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TRANSLATION OF THE ORIGINAL
ASSEMBLY AND OPERATION MANUAL

FIBROTOR EM and ER

Rotary table FIBROTOR EM and ER
Type: -
Item number: -
Serial number: -
Dimensions drawing: -
Year of manufacture: -
Order number: -

ⓘ This document has been created by

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Document: Translation of the original assembly and operation manual
Version 1.4

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1 Introduction

1.1 Definition

Rotary table Rotary table:

The rotary table is a partly completed machine in the sense of European Guideline 2006 / 42 / EG, Art. 1g and 2g.

1.2 Intendeduse

The purpose of the rotary table is to be mounted in other machines or in other partly completed machinery or equipment, or to be assembled with them.

The commissioning is not permitted until the necessary safety has been guaranteed for the entire installation, into which the rotary table has been mounted, and its conformity with the laws and guidelines of the country where the rotary table is to be operated, has been established and confirmed.

Its use is permitted only within the limits defined in the order characteristics.

The intended use includes also

- the reading of this manual and observing the safety information.
- Observing the relevant documentation.
- Observing the maintenance instructions.

The rotary table may only be used as intended. Only methods and procedures described in this manual may be used.

1.3 Improper use

Any use that does not comply with the intended use of the rotary table is considered a misuse and is prohibited.

The rotary table may not be subjected to loads above its maximum load limits.

As a matter of principle, the rotary table is not suitable for

- Operation in mobile or portable systems, on ships or in aircraft
- Operation in life support systems
- Operation in residential housing
- Operation beyond the limits of the specified performance data and operating parameters
- Use in explosive atmospheres
- Use in vacuum spaces
- Use under operating conditions where highly inflammable or explosive substances are processed
- Use under operating conditions with aggressive or solvent-containing substances (e.g. acids, lyes, hydrocarbons, etc.)

The operator of the machine described in this document bears the responsibility for any injuries and damages caused by its improper use.

1.4 Applicable documents

Along with this manual, other applicable documents are necessary for the safe operation of the machine. The data in these documents must be observed.

- Instruction for the assembly of a partly completed machine according to Guideline 2006/42/EG
- Electric diagram
- Hydraulic diagram
- Pneumatic diagram
- Drawings

1.5 Structure

The structural design is characterised by a rigid mechanical structure. The basic device is comprised of the housing, table top, bearings, cam drive, drive motor with gearbox and holding brake. Horizontal and vertical use with several motor layouts is possible.

Additional component assemblies are available if the structure is to be extended. The rotary table may also be used as a built-in table.

1.5.1 Bearing

The arrangement is subject to a service life of MTTF = 20,000 h.

1.5.2 Path of motion

The figure with the operating curve ensures that the operation is smooth and impact-free, even in the event of considerable loads (see the evolution of the operating cam). The indexing time can be taken from the load diagram in accordance with the moment of inertia.

The time for the cam rotation is divided into a stipulated ratio between indexing and holding time.

1.5.3 Drive, cam

The operation is generated from the drive motor via a gearbox and the cam drive to the table top. The cam rollers are pretensioned on both sides on the operating cam in the holding phase. This enables the play-free transition from standstill to movement and vice versa.

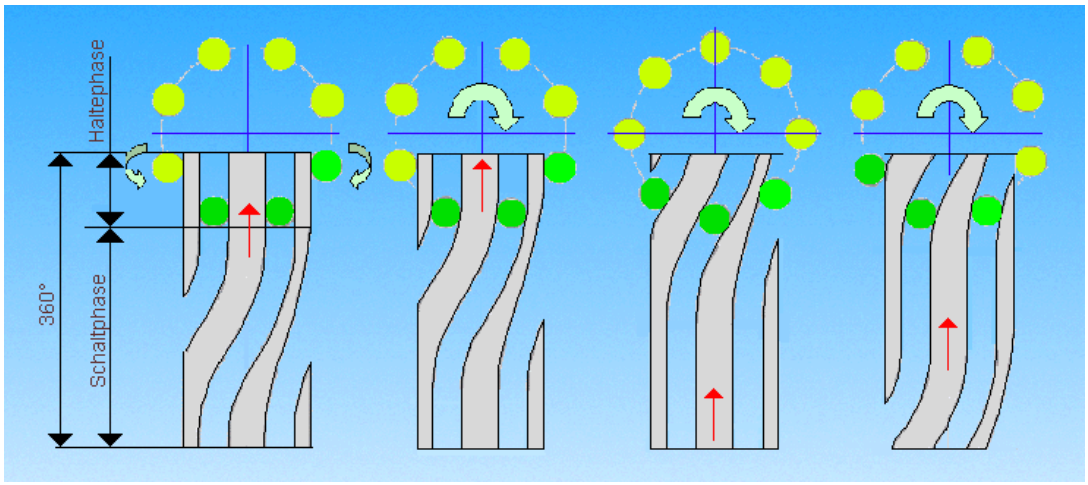


Fig. 1 Cam drive

1.5.4 Positioning

The table top is held in an exact play-free position in the holding phase by the operating cam and the cam rollers. In the event of high tangential forces, a hydraulic table top clamping can be used (relief of the gearbox parts).

Fig. 2 Table top and operating cam

1.5.5 End switch

Standard switch:	2 inductive proximity switches	Basic technology:	PNP
Type:	BESM12MI-PSC20B-S04G	Voltagerange:	10V-30V
Standard size according to:	EN 50 008 A 12	Breaking capacity:	200mA
Fixing thread:	M12x1	Basic function:	BES: Normally open contact

1.5.5.1 Basic wiring diagram

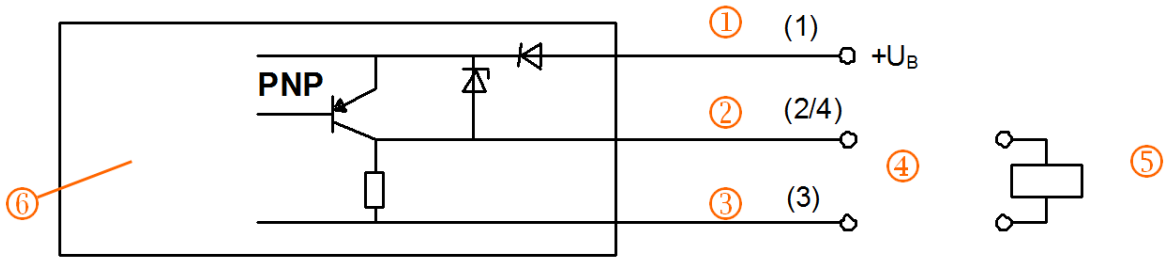


Fig. 3 Wiring diagram end switch

① Brown
② Black
③ Blue
④ Output
⑤ Load
⑥ BESM12MI-PSC20B-S04G

1.5.6 Adjusting the end switches

The end switches S10 and S12 are factory set during the test run (Standard = table top direction of rotation clockwise).
This factory setting does not mean that an adjustment of the end switch setting to the rotary table control system used on site may not be required.
S10 "Table top at standstill"
S12 "Motor off"

ⓘ In the case of pendulum mode we recommend attaching a position detector.
A dividing process occurs from S12 to S12.
The length of the holding phase is displayed with a position diagram.
In divisions as from T 16 there are several standstills on the circumference of the operating cam.

The drive must come to a standstill within the holding phase (pointer in the "Stop" range).

① Pointer
② Disk cam
③ S10 "Table top at standstill"
④ S12 "Motor off"

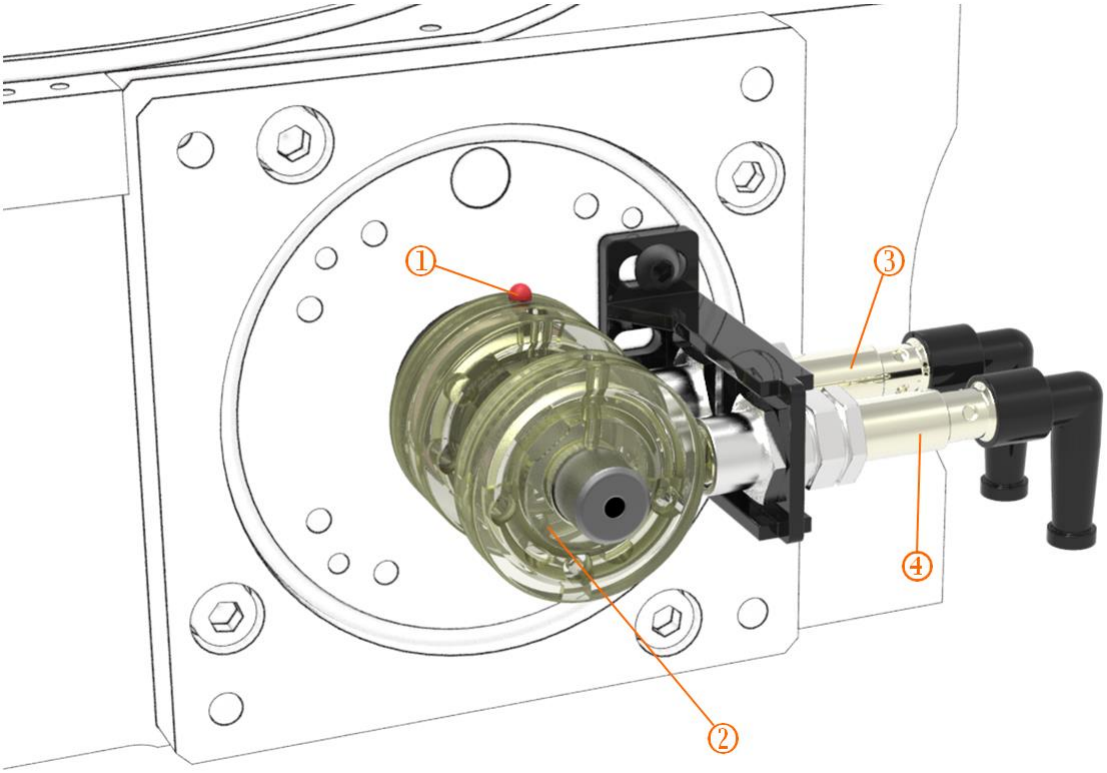


Fig. 4 End switch

1.5.7 Sequence diagram

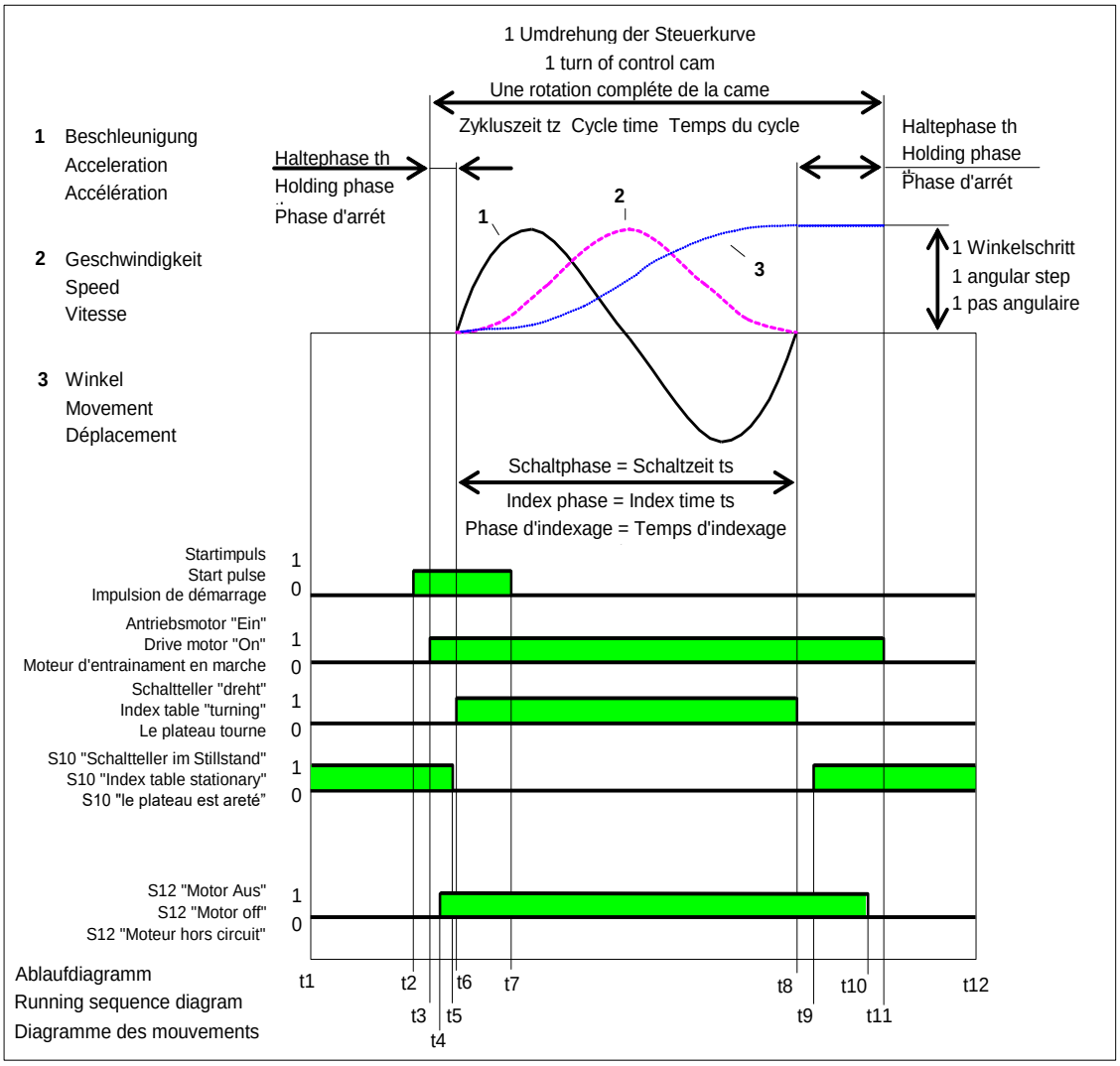


Fig. 5 Sequence diagram

S12 Signal "Motor off" end switch not pressed

alternative:
S12 Signal "Motor off" end switch pressed

1.5.8 Position overrun

If the signal S10 "Table top at standstill" is overrun, the trip cam for "Motor off" must be readjusted. After an extended period of operation the braking system must be readjusted or replaced.

1.5.9 Table top direction of rotation

Standard design: Direction of rotation clockwise

After connection of the motor: Check the table top direction of rotation.

If the table top rotates in the opposite direction, the connections of 2 phases (e.g. L1 and L2) must be changed on the network terminals.

Should the rotary indexing table rotate counter-clockwise this must be indicated in the order or the end trip cam must be readjusted.

During pendulum mode the end trip cams are parallel, i.e. the signals S10 and S12 are emitted at the same time.

NOTICE A change in direction of rotation during the rotational movement leads to the destruction of the driving elements.

1.5.10 Holding phase of the operating cam

The middle of the holding phase is identified by a pointer at the drive shaft and a STOP sign on the fixing flange.

Division 2 to division 12:

In the case of a rotation of the operating cam the table top continues to perform a cycle by one partial step. The middle of the holding phase is identified by a pointer at the drive shaft and a STOP sign on the fixing flange.

As from division 16:

In the case of a rotation of the operating cam the table top continues to perform a cycle by two partial steps. In this case the trip cams for the end switches are designed in such a way that two pulses are emitted during one rotation.

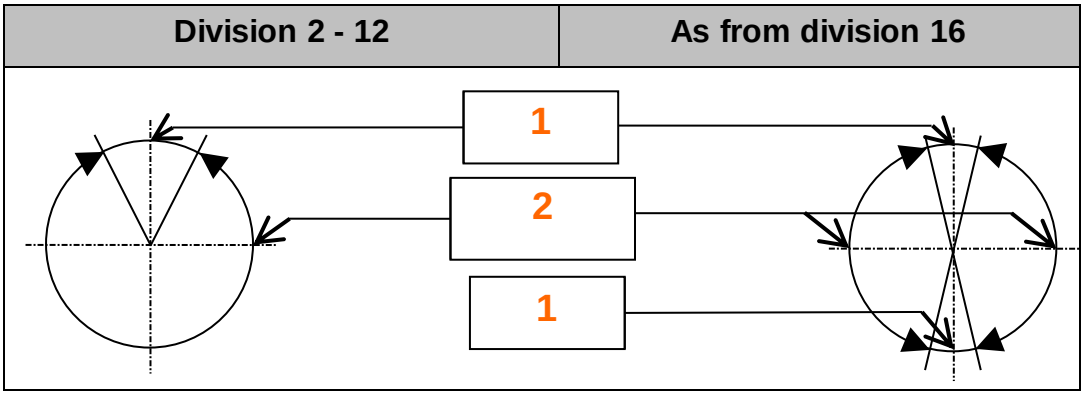


Fig. 6 Holding phases operating cam

1 Holding phase
2 Indexing phase

1.5.11 Emergency Stop mode

When the rotary indexing table is operating in normal mode (start from the base position) the moment of inertia created is gently accelerated via the cam drive and decelerates. During an emergency stop the rotary table is stopped in the indexing phase via the motor brake or accelerated after this via the three-phase motor. This causes excessive acceleration.

This leads to an increased load of the driving elements and thus to a reduced service life.

In order to reduce this torque peak we would suggest adopting the following measures:

- Extension of the indexing time or reduction in the moment of inertia.
- Use of a frequency converter for a soft start at creeping speed after emergency stop up to the next base position.
- Use of a pole-changeable motor.

NOTICE Jog mode in the nominal speed of the drive motor is not permitted.

NOTICE If jog mode is required, a pole-changeable motor or a frequency converter must be used. In the jog mode creeping speed must always be applied.

1.6 Warranty

The warranty is regulated by contract (see General Terms and Conditions or Contract).

1.7 Translation of the Original maintenance and operation manual

This manual is the translation of the original maintenance and operation manual and is part of the scope of delivery.

This manual describes the operation of the machine and contains important information about its intended use.

This manual is addressed especially to the personnel that has been trained and authorised for operating and servicing the machine.

A copy of this manual must be stored and made continuously available at the operating site of the machine and everyone assigned to work on or with the machine must read, understand and apply it.

The safety instructions in the individual chapters must be observed.

This manual and the other relevant documents (see Chapter 1.4 Applicable documents on page 10) are not subject to any modification service.

We reserve the right to update data and drawings in this manual based on further technical development.

The respectively current version can be requested from the manufacturer.

1.7.1 Legend

Certain marks, symbols and abbreviations with the following meaning are used in this manual for clear organisation of its contents:

1. indicates an enumeration.
   a) indicates the second level of an enumeration.
- indicates a listing.
  - indicates the second level of a listing.

The book symbol before the text is a reference to another applicable document. The content of this document must be observed.

The information symbol before the text indicates an additional instruction or an important application tip.

1.7.2 Figures

The figures show the machine as an example. Deviations in the graphical presentation compared to the delivered machine are possible.

1.7.3 List of the valid pages

The number of pages in this manual, including the title page: 72

1.7.4 Meaning of the safety instructions in this manual

This manual contains instructions which must be observed for the protection of personnel and the prevention of property damage.

The safety instructions related to warnings about injuries are emphasised with the help of a code chart containing a warning triangle and a signal word. The respective text describes the type of hazard, its source, the means of prevention and the consequences of disregarding the safety instruction.

The general instructions or those related to possible property damage are designated with a code chart without a warning triangle.

The code charts used in this manual have the following meaning:

DANGER designates a hazardous situation which, if not prevented, can lead to death or serious injury.

WARNING designates a hazardous situation which, if not prevented, can lead to death or serious injury.

CAUTION designates a hazardous situation which, if not prevented, can lead to light to medium-level injuries.

NOTICE ***ATTENTION*** **designates additional instructions, provides information about possible property damage and is not related to possible injuries.**

1.8 Definitions of terms

Manual	General designation of this document.
EMERGENCY STOP	Immediate interruption of all motion processes by activation of an emergency stop button.
Protective equipment	Technical equipment on the machine whose purpose is to guarantee its safety.
Safety instruction	Instruction in manuals and handbooks related to possible physical injuries.
Safety information	Information about the safe operation of the machine.

2 Safety

2.1 BASIC SAFETY INSTRUCTIONS

Most accidents during work with machines are due to disregarding the basic safety instructions.

Perceiving a possible hazard can prevent an accident before it occurs. If there are hazards, the safety information on the rotary table and in this document provides warnings about these hazards. If the warnings are disregarded, this can lead to physical injuries or death.

FIBRO GmbH cannot foresee all possible circumstances that can lead to potential hazards. Therefore, the warnings in this document and on the rotary table do not include all hazards.

Personnel must have the necessary training and experience and possess the necessary tools in order to be able to perform the work on the machine correctly.

Improper operation, maintenance or repair can be dangerous and cause serious or fatal injuries.

No work related to transport, assembly, maintenance or repair may be performed if the information about transport, assembly, maintenance or repair has not been read and understood.

The rotary table is designed for mounting in other machines or for assembly with other machines. FIBRO GmbH has no control over the intended use of the machine.

The operator is responsible for the safety devices for operation of the machine. Operation without safety devices is prohibited.

The operator is responsible for the safe operation and the information that is necessary for the operation.

The rotary table may not be used in any way that deviates from the instructions in this manual. All safety rules and safety measures, including the site-related regulations and safety measures at the workplace, which are applicable to its use, must be observed.

If work equipment, operation, work methods or work techniques that have not been explicitly proposed by FIBRO GmbH are used, the operator must himself ensure the safety for himself and for other persons.

It must also be ensured that the rotary table does not get damaged or become unstable over the course of the intended operation, maintenance and repair work.

The information, descriptions and figures in this document are based on the information that was available at the time of creation of this document.

The descriptions, operating pressures, measurement methods, figures and other items can be changed at any time. These changes can affect the characteristics of the rotary table. The currently applicable information must be provided prior to starting the performance of any work.

2.1.1 Due diligence of the operator

The rotary table is designed and manufactured according to the state of the art. The requirements for ensuring the safety and protection of health have been fulfilled.

However, this safety can be achieved in operational practice only when all necessary measures in this respect have been taken. The operator of the machine must plan these measures and control their implementation.

The operator must make sure that

- the rotary table is used only as intended.
- The rotary table must be operated only in a fully functional state with all mechanical and/or electrical safety devices in place.
- A copy of this manual and of all other applicable documents must be always available in a complete and good legible condition at the operation site of the rotary table. It must be ensured that all persons who have to perform activities on the rotary table can consult the manual at any time.
- The rotary table is operated and maintained by specially trained and authorised personnel.
- Personnel are familiar with the manual and especially the safety instructions contained within it.
- The responsibilities of personnel in the operation and maintenance are clearly defined and observed.
- Personnel is regularly instructed in all applicable issues related to the work safety and environmental protection.
- The operating instructions related to the work safety and accident prevention are enforced.
- The national accident prevention regulations and in-house rules are observed.
- When necessary, personal protective clothing is provided.

Fig. 7 Personal protective clothing

2.1.2 PERSONNEL REQUIREMENTS

The following safety instructions must be observed in all operations on the rotary table. Their violation can cause serious injuries or death.

All persons working on and with the rotary table must:

- read the manual and confirm with their signature that they have understood it.
- observe the safety information and guidelines in the manual and the instructions contained in it.
- make sure that there are no unauthorised persons in the rotary table area.
- make sure that the personnel in training works first on the rotary table only under the supervision of an experienced and trained person.
- in addition to the manual, observe also the operating instructions for work safety and accident prevention issued by the operator.
- inform the operator or the supervisory personnel about any malfunctions.
- inform immediately the respective managers about any changes in the rotary table which can affect its safety.

2.2 Qualification of the personnel

For certain task areas, a special qualification is necessary for personnel.

Task area	Qualification
Electrical system	
Work on the electrical equipment	Skilled electricians
Mechanics	
Commissioning and operation	Authorised and trained personnel
Inspections	Trained personnel
Maintenance	Authorised and trained personnel
Cleaning	Trained personnel
Repair	Service personnel of FIBRO GmbH

2.3 Safety devices on the machine

The rotary table is designed for mounting in other machines or for assembly with other machines. FIBRO GmbH has no control over the intended use of the machine.

The operator is responsible for the safety devices for operation of the machine. Operation without safety devices is prohibited.

The operator is responsible for the safe operation and the information that is necessary for the operation.

The operator must take all the necessary measures to protect his personnel against injuries from the machine.

2.4 Remaining risks

Movement of the table top

The table top turns with high torque. Safety precautions such as, for example, protective grids, jog mode, two-hand operation, emergency stop button, etc. must be taken. Do not reach in the path of motion. Danger of crushing.

Explosive atmospheres

The rotary table is not designed for operation in an explosive atmosphere. Operation in explosive atmosphere or the processing of inflammable substances can lead to explosion. The operator must take all necessary measures for operating the rotary table only as intended. An explosion can cause serious to fatal injuries.

Unauthorised changes

Any unauthorised changes or any mounting of additional equipment not approved by the manufacturer compromise the function of the rotary table and can lead to dangerous situations. Therefore, any structural changes of the rotary table are prohibited. The mounting of additional equipment must be discussed with the manufacturer. Serious injuries or death are possible.

3 Technical description

3.1 General technical data

The technical data of the rotary table depend on the contract.

ⓘ A name plate with number, year of manufacture and type is fixed on the rotary table.

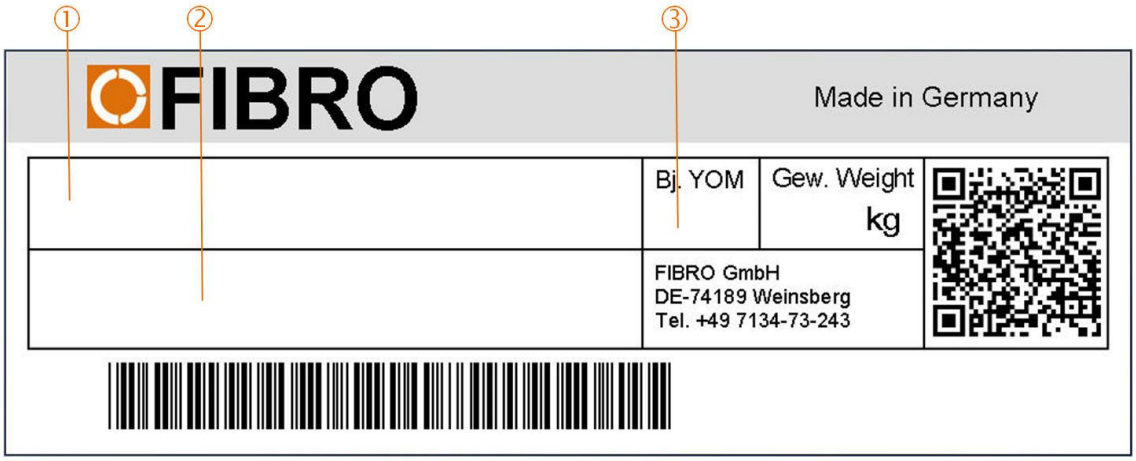


Fig. 8 Name plate

For all questions and orders, the data on the name plate must be provided.

① Number

② Type

③ Year of manufacture

The maximum values of the airborne noise emission of the machine permitted by law should not be exceeded.

3.1.1 Noise leve

The maximum values of the airborne noise emission of the machine permitted by law should not be exceeded.

3.1.2 Electrical connections

Operating voltage	Motor-dependent (see the technical specification)
Control voltage	Motor-dependent (see the technical specification)
Brake voltage	Motor-dependent (see the technical specification)

3.2 Temperature ranges

Operation	between +15° C and +40° C
Storage	between -15° C and +60° C

📖 For information about the technical specifications, time diagrams and wiring diagrams, see Chapter 16 annex .

3.3 Sealing air (optional)

The rotary table has a connection for the sealing air between the housing and the table top (for position and connection thread see the dimensional drawing).

The necessary compressed air must be provided by the supply facilities of the operator.

The sealing air must be regulated and purified by means of a control valve with a filter.

The sealing air pressure must be maximum 0,05 MPa (0,5 bar; 7 psi).

NOTICE If the pressure of 0,05 MPa (0,5 bar; 7 psi) is exceeded, this can cause serious damage to the rotary table.

The sealing air must correspond to quality class 4 according to DIN-ISO 8573-1:

- Solid matter: maximum particle size 15 µm; maximum particle density 8 mg/m^3
- Oil content: maximum oil concentration - 5 mg/m^3
- Water content: maximum pressure condensation point +3 °C

3.4 Operating parameters

Acceleration and deceleration time in the case of adjustable drives:

- In the standard, the rotary table for the connection to the mains network is designed with 3x 400V / 50Hz. During operation with the frequency converter the characteristic values featured in the specification must be observed.
- The acceleration and deceleration times are determined by the operating cam. A ramp is not required on the three-phase braking motor.

3.5 Assembly units

3.5.1 Rotary table

The table top is operated with various motor types and operating cam.

This means that rotational movements can be performed in any direction, however using the angle stipulated by the operating cam.

The acceleration and deceleration is determined mechanically by the operating cam's angle of elevation. No ramp is therefore required on the motor.

The positioning precision is determined by the operating cam holding phase.

A drill pattern is included in the table top.

For information about the technical specifications, time diagrams and wiring diagrams, see Chapter 16 annex .

3.5.2 Cam roller gearbox

The operation is generated from the drive motor via a gearbox and cam drive to the table top. The movement follows a modified sinusoidal shape.

The cam rollers are pretensioned on both sides at the operating cam.

The table top is held in an exact play-free position by the operating cam and the cam rollers.

The direction of rotation can optionally be to the left or right. The rotary table can swing between the positions by a change in the direction of rotation on the drive motor.

① Cam rollers
② Operating curve
③ Table top

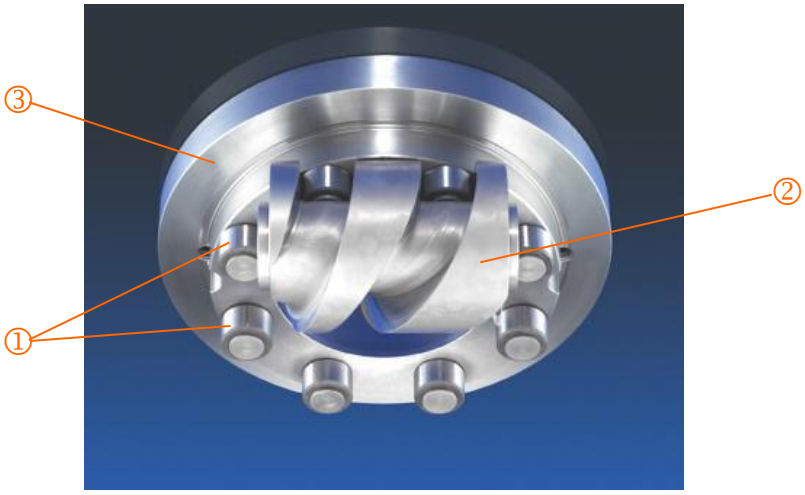


Fig. 9 Worm gearbox

3.5.3 Intermittent operation with braking motor (Optional)

NOTICE The max. switching frequency according to the technical data should not be exceeded.

3.5.3.1 Braking voltage

The brake is ventilated by supplying the stipulated control voltage. The brake is either directly connected to direct voltage, or alternating voltage is rectified by a rectifier built into the terminal box. Various coil designs are possible in order to adapt to the usual connection voltages.

3.5.4 Switching and connection

The braking system connection is carried out via a rectifier built into the terminal box in accordance with the corresponding enclosed wiring diagram. The connection voltage to be applied is featured in the wiring diagram.

NOTICE The motor may only be switched on in conjunction with the direct current brake.

NOTICE The rectifier is not connected to the mains.

The brake must only be switched on on the direct current side. In the event of an alternating current braking process, switching precision must be taken into account.

In the direct current circuit an additional jumper is provided which will have to be replaced by a contact point in order to switch off on the direct current side. This achieves an externally lower overrun. The contact point is generally switched in parallel with the motor control switch.

① Mains connection 400V +/-10%, 3AC, 50/60Hz
② Braking motor
③ Braking coil

Connection according to the internal wiring diagram, remove jumpers 3 +4

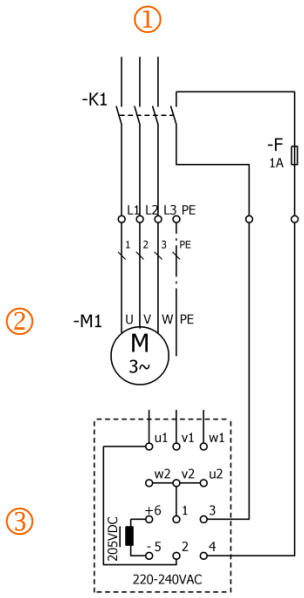


Fig. 10 Connection braking system 240VAC

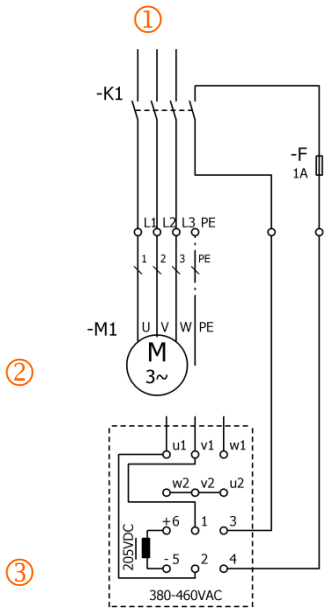


Fig. 11 Connection braking system 400VAC

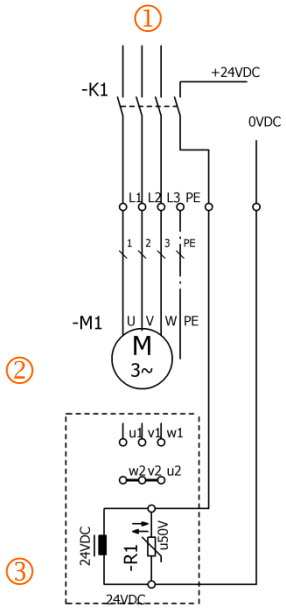


Fig. 12 Connection braking system 24VAC

NOTICE In the case of special voltage or motors the wiring diagram in the terminal box must be observed.

3.5.5 Special sealing against dust, dirt and moisture.

For extreme operating conditions with dust, fibre fly, dirt and the effect of water, as well as intermittent operation in conjunction with frost, the brakes can be delivered in the following designs (surcharge upon request).

- With dust protection ring (4)
- With friction disk made of rust-free material (2)

ⓘ We also recommend this design if the drives have to be stored for an extended period.

3.5.6 Brake

Use conditions:

The use of the KEB Combistopp is not a problem. A prerequisite is that the size selection has been made with care and that it is ensured that grease or oil does not penetrate the friction surface. Moderate dust build-up does not cause damage.

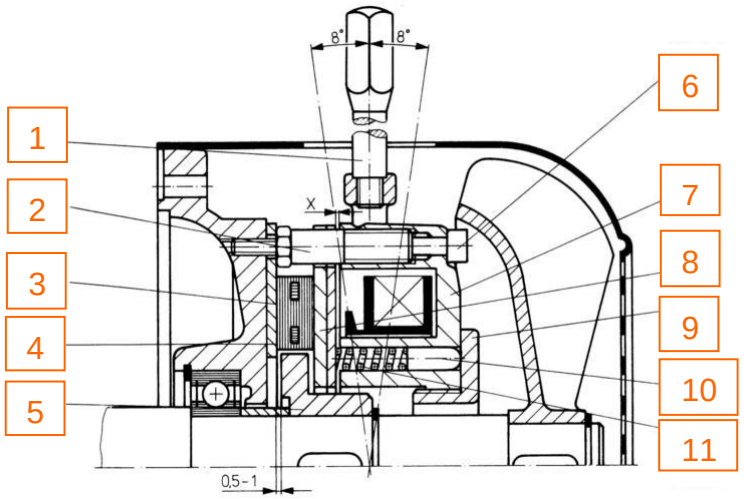


Fig. 13 Brake

1	Manual ventilation
2	Setting piece
3	Second friction surface
4	Lining
5	Hub
6	Cyl. bolt DIN 912 + 6912
7	Magnet
8	Anchor
9	Setting ring
10	Pressure bolt
11	Pressure spring

3.5.7 Intermittent operation with special braking motor KOD (Optional)

NOTICE

The max. switching frequency according to the technical data should not be exceeded.

ⓘ For a further increase in the switching frequency and the service life an external fan can be used.

3.5.7.1 Braking voltage

The brake is ventilated by supplying the stipulated control voltage. The brake is either directly connected to direct voltage, or alternating voltage is rectified by a rectifier built into the terminal box. Various coil designs are possible in order to adapt to the usual connection voltages.

3.5.7.2 Switching and connection

The braking system connection is carried out via a rectifier built into the terminal box in accordance with the corresponding enclosed wiring diagram. The connection voltage to be applied is featured in the wiring diagram.

NOTICE The motor may only be switched on in conjunction with the direct current brake.

NOTICE The rectifier is not connected to the mains.

NOTICE The brake must only be switched on on the direct current side. In the event of an alternating current braking process, switching precision must be taken into account.

In the direct current circuit an additional jumper is provided which will have to be replaced by a contact point in order to switch off on the direct current side. This achieves a clearly lower overrun. The contact point is generally switched in parallel with the motor control switch.

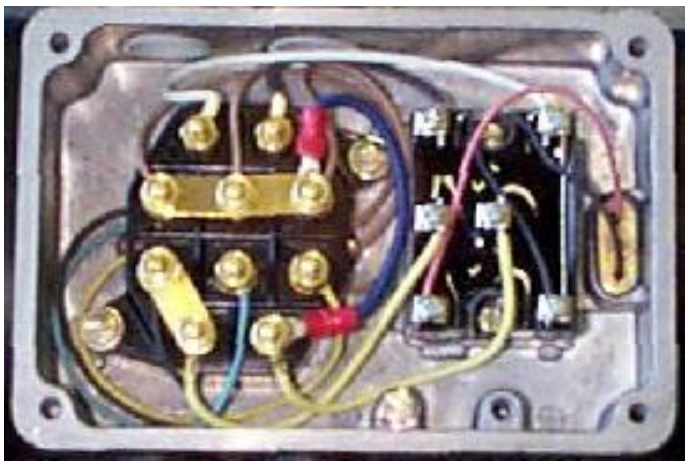


Fig. 14 Connection Georgii Kobold motor

NOTICE In the case of special voltage or motors the wiring diagram in the terminal box must be observed.

3.5.7.3 Special sealing against dust, dirt and moisture.

For extreme operating conditions with dust, fibre fly, dirt and the effect of water, as well as intermittent operation in conjunction with frost, the brakes can be delivered in the following designs (surcharge upon request):

- Encapsulated brake
- With friction disk made of rust-free material

ⓘ We also recommend this design if the drives have to be stored for an extended period.

3.5.7.4 General

The permanent magnet single disk brakes MB are designed for directly fitting to GEORGII KOBOLD motors and rotating field magnets. Dimensions, design, air duct, heat coupling, automatic wear compensation and the technical characteristics featured make the drive unit a high-performing product.

By the application of permanent magnets, the brake has its full brake torque in a voltage-free condition. The application of direct current voltage produces a directional electromagnetic field in the brake-releasing coil in the opposite direction to the permanent magnet field and compensates it. A disc spring built into part 11 rests on a trailing ring and ensures a complete removal of the friction contact.

3.5.7.5 15.6 Connection

There is a wiring diagram in the motor terminal box.

3.5.7.6 Brake maintenance

The brake does not require readjustment during its long service life. As a result of the design (magnetic system with no air gap), the metal pole surfaces rub on each other and together run down the friction lining. The wear is automatically compensated, thus leaving ventilation and overrun constant. The extent of wear can be measured by removing ventilation cover 7. Dimension A in the new condition and in the case of worn brake lining is featured in the table below.

The procedure below is recommended if, for any reason, the trailing ring referred to under "General" sits so markedly on the shaft that the brake torque significantly reduces:

Remove ventilation cover 7 and end plate 5, pull off the circumferential brake part 4 using the pull-off device or ventilate the brake by applying voltage and remove the circumferential brake part. Coat the toothing and shaft with Optimoly PL and assemble parts 4, 5, and 7 again.

Type	Dimension "A", new	worn
COD 3.. MB	9,1	6
COD 4.. MB	9,1	6
COD 5.. MB	9	6
COD 6.. MB	10,7	7
COD 7.. MB	12,9	8
COD 8.. MB	12,9	8
COD 5.. MB 54	9,1	6
	9	6
COD 6.. MB 65		

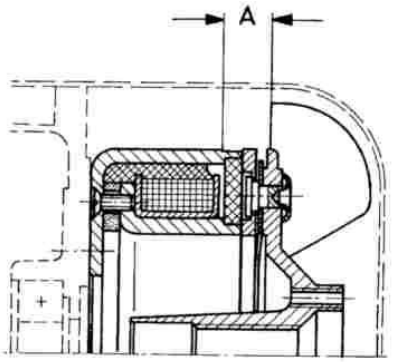


Fig. 15 Brake dimension "A"

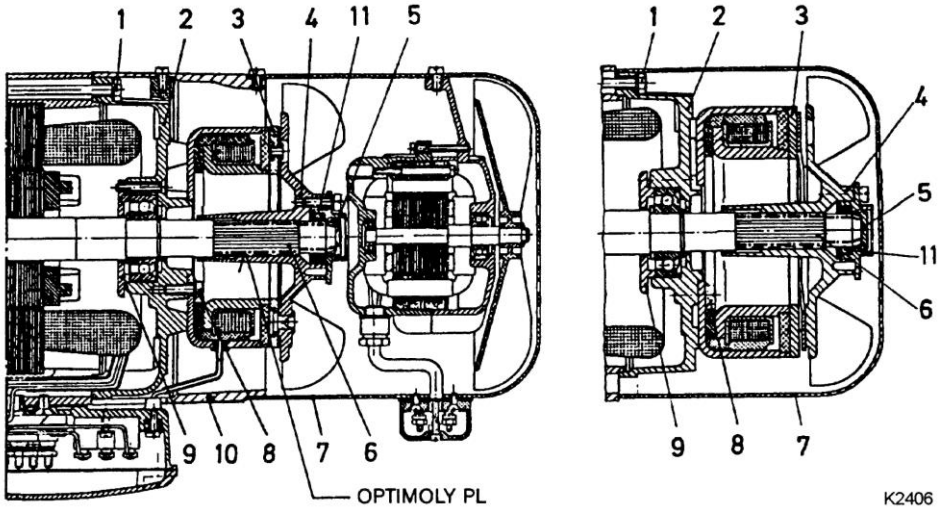


Fig. 16 Cross section brake

3.6 Additional component assemblies and accessories

3.6.1 Hydraulic table top clamping

In its positioned state, the table top is connected with the housing in a friction-locked and backlash-free manner by means of hydraulically impinged clamping. The monitoring of the pressure is performed with the pressure switch.

The level of the admissible pressures is taken from the hydraulic diagram or the technical specification in the annex.

Clamping time approx. 0.4 s,

Release time approx. 0.2s.

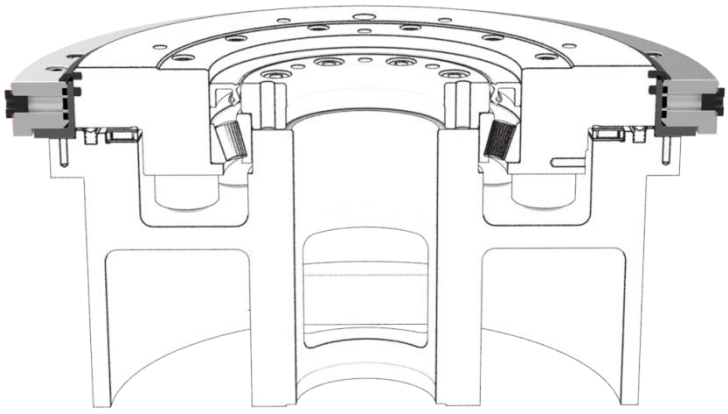


Fig. 17 Hydraulic table top clamping

NOTICE

The clamping should never be activated during the rotation motion of the table top (also not at emergency stop!). The rotary table should never start against closed clamping. This leads to damages. When the clamping is activated, the table top and the housing are connected to each other in a friction-locked manner. The max. clamping pressure and the max. operating pressure should not be exceeded. At higher pressures, the clamping elements can be damaged. The activation of the tangential forces may take place only within the limits defined by the technical specification. If the tangential moments at the clamped table top are exceeded, the clamping elements and, possibly, the driving elements are destroyed.

3.6.2 Connection diagram table top clamping

① Pressure switch, setting range 2-20 bar, Ident. No.: 070 572 3
② Pressure switch, setting range 10-100 bar, Ident. No.: 075 704 7
③ Pneumatic hydraulic tensioning unit, type MO 12
Ident No.: 075 766 6

Settings:
S1: 5 bar clamping control released
S3: 64 bar control clamped

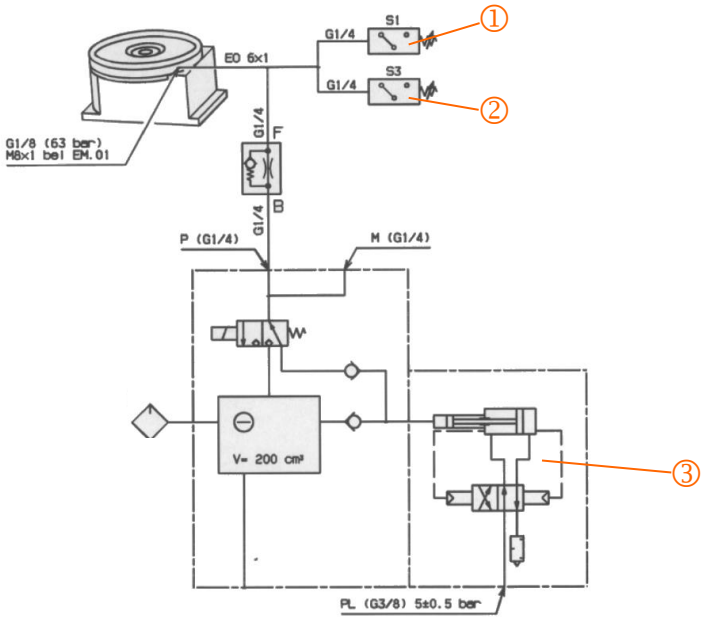


Fig. 18 Connection diagram table top clamping

3.6.2.1 Functional diagram table top positioning

Initial position: The table top is in any position

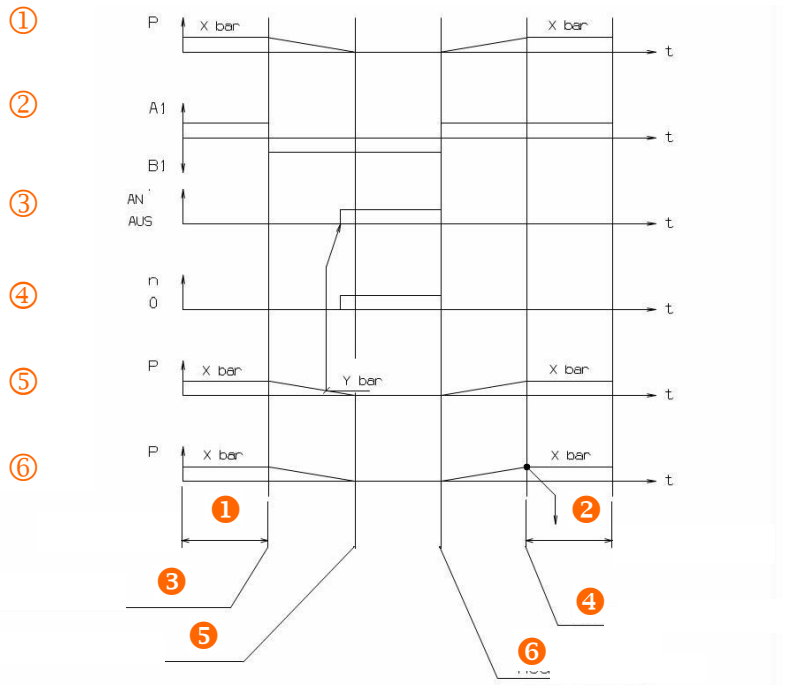


Fig. 19 Functional diagram table top positioning

① = Clamping table top

② = 4/2 directional valve

③ = Turn the motor for the table top

④ = Turn the table top

⑤ = Pressure switch S1/1

⑥ = Pressure switch S2/1

X = Clamping pressure

❶ = Initial position

❷ = new initial position of the table top

❸ = 4/2 directional valve on B1

❹ =Table top clamped

❺ =Clamping released

❻ = new position of the table top

Y = Pressure <= 2 bar

3.6.3 Position detection

In order to request the individual positions a positioning detector (BCD Code) can be attached.

Example for division 06:

Switch	0°	60°	120°	180°	240°	300°
[1]	X	0	X	0	X	0
[2]	0	X	X	0	0	X
[3]	0	0	0	X	X	X

0 = not pressed (hole diameter 8mm)

X = pressed

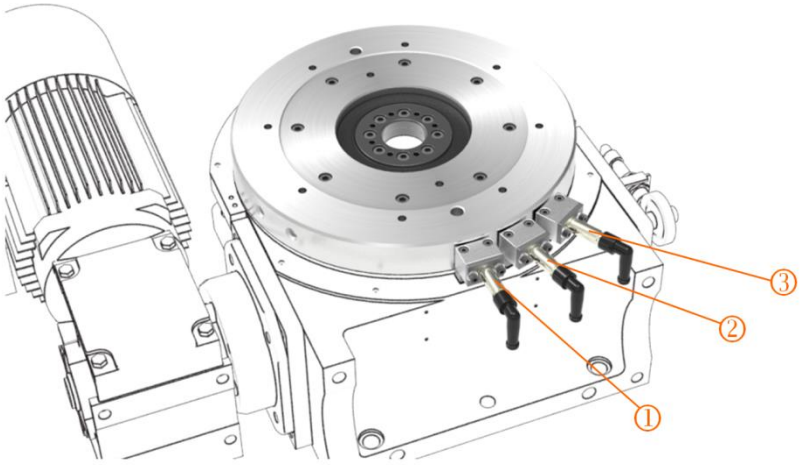


Fig. 20 Position detection

3.6.4 Wiring diagram position detection

For the position detection, as standard the same end switches are used as for the evaluation of the disk cams.

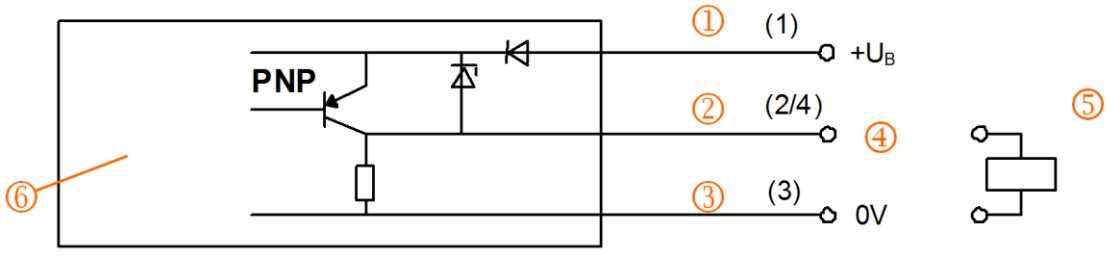


Fig. 21 Wiring diagram position detection

① Brown
② Black
③ Blue
④ Output
⑤ Load
⑥ BESM12MI-PSC20B-S04G

3.6.5 Safety microswitch

During pendulum mode between various positions, through a change in the direction of rotation of the motor, an overrun of the end stations can be prevented by using mechanical end switches ① (emergency stop function).

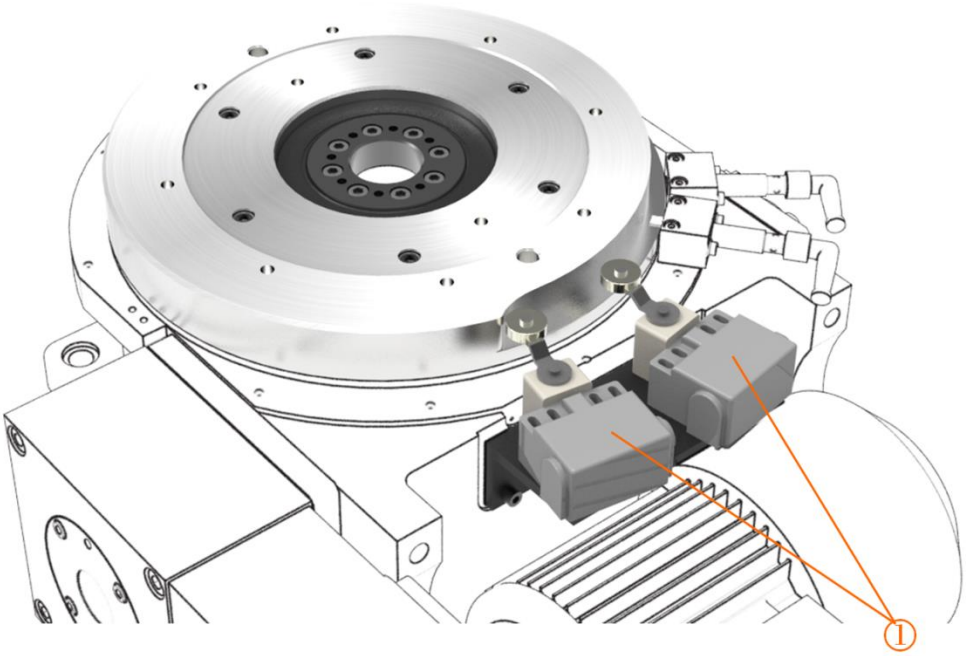


Fig. 22 Safety microswitch

4 Transport

4.1 Important safety guidelines

Suspended loads

Dimensioned load suspension device that are too weak can break. The suspended loads can swing. The lifting equipment and the load suspension devices must correspond to the regulations and should be designed for the weight of the components, including the packaging. It is forbidden to stand under suspended or lifted loads. A sufficiently safe distance must be maintained. The crane operators must be authorised to operate the respective equipment. Injuries from falling loads.

Falling loads

Incorrectly fixed belts or chains can slip. Transport equipment that is not designed for the weight of the individual components can fail. The transport box can fall. Only hoisting equipment with crossbars must be used. The belts and chains must be always outside of the pole plates. Injuries from falling boxes.

Tilted loads

If the centre of gravity is disregarded, a load can tilt. The rotary table must be positioned so that the load can be in equilibrium. Always take into consideration the centre of gravity when fastening the transport means. Secure the load against tilting. Injuries from tilted loads.

Unsecured rotary table

The rotary table can turn or become displaced from the linear axis (depending on the implementation of the rotary table). Provide the rotary table with transport locks for transport. Remove the transport locks only after the assembly has been completed. There is a risk of impact and crushing injuries.

During the transport of the rotary table or its components, the following points must be observed:

- The transport work must only be performed by trained transport personnel and in strict compliance with the safety instructions.
- The transport routes must be blocked and secured so that no unauthorised persons can enter the hazardous zone.
- Protect the sharp edges with edge protection.
- Use only whole belts.
- Compliance with the local applicable accident prevention regulations is mandatory.

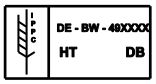
4.2 Packaging and weight

For shipping by truck, the rotary table is secured with transport locks and packaged in foil.

For shipping by sea the rotary table is secured at FIBRO GmbH with transport locks and packaged in a wooden box.

The total weight of each box is printed on the box. In addition, the box is marked with labels according to the internationally valid symbols.

These labels must be observed in order to handle with care the packaged rotary table.

	Top		Protect from moisture, rain or snow
	Fragile content		Fasten here with ropes, belts or chains
	Marking according to the International Plant Protection Convention (IPPC)		

The packaging materials must be either reused or properly disposed of in accordance with the country-specific regulations.

4.3 Transport damages

The shipment must be inspected for completeness and transport damages immediately after the delivery. If damage is found on the packaging that indicates possible damage to the content, the content must be also inspected for damage.

If damage is found, this must be communicated immediately to the transport company and confirmed by this company.

4.4 Interim storage

NOTICE The packaging used by FIBRO is a transport packaging. The transport packaging is not suitable for the storage of the rotary tables. The customer shall take appropriate measures in order to avoid corrosion damages during storage/temporary storage.

4.5 Permitted equipment and auxiliary devices for the transport

The unloading of the boxes and their transport to the installation site can be performed with an overhead crane. Use crossbars.

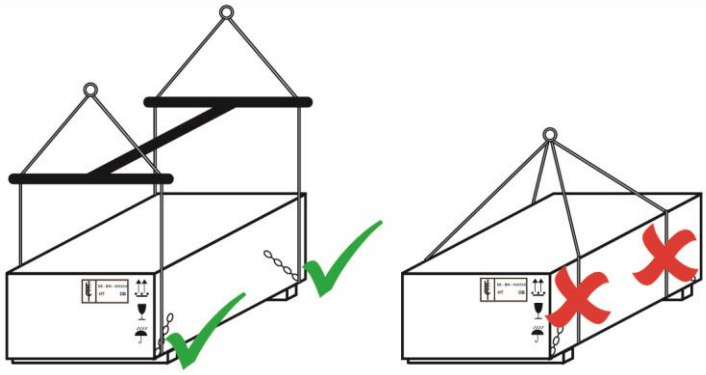


Fig. 23 Transporting boxes

For the transport of the unpacked rotary table, use only suitable attachment eyes. The use of ring bolts as load suspension devices is not permitted.

4.6 Transport locks

NOTICE The rotary table can be transported as an individual device without separate transport locks. In the case of combination layouts transport locks according to the supplementary sheet must be used.

4.6.1 Unpacking and transporting of the rotary table

1. Unpack the rotary table, and make it freely accessible on all sides.
2. Inspect the rotary table for damage during the transport.
3. Verify the entire delivery scope against the delivery papers.
   - Request that the established deficiencies be confirmed by the shipping company and inform FIBRO GmbH thereof immediately.
4. Screw suitable attachment eyes [A] in the screw threads provided on the table top or housing.

NOTICE Damage to components. Never lift the rotary table suddenly with a jerk.

5. Hook the belts onto the attachment eyes and lift the rotary table from the box while observing the safety instructions and transport regulations.
6. Transport the rotary table in compliance with the safety instructions and transport regulations.

7. Hook the belts onto the attachment eyes and lift the machine from the box while observing the safety instructions and transport regulations.

4.7 Return shipping

All parts, which are forwarded to the manufacturer for repair, must be securely packaged for the return shipping.

The air vent screws of the gear boxes must be closed in order to prevent oil leakage.

The electronic components must be always transported in antistatic packaging.

NOTICE The transport locks must be re-attached prior to any further transportation of the rotary table.

4.8 Instructions for disposal of packaging material

The packaging materials must be either reused or properly disposed of in accordance with the country-specific regulations.

5 Assembly

5.1 Important safety guidelines

Incorrect installation

The assembly work should be performed by qualified personnel only. Work on the power supply line connections should be performed by qualified electricians only. A check must be carried out to ensure that the power supply frequency and voltage correspond with the data in the technical specification. The electric, hydraulic and pneumatic devices must be connected only when the power supply is turned off. Crushing and electrocution injuries.

When assembling the rotary table or its components, the following must be ensured:

- the assembly site is suitable for the operational weight, including the superstructural parts of the client and the tools.
- the expected loads, torques and moments of inertia have been taken into consideration.
- the assembly site has been isolated with a signal strip.
- the assembly site has been marked with danger signs.
- only authorised persons have access to the work area and no other persons could be endangered by the assembly work.

5.2 Installation requirements

The assembly site must be prepared for the assembly work and has to be clean and even.

The mounting bolts must be available.

5.3 Assembly of the rotary table

5.3.1 Mechanical assembly

NOTICE Rotary table damage. The rotary table should not be braced while being bolted. The maximum bolting depth and the tightening moments of the mounting bolts as well as the maximum offset for the cylindrical pins must be observed.

Transport the rotary table to the assembly site in compliance with the safety instructions and transport regulations.

Sagging load. Do not hold between the rotary table and the installation surface. Crushing of hands or fingers.

- Lower the machine carefully and place.
- Remove the transport belts.
- Connect sealing air for rotary table (see chapter 3.4 Sealing air) and measuring system.

The type and positions of the connections must be taken from the dimensional drawing and the electric diagram in the appendix.

The information regarding the type, size and other data for pneumatic, hydraulic, water and electrical connections must be taken from the diagrams and drawings enclosed in the appendix.

- Check function:
  - – Functional sequence (see chapter 7.3 Operating modes)
  - – Measuring system

5.4 Modifications and alterations

5.4.1 Admissible modifications and alterations

The admissible alterations can affect the performance of the rotary table. The admissible alterations are:

- Installing tools, workpieces and devices on the table top.
- Attaching hoses, pneumatic lines or cables to the rotary table.
  - The hoses, pneumatic lines or cables must be mounted in such a way that they do not impede the rotational movements or cause motion errors of the rotary table.

5.4.2 Forbidden modifications and alterations

- Modifications of the connection cable between the rotary table and the control system
- Modification of any access panelling on the rotary table or the drive system
- Modifications (including drilling and cutting) of any part of the rotary table surface
- Modifications of any electronic component or printed circuit board
- Laying of additional hoses, air ducts or wires inside the rotary table

6 Commissioning

6.1 Important safety guidelines

The rotary table is designed for mounting in other machines or for assembly with other machines. FIBRO GmbH has no control over the intended use of the rotary table.

The commissioning is a responsibility of the operating company.

6.2 Prior to the commissioning

Prior to the commissioning, visual inspection of the rotary table has to be performed. Hereby it is necessary to check and make sure that

- the safety devices are operational.
- there are no damages on the rotary table.
- there are no foreign bodies, tools or other objects on the machine.
- all supply facilities are connected and operational.

Prior to the return to operation, a test run must be performed.

6.2.1 Test run

The test run is performed without any superstructures on the table top.

Prior to the test run it is necessary that

- all safety devices are tested.

7 Operation

7.1 Important safety guidelines

Inadmissible operating parameters / software.

The change of the operating parameters leads to a change in the system behaviour of the rotating or moving parts of the rotary table. The use of a controller with unlicensed software creates a risk for the safety of the rotary table. The operating parameters may be changed only by authorised personnel with detailed knowledge of the modes of operation and the structure of the rotary table. The use of unlicensed software is prohibited. Violation of this prohibition can lead to serious injuries.

In the operation of the rotary table it must be ensured that

- the rotary table is ready for operation and the operating parameters have been set up correctly.
- the operating personnel has been informed prior to starting the rotary table about the correct behaviour in the event of accidents.
- the operation is performed only by persons who have been trained, instructed and authorised for that. These persons must know this manual and proceed according to it.
- the rotary table is used / deployed only in accordance with its intended use (see Chapter 1.2 Intendeduse on page 9).
- during power-up and operation there is no one in the hazard area of the rotary table.
- the operating instructions of the operator are observed.

7.2 Workplaces of the operating personnel

The workplaces of the operating personnel are determined by the operator of the machine.

7.3 Operating modes

The operating modes can be taken from the specification in the annex.

7.4 Rotary table - turning on and operation

The rotary table is designed for mounting in other machines or for assembly with other machines. FIBRO GmbH has no control over the intended use of the rotary table.

The operator is responsible for the safety devices for operation of the machine. Operation without safety devices is prohibited.

8 Faults

8.1 Important safety guidelines

Unauthorised personnel

Any personnel that has not been adequately trained does not have the necessary authorisation to localise faults or correct errors. Any defects may only be corrected by FIBRO Customer Service or by members of staff from the operating company who are trained and authorised for performing the respective activity. Before the correction of the defects, the machine must be shut down from the master switch and secured against unintended reactivation. The action area of the moving machine parts must be secured. The repairs must be performed by FIBRO personnel only. The use of unauthorised personnel can lead to injuries resulting from incorrect action.

8.2 Customer service

If you need assistance from our customer service, please provide the following data:

- Serial number according to the name plate
- Description of the occurring fault
- The point in time and the circumstances of the occurred fault
- The presumed cause

You can reach our customer service Monday to Friday from 07:00 am to 5:00 pm under the

Service number +49 (0) 7134 - 73-243

Outside the times stated, a recorded message with additional information is available.

Address of the customer service:

FIBRO GmbH
Rotary Table Division
Weidachstrasse 41 - 43
D-74189 Weinsberg

9 Repair

9.1 Important safety guidelines

WARNING

Unauthorised personnel

The personnel of the operator may perform only the maintenance work described in this manual. This personnel must be trained and authorised for performing these activities. The action area of the moving machine parts must be secured. All other work and repairs must be performed by FIBRO personnel only. The use of unauthorised personnel can lead to injuries resulting from incorrect action.

Using wrong spare parts

Using the wrong spare parts or materials can endanger the safety of the rotary table. Only spare parts from our spare parts list or spare parts released for use by us can be used. No individual components may be exchanged with each other. Only the specified materials must be used. The self-locking bolts and nuts must be always replaced with new ones. All prescribed tightening torques must be adhered to exactly as specified. Failure of unapproved spare parts can cause injuries.

Missing safety devices

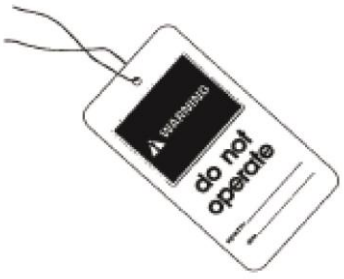
Under certain circumstances, safety devices may have to be removed when maintenance work is performed. The removed parts must be reassembled immediately after completing the maintenance work. The protection function must be tested. Operation of the machine without safety devices is prohibited. Operation of the machine without the safety devices can cause serious or fatal injuries.

NOTICE

Forgotten tools or other objects can fall into the running machine and cause material damages. Before turning on the machine, check whether there are tools or other objects on the rotary table. Remove any forgotten tools or other objects.

Prior to performing any maintenance and cleaning work, turn off the main switch and secure it with a padlock.

Prior to any maintenance work, put warning signs "Do not turn on" or similar warnings on the main switches and the control consoles.



9.2 Maintenance work

The following activities are considered maintenance work:

- Inspection
- Maintenance / cleaning
- Repair

9.2.1 Inspections

Daily before the start of the work shift:

- Inspection of the essential functional units.
- Inspection of the air pressure on the manometer.
- Inspection of the filter bowl for the accumulated condensate.

9.2.2 Maintenance / cleaning

Turn off the machine in a secure manner

Performing maintenance and cleaning work when the power supply is turned on is dangerous. Perform the 5 steps to securely turn off the electric power supply. All other power supply sources must be also turned off. Injuries when the power supply is turned on.

5 steps for securely turning off the electric power supply.

- Turn off the main switch (disconnect all sides)
- Secure the main switch against re-starting
- Check for absence of voltage
- Ensure the grounding of all sides
- Cover any live neighbouring parts

After the work has been completed, the shut-down must be in cancelled in the reverse order.

When maintaining the rotary table, the following must be ensured:

- all work steps are performed in the specified order.

After the maintenance work has been completed, it must be checked whether

- the work has been performed completely.
- all foreign bodies have been removed from the work area.
- the safety devices have been mounted properly and are functioning.

The operator must establish the cleaning intervals.

9.2.2.1 Long-term lubrication

The lubricants are designed for a service life of at least 20,000 operating hours.

A change in lubricant is only required in the event of coolant and lubricant ingress, as well as in the event of a general overhaul of the device. Contact our customer service in this regard.

ⓘ It is recommendable to thoroughly clean the gearbox when changing the lubricant.

The rolling bearings filled with grease must be cleaned every 20,000 operating hours and filled with new grease. Whilst doing so, ensure that the bearing space is filled with approx. 1/3 grease.

NOTICE Synthetic and mineral lubricants must not be mixed with each other.

NOTICE In the case of ambient temperatures below – 20°C and above + 60°C rotary shaft seals with special material quality must be used.

NOTICE In the case of external reservoirs observe their lubrication instructions.

9.2.2.1 Mounting position of horizontal table top

The rotary table is delivered filled with suitable synthetic oil. The gearboxis filled with synthetic gearbox oil.

9.2.2.2 Mounting position of vertical and upside-down table top

The control cam and drive rollers of the rotary table are greased Arcanol MULTITOP before delivery.

9.2.2.3 Lubrication plan

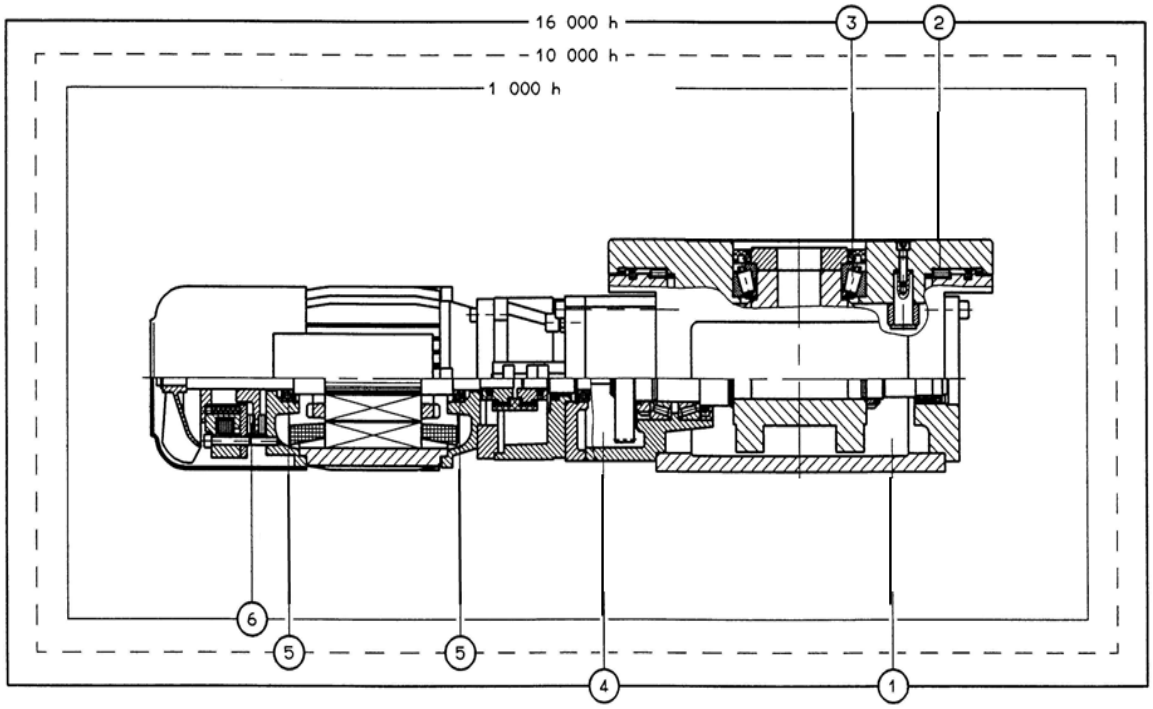


Fig. 24 Lubrication plan

① Lubricant rotary indexing table
② + ③ Lubricant rolling bearing
④ Lubricant gearbox
⑤ Lubricant rolling bearing
⑥ Motor brake control

9.2.2.4 Lubricants

① **Lubricant rotary table:**

The following **synthetic oils** are permitted for the rotary table:

Manufacturer / supplier	Designation
Q8	Q8 EL Greco 220
MOBIL	Mobilgear SHC XMP 220
ARAL	Aral Degol GS 220
BP	BP Enersynl SG-XP 220
KLÜBER	Syntheso D 220 EP

②+③ **Lubricant rolling bearing**

The following **synthetic greases**are permitted for the rolling bearing:

Manufacturer / supplier	Designation
FAG	Arcanol MULTITOP
ARAL	Aralub HLP2
DEA	Discor 8 – EP 2
ESSO	Beacon 325
KLÜBER	Isoflex NCA 15
MOBIL	Mobiltemp SHC 32
SHELL	AERO Shell Grease 16 or 7

④ **Lubricant offset gearbox (FIBROTOR EM, EM.NC, and RT)**

The following **synthetic oils** are permitted for the offset gearbox:

Manufacturer / supplier	Designation
Q8	Q8 EL Greco 220
MOBIL	Mobilgear SHC XMP 220
ARAL	Aral Degol GS 220
BP	BP Enersyn SG-XP 220

NOTICE In the case of external reservoirs observe their lubrication instructions.

9.2.2.5 Filling quantities

Type	(1) Rotary table	(4) Offset Gearbox
EM.10 / EM.NC.10	0,03 l	
EM.11 T02	0,10 l	0,07 l
EM.11 >T02 / EM.NC.11	0,06 l	0,07 l
EM.12 / EM.NC.12	0,17 l	0,07 l
EM.13 T02	0,25 l	0,40 l
EM.13 >T02 / EM.NC.13	0,4 l	0,40 l
EM.15 / EM.NC.15	0,6 l	0,40 l
EM.16 / EM.NC.16	1,1 l	1,0 l
EM.17 / EM.NC.17	2,5 l	1,0 l
EM.18 / EM.NC.18	5,0 l	1,0 l
EM.19 / EM.NC.19	10,0 l	
EM.20 / EM.NC.20	18,0 l	

Type	(1) Rotary table	(4) Gearbox
ER.10	0,03 l	
ER.11 T02	0,10 l	
ER.11 >T02	0,06 l	
ER.12	0,17 l	
ER.13 T02	0,25 l	
ER.13 >T02	0,4 l	
ER.15	0,6 l	
ER.16	1,1 l	
ER.17	2,5 l	

9.2.3 Repair

The operator of the rotary table should not perform any overhaul / repair work.

If there is a need of overhaul / repair work, the FIBRO GmbH customer service must be informed.

10 Shutdown

10.1 Important safety guidelines

WARNING

Restoring the power supply

The restoration of the energy supply to a shut-down machine can lead to unexpected start. In order to shut down the machine, it must be turned off from the main switch and secured against unintended starting. The action area of the moving machine parts must be secured. The restoration of the power supply can lead to injuries.

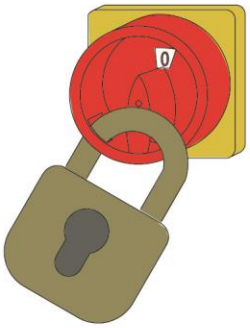
Unauthorised personnel

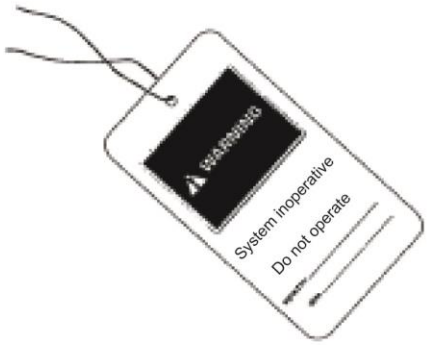
Personnel that has not been properly trained does not have the authorisation to take the machine out of operation. The shutdown must only be performed by trained personnel that has been authorised for performing the respective activities. The use of unauthorised personnel can lead to injuries resulting from incorrect action.

10.2 Temporary shutdown

For the temporary shutdown:

- Turn off the machine in a proper manner.
- Secure the machine against unintentional restarting.
- Put a warning sign on the machine that shows clearly that it is temporarily out of operation.



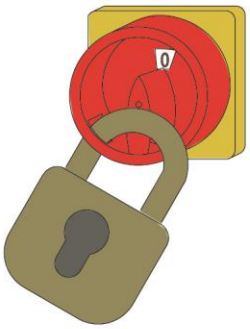


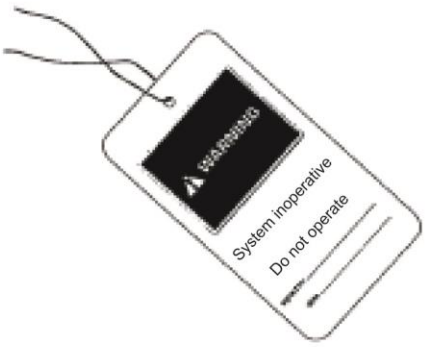
Return to operation (see Chapter 6.2 Prior to the commissioning on page 43).

10.3 Permanent shutdown

For permanent shutdown and decommissioning:

- Turn off the machine in a proper manner.
- Secure the machine against unintentional restarting.
- Put a warning sign on the machine that shows clearly that it is permanently out of operation.





11 Disassembly and disposal

11.1 Important safety guidelines

The rotary table should be disassembled by specialised personnel of FIBRO GmbH only.

Disassembly by personnel of the operator is prohibited.

WARNING

Unauthorised personnel

In the process of disassembly and during transportation, parts can tilt or fall. Loads can swing or fall down. Do not stand under suspended loads. The auxiliary personnel may act only on instructions by the specialised personnel. During the transport, the safety measures for the transport should also be observed. Disregarding the safety measures can lead to serious injuries.

The auxiliary personnel of the operator must strictly adhere to the instructions of the FIBRO personnel and observe the safety instructions.

The auxiliary personnel must wear personal protective clothing.

NOTICE

Leaking lubricants, solvents and preserving agents can damage the environment. Remove any leaking lubricants, solvents and preserving agents immediately.

11.2 Disposal

11.3 Disposal of components

NOTICE

Dispose of the components in a proper manner!

The improper disposal of components can cause damage to the environment and is subject to criminal prosecution. The components have to be disposed of in accordance with the applicable local and regional laws and guidelines. Attention must be paid to the environmentally compatible disposal of the process consumables. The local regulations regarding the proper waste recycling or removal must be observed.

The local authorities provide information about the disposal and collection depots.

The machine consists of:

- Iron / steel
- Aluminium
- Grey cast iron
- Brass
- Copper (motors and electric lines)
- Plastics (electric lines, pneumatic hoses)
- Electronic components

The process consumables are:

- Gearbox oil
- Hydraulic oil
- Low-viscosity grease

12 Service and spare parts

12.1 Service

You can reach our customer service Monday to Friday from 07:00 am to 5:00 pm under the

Service number +49 (0) 7134 - 73-243

or under rtservice@fibro.de

Outside the times stated, a recorded message with additional information is available.

Address all written enquiries to:

FIBRO GmbH
Rotary Table Division
Weidachstrasse 41 - 43
D-74189 Weinsberg

rtservice@fibro.de

All FIBRO representation offices worldwide can be found under www.fibro.de

12.2 Spare parts

Spare parts must meet the technical requirements specified by FIBRO GmbH. By ordering original spare parts from FIBRO GmbH, you are assured that these requirements will be met.

NOTICE FIBRO GmbH can assume no liability for any damage caused as a result of using non-original spare parts.

12.3 Spare parts ordering

When ordering spare parts, please provide the following data:

- Name, address, shipping address
- Exact designation of the equipment (take serial number from the name plate)
- Exact spare part designation
  - When necessary, enclose samples, photos or sketches
- Quantity of the spare parts needed

Please address your spare parts order to:

FIBRO GmbH
Rotary Table Division
Weidachstrasse 41 - 43
D-74189 Weinsberg

rtservice@fibro.de

All FIBRO representation offices worldwide can be found under www.fibro.de

Upon receipt of the spare parts delivery:

- Check that the right number of parts has been delivered and that they are all correct and in good condition
- Report any errors immediately

Any compensation claims for damage in transit must be reported to us immediately

13 Declaration of incorporation

13.1 Declaration of incorporation

in accordance with EU machinery directive 2006/42/EC (Annex II B)

The manufacturer FIBRO GmbH
Weidachstr. 41-43
D-74189 Weinsberg

We herewith declare, that the incomplete machine described below

Product description

Rotary table type:	**FIBROTOR EM and ER**
Type designation:	-
Item number:	-
Serial number:	-
Dimensional drawing:	-
Year of manufacture:	-

satisfies the basic requirements of machinery directive 2006/42/EC as far as possible within the context of the scope of delivery.

In addition, we declare that the special technical documentation has been prepared in accordance with Annex VII

Part B of this guideline.

The incomplete machine also meets the requirements of Directives 2014/35/EU regarding electrical equipment and 2014/30/EU regarding electromagnetic compatibility.

We undertake to submit, via our documentation department, the special documents for the incomplete machine to the market supervisory authorities upon justified request.

The incomplete machine must not be put into service until the final machinery/plant into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC on machinery and until the EC Declaration of Conformity according to Annex II A is issued.

The person authorised to compile the relevant technical documentation (EU address)

Mr. Walter Frey / Agust-Läpple-Weg / 74855 Haßmersheim Head of Documentation / CE Coordinator

Weinsberg, 20.05.2020

ppa. Krischke
.....
Krischke
Rotary Table Division Head

.....
Borrmann
Quality Assurance Department Head

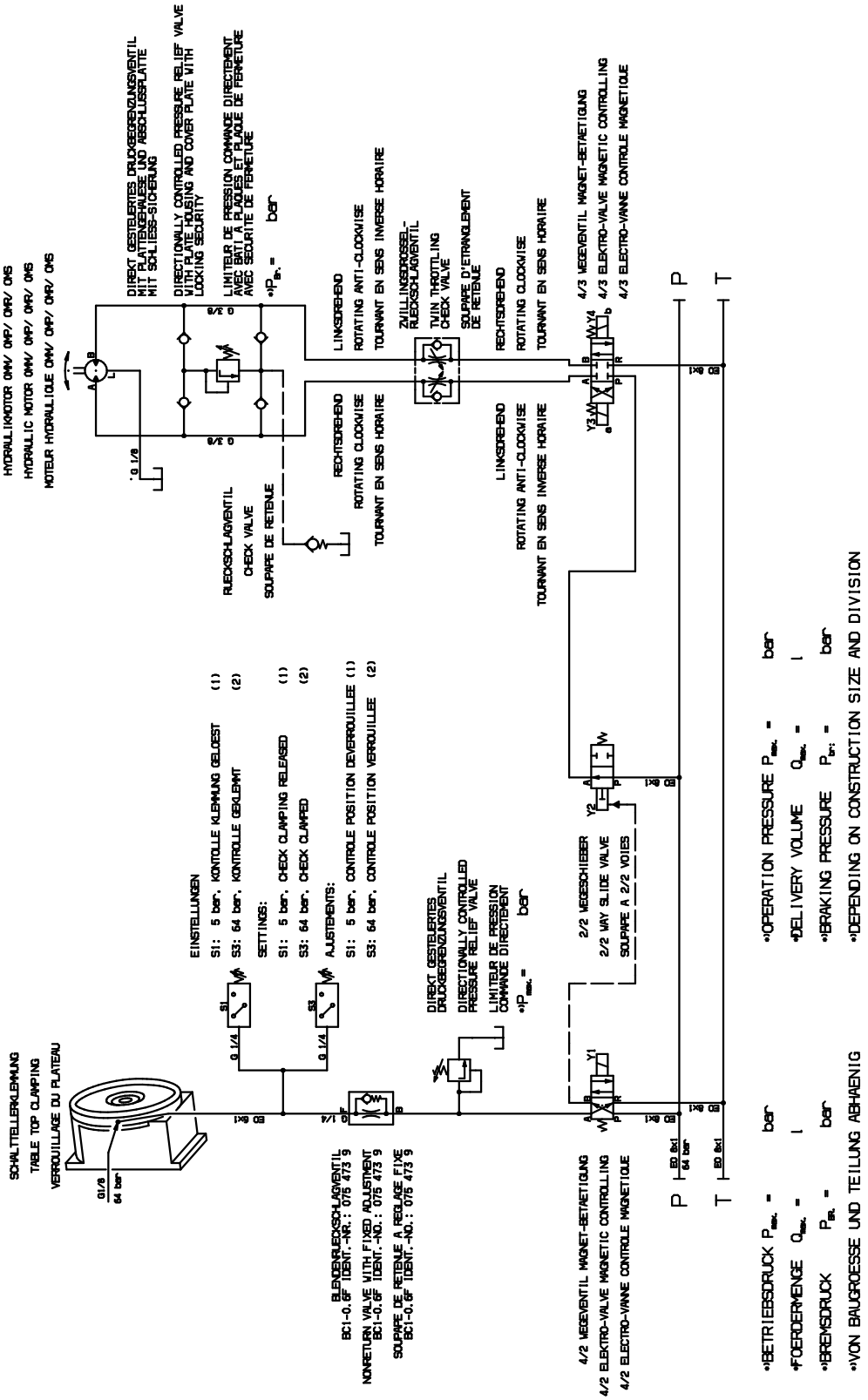
14 Index

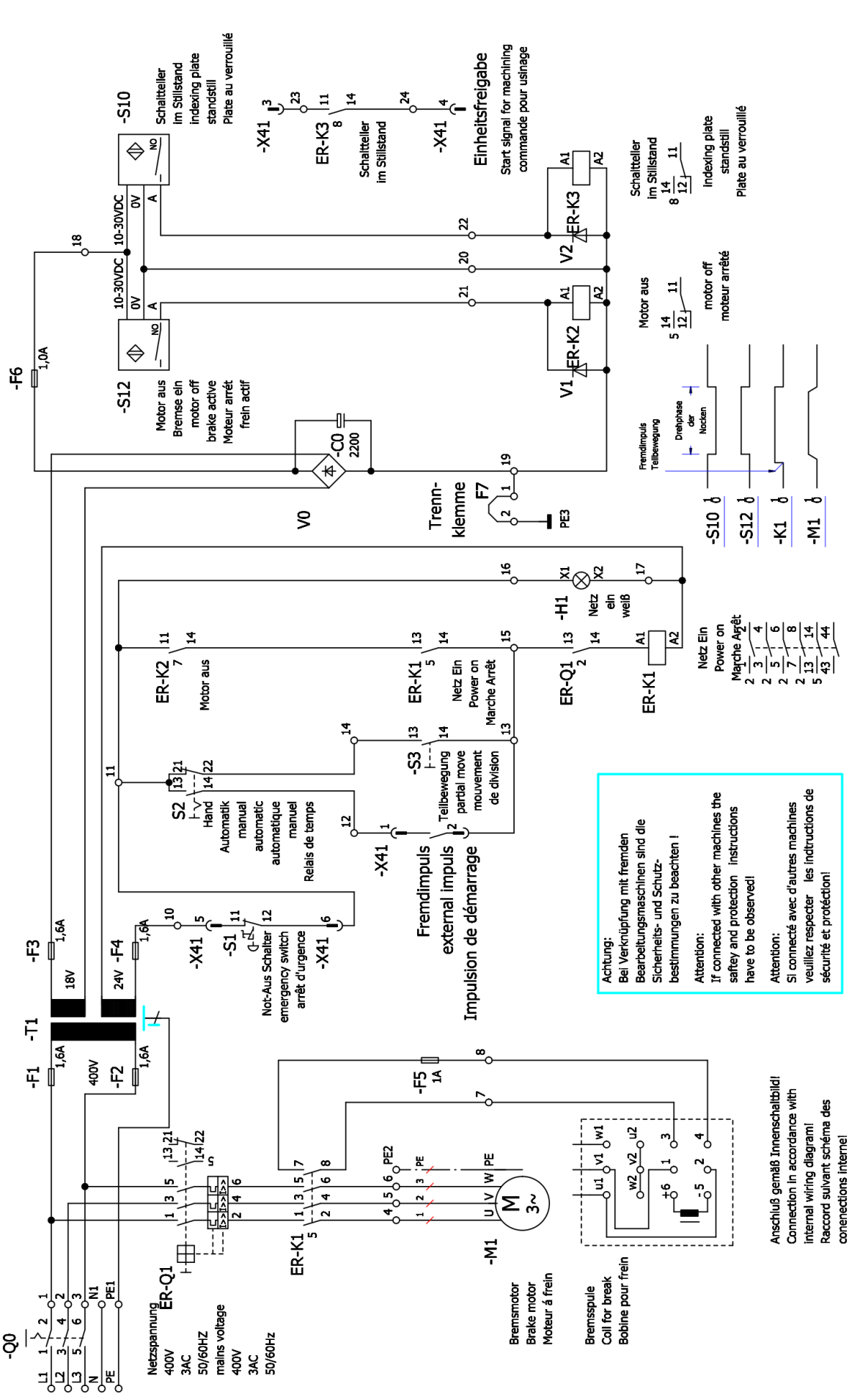
14.1 List

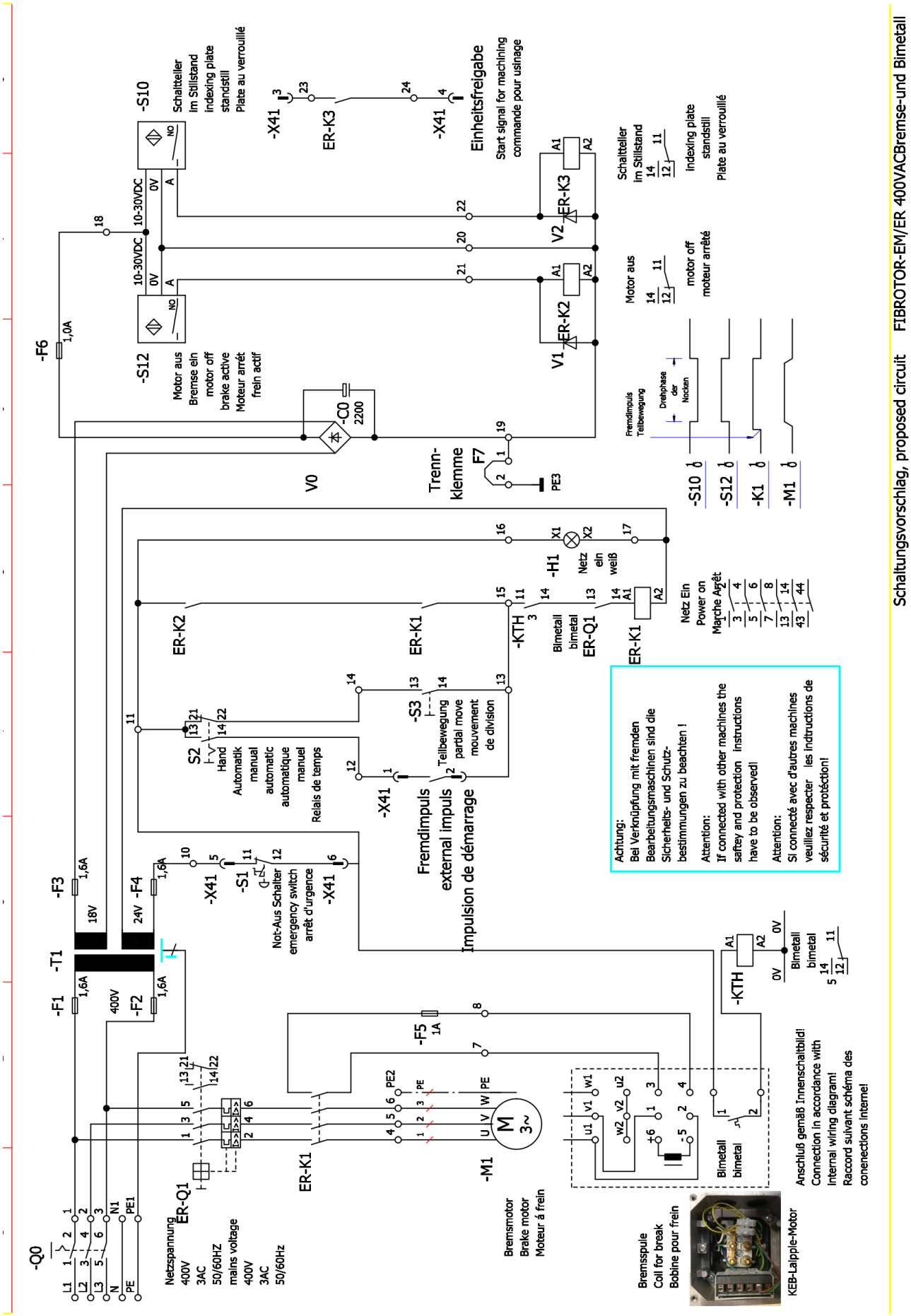
15 Personal notes

16 Annex

16.1 Wiring guidelines




Schaltungsvorschlag, proposed circuit FIBROTOR-EM/ER 400VACBremse-ohne Bimetall
-Q0
-F1 1,6A
-F2 1,6A
-F3 1,6A
-F4 1,6A
-F5 1A
-F6 1,0A
-T1 400V 18V 24V
-S1 Not-Aus Schalter emergency switch arrêt d'urgence
-S2 Hand Automatik manual automatic automatique manuel
-S3 Teilbewegung partial move mouvement de division
-S10 Schaltteller im Stillstand indexing plate standstill Plate au verrouillé
-S12 Motor aus Bremse ein motor off brake active Moteur arrêt frein actif
-C0 2200
-H1 Netz ein weiß
-M1
-K1
-X41
ER-K1 Netz Ein Power on Marche Arrêt
ER-K2 Motor aus
ER-K3 Schaltteller im Stillstand
ER-Q1
V0
V1
V2
Trenn-klemme F7
PE3
Fremdimpuls external impuls Impulsion de démarrage
Einheitsfreigabe Start signal for machining commande pour usinage
Netzspannung 400V 3AC 50/60HZ mains voltage 400V 3AC 50/60Hz
Bremsmotor Brake motor Moteur á frein
Bremsspule Coil for break Bobine pour frein
Achtung: Bei Verknüpfung mit fremden Bearbeitungsmaschinen sind die Sicherheits- und Schutz-bestimmungen zu beachten !
Attention: If connected with other machines the saftey and protection instructions have to be observed!
Attention: Si connecté avec d'autres machines veuillez respecter les instructions de sécurité et protection!
Anschluß gemäß Innenschaltbild! Connection in accordance with internal wiring diagram! Raccord suivant schéma des conenections interne!


Schaltungsvorschlag, proposed circuit FIBROTOR-EM/ER 400VACBremse-und Bimetall
-Q0
-F1
-F2
-F3
-F4
-F5
-F6
-T1
-C0
-K1
-KTH
-M1
-S1
-S2
-S3
-S10
-S12
-X41
-H1
ER-K1
ER-K2
ER-K3
ER-Q1
V0
V1
V2
F7
Netzspannung 400V 3AC 50/60HZ
mains voltage 400V 3AC 50/60Hz
Bremsmotor
Brake motor
Moteur à frein
Bremsspule
Coil for break
Bobine pour frein
KEB-Lapple-Motor
Anschluß gemäß Innenschaltbild!
Connection in accordance with internal wiring diagram!
Raccord suivant schéma des conenections internel
Achtung:
Bei Verknüpfung mit fremden Bearbeitungsmaschinen sind die Sicherheits- und Schutz-bestimmungen zu beachten !
Attention:
If connected with other machines the saftey and protection instructions have to be observed!
Attention:
Si connecté avec d'autres machines veuillez respecter les indtructions de sécurité et protéction!
Einheitsfreigabe
Start signal for machining
commande pour usinage
Schalteller Im Stillstand
indexing plate standstill
Plate au verrouillé
Motor aus Bremse ein
motor off brake active
Moteur arrét frein actif
Motor aus
motor off
moteur arrêté
Netz Ein
Power on
Marche Arrêt
Fremdimpuls
external impuls
Impulsion de démarrage
Not-Aus Schalter
emergency switch
arrêt d'urgence
Hand
Automatik
manual
automatic
automatique
manuel
Relais de temps
Teilbewegung
partial move
mouvement de division
Bimetall
bimetal
Trenn-klemme
Netz
ein
weiß

Mounting instructions for gears and geared motos

(gears and geared motors only optional available for EM.10, ER.10, ER.11, ER.12 and ER.13)

Carl Rehfuss GmbH + Co. KG Antriebstechnik

Mounting instructions for gears and geared motors

according to the machinery directive 2006/42/EC Appendix VI

Buchtalsteigle 5
72461 Albstadt/Germany
Phone: + 49 (0) 7432 / 70 15-0
Fax: + 49 (0) 7432 / 70 15-0
Email: info@rehfuss.com
Url.: www.rehfuss.com

Mounting instructions
These mounting instructions contain information on the successful and safe transport, assembly and startup of the gear and geared motor. In case of questions, please contact the company Rehfuss stating the number of the gearbox.

Liability for defects
Compliance with these mounting instructions is a precondition for all liability claims.

Non-warranty clause
Compliance with the mounting instructions is a basic requirement for achieving the stated product and performance characteristics. Rehfuss is not liable for damages to persons or property or financial loss caused by a non-compliance with the mounting instructions. The company Rehfuss is not liable for defects caused by a non-compliance.

Danger!
The gear and geared motor may not be used in a hazardous area.

Intended use
The products are intended to create a rotary motion and were designed for industrial units. The products shall be used according to the technical documentation and nameplate.
The products may be used for no other purpose than intended. Overstressing the drives will be deemed as a use other than intended.
The company Rehfuss is not liable for damages caused by a non-compliance with the mounting instructions, unauthorized modifications of the products or the use of spare parts, which were not manufactured or approved by Rehfuss.
The system may only be started if conformity of the end product with the regulations of the EC machinery directive 2006/42/EC is guaranteed.

Safety notes
In addition to the safety notes given in the mounting instructions, please follow the applicable national, local and system-specific regulations. Make sure that the products are free from defects (e.g. damages caused by transport or mounting) prior to operation.

Danger!
The products may only be mounted or maintained with the drive being switched off. De-energize the drive system and protect it against an unintended switch-on. Lock the feather key(s) prior to switch-on.

Danger!
Severe injuries and damages to property may result from an inexpert installation, any use other than intended, false operation, neglect of safety notes, unauthorized removal of the housing or protective covers as well as modifications of the gearbox.

Personnel requirements
All work on the machine may be carried out by skilled staff only. In case of failures, such as a higher power input, temperature or vibrations, unusual noises or odors, leakage or activation of the monitoring units, switch off the machine and contact the responsible technical staff.

Transport, storage and preservation
Check the delivery for transport damages upon arrival. In case of damages, the defect shall be classified and removed, if necessary, prior to commissioning. Ensure not to damage the products during transport, e.g. as a result of collision. Store the products in a closed and dry room at mounting position. Make sure that the products cannot tilt. A direct solar radiation and ultraviolet light are not permissible. Do not store the products in the vicinity of aggressive or corrosive materials. Schocks and vibrations shall be prevented in any case. Remove all transport guards prior to commissioning.

Danger!
All means of transport and lifting devices shall be provided with the respective load bearing capacities.

Assembly

Caution!
An improper assembly may cause damages to the product.

Check the drive prior to assembly. The drive may only be mounted if no damages due to the transport or storage and no leaks can be found. Check the shaft sealing rings and end caps for possible damages. In particular cases, a false sense of rotation may cause damages or risks. For this reason, the correct sense of rotation of the gearbox main shaft shall be tested by means of a drive test run in an uncoupled state. The test shall be repeated during normal operation.
Remove the anticorrosive, dirt and other residues from the shaft extensions and flange surfaces by means of a commercial solvent. The sealing lips of the shaft sealing rings may not come in contact with the solvent.

Note
Make sure that the oil filling and draining plug as well as the bleeding valves are easily accessible.

The substructure for mounting the product shall be even and buckling resistant to exclude a deformation of the gearbox housing or shaft bearing.

Caution!
An improper assembly may cause damages to the bearings, gear wheels, housing or shafts. Do not apply any harmful axial forces (e.g. hammer strokes) on the drive during assembly.

The reaction moment shall be supported by means of a flange joint, foot mounting or torque support. In case of a flange joint, the rectangularity of the flange joint surface at the machine may have a maximum deviation of 0.03 mm towards the shaft axis. Check the alignment of the machine shaft and gear shaft. The hollow bore is designed as H7, the shaft extensions with a diameter of up to ø50 as k6, while the shaft extensions with a diameter of more than ø50 are designed as m6. The feather keys conform to DIN 6885/1.

Danger!
Provide the drive section and drive side with a protection against contact.

Slip on gear mechanisms are plugged on the driving shaft of the respective machine. The machine shaft shall be provided with a centering thread according to DIN 332/2 for the uptake and with a contact shoulder as well a central screw for the axial fixing.

Carl Rehfuss GmbH + Co. KG Antriebstechnik

Mounting instructions for gears and geared motors

according to the machinery directive 2006/42/EC Appendix VI

Buchtalsteigle 5
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Phone: + 49 (0) 7432 / 70 15-0
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Url.: www.rehfuss.com

Note
Always use a lubricant when plugging on the drive and transmission elements. Otherwise the joint may not be loosened anymore.

Hollow shaft with shrink disc

The shrink discs are delivered ready for installation. If the shrink discs are disassembled prior to mounting, an additional risk of a false assembly is created.

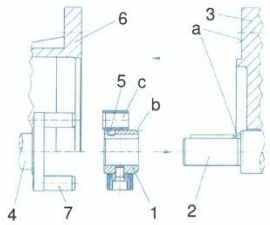
Caution!
Do not tighten the clamping screws without the solid shaft being mounted.

Degrease the hollow shaft and drive shaft. Mount the drive shaft and tighten the shrink disc at the hollow shaft collar as far as it will go. Tighten the clamping screws in a row (not crossing) by means of a torque wrench. The required tightening torque is stated on the shrink disc.
Demount the system by loosening the clamping screws one after the other. Do not remove the clamping screws from the thread. Loose the wheel flanges from the inner ring cone. Remove the drive from the drive shaft.

Danger!
Risk of injury due to an improper assembly and disassembly of the shrink disc. Provide the shrink discs and freely rotating shaft extension with a protection against contact to prevent injuries.

Mounting the IEC coupling

Slide the coupling (1) up the motor shaft (2) until the hub rests against the shaft collar (a). Make sure that the shaft collar (a) and flange facing (a) are at the same level with the highly chamfered side (b) facing the motor flange (3). This guarantees the correct distance between the coupling and the coupling shaft (4). Tighten the radial locking screw (5) in the hub. Place the motor on IEC-Adapter (6). Ensure that the socket pins (7) have been correctly inserted into the bore holes (c) of the coupling ring. Fix the motor at the IEC adapter.



Note
We recommend using an anti-corrosive on the motor shaft before mounting the coupling hub.

Caution!
Excessive overloads may result from the assembly of the motor. The following limits may not be exceeded:

IEC installation size	Max. admissible motor weight in kg
56	25
63/71	30
80/90	50
100/112	80
132	100
160/180	250

Caution!
If you wish to paint the gearbox, make sure that the shaft sealing rings, rubber parts, pressure bleeding valves, nameplates, stickers and motor coupling parts cannot come in contact with the paint, lacquer and solvents. Otherwise these parts may be damaged or become illegible.

Start-up

Worm gears have a warm-up time of at least 48 hours before their maximum efficiency is reached. If the gear shall be operated into both senses of rotation, the respective warm-up time is applicable for each rotating direction. The maximum efficiency of the worm gears is reached after the warm-up time.
All electrical connections provided by the customer shall be in compliance with the applicable regulations.

Note
The wiring diagram for all factory-provided motors can be found in the terminal box.

Danger!
Prior to starting the machine, make sure that the start-up can not cause any damages to persons. In addition, make sure that all safeguards are installed properly, that the drive is not blocked and that the sense of rotation of the drive is correct. The same shall be checked during a test run of the drive.

Inspection / maintenance

Danger!
Danger of crushing due to an unintended start-up. Danger of burning due to hot gearbox and hot gear oil.

Caution!
All work on the drive may be carried out by qualified and skilled staff only. The use of an inappropriate gear oil may lead to a loss of the lubricant characteristics. Do not mix mineral and synthetic oil.

The gearboxes of the types SM(N) and SSM are lubricated for life. They are maintenance-free if used as intended. For all other gear types, change the oil every 10,000 hours. The amount and type of lubricant to be used is stated on the nameplate. The filling quantity is depending on the mounting position and shall not be modified without authorization by the company Rehfuss.

Abbreviations:
CLP - Mineral oil
CLP PG – Gear oil on basis of polyglycol
CLP H1 – H1 compliant

Spare parts

To order spare parts, please state the following:
Item number according to the spare parts list
Type designation according to the nameplate
Gearbox number according to the nameplate
Do not use spare parts supplied by companies other than Rehfuss.

Disposal

Please follow the applicable legal norms and regulations.

16.3 Other documents

Technical data / specification
Dimensional drawing(s)
Connection diagram