

# Assembly instructions

## Gear motor 3112.00



Original assembly instructions  
3112.00-02i02/20192708



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**Compilation of technical documents**

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# 1 Introduction

## 1.1 Foreword



Dear user,

These instructions are not intended for the end user, but as a source of information for the device and system manufacturer.

It is the responsibility of the manufacturer to deliver operating instructions with relevant safety information from these instructions to the end user.

**These instructions form part of every Ketterer standard drive/spindle drive and must be observed together with the "General operating instructions for Ketterer gear motors and spindle drives".**

**Please read these instructions carefully and adhere strictly to the safety information.**

**Depending on the version or the revision status of the products, there could be deviations from these instructions. The user must check this before use and take the deviations into account if necessary.**



### Information

These instructions together with the "General operating instructions for Ketterer gear motors and spindle drives" must be kept in a known and easily accessible location and must be consulted if there is even the slightest doubt.

If you have questions about the products, please do not hesitate to contact our employees.

Sincerely,

**B. Ketterer Söhne GmbH & Co. KG**

## 1.2 Scope

These instructions apply solely to gear motor 3112.00 (also referred to as drive below) and in combination with lifting units 3130.14-VX1EXXXHXXX (also referred to below as electric motor spindle drive system).

## 1.3 Warranty and liability



Information on warranty and liability can be found in the document "General operating instructions for Ketterer gear motors and spindle drives".

### Information

Please refrain from interfering with or changing the components not authorized by us as this would result in the repeal of submitted declarations concerning EC Directives.

## 1.4 Target group and prior knowledge

The products are designed for use by processing customers. These operating instructions are intended exclusively for qualified staff who, due to their professional training, knowledge and experience as well as familiarity with the relevant provisions, are able to perform the work assigned to them and independently identify and prevent hazards. → see chapter 3 "Product description"

## 1.5 Use

### 1.5.1 Proper use

Electric drive 3112.00-XXXX is used to generate a rotational movement.

If the drive is combined with a lifting unit, this creates an electric motor spindle drive system that is designed for linear adjustment and positioning of a mass. The maximum load depends here on the spindle type used here, and can be found on the technical data sheet (→ see chapter 3.3 "Technical data").

The products are suitable for use indoors with an ambient temperature of +10 to +40°C. The drives are designed for inching operation.

Directions of movement include:

- Slide and pull (force in pushing direction and pulling direction, observing the technical limits in the process → see chapter 3.3 "Technical data")
- Raise and lower (equal force in pushing direction and pulling direction, observing the technical limits in the process → see chapter 3.3 "Technical data")

System must be operated in an enclosure.



### Information

Please also observe the supplementary, general information on proper use that can be found in the document "General operating instructions for Ketterer gear motors and spindle drives".

### 1.5.2 Type-dependent exclusion

Information on construction-related exclusion can be found in the document "General operating instructions for Ketterer gear motors and spindle drives".

### 1.5.3 Possibilities for intervention and foreseeable misuse

Intervention into the components or the system is only intended during assembly or transport. No intervention is permissible during operation.

Electric motor spindle drive system: to be fitted in accordance with the manufacturer's specifications. The drive is not permitted to be operated with a voltage source that does not have any suitable shutdown for both limit positions.

It is not permitted to exceed a maximum speed of 25 mm/s for the lifting unit with spindle type SG14x16 and 6mm/s for the lifting unit with spindle type TR14x3. The voltage range is 12V. It may be necessary to fit support elements as necessary to prevent the spindles buckling.

If another spindle type is to be used, this must be tested and approved separately by Ketterer.

Safe operation of the device is not ensured if these points are disregarded.

## 1.6 Signs and symbols of these instructions

Explanations on the signs and symbols used in these instructions can be found in the document "General operating instructions for Ketterer gear motors and spindle drives".

## 2 Safety



### Information

The products listed in these instructions, individually and as a whole, satisfy the currently valid safety standards in accordance with the requirements of EC Machinery Directive 2006/42/EC. The products are safe when used properly and when the safety information and requirements in this documentation are observed.



**Carefully read the safety instructions and information on safe operation through carefully in the "General operating instructions for Ketterer gear motors and spindle drives" before beginning work. Familiarize yourself with all functions. Keep this manual in a safe place and, if necessary, give it to others.**

**For your safety, it is very important that you have understood all sections on safety and comply with them.**

On the topic of safety, read and observe

- chapter 2 Safety in the document "General operating instructions for Ketterer geared motors and spindle drives"
- The special warning information regarding hazardous activities
- The safety data sheets at the workstation
- The work instructions at the workstation

Non-observance can result in danger of death and health risk to persons, environmental damage and/or extensive property damage.

Observing the safety information helps prevent hazards.

### 2.1 Personnel - qualification and obligations



#### Information

All activities on the machine must only be done by authorized staff.

Please observe the notes on personnel qualifications and obligations. These can be found in the document "General operating instructions for Ketterer gear motors and spindle drives".

## 2.2 Safety/Warning information



It is essential that you carefully read through the safety and warning notes given in the document "General operating instructions for Ketterer gear motors and spindle drives" that apply to all Ketterer drives and drive systems. There you will find the general information on thermal, mechanical, electrical hazards and other hazards.

## 2.3 General notes



### Information

Please observe the general notes on maintenance/repair, conversions/modifications, transportation/storage and disposal. These can be found in the document "General operating instructions for Ketterer gear motors and spindle drives".



### 3 Product description

#### 3.1 Description of the drive

Compact 12 V DC motor with worm gear and continuous hexagonal bolt. A cable with AMP plug and integrated hall sensor system permit simple and safe actuation of the overall system. Easy adaptation options using hexagon socket and fixing holes.

#### 3.2 Included equipment



##### Information

A list of the included equipment can be found on the order confirmation.

The standard equipment consists of the motor drive [1] that is normally used with the lifting units (must be ordered separately) as a spindle drive system.

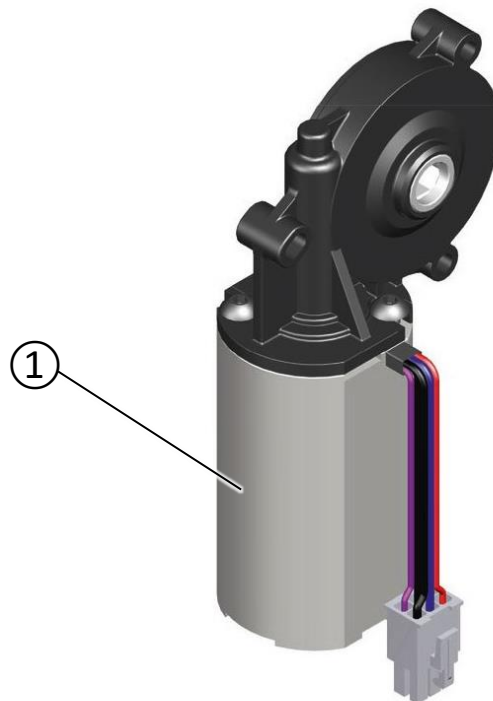


Fig. 3-1: Included equipment  
1 Motor drive

### 3.3 Technical data

#### Motor drive 3112.00-XXXX

Series	3.112.00-1006	3.112.00-1009
Drive motor	DC motor 12 V	
Sensor/supply	Hall/5 V DC/0.3 A	
Protection class	IP30	
Idling speed	120 rpm (12 V)	
Switch-on duration during idle	20% (at 5 min.)	
Switch-on duration at nominal load*	20 s ON 240 s OFF	
Nominal torque*	2.8 Nm	
Power intake at nominal torque	6.3 A	
Short-term peak torque (<1s)	6 Nm	
Drive	Hex SW6 mm	Hex SW9 mm

#### Ambient conditions

Temperature	3112.00-XXXX
Operation:	+10°C to +40°C
Storage:	-10°C to +40°C
Transport:	-10°C to +40°C

#### With lifting unit 3130 .14-VX1EXXXHXXX

Series	with 3130.14-V11EXXXHXXX	with 3130.14-V21EXXXHXXX
Spindle type	TR14x3 RH	SG14x16P4 RH
Switch-on duration at nominal load & 500 mm stroke	90 s ON/ 540 s OFF	25 s ON/ 300 s OFF
Max. lifting force F1*	900 N	400 N
Max. tensile force F2*	500 N	400 N
Stat. self-inhibition	150 kg	60 kg
<b>Attention! Cannot be combined with lifting unit 3130.14-VX2... (flange type 2). Custom flange on request.</b>		

\* Determined the service life of 10,000 double strokes

### 3.4 Motor characteristics

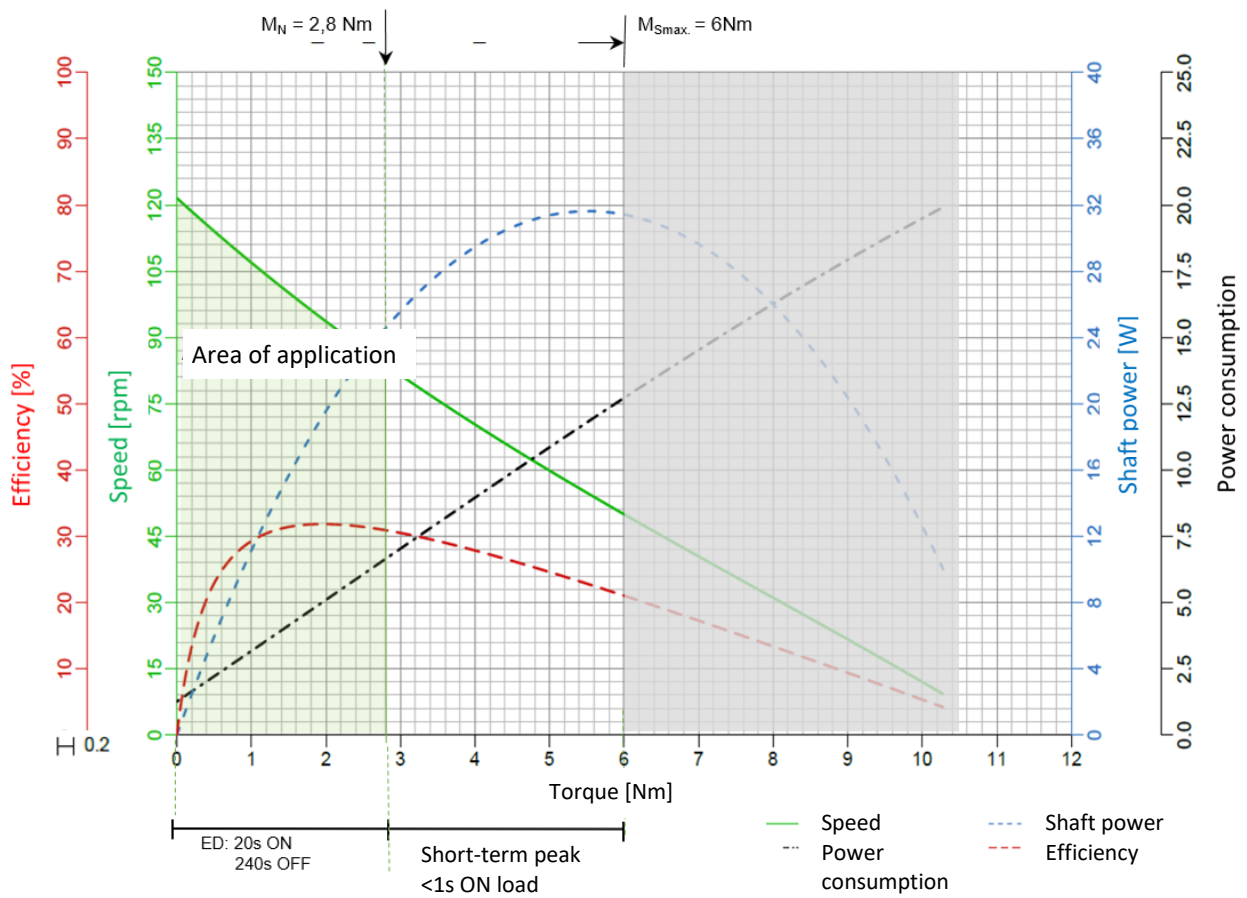


Fig. 3-2: Motor characteristics



**Please note:**

The characteristics do not provide representative, statistically determined average values, and are instead the characteristics of an example drive. Accordingly, the values may vary slightly from drive to drive.

### 3.5 Dimensions

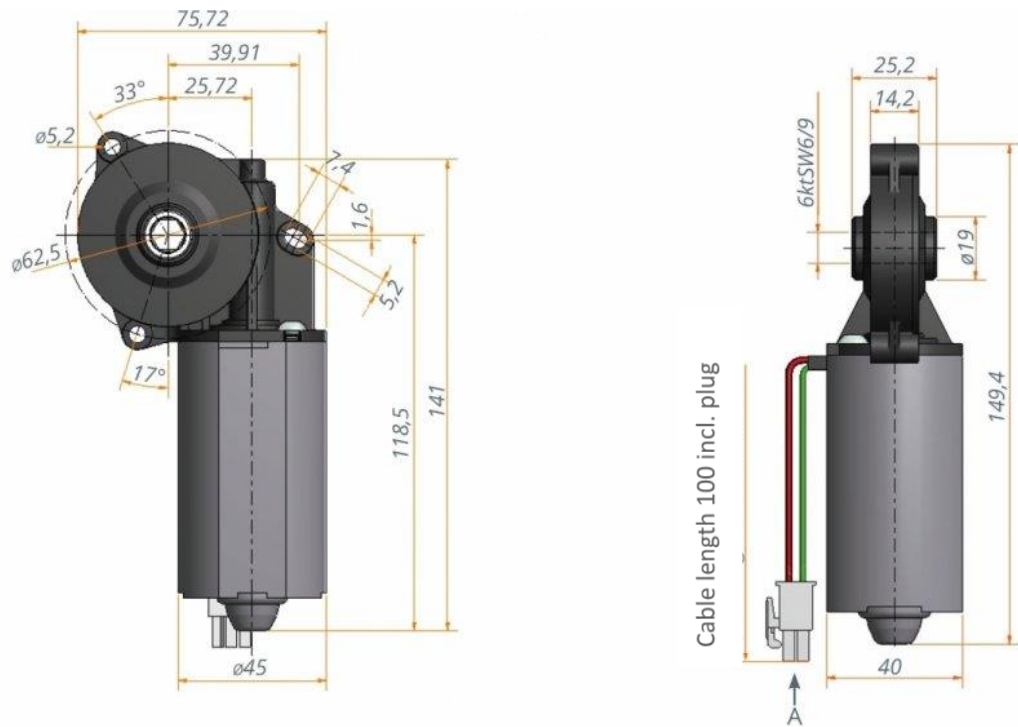
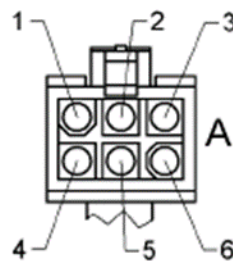


Fig. 3-3: Dimensions

### 3.6 Electrical plug and pin assignment

Cable plug: AMP 172168-1  
 or ALEX 6612-06M1  
 or HRB P1010-2x3-N-H



- 1 Motor, black -
- 2 Motor, blue +
- 3 Hall sensor, red, +5V
- 4 Hall sensor, violet, output 2
- 5 Hall sensor, black GND
- 6 Hall sensor, green, output 1

Fig. 3-4: Electrical plug and pin assignment

### 3.7 Circuit diagram and signal sequence for Hall sensors

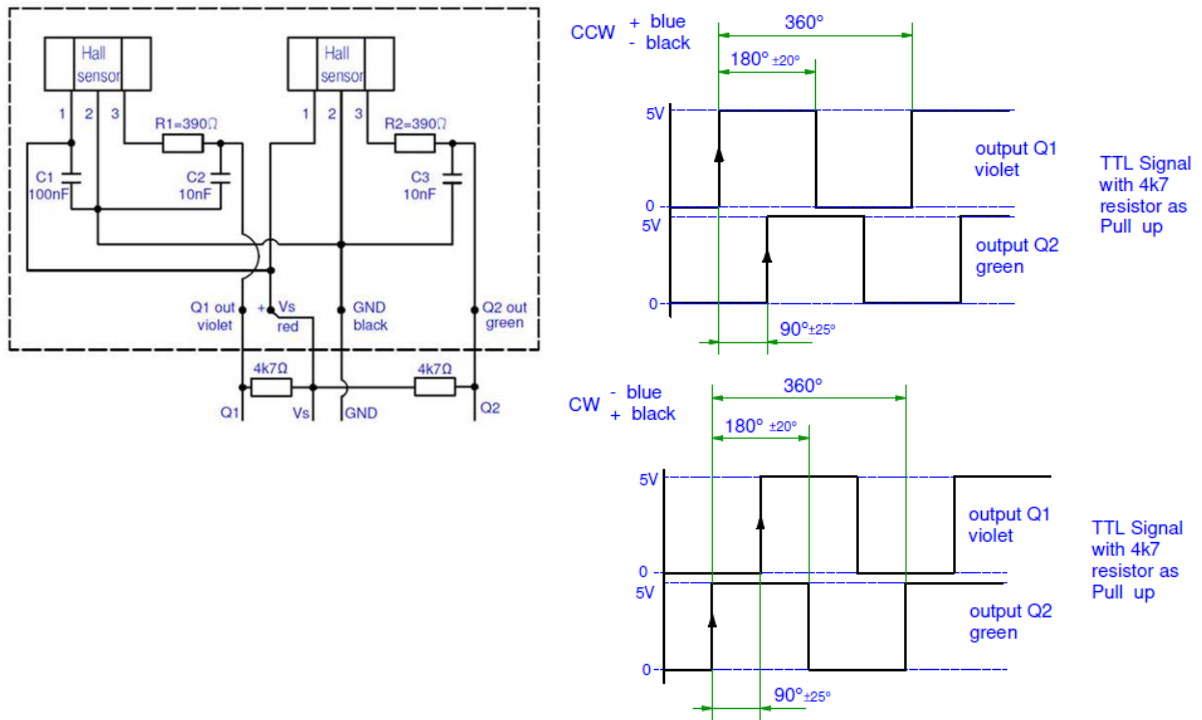


Fig. 3-5: Circuit diagram and signal sequence for Hall sensors

## 4 Installation and operation

### 4.1 Assembly



It is essential that you carefully read through the safety and warning notes given in the "General operating instructions for Ketterer gear motors and spindle drives" and the "Assembly" chapter that apply to all Ketterer drives and drive systems.

Here you will find the general information on the thermal, mechanical, electrical and other dangers as well as the notes on assembly.

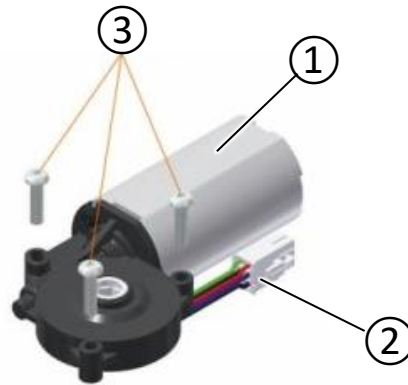


Fig. 4-1 Assembly

1 Motor drive

2 Connector

3 Fixing screws

- ▶ The motor drive [1] is assembled using 3 x M5x20 DIN7380 through-bolts [3]  
→ Max. tightening torque 1.8 Nm.
- ▶ Use of vibration damping elements is advantageous.
- ▶ Connect the power supply [2] to the control unit.
- ▶ Ensure that the connection cable is not disconnected.

The functional safety of the drive is then to be checked in application.

## 4.2 Assembly of the drive with lifting unit 3130.14-VX1EXXXHXXX



Fig. 4-2 Assembly

- ▶ Between the drive, spindle head and frame (framework, guide system...), the use of an additional fixing adapter may be necessary. This is manufactured by the customer and has the purpose of positioning the spindle centrally in the frame.
- ▶ The lifting unit is to be screwed from underneath to the frame (guide system).

Ø3,2 (2x) Fixing holes for  
WN1452x16 bolts  
tightening torque 1.8 Nm

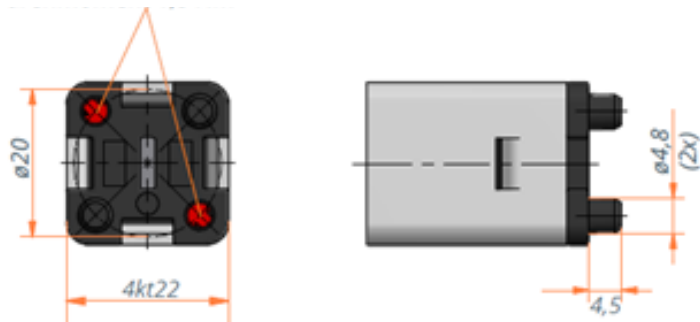


Fig. 4-3 Assembly

- ▶ The lifting unit is assembled using 2 fixing holes for WN1452 K40x16 bolts  
→ max. tightening torque 1.8 Nm

**Information**

- ▶ The lifting units are to be protected against the effects of lateral forces by a separate guide system.
- ▶ Attention: The spindle systems with spindle pitch > 3 mm are no longer self-inhibiting as appropriate. The self-inhibition is to be checked in application.
- ▶ The listing unit is tested for pressure only.
- ▶ Incorrect dimensioning of the guide system can result in damage to the lifting unit: Please note the construction and safety instructions on spindle drives. These can be found at:  
<https://www.ketterer.de/downloads/anleitungen>

### 4.3 Commissioning and operation



**It is essential that you carefully read through the safety and warning notes given in the "General operating instructions for Ketterer gear motors and spindle drives" and the "Commissioning and operation" chapter that apply to all Ketterer drives and drive systems.**

**Here you will find the general information on the thermal, mechanical, electrical and other dangers as well as the notes on commissioning/operation.**

**Information****Prerequisites for connection and commissioning:**

- ▶ Before you connect the product, make sure that the supply voltage matches the product voltage.
- ▶ Operation is only intended with a suitable controller (→ see chapter 0 "
- ▶
- ▶ General requirements on the control") or with a power supply unit with the corresponding EMC filter. Observe the type plate and detailed specifications.
- ▶ Only use cables designed for the current strengths in accordance with the type plate and the respective ambient conditions. Ensure mechanical protection of the electrical connection.
- ▶ Maximum load of the electric motor driven spindle drive systems also depends on the spindle pitch used. Please observe the limit values on the technical data sheet (→ see chapter 3.3 Technical data).



#### 4.4 Standstill

- ▶ The motor drive is brought to a standstill by disconnecting the power supply.

#### 4.5 Dismantling



##### Information

Dismantling is only to be carried out by trained, specialist personnel.

- ▶ Disconnect the power supply.
- ▶ Disconnect the motor drive from the spindle.

#### 4.6 Maintenance



It is essential that you carefully read through the safety and warning notes given in the "General operating instructions for Ketterer gear motors and spindle drives" and the "Maintenance" chapter that apply to all Ketterer drives and drive systems.

Here you will find the general information on the thermal, mechanical, electrical and other dangers as well as the notes on maintenance.

The motor drive is maintenance-free, but the surface must be cleaned on a regular basis.

#### 4.7 Disposal



It is essential that you carefully read through the safety and warning notes given in the "General operating instructions for Ketterer gear motors and spindle drives" and the "Disposal" chapter that apply to all Ketterer drives and drive systems.

Here you will find the general information on the thermal, mechanical, electrical and other dangers as well as the notes on disposal.

## 4.8 Malfunctions: Causes and remedies

Potential faults with causes and rectification are given here.

Fault	Cause	Remedy
Drive will not start or turn over	No power supply	Connect the power supply
	The fuse in the controller is faulty	Replace the fuse
	The cable is damaged	Send in drive for repair
	Mechanical blockage	Switch off, disconnect from voltage and remove mechanical blockage
	Mains voltage faulty	Check mains voltage, restore voltage supply
	Connection faulty	Correct connection, see terminal assignment
	Drive is too hot	Cool off motor, find cause of error
	Ambient temperature too high	Lower ambient temperature
Increased power consumption		Send in drive for repair
Motor is running but the spindle is not moving	Gearwheel or spindle damaged	Send in drive for repair
Drive cannot lift the full load	Inadequate power supply	Increase the power supply
	Voltage drop in the cable	Use a thicker cable
	Motor damaged	Send in drive for repair
Motor running too slowly or not at full power	Inadequate power supply	Increase the power supply
	Voltage drop in the cable	Use a thicker cable

## 5 General requirements on the control

The firm Ketterer supplies motor drives as well as connector rods and spindle systems to machine manufacturers. These are machine manufacturers conforming to Machinery Directive 2006/42/EC and are not responsible for fulfilling the requirements for machines in accordance with Machinery Directive 2006/42/EC.

The firm Ketterer defines in the following requirements for the controller being used for inching operation of the motor drive. These are used as the basis for safe operation of the motor drive. This list is not a conclusive list because while Ketterer is able to define proper use, as well as appropriate, foreseeable use, the place of use cannot be fully evaluated. The manufacturer of the machine is to determine all hazards as part of its risk assessment and to evaluate or minimize these hazards.

The motor drive is to be operated with a DC voltage of 12V DC and supply of the Hall sensors of max. 12V (preferably 5V).

The controller must offer the following options:

- Detection of the upper and lower end position (preferably half the rated output per motor channel) and does not cause damage to the drive. The safety distance to the upper and lower end position must be observed.
- Regulation/monitoring of speed, position and current by the control. The max. current consumption must be set in accordance with the motor type.
- Monitoring/limitation of the duty cycle of the drive.
- Monitoring of the  $I^2t$ .

The controller must comply with general EC Directives.