54	125	1481,25	1477,69	1484,81
25	1096,25	1094,61	1097,89	130	1500,5	1496,84	1504,16
30	1115,5	1113,77	1117,23	135	1519,75	1516	1523,5
35	1134,75	1132,92	1136,58	140	1539	1535,15	1542,85
40	1154	1152,08	1155,92	145	1558,25	1554,3	1562,2
45	1173,25	1171,23	1175,27	150	1577,5	1573,46	1581,54
50	1192,5	1190,38	1194,62				

Tbl. 11: Temperature - resistance values

9.1.5 Pin assignment of signal connector M17 – 12-pin (on Compact Module side)

- Additional connector for Compact Module with encoder.
- Manufacturer: Intercontec
- Order No. Connector M 17 12-pin (12 signal) EEG A 001 NN 00 0001 000
- 8 x contact pin 61.232.11
- Pin assignment also valid when using Y and / or angled plugs



Pin	Assignment
1	V_{dd} red
2	GDN blur
3	A grew
4	B green
5	Z white
6	A- pink
7	B- yellow
8	Z- brown
9	not assigned
10	not assigned
11	not assigned
12	not assigned

Tbl-2: Pin assignment of signal connector M17 – 12-pin (on Compact Module side)

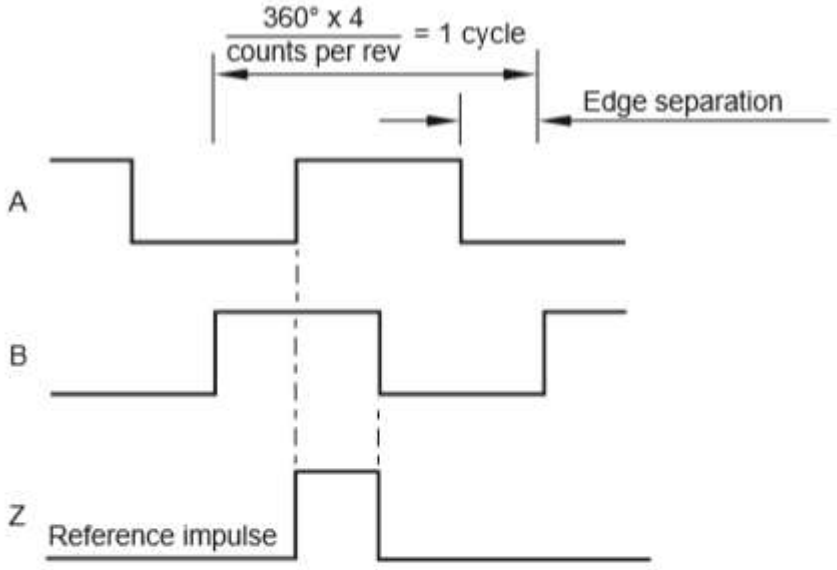
9.1.6 Specification Encoder

- Manufacturer: Renishaw
- Model RM44IC encoder
- Model RM44A3 giver

Charcteristics	
Power consumption	-Max. 35mA
Output signals	A, B, Z, A–, B–, Z– (RS422)
Accuracy	Typ. ±0.5
Hysteresis	0.18°
Encoder line count	1024
Maximum speed	30,000 rpm
Maximum cable lengt	50 m
Operating temperature	–40 °C to +125 °C (IP64) –40 °C to +85 °C (IP68)

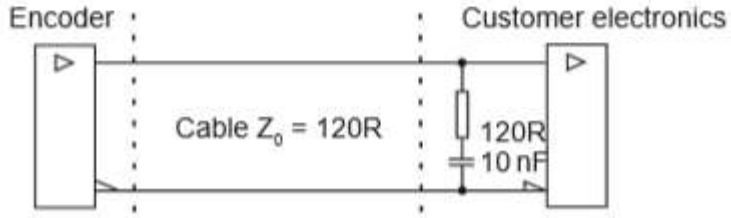
Timing diagram

Complementary signals not shown



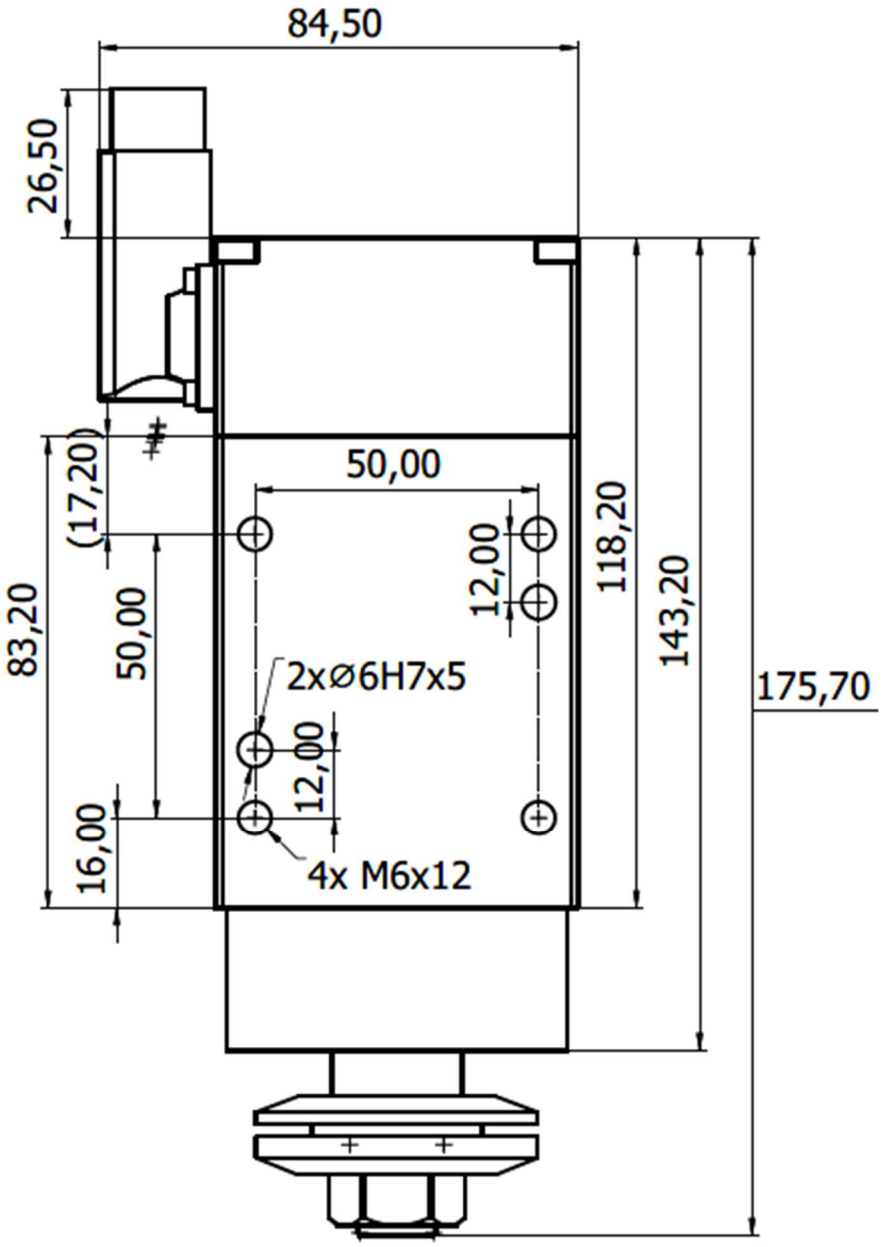
B leads A for clockwise rotation of magnetic actuator.

Recommended signal termination

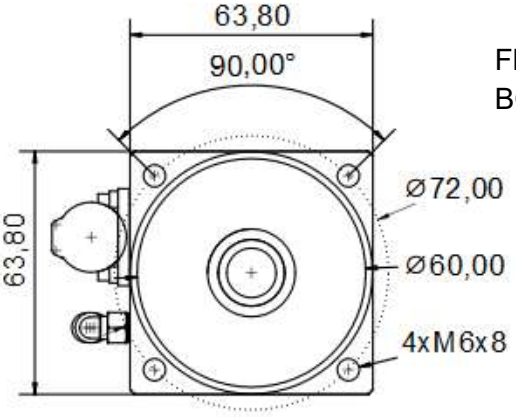


9.2 Dimension sheets models CV064

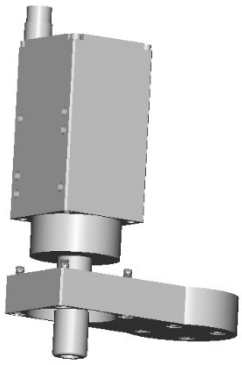
9.2.1 Dimension sheet Compact Module with saw blade



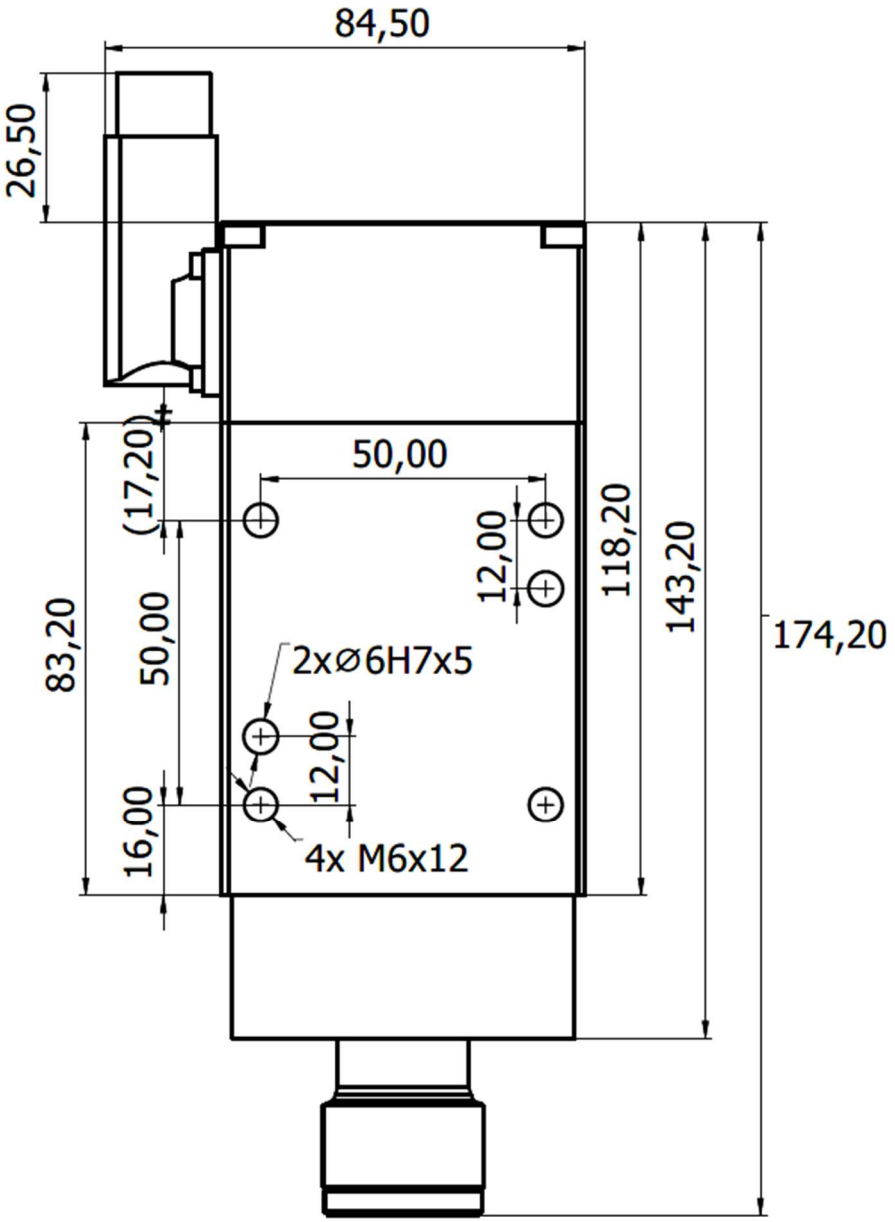
Mounting surface identical on front and back



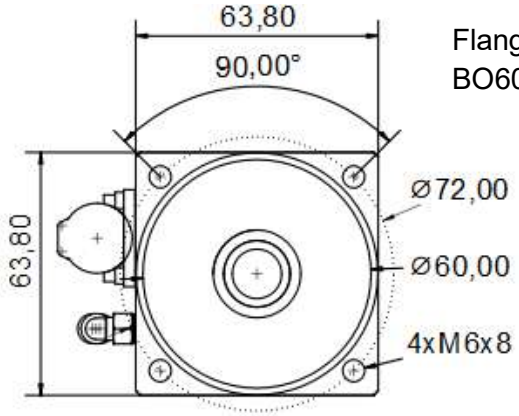
Flange dimension BO60



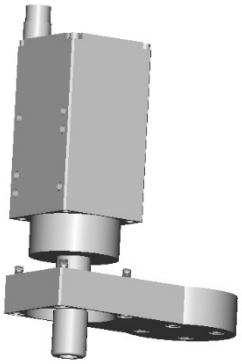
9.2.2 Dimension sheet Compact Module ER20



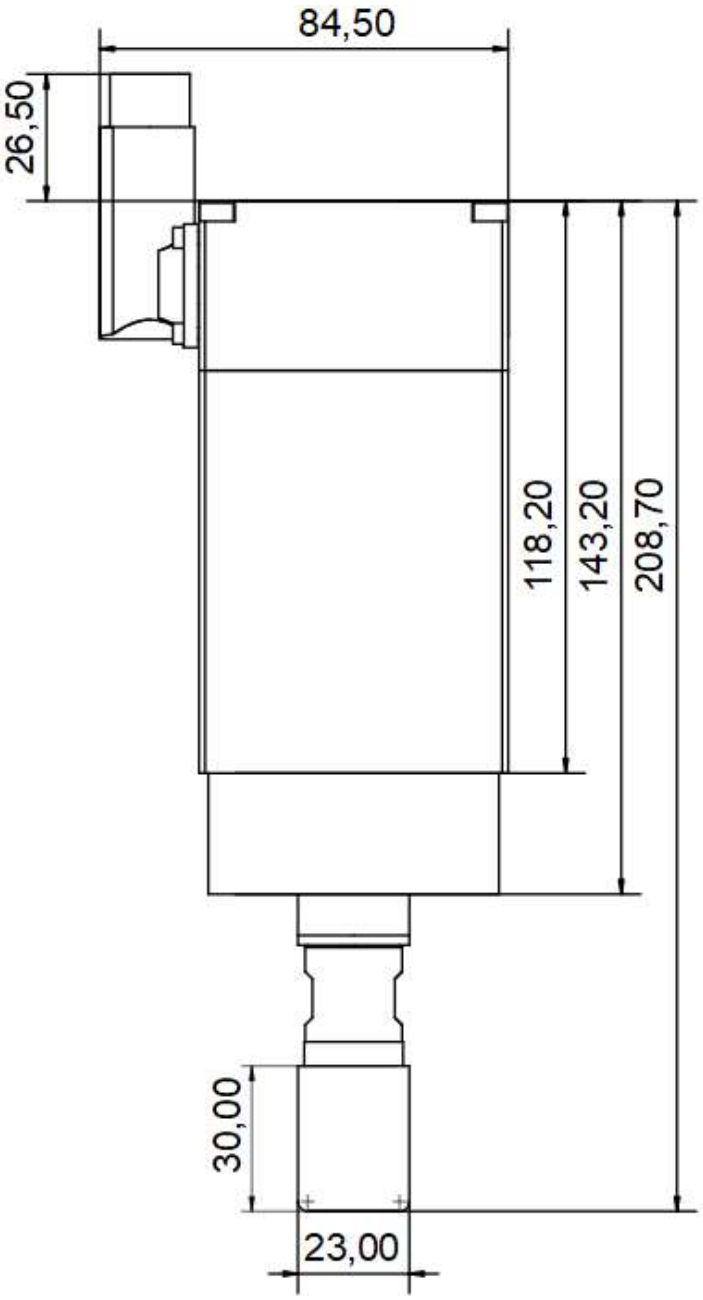
Mounting surface identical on front and back



Flange dimension BO60

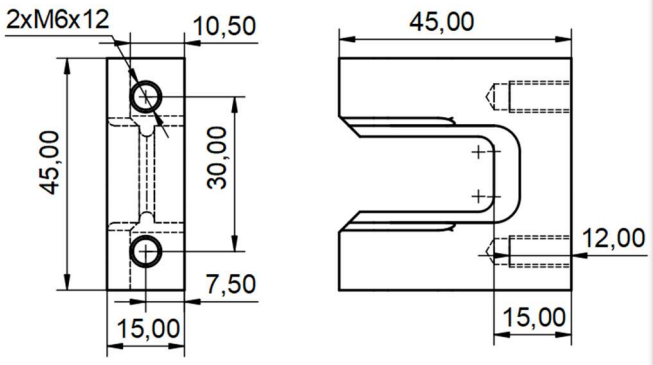


9.2.3 Dimension sheet Compact Module with quick change



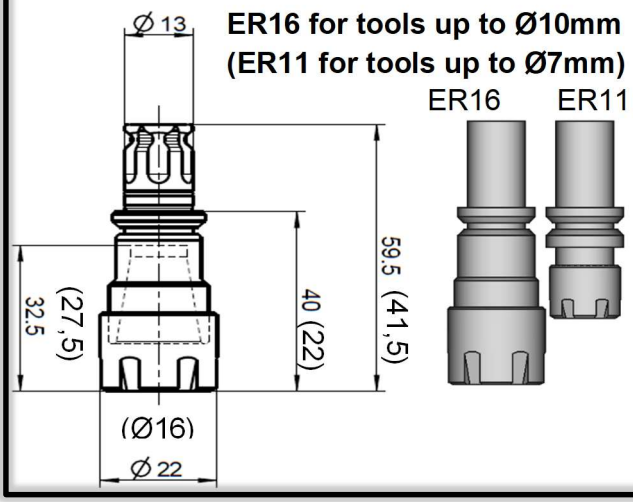
Mounting sureface,
see 9.2.1

Details Storage:



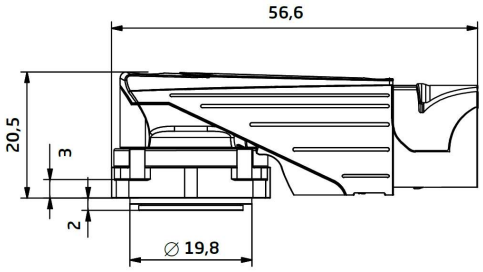
Tool holders:

ER16 for tools up to Ø10mm
(ER11 for tools up to Ø7mm)

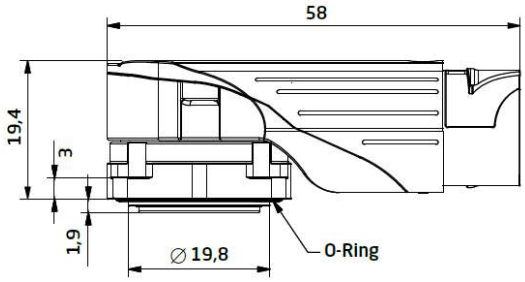


9.2.4 Dimension sheet straight- and angle connector

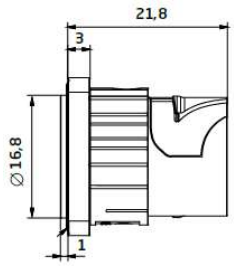
Angle connector for Compact Module without encoder (Self Lock)



Angle connector for Compact Module with encoder (Self Lock)

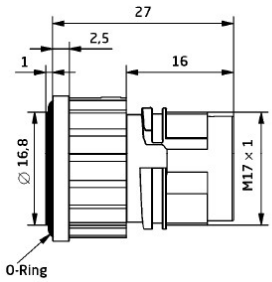


Straight connector for Compact Module with and without encoder (Self Lock)



(mit Encoder)

Straight connector for Compact Module without encoder (Drive Power Link M17)



The order codes in chapter 3.3 shows the connector varaints in the table.

10. Declaration of Conformity

ToolDrives
Intelligent services for smart processes

EU-Konformitätserklärung / EU Declaration of Conformity
Hersteller / Manufacturer: ToolDrives GmbH & Co. KG
Königlicher Wald 6
D-33142 Büren, Germany
Tel.: +49 2951 70798 50

Produktbezeichnung / Product Description: Compactmodul / *Compact Module* Typ / *Type*: **CV064** Seriennummer / *Serial no.*: Diverse / *Various*

Wir erklären hiermit in alleiniger Verantwortung, dass das oben bezeichnete Produkt bei bestimmungsgemäßer Verwendung den einschlägigen Harmonisierungsrechtsvorschriften der Europäischen Union entspricht:
We hereby declare under our sole responsibility that the product designated above, when used as intended, complies with the relevant European Union harmonization legislation:

- **2014/35/EU** – Niederspannungsrichtlinie / *Low Voltage Directive*
- **2006/42/EG** – Maschinenrichtlinie / *Machinery Directive*
- **2014/30/EU** – EMV-Richtlinie / *EMC Directive*
- **2011/65/EU** – RoHS-Richtlinie / *RoHS Directive*

Angewandte harmonisierte Normen / Applied harmonized standards:

- **DIN EN 60204-1:2019** (Sicherheit von Maschinen – Elektrische Ausrüstung / *Safety of machinery – Electrical equipment*)
- **DIN EN 60034-1:2023** (Drehende elektrische Maschinen – Bemessung und Betriebsverhalten / *Rotating electrical machines – Rating and performance*)
- **DIN EN IEC 61800-3:2018** (Drehzahlveränderbare elektrische Antriebe – EMV / *Adjustable speed electrical power drive systems – EMC*)
- **DIN EN IEC 63000:2019** (Technische Dokumentation zur Beschränkung gefährlicher Stoffe / *Technical documentation for the assessment of hazardous substances*)

Das Produkt trägt das CE-Zeichen. Die Gültigkeit dieser Erklärung erlischt bei nicht mit uns abgestimmten Änderungen oder der Verwendung nicht freigegebener Ersatzteile.
The product bears the CE marking. The validity of this declaration expires in the event of modifications not coordinated with us or the use of non-approved spare parts.

Bevollmächtigte für die technische Dokumentation / Authorized person for technical documentation: Birgit Meier
ToolDrives GmbH & Co. KG, Königlicher Wald 6, D-33142 Büren

Ort und Datum / Place and date: Büren, 05. Jan 2026

Unterzeichnet für und im Namen von / Signed for and on behalf of: ToolDrives GmbH & Co. KG

Volker Meier Geschäftsführer / *General Manager*

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