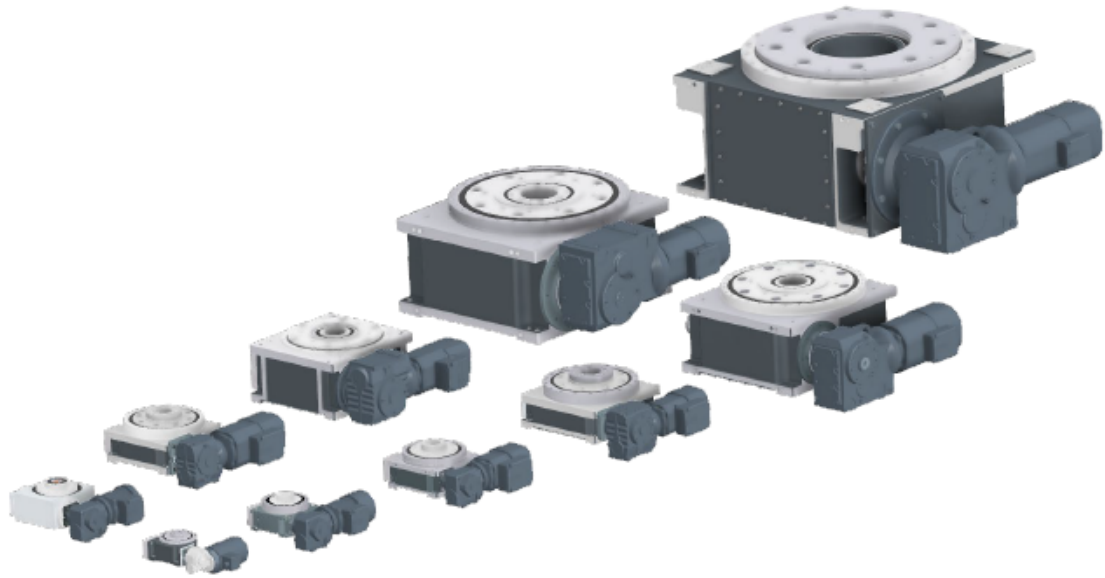




MOTION INDEX DRIVES



RTX Rotary Indexers

Assembly Instructions

Version 1.0
5-30-2022



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1 About these instructions

1.1 Purpose

The purpose of these Assembly Instructions is to provide users with all the information necessary for proper and safe installation of the rotary indexer in a complete machine.

1.2 Contact information

Motion Index Drives
1204 East Maple
Troy MI 48083

Tel.: [248-743-9999](tel:248-743-9999)
Fax: [248-743-0479](tel:248-743-0479)
E-mail: info@mid.us.com
Internet: www.motionindexdrives.com

1.3 Product designation

Product designation: Rotary indexer

Product type: RTX



1.4 Symbols

The following symbols are used in these instructions:

Instructions and directions

Requirements for performing an instruction are indicated by a check mark.

The action steps to be executed are numbered.

The results of individual action steps are indicated by a black arrow. The overall result of an instruction is marked by a white arrow in a black circle.

Example

- ✓ Requirement
 - 1. Instruction (step 1)
 - 2. Instruction (step 2)
 - ⇒ Result or response of system to step 2
 - 3. Instruction (step 3)
- ➡ Overall result of the instruction

Enumerations

Enumerations in no strict order are indicated as follows:

- Property A
 - Detail 1
 - Detail 2
- Property B
 - Detail 1
 - Detail 2



2 Safety

2.1 Safety instructions

General safety instructions

- Read through these instructions completely
- Observe the information and instructions in these instructions
- Keep unauthorized persons away from the working area
- Work on electrical systems may only be carried out by qualified electricians
- Keep the instructions in a safe place and make them available to all employees
- Observe the documentation of the supplier components

2.2 Warnings

2.2.1 Structure of the warnings

All the warnings in these instructions have the following structure:

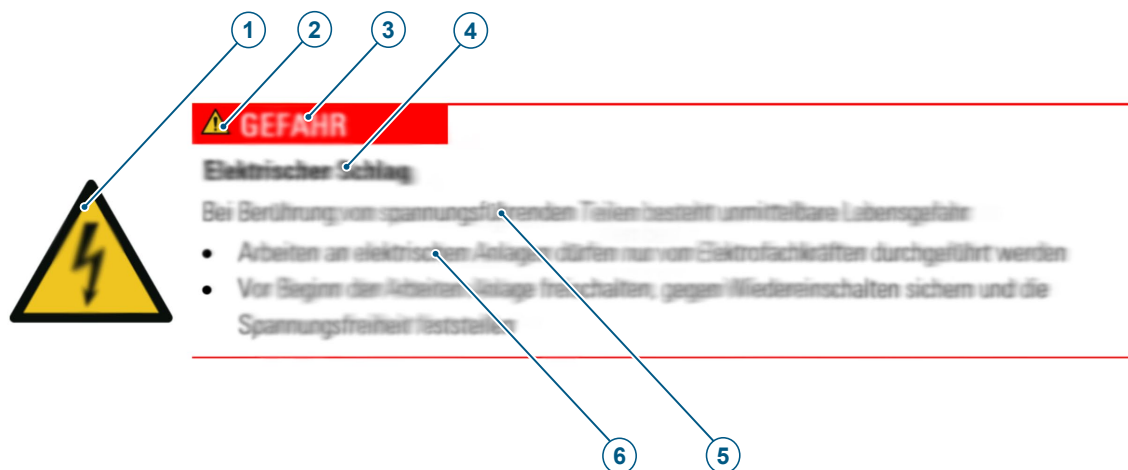


Fig. 1: Structure of the warnings

1	Hazard-specific symbol	2	Hazard symbol
3	Signal word	4	Type and source of danger
5	Possible consequences of non-observance	6	Procedure for hazard prevention



2.2.2 Meaning of the signal words and symbols

The following signal words are used in this document:

Signal word	Meaning
DANGER	Indicates a hazardous situation which will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which may result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which may result in property and environmental damage.

The following symbols for dangers, warnings, mandatory requirements and prohibitions are used in this document:



General warning sign



Warning: Electrical voltage



Warning: Suspended load



Warning: Slipping hazard



Warning: Crushing hazard



Wear head protection



Wear eye protection



Wear foot protection



Wear hand protection

2.3 Requirements for personnel

The activities described in these instructions may only be performed by qualified personnel.

Qualified personnel are persons who are able to carry out the work assigned to them due to their technical training, knowledge and experience. They are familiar with the relevant standards and regulations and are able to recognize potential hazards on their own.

2.4 Personal protective equipment

Personal protective equipment is used to protect personnel from impairments to safety and health during work. Personnel must wear the personal protective equipment when performing all of the activities described in these instructions. The required personal protective equipment is indicated in the different chapters of these instructions.

2.5 Requirements for incorporation into a complete machine

The rotary indexer is partly completed machinery. Operation of the rotary indexer is only permitted in a complete, CE-compliant machine or system.

The manufacturer of the complete machinery or system is responsible for integrating the rotary indexer into the system in such a way that completely safe operation is guaranteed.

- During operation, it is prohibited to remain in the immediate vicinity of the rotary indexer. Staying in the vicinity of the rotary indexer is only permitted within the scope of inspection tasks, maintenance or servicing work by specially trained personnel.
- Maintenance work must be carried out in accordance with the maintenance plan and the operating instructions.
- All tasks on or at the rotary indexer may only be carried out by trained, qualified personnel.



3 Product description

3.1 Intended use

The rotary indexer is designed for incorporation in CE-compliant complete machinery or an overall system. The rotary indexer turns and tilts loads about the vertical rotary axis. To this end, customer attachments can be mounted on the rotary indexer.

All applications deviating from this intended use are not permitted.

- Modifications must be approved by **Motion Index Drives**
- The rotary indexer may only be operated within the defined operating parameters
- Use of the rotary indexer in the food sector is not permitted

3.2 Technical data

Application range	Indoors/in enclosed spaces: the installation room must be dry, clean and low-vibration. Not suitable for use in high-vacuum area.
Temperature range [°C]	+10 to +40
Relative humidity [%]	40 to 70
Media	do not expose to aggressive media

3.2.1 Storage conditions

Application range	indoors
Temperature range [°C]	-22 to +50
Relative humidity [%]	40 to 70
Media	do not expose to aggressive media
Storage period > 6 months	provide additional corrosion protection

3.2.2 Dimensions

the dimensions of the different versions are given on the Motion Index Drives website www.motionindexdrives.com



3.3 Product overview

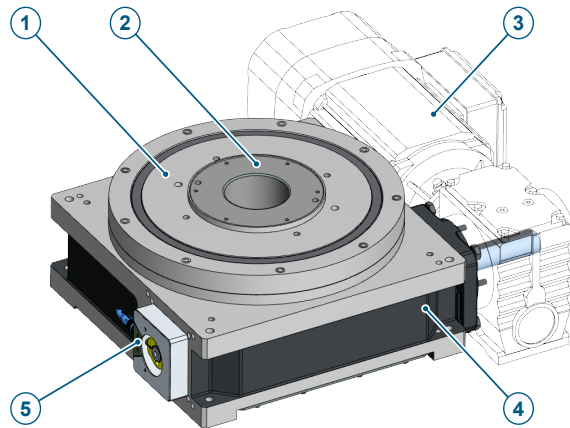


Fig. 2: Rotary indexer structure – basic type with closed circuit

1	Roll star / output flange	2	Middle part (fixed) in basic type
3	Drive unit	4	Housing
5	Position indicator		

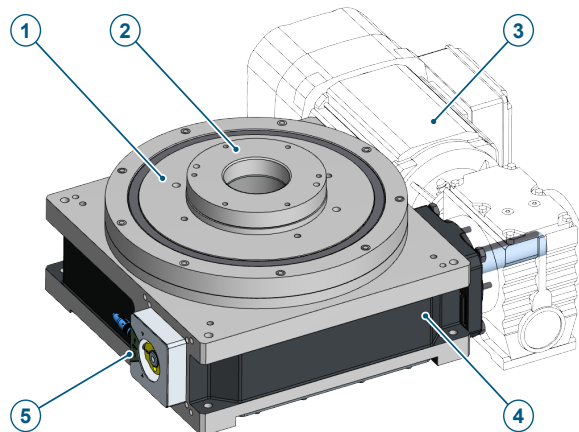


Fig. 3: Rotary indexer structure – distance type with closed circuit

1	Roll star / output flange	2	Middle section (fixed) in distance type
3	Drive unit	4	Housing
5	Position indicator		

The input shaft is driven by a three-phase a.c. motor, an gear reducer or a sprocket or belt pulley. A drum cam converts the radial movement of the input side into a clocked or uniformly reduced movement of the roll star / output flange.

The attachments are fixed onto the roll star / output flange. If necessary, further fixed attachments can be fixed onto the middle section.



4 Transport

Required personal protective equipment



WARNING

Tipping or falling loads



Suspended loads can tip or fall down. This can cause serious or fatal injuries to persons.

- Do not step under suspended loads
- Keep unauthorized persons out of the danger zone
- Observe the weight and centre of gravity
- Only use suitable, approved and undamaged load handling attachments

NOTICE



Damage to components

Improper transport can cause material damage

- Carry out transport carefully and note the symbols on the packaging
- Align the lifting eyes in the direction of the load
- Follow the operating instructions for the lifting gear

Check the delivery immediately on receipt for completeness and transport damage.

In the event of externally visible transport damage, observe the following:

- Do not accept the delivery or accept it only with reservations
- Note the extent of the damage on the transport documents or on the transport delivery note
- Report material damage to the manufacturer immediately



4.1 Transport with slings

4.1.1 Slings on the middle section (RTX350/RTX450)

Transport the rotary indexer with the slings as follows:

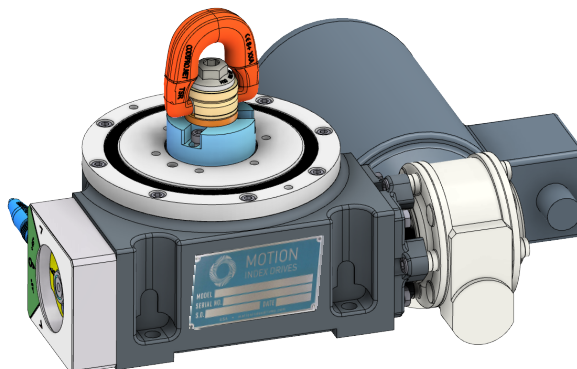


Fig. 4: Transport with slings

Attach the slings in the threaded holes as shown below and check their function.

Recommended slings

RTX	Quantity	Manufacturer	Designation	Type
350	1	CODIPRO	Swivel eyebolt M10	DSR M10 UP - 0.70t
350	1	CODIPRO	Eyebolt flange RTX350	ART20003500
450	1	CODIPRO	Swivel eyebolt M10	DSR M10 UP - 0.70t
450	1	CODIPRO	Eyebolt flange RTX450	ART20003528



4.1.2 Slings on the housing (RTX 550-RTX900)

Transport the rotary indexer with the slings as follows:

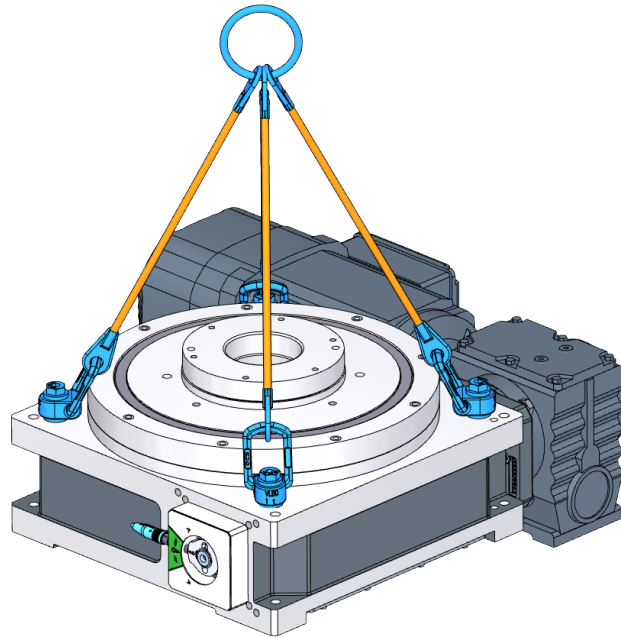


Fig. 5: Transport with slings

Attach the slings in the threaded holes as shown below and check their function.

The angle between the vertical and the chain sling or sling strap must be between 0° and 45° .

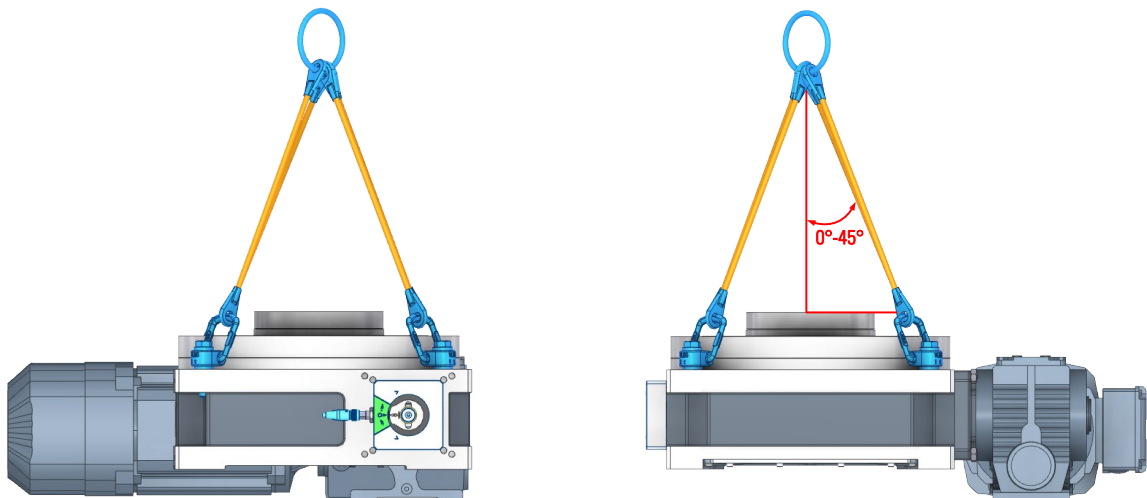


Fig. 6: Lifting instruction

**Recommended slings**

RTX	Quantity	Manufacturer	Designation	Type
550	4	CODIPRO	Swivel eyebolt M6	DSR M6 UP - 0.15t
650	4	CODIPRO	Swivel eyebolt M8	DSR M8 UP - 0.40t
750	4	CODIPRO	Swivel eyebolt M8	DSR M8 UP - 0.40t
900	4	CODIPRO	Swivel eyebolt M10	DSR M10 UP - 0.70t



5 Assembly

Required personal protective equipment



DANGER

Electric shock



Touching live parts poses an immediate danger to life

- Work on electrical systems may only be carried out by qualified electricians
- Before starting work, disconnect the system, secure it against being switched on again and make sure that no voltage is present

WARNING

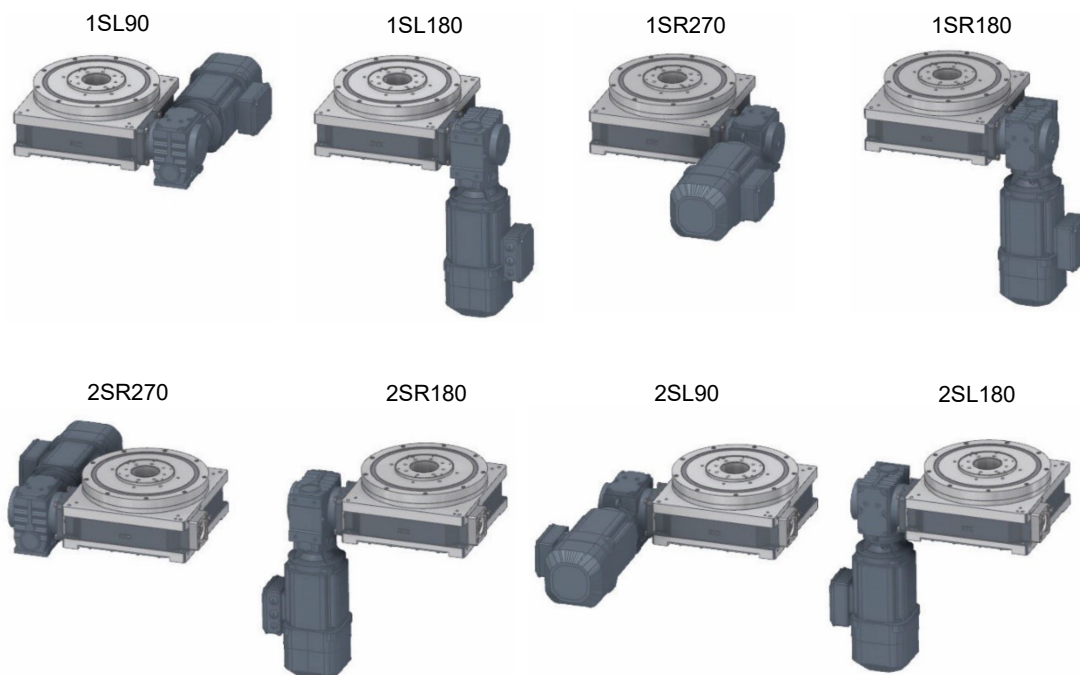
Crushing during assembly and dismantling



Persons within the work area of the rotary indexer can be crushed during assembly and dismantling.

- Wear suitable personal protective equipment.
- The assembly and dismantling may only be carried out by instructed skilled personnel.

5.1 Attachment positions



Fix. 7: RTX drive attachment positions



5.2 Drive attachment

NOTICE

Damage to components



Improper attachment of the drive can cause material damage

- The type of drive, e.g. a servomotor or three-phase a.c. motor must be agreed with Motion Index Drives.
- On attaching the drive, note and follow the manufacturer's operating instructions
- Note the spatial positions of the drive
- Fix the drive in the specified mounting points
- Tighten the screws to the specified torque

Attach the drive to the rotary indexer as follows:

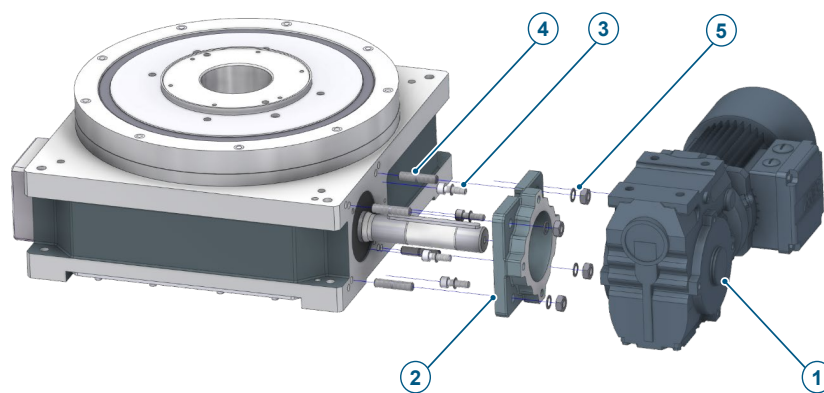


Fig. 8: Drive attachment order

1	Drive unit	2	Drive flange
3	Cylindrical head screw + Schnorr washer	4	Stud bolt
5	Nut + Schnorr washer		



5.2.1 Installation

DANGER

Electric shock



Touching live parts poses an immediate danger to life

- Work on electrical systems may only be carried out by qualified electricians
- Before starting work, disconnect the system, secure it against being switched on again and make sure that no voltage is present

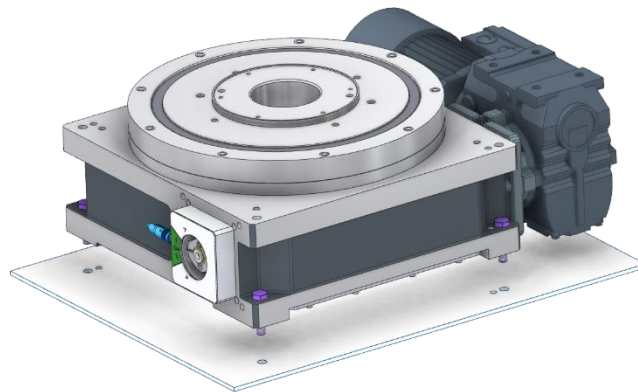


Fig. 9: Installation of the rotary indexer - standard installation position

- ✓ The mounting surface must be level.
 1. Clean the mounting surface and apply an oil film.
 2. Place the rotary indexer on the mounting surface.
 3. Fix the rotary indexer with screws and alignment pins according to the requirements.
 4. Compare the supply voltage with the data on the nameplate.
 5. Connect the drive unit.
 6. Earth the housing of the rotary indexer with an adequate cross-section.

Roll star / output flange attachments

Note the following regarding attachments on the roll star / output flange:

- Maximum weight moved (according to Motion Index Drives project planning).
- Minimum time until positioning (according to Motion Index Drives project planning).
- Maximum overhang (tipping moment) (according to Motion Index Drives project planning).
- Do not exceed the max. tightening torque of the mounting screws.



5.3 Guidelines for drive control of indexing tables

The specified switching time must be reached for correct operation of the indexing table. The switching time is the time required for the output flange to move from station to station (circuit) at a constant rated motor speed (50 Hz). The switching time does not include any times for the motor movement in the dwell area, as well as the time for motor acceleration and delay.

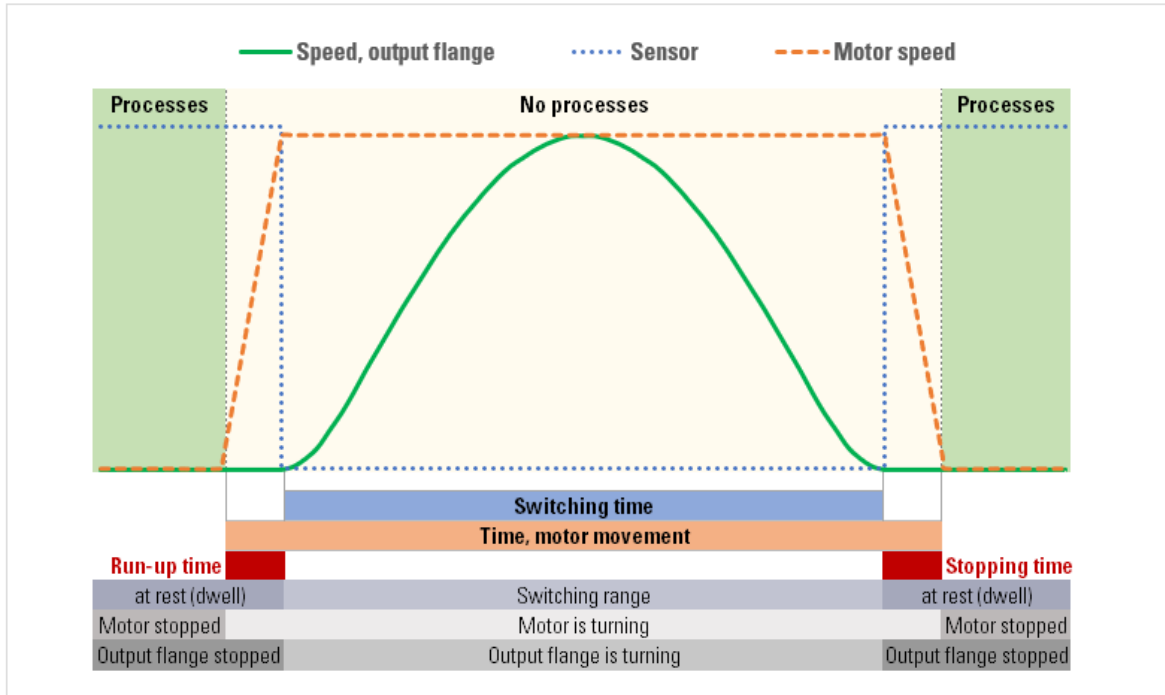


Fig. 10: Switching time diagram

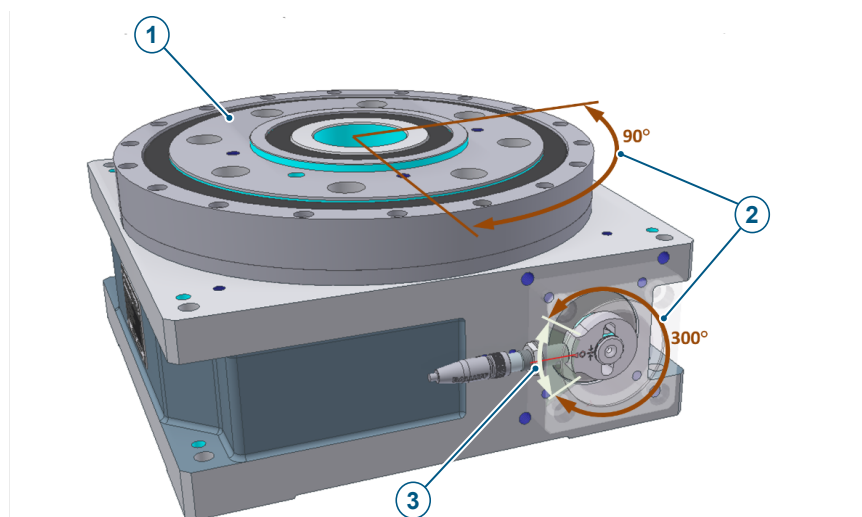
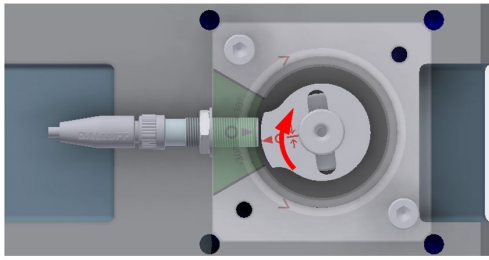


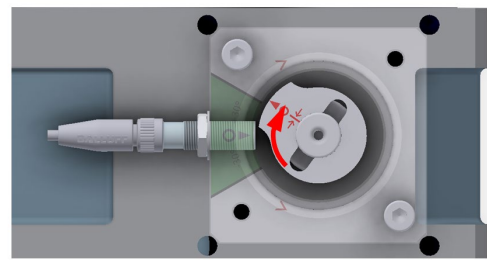
Fig. 11: Indexing table example, 4 stations (90°), switching time 0.8 s, switching angle 300°, dwell area 60°

1	Output flange	2	Switching range
3	Dwell area		

The motor must stop within the dwell area on braking. The stopping time must therefore be kept as short as possible.



Immediate reaction to sensor signal:
Motor remains stopped in the dwell area



Delayed reaction to sensor signal:
Motor remains stopped outside the dwell area

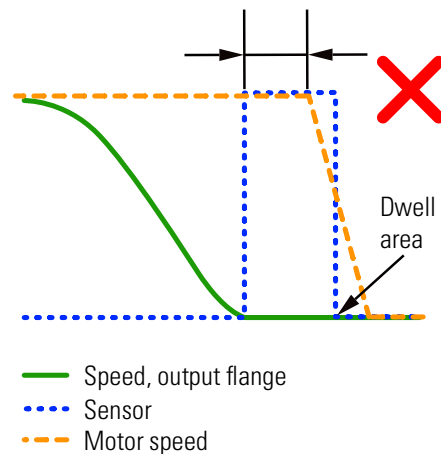
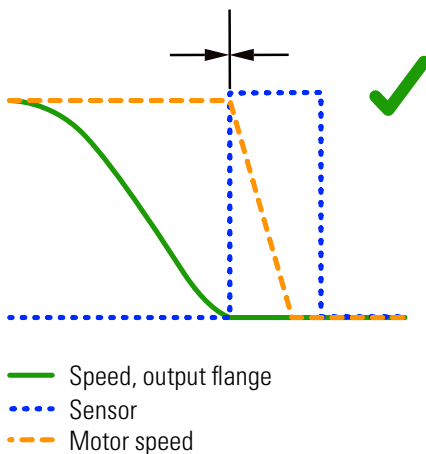


Fig. 12: Run-up and stopping time of the motor

Not the following regarding the drive control to enable optimum operation of indexing tables:

- The reaction to the sensor signal must take place **immediately**
 - Use the sensor signal directly to activate the mains contactor for motor and brake. This avoids the time delay due to evaluation of the sensor signal by electronic equipment or the PLC.
 - If the sensor signal has to be processed in the PLC immediately, program and configure the PLC so that the reaction time to the sensor signal for motor stop can be kept as short as possible.
 - Sensor signal time delays can occur if the sensor is attached to sensor boxes, intelligent terminals, distribution boxes, bus systems or similar.
- Activation and wiring of the brake
 - Do not connect the brake directly to the terminal board with alternating voltage, as this leads to the delaying of the engaging of the brake.
 - Brake with alternating voltage: The brake is switched off on the alternating and direct current side simultaneously. The type of switching off offers faster engaging of the brake compared to alternating current switching off. Contact the motor manufacturer for further information on optimum activation of the brake.
 - Use brake activation components (e.g. relays) with faster reaction time.
- The stopping time increases due to brake wear. Check and adjust the brake wear.
- When operating the motor in TIC, the sensor must be connected to the TIC universal control. The sensor signal is sent to the PLC directly via a fieldbus.



6 Operation

⚠ DANGER



Electric shock

Touching live parts poses an immediate danger to life

- Work on electrical systems may only be carried out by qualified electricians
- Before starting work, disconnect the system, secure it against being switched on again and make sure that no voltage is present

NOTICE



Improper activation can cause material damage

- Inching mode is not permitted without a suitable universal controller (TIC)
- Use a suitable universal controller (TIC)

General requirements for operation

Operation of the rotary indexer is only permitted in a complete, CE-compliant machine or system.

The rotary indexer may not be operated with defective or disabled safety devices.

6.1 Operating modes

Normal operation

In normal operation, the roll star / output flange moves in one direction from one position to the next. The rotational direction of the roll star / output flange corresponds to the rotational direction of the drive. The rotational direction of a three-phase a.c. motor can be reversed easily by swapping two phases of the supply voltage.

Intermittent operation

The drive shaft stops in the dwell phase of the drum curve. The step time is fixed. The dwell time is variable. This mode is used in machines with significantly longer machining times than rotating times and is the most frequent mode.

Continuous operation

The rotary indexer runs continuously without the motor stopping. Step and dwell times are fixed and are run through uniformly. The drive motor has only one direction of rotation.

This mode is frequently used in fast-running machines with short machining times. The partly completed machinery is synchronised mechanically with the rest of the machine via the free drive shaft. The ratio between the dwell and step time can be adjusted within certain limits by Motion Index Drives when producing the curve.

Reversing operation (reciprocating operation)

In this mode the roll star / output flange oscillates (shuttles) continuously, back and forth between two positions. The drive of the partly completed machinery is reversed in the respective dwell phase.

Inching mode

In inching mode, the roll star / output flange move in small steps between two dwell positions.



The cylinder is unable to accelerate and decelerate the accumulated load gently. As a result, high accelerations occur, which impact the mechanics. Inching may only be carried out with a suitable universal controller. A suitable controller is, for example, the TIC controller (**Motion Index Drives Indexing Controller**).

Emergency stop

The emergency stop stops the movement of the roll star / output flange immediately. The resultant load that is built up impacts the mechanics. The emergency stop should therefore only be used in emergency situations.



7 Maintenance

Required personal protective equipment



DANGER

Electric shock



Touching live parts poses an immediate danger to life

- Work on electrical systems may only be carried out by qualified electricians
- Before starting work, disconnect the system, secure it against being switched on again and make sure that no voltage is present

CAUTION

Harmful substances



Lubricants can cause health damage

- When using lubricants, note the information in the safety data sheets

CAUTION

Eye injury due to leaking oil



Leaking oil when installing overhead can cause eye injuries.

- Wear suitable goggles

CAUTION

Slipping hazard due to leaking operating materials



A floor contaminated with operating materials (oil, etc.) can cause falls.

- Wear slip-resistant footwear
- Removed leaked operating materials immediately
- Check seals regularly for adequate function
- Put up warning sign to point attention to slipping hazards



7.1 Maintenance tasks

7.1.1 Maintenance plan

Interval	Activity	Personnel
Daily	<ul style="list-style-type: none">• General visual inspection and check for noises	Operator
Monthly	<ul style="list-style-type: none">• Check the rotary indexer for oil leakage• Check the function of the seals	Operator
Half-yearly	<ul style="list-style-type: none">• Check for damage (visual inspection)• Remove dust deposits (especially on the ventilation grille of the drive unit)• Check electric cables for damage	Qualified personnel
Annually	<ul style="list-style-type: none">• Check the rotary indexer for clearance in the dwell positions	Qualified personnel



7.2 Lubricating

7.2.1 Lubricant requirements

Careful lubrication is necessary to ensure operating reliability and a long life of the partly completed machinery. All lubricating points must be supplied with the specified oils and greases.

Clean soiled lubricating points carefully with petroleum or an appropriate means and then lubricate with new lubricant. After lubricating, the surplus lubricant must be removed and disposed of properly.

NOTICE



Component damage due to unsuitable lubricant

Mixing greases with different bases leads to gumming and decomposition of the greases and cancels the lubricating effect.

- Use lithium-saponified grease only for relubricating

Lubricating oils

Only use lubricating oils to DIN 51 517 (ISO VG 460).

Recommended gear oils

Manufacturer	Designation
Mobil	Mobilgear 600 XP 460
BP	Energol GR-XP 460
SHELL	Omala 460
LIQUI MOLY	meguin CLP 460 gear oil
Zeller+Gmelin	Divinol ICL ISO 460
Klüber	Klüberoil GEM 1 N

Lubricating greases

Only use lubricating greases to DIN 51 825-KP 2K.

Recommended grease

Manufacturer	Designation	Specification
Mobil	Mobilux EP2	KP2 K-30
BP	Energrease LS-EP 2	KP2 K-20
Aral	Aralub HLP 2	KP2 N-30
Fuchs-DEA	Renolit MP	KP2 K-40
Klüber	Centoplex 2	KP2 K-20
SHELL	Alvania G2	KP2 K-20



8 Troubleshooting

Fault	Possible cause	Remedy
Drive does not turn	<ul style="list-style-type: none">• No supply voltage• Drive contactor malfunction• Drive protection switch has triggered• Brake not released	<ul style="list-style-type: none">• Check power supply• Change contactor• Let the drive cool down; latch the drive protection switch• Incorrectly connected or worn brake• Check sensor setting on position cam• Check sensor cable on sensor
The drive turns but the rotary indexer does not turn and the roll star / output flange has <u>no</u> clearance	<ul style="list-style-type: none">• Worm gear malfunction• Safety clutch overload / disengaged• Input shaft is broken• Clamping set not mounted correctly	<ul style="list-style-type: none">• Contact Motion Index Drives• Remove the external blockage / engage the safety clutch• Contact Motion Index Drives• Install clamping set according to manufacturer's operating instructions
The drive turns but the rotary indexer does not turn and the roll star / output flange has clearance	<ul style="list-style-type: none">• Cam follower ripped off by large overload	<ul style="list-style-type: none">• Contact Motion Index Drives
Drive turns with loud humming noises	<ul style="list-style-type: none">• Drive operates on 2 phases only	<ul style="list-style-type: none">• Check fuses or drive contactor• Measure current in all 3 phases (voltage measurement is not enough)
Sensor transmits no signal	<ul style="list-style-type: none">• Sensor not actuated / not fully actuated• Cable defective• Sensor defective• No supply voltage	<ul style="list-style-type: none">• Remove blockage• Check cable and replace if necessary• Replace sensor• Check power supply



9 Disposal

Required personal protective equipment



NOTICE

Environmental damage

Improper disposal may result in environmental damage

- Dispose of components and operating materials in accordance with local regulations
- Observe the safety data sheets of the operating materials

Materials used

The components are mainly made of the following materials:

- Copper (complete drive units, electrical cables)
- Steel and grey cast iron (housings, attachments, shafts, bearings)
- Plastic (toothed belts, insulation, bearings)

Preparation for disposal

1. Disconnect the system from all power supplies and secure it against being switched on again.
2. Wait 15 minutes until all live components are completely discharged.
3. Disassemble and dispose of assemblies and components in accordance with local environmental regulations.



10 Spare and wear parts



NOTICE

The use of unsuitable spare parts may result in material damage

Spare parts must comply with the technical requirements specified by the manufacturer

- Only use original spare parts
- Check spare parts for faults or defects prior to installation

Spare and wear parts are always order-specific. A corresponding spare and wear parts list is available from **Motion Index Drives** on request. When ordering spare parts, always specify the serial number. The serial number is located on the nameplate.

11 Annexes

11.1 Content of the declaration of incorporation

(The original declaration of incorporation is included in the documentation)

**Translation of the original declaration of incorporation
(in German) for partly completed machinery
(Machinery Directive 2006/42/EC, Annex II 1 B)**

Manufacturer:

Motion Index Drives
1204 East Maple Rd
Troy MI 48083

Description and identification of the partly completed machinery:

Your order No.: -
Our order No.: -
Product: Rotary indexer
Type: RTX
Serial number: -
Commercial name: Rotary indexer RTX

The manufacturer declares that the following essential requirements of the Machinery Directive 2006/42/EC have been applied and met:

1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.5.3, 1.5.4, 1.6.1, 1.6.4, 1.7.1, 1.7.4

Reference of the applied harmonised standards according to Article 7 Section 2:
EN ISO 12100:2010 Safety of machinery — General principles for design — Risk assessment and risk reduction

Furthermore, it is declared that the relevant technical documentation for this partly completed machinery has been compiled according to Annex VII Part B. The manufacturer undertakes to transmit in electronic form relevant information on the partly completed machinery within a reasonable time in response to a reasoned request by the national authorities.

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared to be in conformity with the provisions of the Machinery Directive.

Responsible for the documentation: Motion Index Drives
Address: 1204 East Maple Rd Troy MI 48083