




Translation of the  
original assembly and  
operation manual

**FIBROMAT**  
**AT**

## 1.1 Definition

Rotary table      **FIBROMAT**  
Type:              **AT**  
Item number:     -  
Serial number:    -  
Dimensions drawing: -  
Year of manufacture: -  
Customer:         -  
Order number:    -

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Document: Translation of the original assembly and operation manual  
Version 1.1

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1.1 Definition

# 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 Intended use

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

## 1.4 Applicable documents

- 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 basic device consists of:

- ① Table top
- ② Table top bearing
- ③ Helical gearbox
- ④ Rotary table housing
- ⑤ Additional gearbox
- ⑥ Drive motor
- ⑦ Holding brake on motor
- ⑧ Absolute encoder/measuring system

The figure shows in a schematic representation the basic structure of the rotary table.

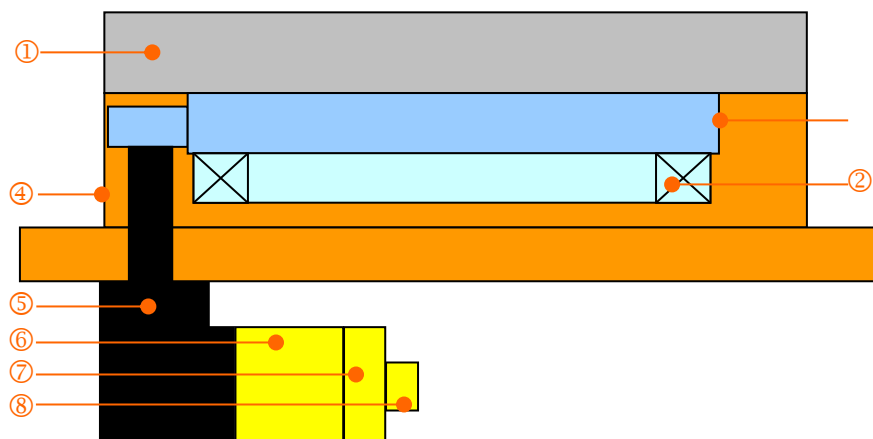


Fig. 1 Basic device

## 1.6 Function

The table top performs a rotating movement without rotation angle constraint. The table top is driven by a servomotor, a straight bevel gearbox, and a helical gearbox. The positioning procedure is controlled using an absolute encoder integrated into the motor.

The structural design is characterised by a rigid mechanical structure.

Horizontal and vertical use with several drive layouts is possible.

Additional modules are available to extend the structure.

The basic device can also be provided in a built-in variant.

## 1.7 Warranty

Description of the modes of operation (see Chapter 7.3, "Operating Modes," on page 43).

Description of the functional processes (see Chapter 7.4 on page 44).

## 1.7 Warranty

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

## 1.8 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 8) 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.

### 1.8.1 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.

## 1.8 Translation of the Original maintenance and operation manual

**1.8.2 Figures**

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

**1.8.3 List of the valid pages**

The number of pages in this manual, including the title page: 71

**1.8.4 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.



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

## 1.9 Definitions of terms

**1.9 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 BASIC SAFETY INSTRUCTIONS

### 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. 2 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

## 0 Safety devices on the machine

### 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.

### 2.3 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.

- ① A name plate with number, year of manufacture and type is fixed on the rotary table.



Fig. 3 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.

#### 3.2 Electrical connections

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

#### 3.3 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 of the appendix on page .

## 3.4 Operating parameters

### 3.4 Operating parameters

Acceleration and deceleration time in the case of adjustable drives:

- The acceleration and deceleration times specified in the order characteristics must not fall below the permitted specified values in any of the operating modes (automatic mode, maintenance mode, emergency stop, etc.)
- The standard rotary table is designed for connection to the 3x 400V / 50Hz mains network.

Setting parameters for the controller:

- The specified maximum KV factor = 2 only serves as an aid for the commissioning of the rotary table. It is absolutely essential that the maximum value is approached in steps.



The approved acceleration and deceleration times can be found in the Technical Data and Specifications in the appendix

## 3.5 Assembly units

### 3.5.1 Rotary table

The table top performs a rotating movement without rotation angle constraint.

The table top is driven by a servomotor, a straight bevel gearbox, and a helical gearbox. The positioning procedure is controlled using an absolute encoder integrated into the motor.

The structural design is characterised by a rigid mechanical structure.

Horizontal and vertical use with several drive layouts is possible.

Additional modules are available to extend the structure.



For information about the technical specifications, time diagrams, and wiring diagrams, see Chapter 16 of the appendix on page .

### 3.5.2 Table top

The cast table top has a large centre hole. The applied standard drilling template forms the interface for the construction of the connection.

The direction of rotation is clockwise or anticlockwise as required. The table top can oscillate between positions.

For the protection of the seal on the rotating table top, a cover band is mounted.

An application position that is different from the standard (rotary axis vertical) must be specified when ordering. If the application position is changed, parts will have to be adjusted in the rotary table. The adjustments must be taken into consideration in the order.


### 3.5.3 Table top bearing

The table top has large bearings and both axial and radial initial prestress. The layout is designed for a service life of 20,000 operating hours MTTF.

### 3.5.4 Helical gearbox

The rotary table is equipped with a straight-tooth helical gearbox and is not self-locking.

The pinion is supported in a floating manner and connected to the motor shaft in a non-positive manner.

-  The rotary table construction permits the use of a mechanically tensioned pinion. Through the turning of the two pinion halves, the play between the pinion and the gear rim is completely eliminated. In this way, the play in the drive train is reduced to the gear play in the additional gearbox.


### 3.5.5 Rotary table housing

The rotary table housing consists of lacquered glass and provides the highest possibility stability.

The centring mechanism for the gearbox flange in the housing guarantees a simple adaptation and alignment of the additional gearbox.

The fitted boreholes in the housing flange provide the possibility to remove the housing together with the connection construction and thus prevent extensive adjustment.

A venting valve provides perfect, complement ventilation and must be attached to the highest part of the housing. This must be taken into consideration especially in case of a slanted position.

-  The modular system lets the housing be made with two or more gearbox connections to make additional gearbox connections possible in order to increase torque.



### 3.5.6 Additional gearbox

The basic device is equipped with an additional gearbox (offset gearbox/play-reduced) so that the speed and torque can be adapted. On principle, any gearbox type can be attached.

### 3.5.7 Drive motor

By default, the rotary table is driven by an asynchronous servo gearbox motor.

### 3.5 Assembly units

-  An additional gearbox with adapter flange permits an adaptation of all common synchronous servomotors.
-  A manual, pneumatic, or hydraulic drive of the rotary axis can also be implemented.

**NOTICE**

To avoid mechanical overloads on the rotary table, the acceleration time  $t_a$  (see “Technical Data/Specifications” in the appendix) must not be reduced even in the event of an emergency stop.

**NOTICE**

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

#### 3.5.8 Holding brake on motor

In the case of an emergency stop, the rotary axis is delayed in a controlled manner.

In case of a cable breakage, the motor brake is used.

The holding brake on the synchronous servomotor cannot be retrofitted.

The motor holding brake should principally be actuated when the table top is positioned in order to remove the motor from the control circuit and thus prevent a thermal overload of the motor.

The holding brake is released by supplying the stipulated control voltage.



The interface description can be found in the appendix.

#### 3.5.9 Absolute encoder/measuring system

The basic device is equipped with an absolute encoder on the motor to achieve a high speed and positioning precision. In addition, the absolute encoder for the synchronous motor provides the rotor bearing information for current regulation.

There are two possibilities for the arrangement of the measuring system:

Indirect measurement, with the rotary encoder arranged in the motor axis.

In this design, the tolerances and play of the entire drive train enter into the measurement. With this measuring arrangement, precise position values that suffice for many application cases can still be reached.

Direct measurement, with the attachment of the measuring system directly to the table top axis. The measuring accuracy is, to a great extent, dependent on the accuracy of the measuring system. Other fault influences such as gearbox play are prevented.

### 3.6 Additional component assemblies and accessories

#### 3.6.1 Indexing unit and proximity table top for T-groove

##### 3.6.1.1 Structure

The rotary table with indexing unit consists of:

- ① Table top or additional table top
- ② Table top bearing
- ③ Helical gearbox
- ④ Rotary table housing
- ⑤ Additional gearbox
- ⑥ Drive motor
- ⑦ Holding brake on motor
- ⑧ Absolute encoder/measuring system
- ⑨ Indexing unit and proximity table top for T-groove
- ⑩ Indexing unit and proximity table top for T-groove in the built-in version

The figure shows in a schematic representation the basic structure of the rotary table.

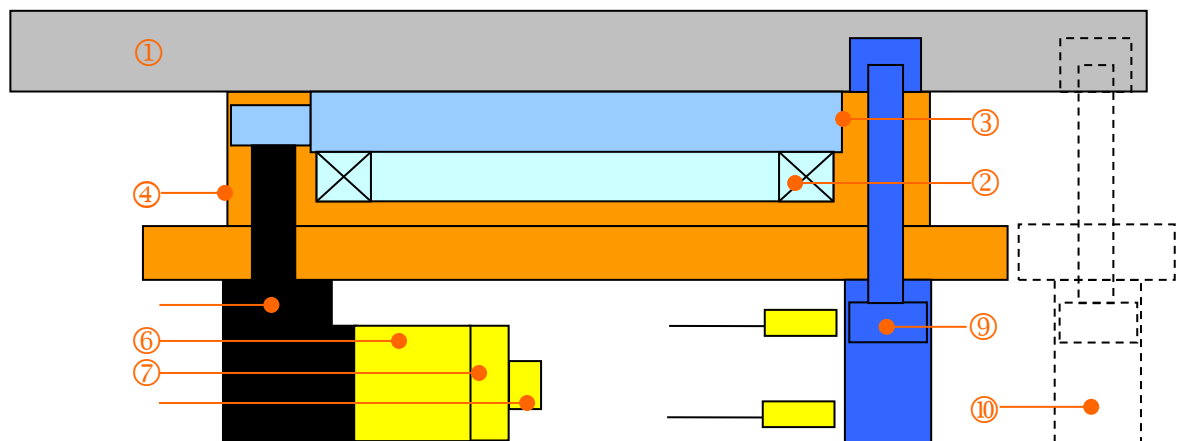


Fig. 4 Rotary table with indexing unit

## 3.6 Additional component assemblies and accessories

The indexing unit consists of:

- ① Centring cone
- ② Stone screw
- ③ Guide bushing/bronze with solid lubricant
- ④ Adapter flange with slot stone
- ⑤ Pneumatic cylinder
- ⑥ Proximity table top for T-groove
- ⑦ Throttle return valves

The following image shows a cross-section of the indexing unit.

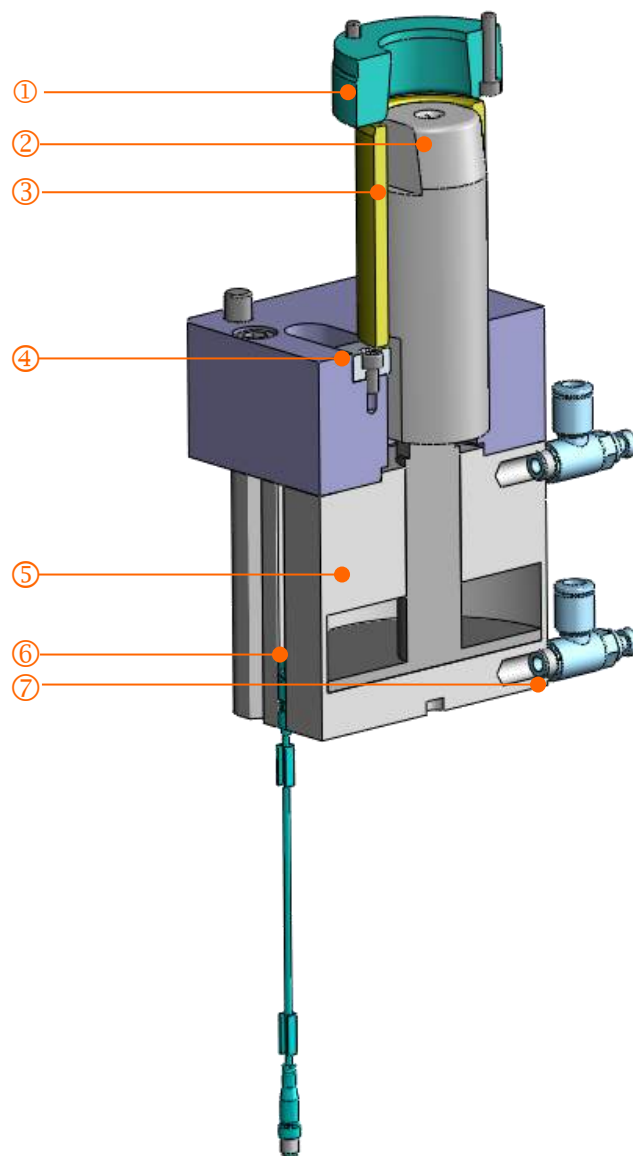


Fig. 5 Indexing unit

## 3.6 Additional component assemblies and accessories

## 3.6.1.2 Function


The table top performs a rotating movement without rotation angle constraint.

The table top is driven by a servomotor, a straight bevel gearbox, and a helical gearbox. The positioning procedure is controlled using an absolute encoder integrated into the motor.

Through the pneumatic indexing unit additional component assembly, the table top can be attached to the housing in a non-positive, play-free manner when positioned. The table top is locked by a stone screw that in turn engages in a centring cone.

High tangential loads with the simultaneous relief of the gearbox parts are thus possible.

With the indexing unit, the highest degree of parts precision and repeating precision are achieved.

-  The indexing unit can also be provided in a built-in variant. In the case of the built-in variant of the indexing unit, the centring cone is mounted to the outer diameter of the additional table top to achieve higher parts precision.

An additional housing is required for the guide bushing.


-  See the pressure specifications in the appendix


Locking time approx. 0.4 s

Unlocking time approx. 0.2 s

The setting of the stone screw is queried by two limit switches on the pneumatic cylinder which were set at the factory.

This factory setting of the limit switches does not mean that an adjustment of the limit switches to the rotary table control system used on site may not be required.

-  The limit switch settings can be found in the pneumatic diagram in the appendix.

-  Optionally, an additional query can be realized on the table top or directly on the piston rod.

**NOTICE**

Actuating the indexing unit during the rotational movement leads to the destruction of the driving elements.

**NOTICE**

Observe the functional description of the indexing unit.

**3.6.2 Additional drive unit**

## 3.6.2.1 Structure

The figure shows in a schematic representation the basic structure of the rotary

### 3.6 Additional component assemblies and accessories

table with master-slave drive.

The rotary table in the master-slave variant consists of the following:

- ① Table top
- ② Table top bearing
- ③ Helical gearbox with two pinions
- ④ Rotary table housing
- ⑤ 2x additional gearboxes
- ⑥ 2x drive motors
- ⑦ 2x holding brakes on motor
- ⑧ 2x absolute encoders/measuring system

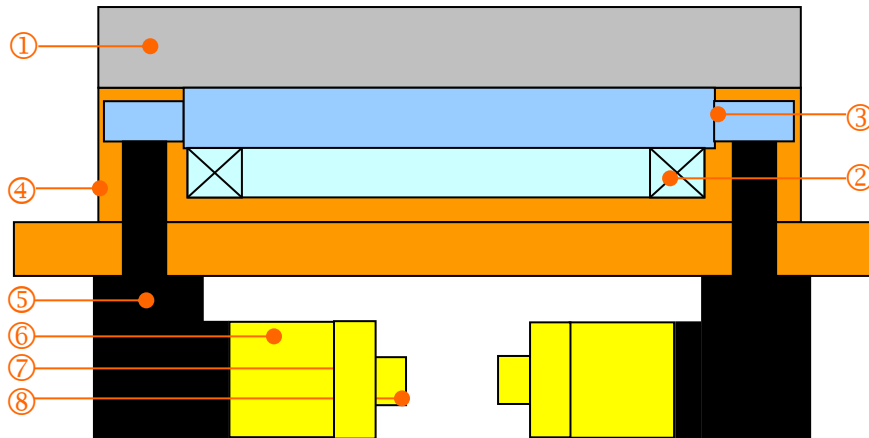


Fig. 6 Master-slave drive

#### 3.6.2.2 Function

The rotary table with two motors is suited for modern drive control concepts (master-slave). The drives share the driving torque during the rotational movement. During positioning, a prestress torque is set on one of the motors to neutralise the gearbox play. This solution permits higher dynamics, rigidity, and parts precision in comparison with a drive.

- ① The rotary table in the master-slave variant can be combined with an angle measurement system in the round table axis or with an indexing unit to achieve higher parts precision.
- ① The optional second gearbox connection can be used for the connection of a rotation brake.



---

### 3.6 Additional component assemblies and accessories

**NOTICE**

To avoid mechanical overloads on the rotary table, the acceleration time  $t_a$  (see “Technical Data/Specifications” in the appendix) must not be reduced even in the event of an emergency stop.

**NOTICE**

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

### 3.6 Additional component assemblies and accessories

## 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





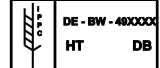
### 4.2 Packaging and weight

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

- The rotary table must be stored only in dry conditions, in its original packaging and in closed rooms.
- Provide the unpacked, bare parts with corrosion protection.
- Storage temperature  $-15^{\circ}\text{C}$  to  $60^{\circ}\text{C}$
- Maximum air humidity 60% (at  $25^{\circ}\text{C}$ )
- Maximum storage duration 1 year.
- No aggressive substances (acids, lyes, solvents, etc.) must be stored in the storage place.

#### 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

**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.

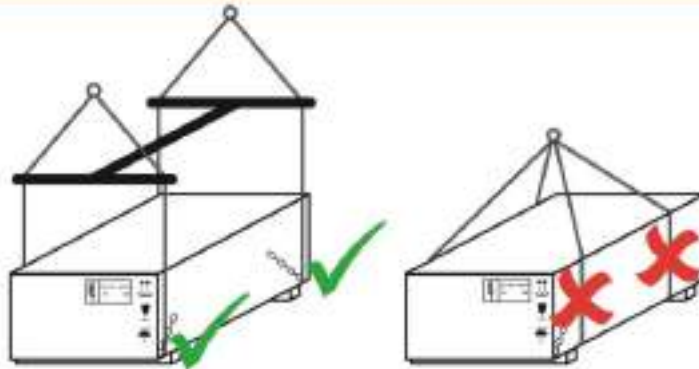


Fig. 7 Transporting boxes

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 the rotary table**

1. Unpack the rotary table, allowing free access from all sides.
2. Inspect the rotary table for transport damage.
3. Verify delivery against the delivery papers.
  - ▶ Have any deficiencies confirmed by the shipping company and inform FIBRO GmbH immediately.
4. Screw suitable attachment eyes [A] in the screw threads provided on the table top or housing.

## 4.7 Return shipping

### 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.



### CAUTION

Transport is permissible only without mounting weights! Remove the sheet metal plating for transport through transport threads (see the dimensional drawing in the appendix). If a transport aid has been included in delivery, it must be used!



The weight of the unit can be found in the delivery papers.



During transport, the pertinent national and international standards and safety regulations must be observed!

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.

### 5.3 Assembly of the rotary table

#### 5.3.1 Mechanical assembly

##### NOTICE

Rotary table damage. The rotary table should not be distorted during assembly. The maximum bolting depth, the tightening torques of the mounting bolts, and the maximum press-in depth for the cylindrical pins must be observed.

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

## 5.3 Assembly of the rotary table



Dropping load. Do not reach between the machine and the support.  
Crushing of hands or fingers.

Lower the rotary table carefully to its position.

1. Remove the transport belts.

## 5.3.2 Assembly of motor

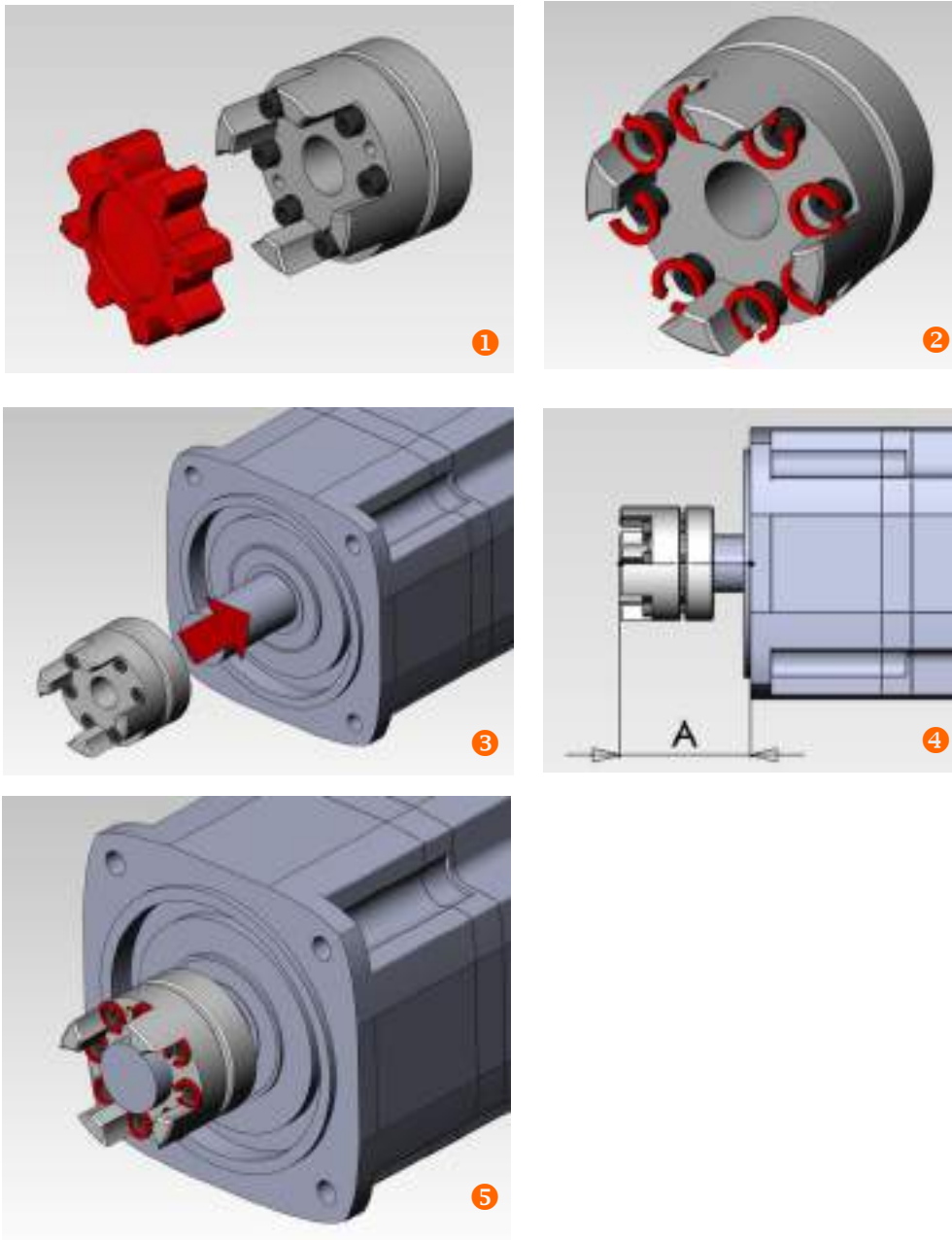




Fig. 8 Assembly of coupling



## 5.3 Assembly of the rotary table

AQH		A [mm]	DIN 912 	TA [Nm]
AQH 80 /1/2/3	19/24	44.5	M4 - 8.8	3
AQH 100 /1/2		39		
AQH 100 /3/4		53		
AQH 115 /1/2		62		
AQH 115 /3	24/28	62	M5- 8.8	6
AQH 140 /1/2		62		
AQH 140 /3	28/38	74.5	M5- 8.8	6
AQH 190 /1/2		76.5		
AQH 190 /3	38/45	100	M6- 8.8	10

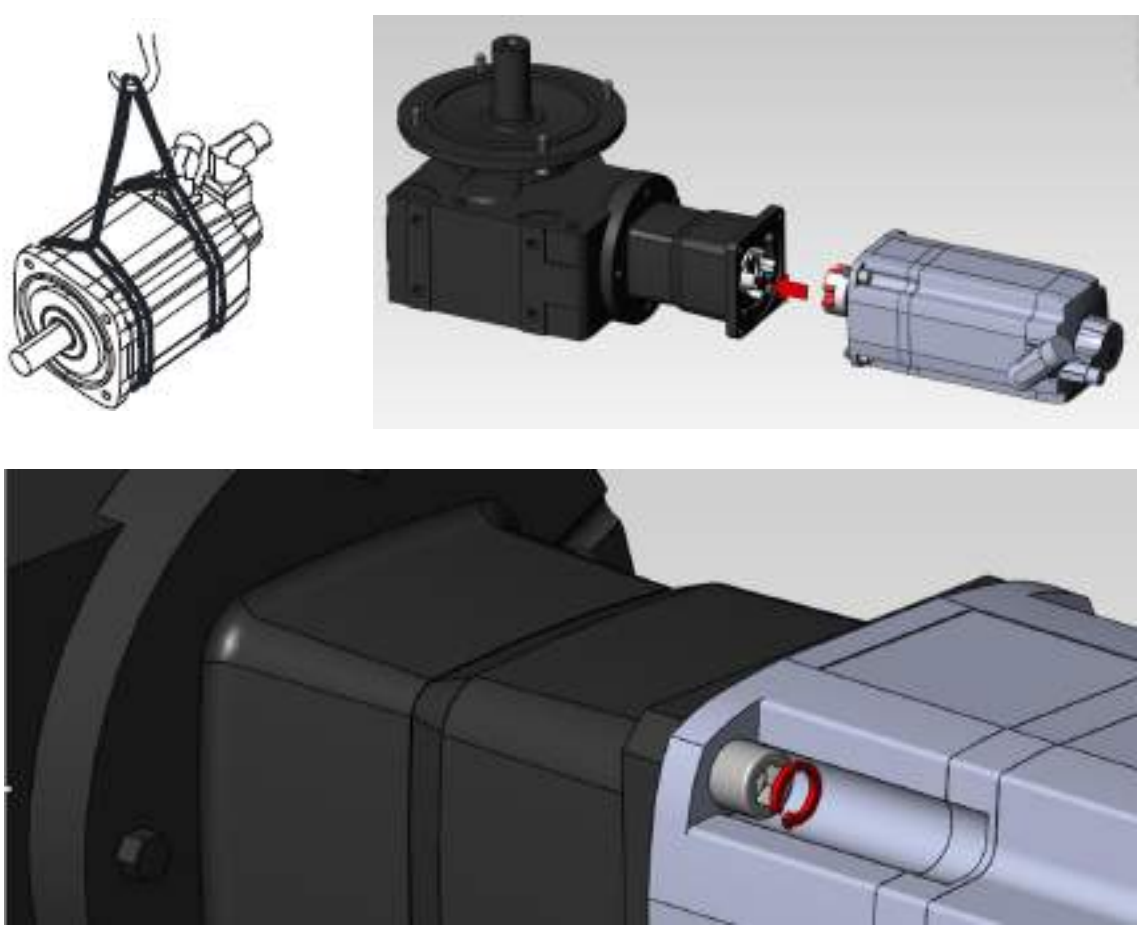


Fig. 9 Assembly of motor

## 5.3 Assembly of the rotary table

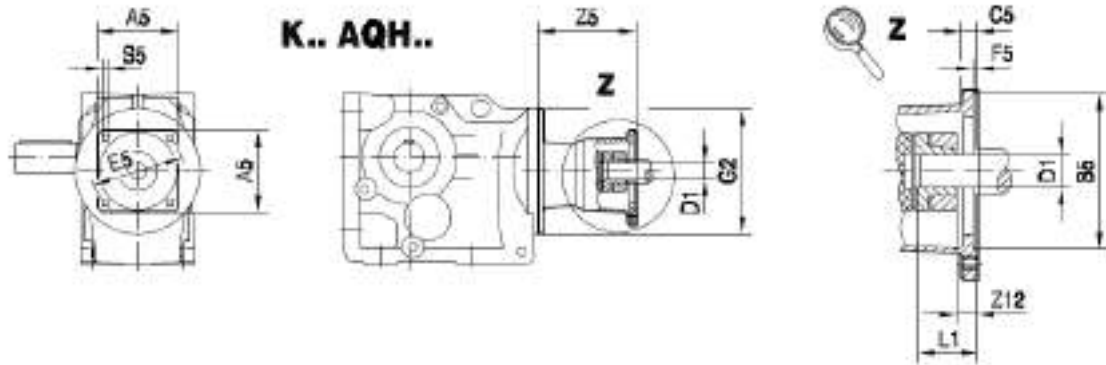
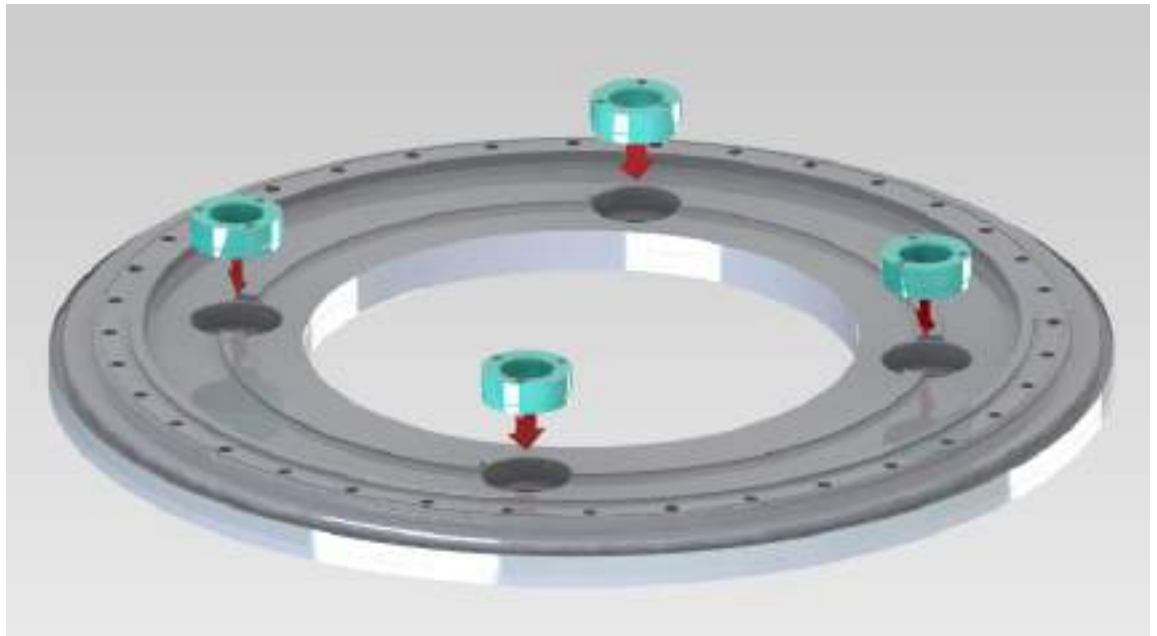


Fig. 10 Flange dimensions of additional gearbox

	Centring Ø B5 [mm]	Flange thickness	Hole ring Ø E5 [mm]	Centring depth F5 [mm]	Threaded borehole S5	TA [Nm]	Coupling borehole Ø D1	Max. insertion depth Motor shaft L1
AQH 140 /1	110	15	165	5	M10	46	24	50
AQH 140 /2	130	15	165	5	M10	46	24	50
AQH 140 /3	130	15	165	5	M10	46	32	50
AQH 140 /4	130	15	165	5	M10	46	28	60
AQH 160 /1	155	15	190	5	M10	46	32	60
AQH 190 /1	130	16	215	5	M12	79	32	60
AQH 190 /2	180	16	215	5	M12	79	32	60
AQH 190 /3	180	16	215	5	M12	79	38	80

**5.3.3 Mounting of the indexing unit**





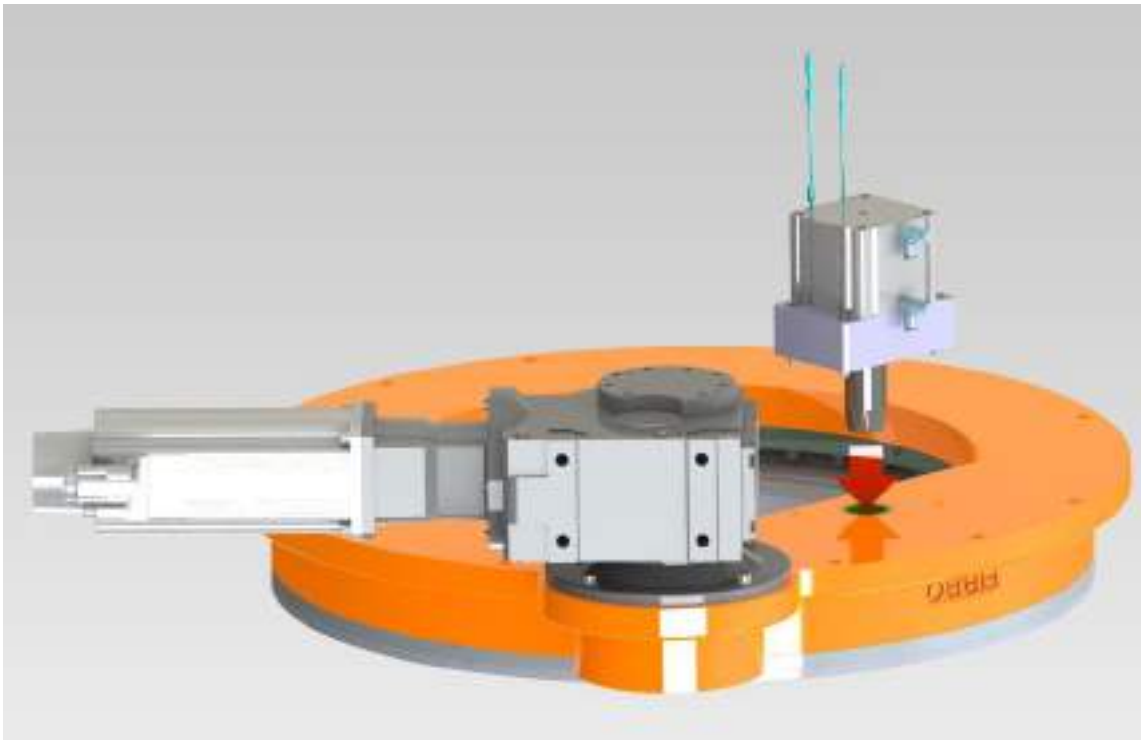
Centring cone	Size	DIN 912	TA [Nm]
	Ø50	 M6x30 - 8.8	10

Fig. 11 Mounting of centring cone

## 5.3 Assembly of the rotary table





Indexing unit	Size	DIN 912	TA [Nm]
	Ø50	 M12x60 - 8.8	79

Fig. 12 Mounting of the indexing unit

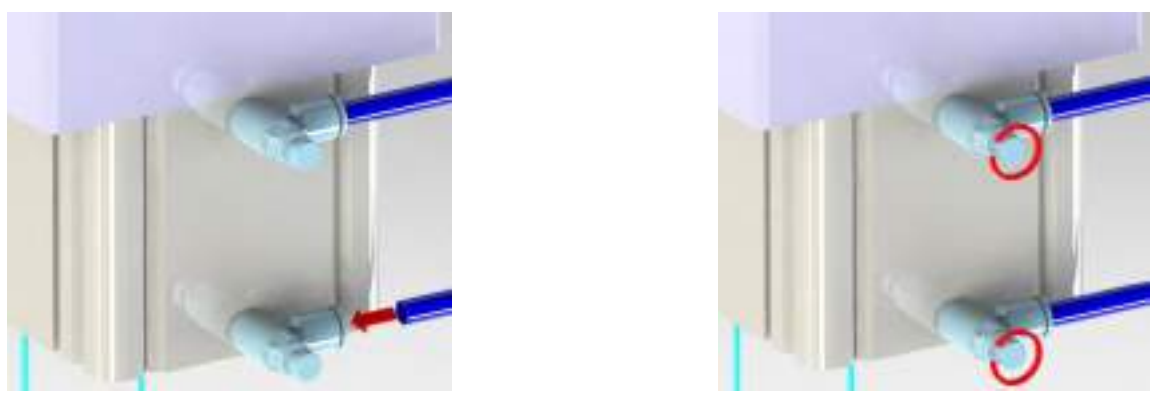
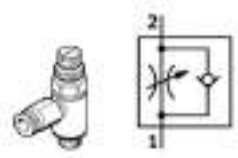


Fig. 13 Connection of the throttles

**NOTICE**

The two throttles must be regulated to ensure that the table top is stationary without jerking at removal.

- i** The throttle effect is increased when the two adjusting screws are rotated clockwise.

Throttle return valve, exhaust air	Designation	Plug connection [mm]	Operating pressure [MPa]	Adjusting element
	GRLA-1/4-QS-10-RS-D #534340	10	0.6	Knurled screw

## 5.3 Assembly of the rotary table

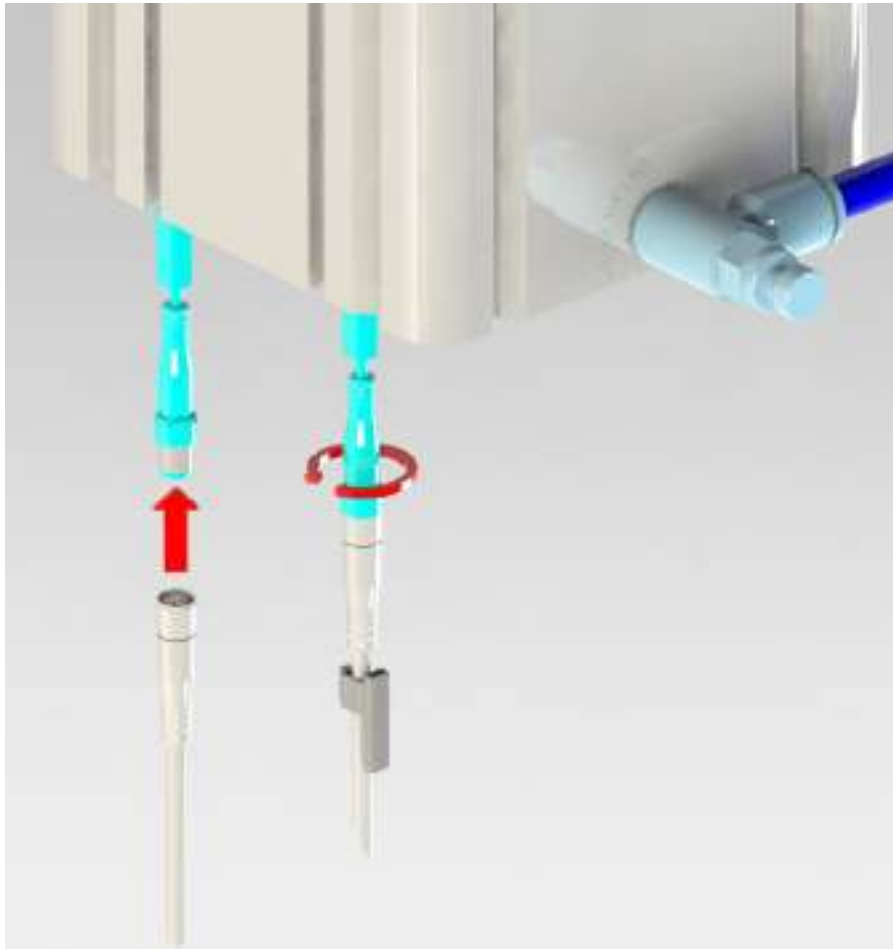
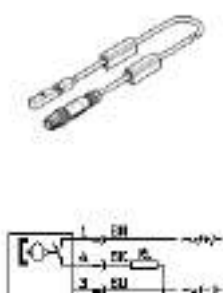


Fig. 14 Connection of the proximity switch

Proximity switch for T-groove	Designation	Plug connection	Operating voltage [V DC]	Switching output
	SME-8M-DS-24V-K-0.3-M8D #543861	M8D M8 Rotating thread	24	DS 3-wire make contact

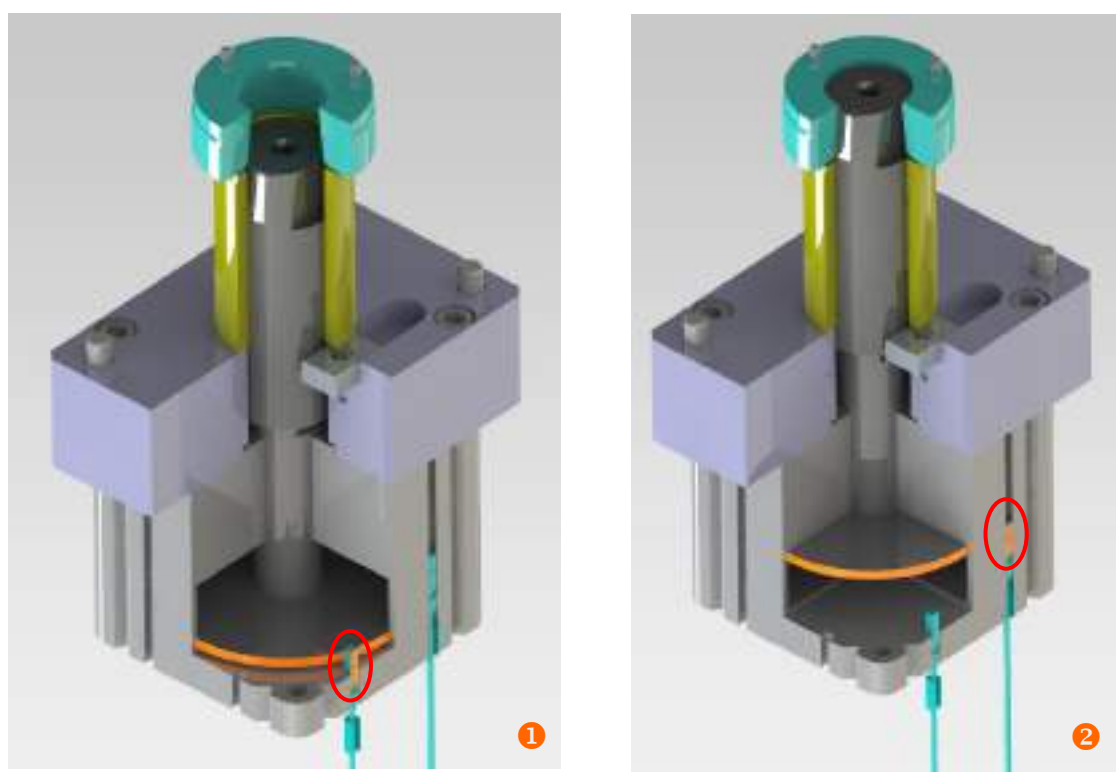



Fig. 15 Indexing unit

- ① Indexing unit unlocked
- ② Indexing unit locked

**NOTICE** Actuating the indexing unit during the rotational movement leads to the destruction of the driving elements.

**5.3.4 Connecting the rotary table**

- Connect the power and signal plugs (for the connection description, see the dimensional drawing in the appendix).
- Supply the indexing unit with compressed air.
- Check function:
  - ▶ – Functional processes (see Chapter 7.4)
  - ▶ – Indexing unit (see Chapter 7.4)
  - ▶ – Drive train (acoustic)

 Read the manufacturer-specific operating instructions for synchronous motors before handling the motor.

## 5.4 Modifications and alterations

### 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.

6.2 Prior to the commissioning

## 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 7).
- 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 Functional sequences

### 7.4 Functional sequences

#### 7.4.1 Dividing movement

**Preconditions:**

- Table top in any position
- Pneumatic indexing unit unlocked
- Holding brake on motor released
- NC controlled: Data entry completed

**Path of motion:**

- Dividing process by the servo motor
- Table top in desired position
- Pneumatic indexing unit locked
- Holding brake on motor applied

#### 7.4.2 Continuous movement

**Preconditions:**

- Table top in any position
- Pneumatic indexing unit unlocked
- Holding brake on motor released
- NC controlled: Data entry completed

**Path of motion:**

- Rotational motion by the servo motor

## 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



## 8.2 Customer service

## 9 Repair

### 9.1 Important safety guidelines



#### 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.



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

### 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.

#### 9.2.2.1 Long-term lubrication

The rotary table is delivered filled with suitable lubricant. The additional gearbox is filled with synthetic gearbox oil. The indexing unit is premounted to be ready for installation and requires no additional lubrication for the lifetime of the rotary table. The lubricants are designed for a service life of at least 8,000 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.

-  We recommend that you thoroughly clean the gearbox when changing the lubricant.

The rolling bearings filled with grease must be cleaned every 8,000 operating hours and filled with new grease.

**NOTICE**

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

**NOTICE**

In the case of ambient temperatures below  $-20^{\circ}\text{C}$  and above  $+60^{\circ}\text{C}$  rotary shaft seals with special material quality must be used.

**NOTICE**

In the case of external reservoirs observe their lubrication instructions.

## 9.2 Maintenance work

## 9.2.2.2 Lubrication plan

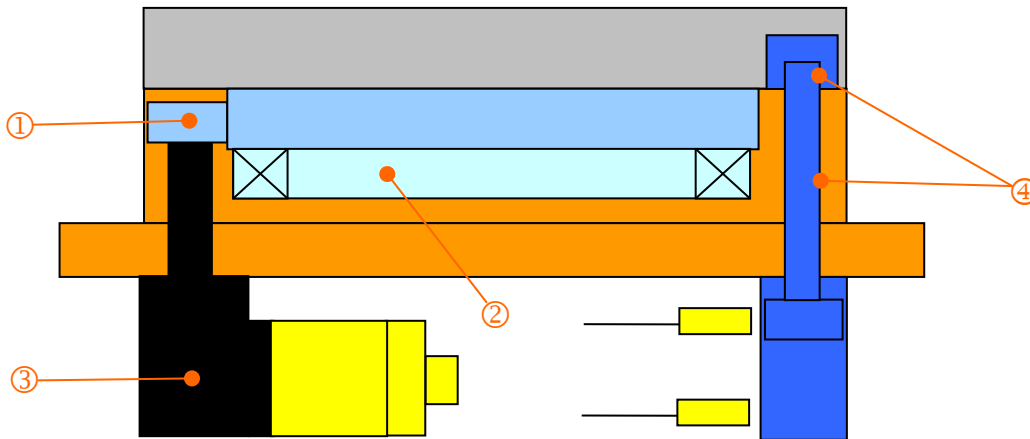


Fig. 16 Lubrication plan

- ① Lubricant for rotary table/helical gearbox
- ② Lubricant for rotary table/roller bearing
- ③ Lubricant for additional gearbox
- ④ Lubricant for indexing unit

## 9.2.2.3 Lubricants

① **Lubricant for rotary table/helical gearbox:**

The following **synthetic liquid greases** are permitted for the rotary table/helical gearbox:

Manufacturer / supplier	Designation
ZAHRADNIK	Z-Glycogrease 00F (Standard)
LUBCON	GRIZZLYGREASE No. 1
ARAL	Aralub LFZ1
BP	Energol WRL/GR 154 GS
ESSO	Surret Fluid NX
MOBIL	Mobiltac 81
SHELL	Melleus Fluid D

### ② Lubricant for rotary table/roller bearing

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

Manufacturer / supplier	Designation
ARAL	Aralub HLP2 (Standard)
LUBCON	TURMOPLEX 2EP
FAG	ARCANOL MULTITOP
CASTROL	Grease LMX
BP	Energrease LS - EP2
ESSO	Beacon EP2
MOBIL	Mobilux EP2
SHELL	Calithia EP2
ELF	Epexa 2
Epexelf 2	Cardexa DC1

### ③ Lubricant for additional gearbox

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

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

### ④ Lubricant for indexing unit

For the indexing unit, the following **greases** are permitted for initial lubrication:

Manufacturer / supplier	Designation
FUCHS	RENOLIT GP 2 K2K-30 (Standard)
KLÜBER	Klüberlub BE 41-542 K2N-20
TOTAL	Multis 2 Multipurpose Grease K2K-25
AVIA	Avialith 2 KP2K-30
ESSO	Beacon 325 K2K-60
SHELL	Alvania RL2 K2N-20

- ① To reduce friction and wear, we recommend that you spray the centring cone (metal/metal sliding pairs) with humidity-hardening tribo-system dry lubricant (KLÜBER UNIMOLY C 220) before mounting.

#### NOTICE

In the case of external reservoirs observe their lubrication instructions.

## 9.2 Maintenance work

### 9.2.2.4 Filling quantities

Type	Rotary table/ helical gearbox	Rotary table/ rolling bearing	Additional gearbox	Indexing unit
AT.0800	5.0 l	0.15 l	3.5 l	Initial lubrication
AT.1000	6.0 l	0.20 l	4.5 l	Initial lubrication
AT.1250	7.5 l	0.30 l	5.0 l	Initial lubrication
AT.1600	9.0 l	0.40 l	8.4 l	Initial lubrication

### 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



#### 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 41).

## 10.3 Permanent shutdown

**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.



#### 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

**11.2 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](mailto: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](mailto:rtservice@fibro.de)

All FIBRO representation offices worldwide can be found under [www.fibro.de](http://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

### 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](http://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

## 13.1 Declaration of incorporation

**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: **FIBROMAT**  
Type designation: **AT**  
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.

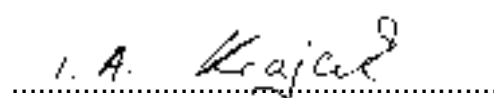
The incomplete machine must not be put into service until the final machinery/plant into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC on machinery and until the EC Declaration of Conformity according to Annex II A is issued.

**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, 19.04.2017

  
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Gaschik  
Rotary Table Division Head

  
-----  
Krajcek  
Quality Assurance Department  
Head

## 13.1 Declaration of incorporation

**13.1** Declaration of incorporation

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16.1 Wiring guidelines

16 Annex

16.1 Wiring guidelines

Systemübersicht Rundtisch, System Overview Rotary Table  
Baugruppe 4-900-047-0001


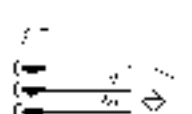
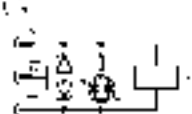
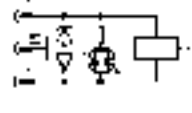



FIBROMAT



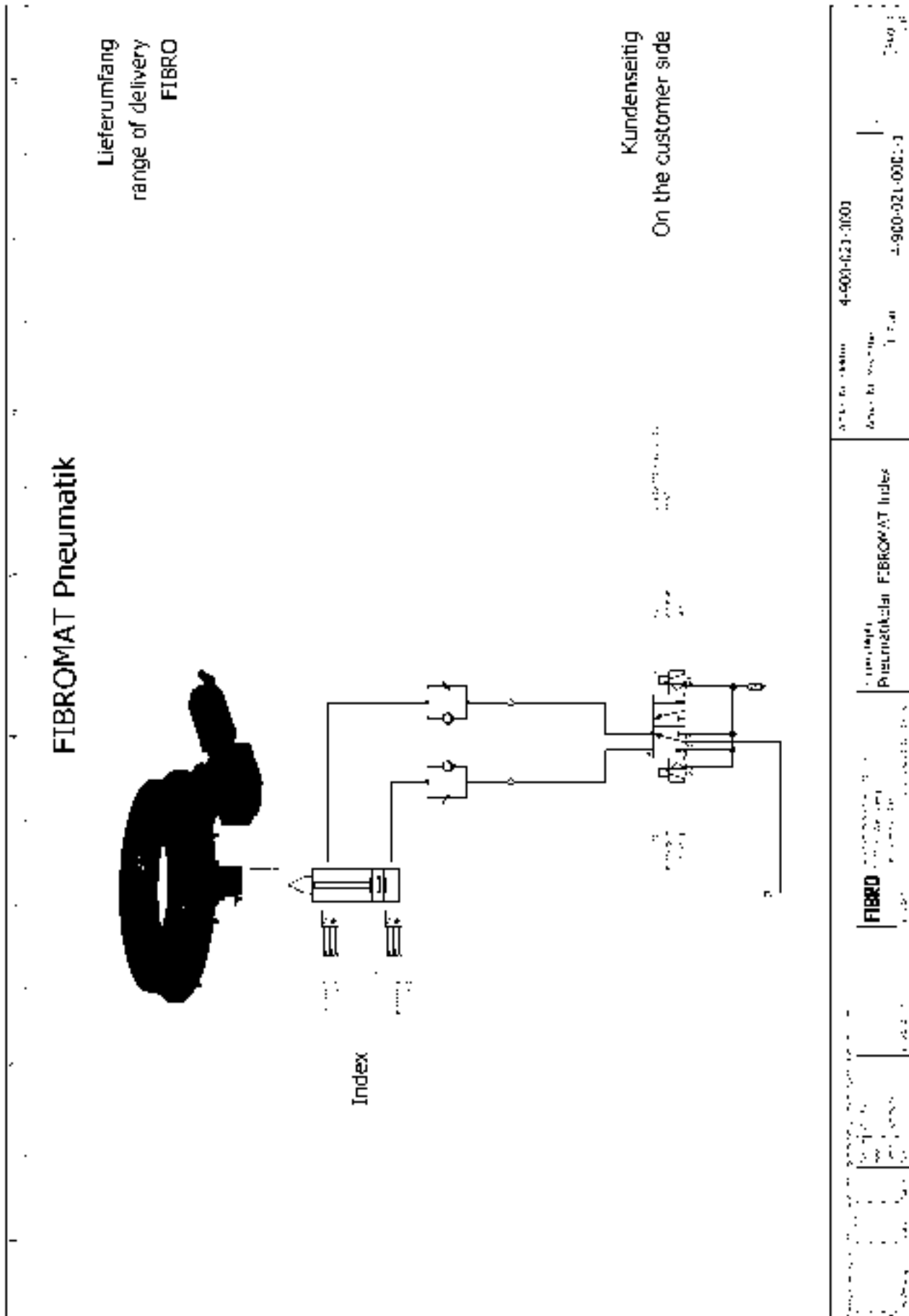
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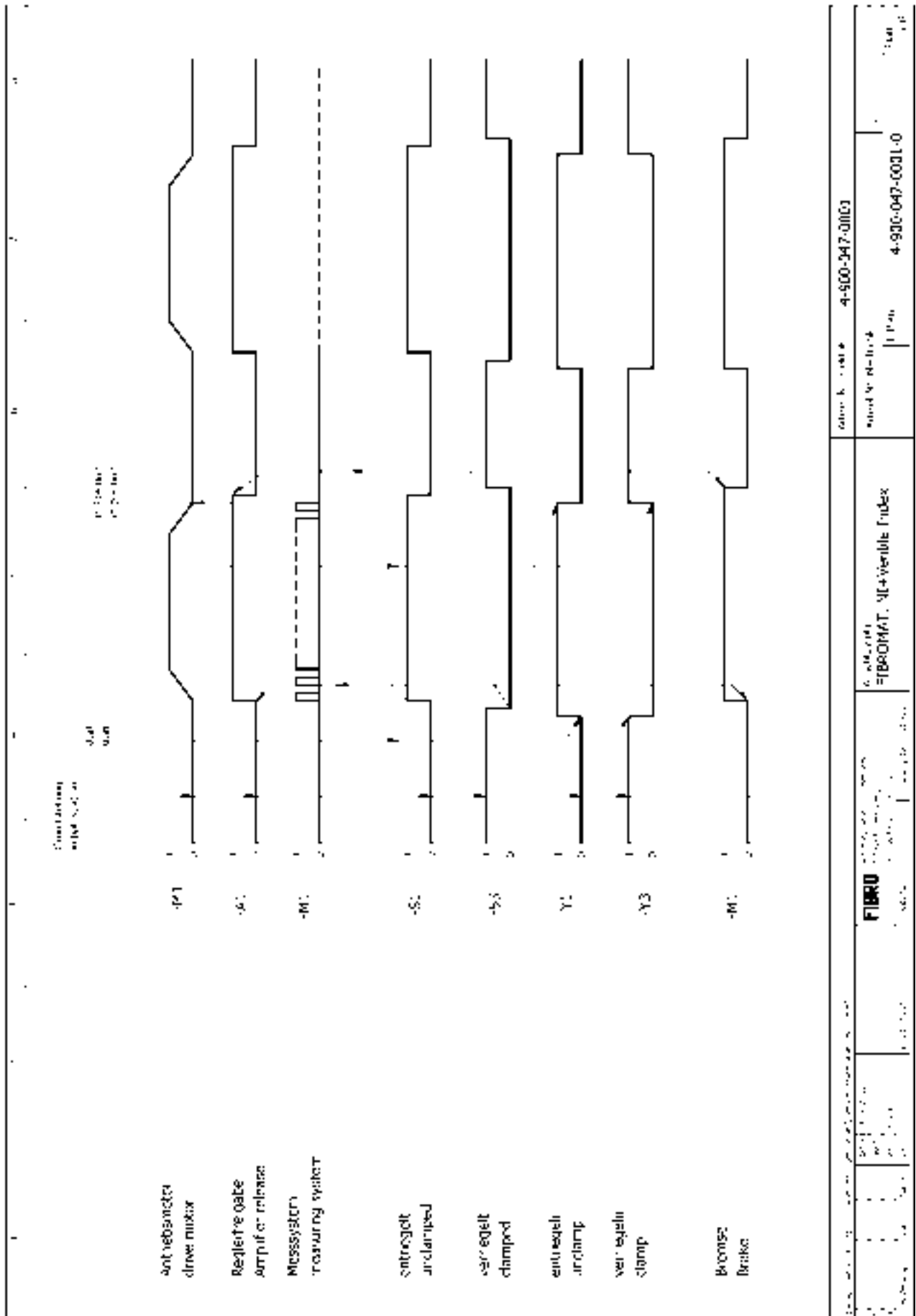
16.1 Wiring guidelines

	<p><b>Acetung!</b>                  Übersetzungen, Schaltungen, Anordnungen und Einzelungen sind aus den Unterlagen der technischen Dokumentation zu entnehmen!  <b>ATTENTION!</b>                  Please refer to the technical documentation for transmission rates, indexing bytes, drive data and settings!</p>	<p style="text-align: center;"><b>Kundenseitig</b>                  On the customer side</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>-S1 einseitig undamped</p> </div> <div style="text-align: center;">  <p>-S2 verriegelt damped</p> </div> <div style="text-align: center;">  <p>-Y1 entriegelt undamped</p> </div> <div style="text-align: center;">  <p>-Y2 verriegelt damped</p> </div> </div>	<p style="text-align: center;"><b>Index</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 33%; text-align: center;">  </td> <td style="width: 33%; text-align: center;">                 FIBRO MAT, NO + weitere Index             </td> <td style="width: 33%; text-align: center;">                 4-900-047-0001                  4-900-047-0003-0             </td> </tr> </table>		FIBRO MAT, NO + weitere Index	4-900-047-0001 4-900-047-0003-0
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16.1 Wiring guidelines



16.1 Wiring guidelines





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16.2 Other documents

## **16.2 Other documents**

