

Rotary indexing table

Type RT - TT

Translation of original
operating instructions

Version 2.1.1 |
19.12.2019

Table of contents

1	About these Operating Instructions	3
1.2	Continuative documents	5
1.3	Excerpt of Declaration of Incorporation	6
2	Safety information.....	7
2.1	Explanation of the symbols used	7
2.2	Intended use	8
2.3	Foreseeable misuse	9
2.4	Directives, statutory provisions and standards.....	9
2.5	Technical condition of the partly completed machinery.....	9
2.6	General hazards.....	9
2.7	Responsibility of the operator	10
2.8	Staff qualification	11
2.9	Personal protective equipment.....	12
2.10	Nameplate.....	13
3	Construction and function	14
3.1	Construction Rotary indexing table type RT - TT	14
3.2	Function	15
3.3	Operating modes	16
3.4	Technical Data Rotary indexing table	17
3.5	Ambient conditions	17
4	Transport.....	29
4.1	Transport inspection	29
4.2	Packaging, handling, unpacking	29
5	Mechanical installation.....	33
5.1	Installation orientation.....	33
5.2	Securing the drive	34
5.3	Installation and commissioning.....	35
5.4	Adjustment of the position cam series with open position indicator	37
5.5	Maintenance task	38
5.6	Lubrication.....	39
6	Troubleshooting	40
7	Disposal	42
8	Spare part and wear part RT - TT	43
9	Annex.....	44
9.1	Safety data sheets	44

1 About these Operating Instructions

These Operating Instructions describe the partly completed machinery Rotary indexing table. The Rotary indexing table is referred to below as the partly completed machinery.

Purpose of these Operating Instructions

The Operating Instructions are intended to help you to:

- work efficiently
- ensure quality
- find information quickly
- avoid danger

Table of contents

The Operating Instructions have a table of contents at the front. This gives you an overview of all the sections in the document.

Headings and page numbers

The chapters are numbered sequentially. The sections within each chapter are numbered sequentially.

Safety information

Any safety information is placed before the descriptions of actions that may pose a risk. You will find a detailed description of the safety information in the chapter entitled Safety.

Text, symbols, figures

Instructions for performing various activities and other information are presented in small, discrete sections.

The information is presented using a combination of text, symbols and figures.

Instructions for performing action are described in the appropriate sequence and numbered accordingly.

Instructions for action

For the sake of clarity the instructions for action have been broken down into individual steps:

- ▶ Introductory text...
 - ⇒ Instruction result

Lists

Any lists which do not include individual operating steps are indicated as follows:

- Lists...
 - Sub-items in lists

Figures

Figures, dimensions and technical data presented in these Operating Instructions may be Subject to change.

Cross-references

Cross-references point you to additional descriptions within the Operating Instructions. (Chapter number/page number).

Third-party components

Refer to the Operating Instructions of the relevant manufacturers for information on operation and maintenance of third-party components fitted in the system.

Additional documentation

To complement the information in these Operating Instructions, please read the following regulations and directives:

- safety regulations and accident prevention regulations
- instruction sheets, instruction booklets
- work instructions provided by the statutory accident insurance provider
- generally accepted occupational health regulations

Manufacturer

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Technical information

The technical information, figures and data contained in these Operating Instructions are correct at the time of printing.

Our products undergo continuous further develop.

We therefore reserve the right to make any changes and improvements that we deem appropriate.

However, this does not, imply any obligation to apply such changes retrospectively to equipment already supplied.

1.1.1 Published by

TAKTOMAT GmbH
Rudolf-Diesel-Straße 14
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Document revision

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Version 2.1.0	13.02.2019	Maintenance
Version 2.0.6	18.05.2016	Chapter Lubricating Rotary indexing table removed
Version 2.0.1	18.05.2016	Technical data updated
Version 2.0.1	19.03.2015	Layout adaption, added excerpt of Atex and declaration of incorporation
Version 1.0.4	20.10.2014	Initial release

1.2 Continulative documents

Read the following documents according to the provided components before you use these partly completed machinery with Operating instructions.

Designation	Manufacturer	Version / Revision / Date	Number
Assembly and Operating Instructions Gear unit	Every type	-	-
Operating Instructions AC Motors	Every type	-	-
Operating instructions inductive Sensors	Every type	-	-
Operating instructions encoder	Every type	-	-

1.3 Excerpt of Declaration of Incorporation

Translation of Original Declaration of Incorporation of Partly Completed Machinery (According to the EC-Machinery Directive 2006/42/EG, Annex II B)

Manufacturer:
TAKTOMAT GmbH
Rudolf-Diesel-Straße 14
D-86554 Pöttmes

Description and identification of the partly completed machinery:

Your Order-No.: -
Our order confirmation: -
Product: Rotary indexing table RT
Type: RT
Serial number: -
Commercial designation: Rotary indexing table RT

The manufacturer declares that the following basic requirements of the Machinery Directive 2006/42/EG applied and complied with:

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


The reference of the harmonised standard applied to Article 7 (2):
EN ISO 12100.2010 Safety of Machinery – general principles for design

Furthermore, we declare that the relevant technical documentation for this partly completed machinery is compiled in accordance with part B of Annex VII. The manufacturer undertakes to send the relevant documentation for the partly completed machinery electronically to national authorities in case of a duly reasoned request.

This partly-completed machine may be put into operation only if it has been stated, that the machine, into which the un-completed part has to be incorporated, does comply with the requirement of the machine directive.

Responsible for the documentation: Taktomat GmbH
Address: Rudolf-Diesel-Straße 14, D-86554 Pöttmes

Pöttmes, Belegdatum – zur Eingabe Klicken



Norbert Hofstetter
CEO

2 Safety information









General information

This document contains important information on the safe use of the partly completed machinery. This information is intended to ensure personal safety and prevent damage to the partly completed machinery. The information is intended for the operator and for properly trained, qualified and instructed staff responsible for operating and servicing the partly completed machinery.

Additional task-specific safety information is included in the relevant sections on the different phases during the service life of the system.

2.1 Explanation of the symbols used

2.1.1 Warnings

	
	DANGER! This combination of symbol and alert word indicates an inherently dangerous situation which can be fatal or cause serious injury if it is not avoided.
<hr/>	
	
	WARNING! This combination of symbol and alert word indicates a potentially dangerous situation which can be fatal or cause serious injury if it is not avoided.
<hr/>	
	
	CAUTION! This combination of symbol and alert word indicates a potentially dangerous situation which can cause minor injury if it is not avoided.
<hr/>	
	
	NOTICE! This combination of symbol and alert word indicates a potentially dangerous situation which can cause damage to property or harm the environment if it is not avoided.

2.1.2 MANDATORY SIGNS



REFER TO INSTRUCTION MANUAL/BOOKLET!

This symbol signifies that the instruction manual/booklet of the component supplier must be read.



WEAR HEAD PROTECTION!

This symbol signifies that head protection must be worn.



WEAR EYE PROTECTION!

This symbol signifies that eye protection must be worn.



WEAR SAFETY FOOTWEAR!

This symbol signifies that safety footwear must be worn.



WEAR PROTECTIVE GLOVES!

This symbol signifies that protective gloves must be worn.

2.2 Intended use

The partly completed machinery is intended for installation in a surrounding construction, thus integrating it to form part of an overall system. The partly completed machinery is controlled by the overall system. The functions of the protective equipment are also connected to the partly completed machinery via the controller. The partly completed machinery may only be operated as part of a CE-compliant system.

Customer specific constructions are mounted on the Rotary indexing table. They're used as support for different products. The Rotary indexing table has a fixed or flexible division (for an exact design see data sheet). The Rotary indexing table is inside a safety enclosure or is installed in another work equipment. The safety enclosure or assembly are realized by the integrator. This also applies to the electrical connection and control.

Any use that deviates from the intended use is regarded as inappropriate use.

This includes:

- any use outside the permitted operating limits
- any use in conjunction with foodstuffs
- any use in conjunction with aggressive materials (such as acids)
- transporting the system using the designated lifting points or eye bolts

The manufacturer shall not be liable for any damage resulting from such use. Intended use also includes observance of all the information in these instructions.

2.3 Foreseeable misuse

Any use beyond or other than the intended use is regarded as misuse.

2.3.1 Guarantee conditions

Changes to the structure of the materials used in the machine, e.g. the drilling of additional holes, can result in damage to the components. This is not regarded as intended use and may lead to loss of warranty or liability claims as a consequence.

2.4 Directives, statutory provisions and standards

The following statutory provisions and standards were applied:

Machine Directive	2006/42/EG, Annex I
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
Safety of machinery - basic concepts - risk assessment and risk mitigation	DIN EN ISO 12100

2.5 Technical condition of the partly completed machinery

Do not use the partly completed machinery if it is not in sound condition technically. If the partly completed machinery is used when it is not in a sound condition technically, there is a risk of death or injury to staff and a risk of damage to property.

2.5.1 Make no changes in the safety provisions

The manufacturer has made safety provisions. No liability will be accepted if the operator of the partly completed machinery makes any changes in the safety provisions without express permission.

2.6 General hazards

This section lists risks associated with the partly completed machinery that remain even when it is operated according to its intended use.

In order to reduce the risk of personal injury or damage to property, and to avoid potentially dangerous situations, the safety information provided here and in the other sections of these Operating Instructions must be observed.

Risk of death by electrocution

! DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched. Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

Risk of injury from moving parts

! WARNING



Risk of injury from moving parts!

Moving parts can cause serious injury.

- ▶ Do not reach into moving parts or carry out work on moving parts while the system is in operation.
- ▶ Never open any covers while the system is in operation.

2.7 Responsibility of the operator

The partly completed machinery is to be used commercially according to its intended use. The operator of the partly completed machinery is therefore subject to statutory occupational health and safety provisions.

In addition to the general safety information contained in this document, any further safety, accident prevention and environmental regulations applicable to the field of application of the partly completed machinery must also be observed.

In particular, operators have the following obligations:

- They must always be fully informed of the most recent occupational safety regulations and perform a risk assessment to identify any additional hazardous locations and places resulting from the specific working conditions at the place of use. They must document any such findings in the form of operating instructions (work instructions, work descriptions, etc.) for use during operation.
- During the entire service life of the partly completed machinery, they must check whether the operating instructions they have written are compliant with current regulations and make any necessary adjustments.
- They must unambiguously regulate and define who is responsible for carrying out installation, operation, maintenance and cleaning.
- They must ensure that the staff deployed have the necessary qualifications for the work they are instructed to perform.
- They must ensure that all staff who work on the partly completed machinery have read and understood all the documents relevant for its operation (Operating Instructions, maintenance regulations, safety guidelines).
- They must provide training for the staff at regular intervals and inform them of potential dangers.
- They must bear the responsibility for personal injury and damage to property arising from manipulation of the partly completed machinery. For this reason, the partly completed machinery and its safety equipment must be inspected at regular intervals to ensure that they are in sound condition and functioning properly, and the results of this inspection must be suitably documented.
- They must ensure that the partly completed machinery is always in a sound condition technically.

2.7.1 Preventive measures

It is recommended that the operator take the following preventive measures:

- Only allow qualified, trained and properly instructed staff to work on the partly completed machinery.
- Unambiguously define the responsibilities of operating and service personnel.
- Supplement these Operating Instructions with
 - stipulations deriving from national and regional labor and environmental regulations
 - adjust information covering specific operational aspects (workflows, supervisory obligations, reporting obligations, fire alarm equipment, etc.)
- Occasionally check to confirm that the Operating Instructions are being used and that such use is correct, and when necessary repeat the instruction process.
- Ensure that all documentation is permanently available in a readable form and easily accessible at the point of use.
- Observe any periodic checks and inspections that are required (by law) or specified in this document.
- Replace in good time any components indicated in these documents as being crucial for safety.
- Regularly inspect the partly completed machinery to ensure that the safety equipment operates correctly.
- Make sure that safety information and hazard warnings on the partly completed machinery and in the working area are always legible.
- Take steps to ensure that the partly completed machinery is regularly inspected for visible damage and defects.

2.8 Staff qualification

The various activities described in these Operating Instructions require different qualifications of the staff entrusted with these duties.



WARNING

Danger if staff are insufficiently qualified!

Persons who are inadequately qualified are unable to assess the risks associated with working on the partly completed machinery and expose themselves and others to the risk of serious or fatal injury.

- ▶ Ensure that all work is performed only by suitably qualified persons.
- ▶ Keep insufficiently qualified persons at a safe distance from the working area.

2.8.1 Qualified staff

For the purposes of these Operating Instructions, qualified staff are understood to be

- Operators who have been specially trained and instructed in working with the partly completed machinery.
- Installation and service staff who have appropriate expertise in setting up and maintaining the partly completed machinery and who are familiar with the safety information.
- The qualified staff must have read and understood the contents of the Operating Instructions before the partly completed machinery is taken into service and must have been informed of the risks associated with working with the partly completed machinery by the partly completed machinery operator.
- A knowledge of first aid is required.

2.8.2 Competent specialists

Competent specialists are persons whose specialist training and experience have given them sufficient knowledge with respect to using this partly completed machinery and who are sufficiently familiar with the relevant statutory occupational health regulations, accident prevention regulations, directives, and generally approved technical practice that they are able to assess whether the condition of the partly completed machinery allows it to be used safely.

2.8.3 Auxiliary staff

Work on or in the vicinity of this partly completed machinery which is not associated with the actual operation of the partly completed machinery (e.g. cleaning, transport, material provisioning, etc.) can be performed by other persons. Before the partly completed machinery is taken into service, the qualified staff of the partly completed machinery operator must instruct such persons with regard to the nature of the work to be performed and the risks associated with working on the partly completed machinery. Take special care when instructing persons who cannot read or write, and instruct them separately!

2.8.4 Servicing, repairing and maintaining the partly completed machinery

Service, repair and maintenance work on the partly completed machinery may only be carried out by service engineers of the manufacturer or by qualified staff authorized by Taktomat GmbH. When carrying out such work, always cordon off the working area carefully!

2.9 Personal protective equipment

Personal protective equipment is intended to protect individuals from safety and health risks at work. When performing certain tasks on and with the partly completed machinery, staff must wear personal protective equipment. This is explicitly indicated in the relevant sections of these Operating Instructions.



! WARNING

Risk of injury from moving parts!

Exposed jewellery and long hair can be trapped by moving parts and lead to serious injury.

- ▶ Always remove exposed jewellery such as chains, rings and watches before starting work.
- ▶ Protect long hair with a hair net.

2.10 Nameplate



Fig. 1 Example of a nameplate

There is a nameplate attached to the partly completed machinery:

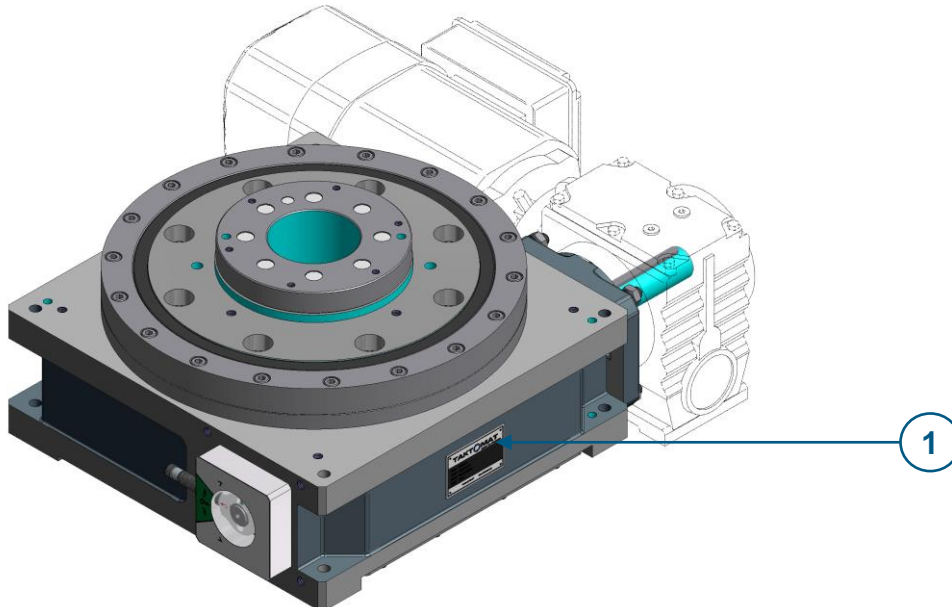


Fig. 2 Position Nameplate (1)

3 Construction and function

3.1 Construction Rotary indexing table type RT - TT

3.1.1 Rotary indexing table RT100 - RT250 and TT075 - TT315

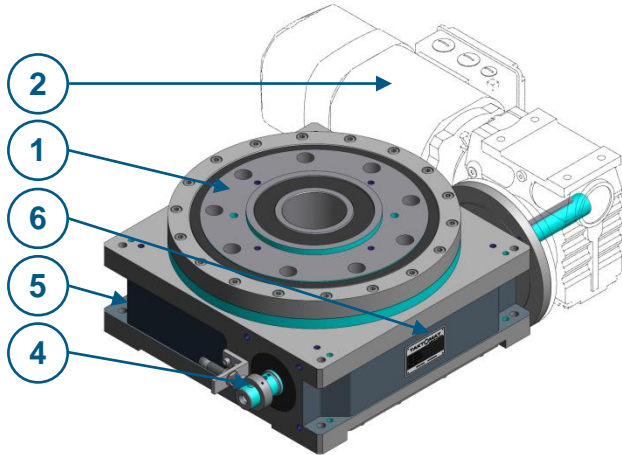


Fig. 3 Rotary indexing table type RT open position indicator

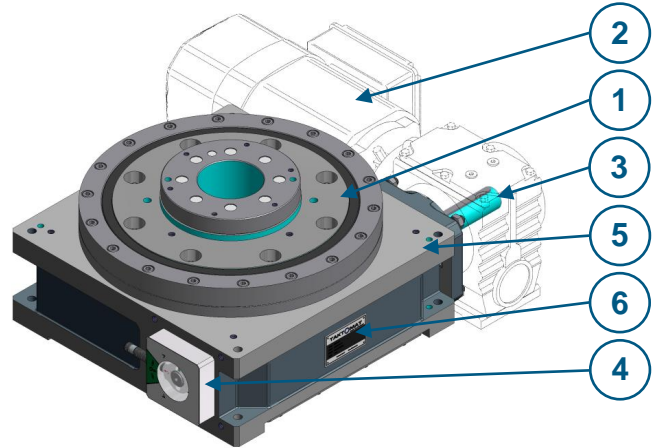


Fig. 4 Rotary indexing table type RT closed position indicator

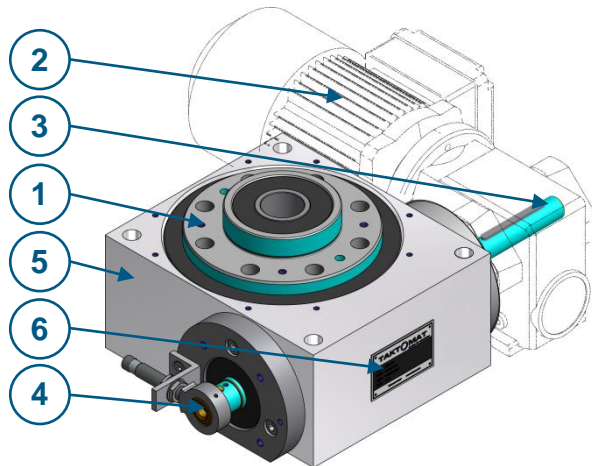


Fig. 5 Rotary indexing table type TT open position indicator

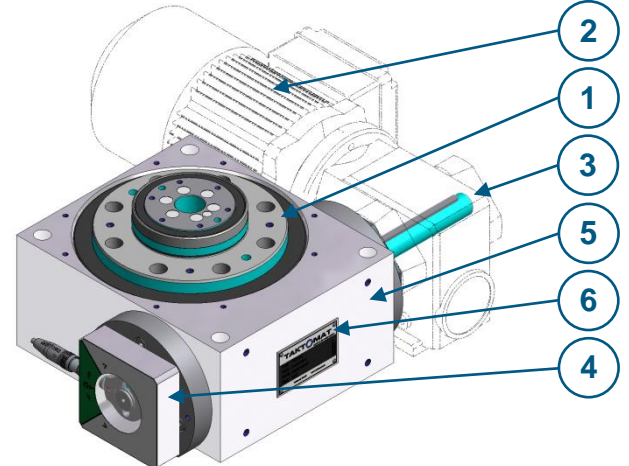


Fig. 6 Rotary indexing table type TT closed position indicator

Item	Designation
1	Output flange / Star wheel
2	Drive
3	Input shaft (drive)
4	Position indicator
5	Housing
6	Nameplate

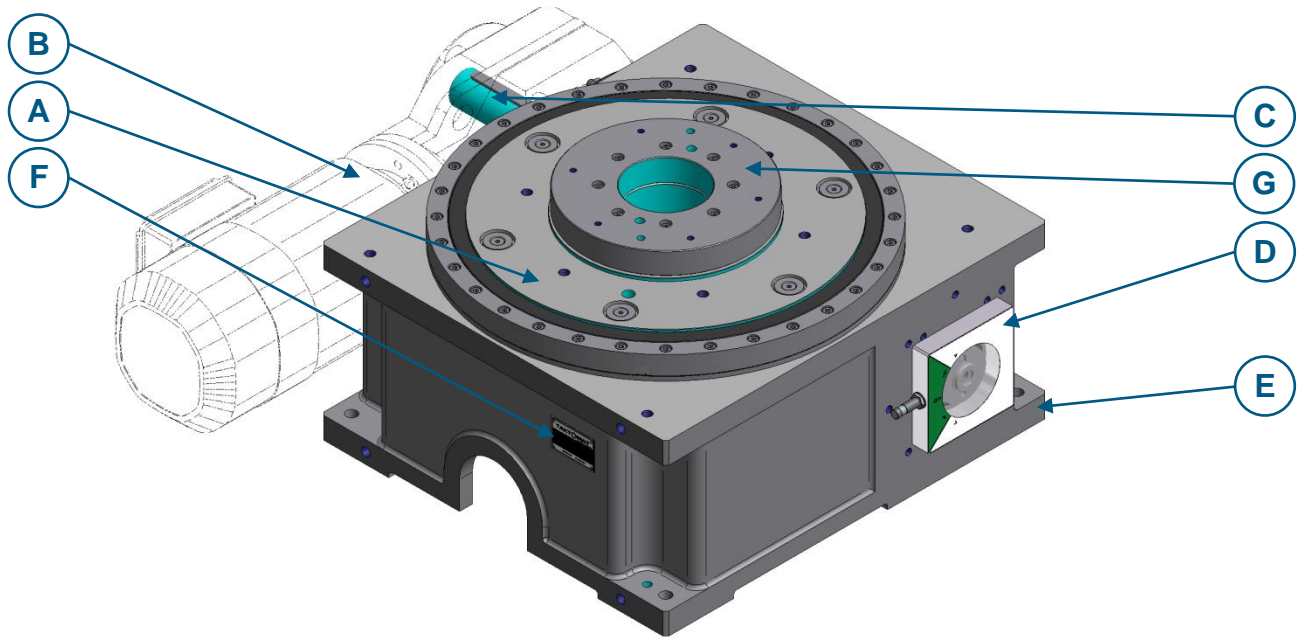


Fig. 7 Rotary indexing table RT400 – RT630
closed position indicator

Item	Designation
A	Output flange / Star wheel
B	Drive
C	Input shaft (drive)
D	Position indicator
E	Housing
F	Nameplate
G	Center column

3.2 Function

The drive drives (2 und B) the output flange / star wheel (1 and A) via the input shaft (3 and C) and the cylinder cam. The output plane is perpendicular to the drive plane. It converts a uniform radial movement on the drive side to an intermittent or uniformly reduced output movement. The accessories are mounted on the output flange / star wheel (1 and A). The position indicator (4 and D) shows the current position of the cylinder cam. The nameplate (6 and F) is attached to the housing (5 and E). If required additional accessories are mounted on the center column (G).

No additional mechanical locking for the output flange / star wheel is necessary. This can lead to mechanical over tightening and ultimately to the destruction of the rotary indexing table. Power is provided either by means of a three-phase motor (with / without brake) via reduction gear unit or by means of a chain-wheel or belt wheel on the drive shaft of the rotary indexing table.

This is firmly connected to the cylinder cam, without any further internal gear sets, and it turns the output flange / star wheel through cam followers.

The type RT the output flange / star wheel is mounted within a wire-race bearing assembly, stiff and free of play (inside steel rings not in the casting). The shaft seals appropriate for each size seal off the rotary indexing table inside and out.

3.3 Operating modes

The partly completed machinery has the following operating modes:

- Normal operational
 - Intermittent operation
 - Continuous operation
 - Reversing operation (Oscillating operation)
- Inching mode
- Emergency-Stop

NOTICE



**Damage arising from operation without an appropriate machine controller!
Improper control of the machine can cause serious material damage.**

- ▶ Do not operate in inching mode without an appropriate universal machine controller.
- ▶ Use an appropriate universal machine controller.

3.3.1 Normal operation

Normal operation is regarded as the movement of the output flange in a direction from one position to the next. The rotational direction of the output flange is determined by the rotational direction of the drive. With a three-phase motor this can easily be reversed by swapping two phases of the supply voltage.

3.3.2 Intermittent operation

The drive shaft stops in the dwell phase. The step time is fixed. The dwell period is variable. This mode of operation is used in plants with much longer processing times than times and is the most common mode of operation.

3.3.3 Continuous operation

The partly completed machinery runs continuously without the motor stopping. Step and dwell times are fixed and are run through continuously. The drive motor has only one rotational direction. This mode of operation is frequently used in fast-running plants with short processing times. The partly completed machinery is mechanically synchronized to the rest of the plant by the free drive shaft. The ratio of dwell to step time can be adjusted within certain limits by TAKTOMAT when producing the cam.

3.3.4 Reversing operation (reciprocating operation)

The drive of the partly completed machinery is always decelerated to the reverse position and accelerated after the reverse phase. In this mode of operation, the output flange shuttles back and forth between two positions.

3.3.5 Inching mode

In inching operation, the output flange moves in small increments between two positions. The cylinder cam cannot gently accelerate and decelerate the accumulated load. This puts the hardware under stress, since any acceleration that occurs during the inching operation exceeds that of normal operation many times over. No inching operation is permitted if there are no suitable machine controller (TIC) that allow gentle acceleration and braking of the load.


3.3.6 Emergency-Stop

Emergency stop is comparable with the stopping in inching operation. Frequent emergency-stop situations should be avoided.

3.4 Technical Data Rotary indexing table

3.5 Ambient conditions

Following ambient conditions apply to all Rotary indexing table described in this operating manual.

NOTICE	
	<p>Deviating ambient conditions can cause material damage. Do not operate in deviating ambient conditions.</p> <ul style="list-style-type: none"> ▶ Adhere to the given operating – and storage conditions. ▶ Other ambient condition only in consultation with Taktomat.

3.5.1 Operating conditions

Area of application	Inside
Temperature range [°C]	+10 to + 40
Relative humidity [%]	max 40 to 70
Media	do not expose the system to any aggressive agents

3.5.2 Storage conditions

Area of application	Inside
Lighting [Lux]	min. 300
Temperature range [°C]	-22 to + 50
Relative air humidity [%]	max. 40 to 70
Media	do not expose the system to any aggressive agents
Storage period > 6 month	coat the partly completed machinery with corrosive protection

3.5.3 Noise emission

The direct noise emission from the partly completed machinery depends upon the ambient conditions. Deduced from these conditions there must be further acoustic pressure measurements performed on the installation location of the partly completed machinery.

3.5.4 Rotary indexing table TT075 / TT080

Primary dimensions	
Star wheel / Output flange Ø [mm]	95
Height (mounting surface of output flange) [mm]	105
Internal diameter Ø [mm]	9,8
Maximum recommended accessory plate diameter [mm]	500
Approx. weight of Rotary indexing table without drive [kg]	12
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	85
Indexing accuracy in radians ± [mm]	0,016 / 0,017
Max. strain on output flange	
Axial force Fa [kN]	1,5
Radial force Fr [kN]	0,6
Tilting moment Mk [kNm]	0,5
Max. strain on center colum	
Axial force Fa [kN]	0,5
Tilting moment Mk [kNm]	0,04

3.5.5 Rotary indexing table RT100

Primary dimensions	
Star wheel / Output flange Ø [mm]	125
Height (mounting surface of output flange) [mm]	112
Internal diameter Ø [mm]	20 / 22
Maximum recommended accessory plate diameter [mm]	800
Approx. weight of Rotary indexing table without drive [kg]	18
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	70
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	6
Radial force Fr [kN]	3,8
Tilting moment Mk [kNm]	0,7
Max. strain on center colum	
Axial force Fa [kN]	5
Tilting moment Mk [kNm]	0,19

3.5.6 Rotary indexing table TT125

Primary dimensions	
Star wheel / Output flange Ø [mm]	160
Height (mounting surface of output flange) [mm]	120
Internal diameter Ø [mm]	35
Maximum recommended accessory plate diameter [mm]	1000
Approx. weight of Rotary indexing table without drive [kg]	24
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	55
Indexing accuracy in radians ± [mm]	0,019
Max. strain on output flange	
Axial force Fa [kN]	6
Radial force Fr [kN]	2,8
Tilting moment Mk [kNm]	0,2
Max. strain on center colum	
Axial force Fa [kN]	3
Tilting moment Mk [kNm]	0,2

3.5.7 Rotary indexing table RT160

Primary dimensions	
Star wheel / Output flange Ø [mm]	185
Height (mounting surface of output flange) [mm]	140
Internal diameter Ø [mm]	50
Maximum recommended accessory plate diameter [mm]	1300
Approx. weight of Rotary indexing table without drive [kg]	31
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	45
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	15
Radial force Fr [kN]	8
Tilting moment Mk [kNm]	2,7
Max. strain on center colum	
Axial force Fa [kN]	7,5
Tilting moment Mk [kNm]	0,53

3.5.8 Rotary indexing table RT200

Primary dimensions	
Star wheel / Output flange Ø [mm]	240
Height (mounting surface of output flange) [mm]	160
Internal diameter Ø [mm]	60
Maximum recommended accessory plate diameter [mm]	1800
Approx. weight of Rotary indexing table without drive [kg]	63
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	35
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	21
Radial force Fr [kN]	11
Tilting moment Mk [kNm]	3,7
Max. strain on center colum	
Axial force Fa [kN]	12,5
Tilting moment Mk [kNm]	1,2

3.5.9 Rotary indexing table RT250

Primary dimensions	
Star wheel / Output flange Ø [mm]	285
Height (mounting surface of output flange) [mm]	174
Internal diameter Ø [mm]	80
Maximum recommended accessory plate diameter [mm]	2200
Approx. weight of Rotary indexing table without drive [kg]	100
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	30
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	27
Radial force Fr [kN]	14
Tilting moment Mk [kNm]	5
Max. strain on center colum	
Axial force Fa [kN]	25
Tilting moment Mk [kNm]	2

3.5.10 Rotary indexing table TT250

Primary dimensions	
Star wheel / Output flange Ø [mm]	280
Height (mounting surface of output flange) [mm]	165
Internal diameter Ø [mm]	50
Maximum recommended accessory plate diameter [mm]	2000
Approx. weight of Rotary indexing table without drive [kg]	77
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	30
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	23
Radial force Fr [kN]	24
Tilting moment Mk [kNm]	2
Max. strain on center colum	
Axial force Fa [kN]	12
Tilting moment Mk [kNm]	2

3.5.11 Rotary indexing table TT315

Primary dimensions	
Star wheel / Output flange Ø [mm]	360
Height (mounting surface of output flange) [mm]	243,5
Internal diameter Ø [mm]	90
Maximum recommended accessory plate diameter [mm]	2800
Approx. weight of Rotary indexing table without drive [kg]	193
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	22
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	32
Radial force Fr [kN]	17
Tilting moment Mk [kNm]	5
Max. strain on center colum	
Axial force Fa [kN]	28
Tilting moment Mk [kNm]	4

3.5.12 Rotary indexing table RT400

Primary dimensions	
Star wheel / Output flange Ø [mm]	460
Height (mounting surface of output flange) [mm]	316
Internal diameter Ø [mm]	110
Maximum recommended accessory plate diameter [mm]	3500
Approx. weight of Rotary indexing table without drive [kg]	325
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	20
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	50
Radial force Fr [kN]	26
Tilting moment Mk [kNm]	10
Max. strain on center colum	
Axial force Fa [kN]	45
Tilting moment Mk [kNm]	5,5

3.5.13 Rotary indexing table RT500

Primary dimensions	
Star wheel / Output flange Ø [mm]	560
Height (mounting surface of output flange) [mm]	420
Internal diameter Ø [mm]	140
Maximum recommended accessory plate diameter [mm]	4500
Approx. weight of Rotary indexing table without drive [kg]	600
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	15
Indexing accuracy in radians ± [mm]	0,018
Max. strain on output flange	
Axial force Fa [kN]	84
Radial force Fr [kN]	49
Tilting moment Mk [kNm]	22
Max. strain on center colum	
Axial force Fa [kN]	60
Tilting moment Mk [kNm]	7,8

3.5.14 Rotary indexing table RT630

Primary dimensions	
Star wheel / Output flange Ø [mm]	778
Height (mounting surface of output flange) [mm]	560
Internal diameter Ø [mm]	250
Maximum recommended accessory plate diameter [mm]	6000
Approx. weight of Rotary indexing table without drive [kg]	1600
Standard internal transmission ratio	2,3,4,6,8,10,12,16,20,24,30,36
Direction	cw, ccw, reversing
Installation orientation	horizontal, vertical, upside down
Precision	
Indexing accuracy in angular seconds ± ["]	15
Indexing accuracy in radians ± [mm]	0,023
Max. strain on output flange	
Axial force Fa [kN]	145
Radial force Fr [kN]	86
Tilting moment Mk [kNm]	41
Max. strain on center colum	
Axial force Fa [kN]	80
Tilting moment Mk [kNm]	9

4 Transport

Safety information

NOTICE



Damage arising from improper transport!
Improper transport can cause significant damage to property.

- ▶ Take care and take note of the symbols on the packaging when unloading the partly completed machinery on delivery and when transporting it on the premises.

4.1 Transport inspection

Immediately on receipt, check to make certain that the delivery is complete and has not been damaged during transport:

Proceed as follows if there are visible signs of damage during transport:

- ▶ Do not accept the delivery or only do so conditionally.
- ▶ Record the extent of the damage on the transport documentation or on the associated delivery note.
- ▶ Immediately report any damage to the manufacturer of the partly completed machinery.

⚠ DANGER



Risk of fatal injury from suspended loads and falling parts!
Parts can fall during transport and cause serious or fatal injury.

- ▶ Do not walk under suspended loads.
- ▶ Keep people clear of the danger zone.
- ▶ Always use lifting gear with a sufficient load capacity.
- ▶ Always use forklift trucks or pallet trucks with a sufficient load capacity and fork length.
- ▶ Do not leave the load suspended if you leave the working area.

4.2 Packaging, handling, unpacking

The partly completed machinery is packed in plastic sheeting or cardboard packaging and secured to a pallet for transportation.

NOTICE



Damage arising from improper transport!
Improper transport can cause significant damage to property.

- ▶ The partly completed machinery must not be allowed to become wet while it is being transported.
 - ▶ Take the partly completed machinery out of the packaging just before installation
-
- ▶ Remove the packaging carefully and dispose of it with due regard to environmental considerations.

4.2.1 Transport using sling equipment

Staff

Qualified staff

Protective equipment



- ▶ The sling equipment (see figure) must be attached to the attachment points (see table and dimensions sheet) in the positions shown in the figure and checked to ensure that it is working correctly (see the instructions for the sling equipment).

Transport the partly completed machinery as follows if you are using sling equipment:

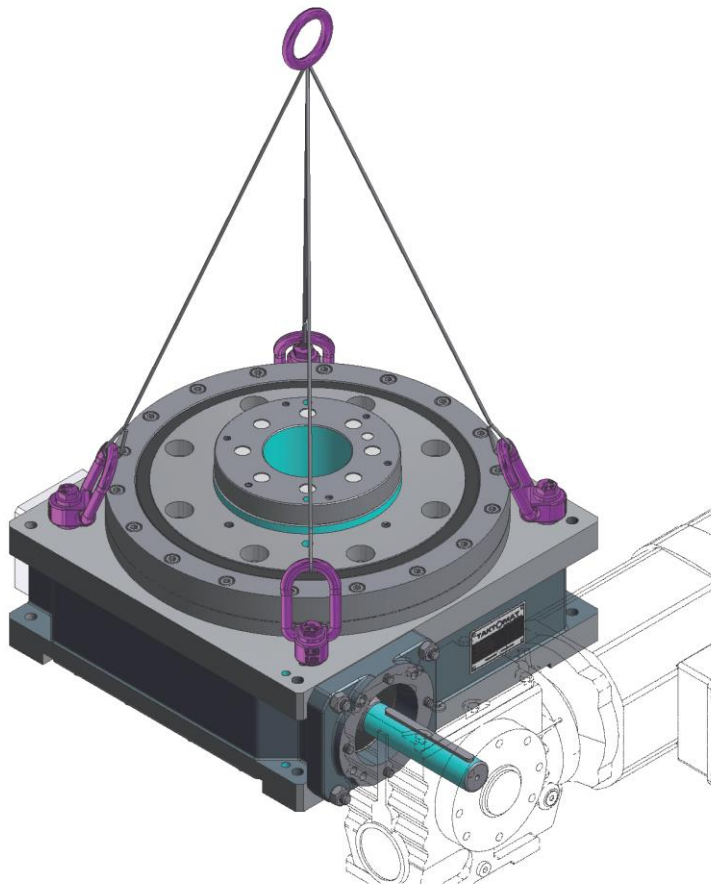


Fig. 8 Transport using sling equipment

Lifting instructions:

The angle between the perpendicular and the sling chain must lie between 0° and 45°.

⚠ WARNING



Risk of injury from falling or sinking Load!

Too weak dimensioned sling equipment can break.

Transport vehicles can fail or topple if they are not designed for the weight of the partly completed machinery.

Falling or toppling machines may lead to serious personal injury.

- ▶ Lifting equipment, industrial trucks and sling equipment have to comply and designed to the rules for the weight of the machine including
- ▶ It is prohibited to stand under suspended loads or raised machine parts.

NOTICE



Damage arising from improper transport!

Improper transport can cause significant damage to property.

- ▶ Take care and take note of the symbols on the packaging when unloading the partly completed machinery on delivery and when transporting it on the premises
- ▶ Use slinging equipment with sufficient load capacity
- ▶ Align slinging equipment in load direction.
- ▶ If the recommended angle between perpendicular and the sling chain or sling strap exceeds 45° the load capacity of the sling equipment is reduced.

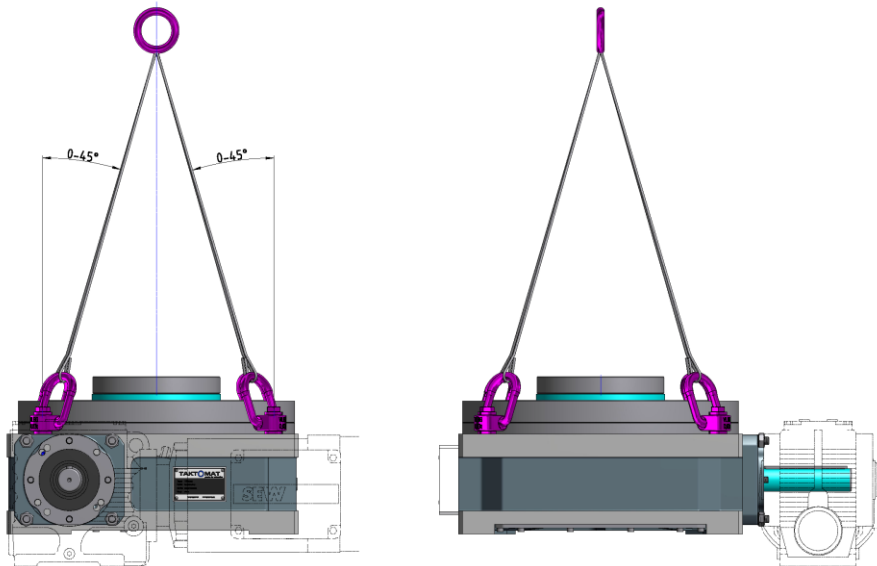


Fig. 9 Lifting instructions

Table for attachment points:

Suitable threaded holes are provided on the machine to accommodate slinging equipment. Please refer to the dimensions sheet in the technical data for the thread sizes.

Recommendation sling equipment:

Thread size	Number of sling points	Recommendation sling equipment
M6	4	VRS-F
M6	4	VRS-F
M8	4	VLBG 0,3t
M8	4	VLBG 0,3t
M8	4	VLBG 0,3t
M10	4	VLBG 0,63t
M10	4	VRS-F
M12	4	VRS-F
M16	4	VLBG 1,5t
M24	4	VLBG 4t

5 Mechanical installation

5.1 Installation orientation

Possible Installation orientations.

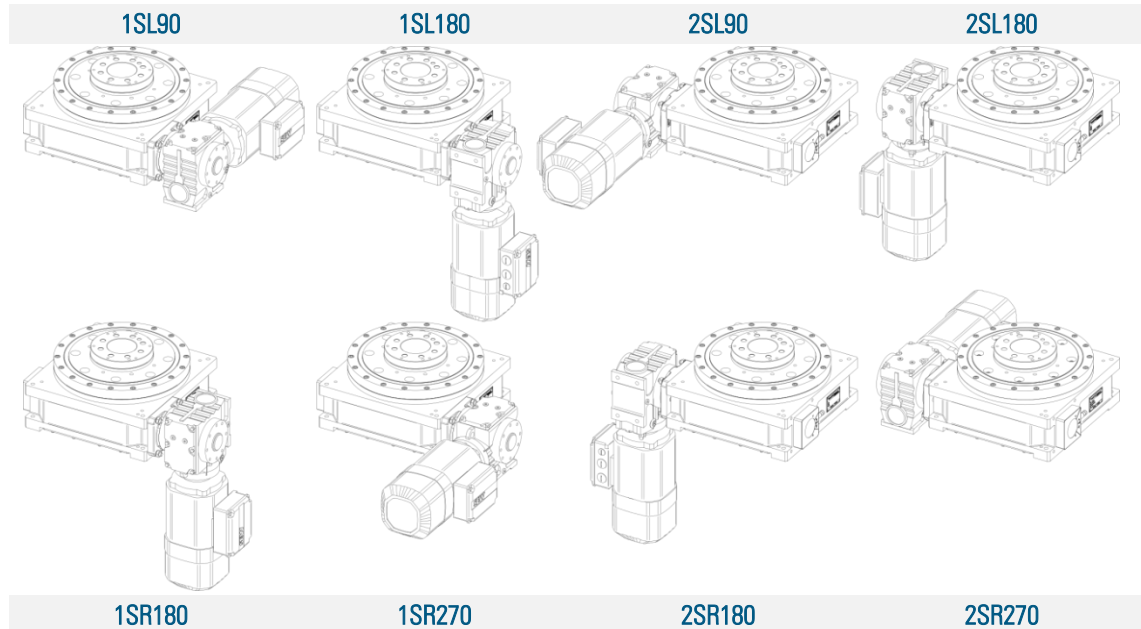


Fig. 10 Possible drive Installation orientation of RT - TT

NOTICE



Damage arising from improper installation of the drive!

Improper installation of the drive can cause significant damage to property and material.

- ▶ Always follow the original operating instructions of the drive manufacturer on mounting the drive (Standard SEW) to the machine.
- ▶ Oil control – and drain bolts as well as air escape valves must be freely accessible without mechanical intervention.

5.2 Securing the drive

Staff

Qualified staff

Protective equipment



The drive must be secured with bolts at the specified points. The type of drive, servo motor or asynchronous motor has to be agreed by TAKTOMAT.

- ▶ Secure the drive with the specified bolts at the specified points (see figure: Drive assembly sequence)
- ▶ Fasten the bolts with the appropriate torque (see torque table)
- ▶ Check tightening torque after fastening

Mount the drive on the Rotary indexing table as follows:

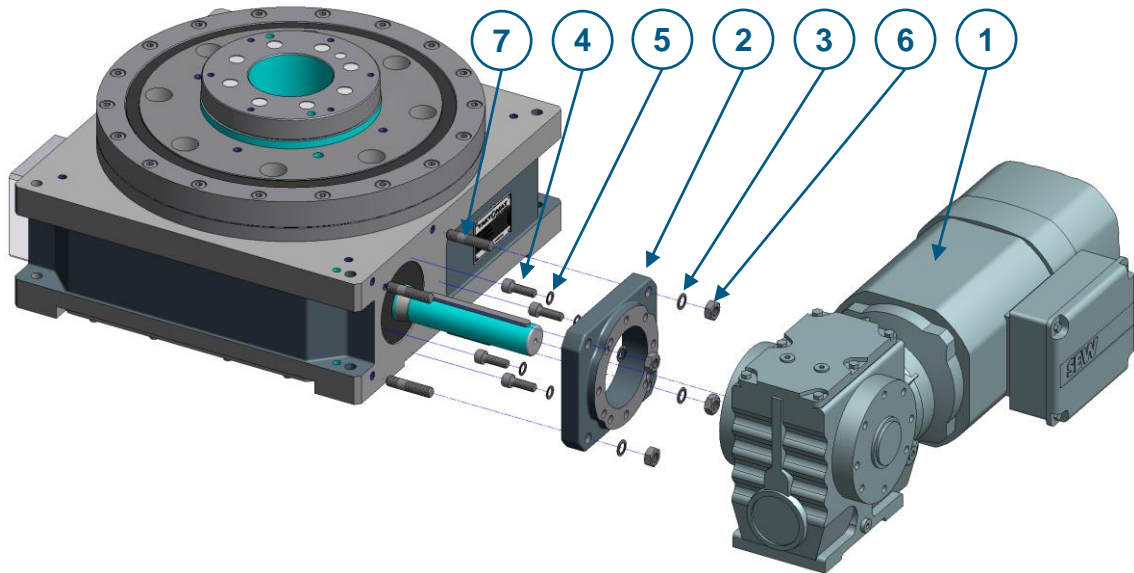


Fig. 11 Drive assembly sequence

Item	Designation
1	Drive
2	Adapter flange
3	SCHNORR washer
4	Allen screw
5	SCHNORR washer
6	Nut
7	Bolt

5.3 Installation and commissioning

Safety information

⚠ DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched. Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

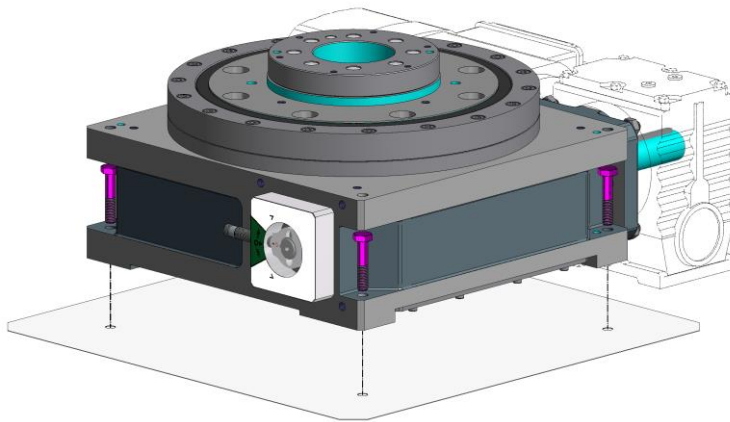


Fig.12 Installation of the Rotary indexing table RT - TT; Side (6) Standard

5.3.1 Installation

Staff **Protective equipment**

Qualified staff



- ▶ The surface on which the partly completed machinery is to be installed must be level.
- ▶ Clean the installation surface and apply a film of oil.
- ▶ Place the Rotary indexing table RT - TT on the installation surface.
- ▶ Secure the Rotary indexing table RT - TT with screws and studs according to requirements.
- ▶ Compare the power supply with the details on the nameplate.
- ▶ Connect the drive
- ▶ The housing of the Rotary indexing table RT - TT has to be earthed consistently according to the VDE regulations with adequate width.

Accessories on the star wheel / output flange

Observe the following constraints when attaching accessories to the star wheel / output flange:

- ▶ Maximum weight moved (as per Taktomat project planning)
- ▶ Minimum positioning time (as per Taktomat project planning)
- ▶ Maximum overhang (tipping moment) (as per Taktomat project planning)
- ▶ Maximum tightening torque for securing holes, see torque table

5.4 Adjustment of the position cam series with open position indicator

Exclusively for designs with fixed indexing

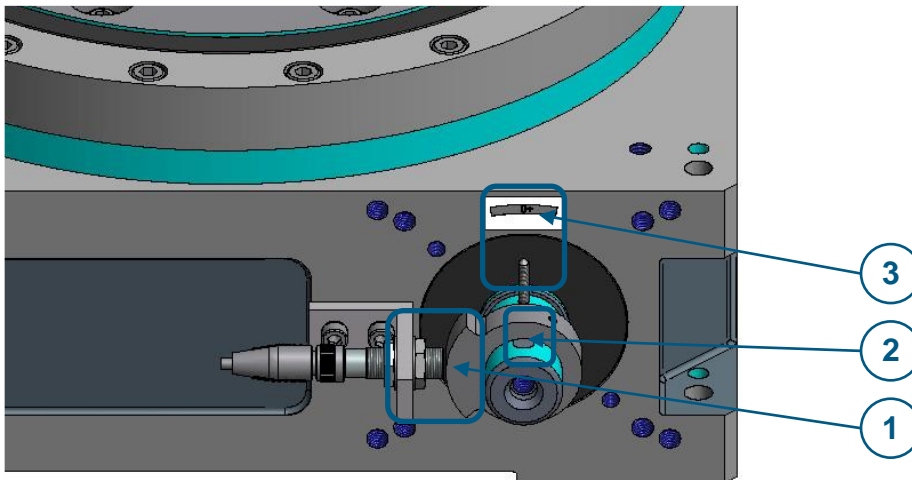


Fig. 13 Detail position cam

- (1) Middle of switch flag aligned with the sensor
- (2) Centrally to the dwell phase arranged position cam (Position of the keyway / pointer point towards the output flange / star wheel or the zero reference mark on the decal)
- (3) Decal zero position (The grey area of the decal is only symbolic and does not indicate the length of the dwell phase.)

The position cam is secured positively in place on the drive shaft. It is correctly set up when the keyway (2) and the pointer point to the zero reference mark on the decal (3) and the middle of the switching flag is aligned with the sensor (1).

5.5 Maintenance task

5.5.1 Maintenance plan

Interval	Maintenance activity	Staff
Daily	General visual and acoustic inspection	Operator
Monthly	Check that no oil is escaping from the Rotary indexing table RT - TT	Operator
Monthly	Check oil level	Operator
Semi - annual	Visual inspection for damage Remove any dust deposits (especially on ventilation grills of the drive units) Inspect electric cables for damage	Qualified staff
Annual	Controll Rotary indexing table if it is without play in dwell position	Qualified staff

5.6 Lubrication

5.6.1 Requirements for lubricants

General

To ensure safe operation and a long service life, it is necessary to lubricate the machine carefully. The specified oil and grease must be applied to all lubrication points.

Carefully clean dirty lubrication points using a suitable agent and then lubricate them with new lubricant. After lubrication, any excess lubricant must be removed and properly disposed of.

The oil and grease used must be silicone-free.

Lubricating oil

Use only lubricating oil compliant with DIN 51 517 (ISO VG 460)

Recommended gear oil

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

Lubricating grease

Use only lubricating grease compliant with DIN 51 825-KP 2K.

Recommended lubricating 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 N-20
Mobil	Mobilux EP2	KP2 K-30

Note:

Only use lithium soap based grease for lubrication. The use of greases based on different materials causes gummy deposits, decomposes the grease and destroys its lubricating properties.

6 Troubleshooting

DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched. Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

WARNING



Risk of injury from improper troubleshooting!

Improper troubleshooting can cause serious injury to staff and material.

- ▶ Before starting work ensure that there is sufficient room to carry out the work.
- ▶ Pay attention to tidiness and cleanliness in the working area! Loose parts and tools which are piled up or lying around are sources of accidents.

Fault	Possible cause	Remedy
Drive does not turn	<ul style="list-style-type: none"> • No supply voltage • Drive contactor malfunction • Drive protection switch triggered • Brake not released 	<ul style="list-style-type: none"> ▶ Check power supply ▶ Change contactor ▶ Let the drive cool down; latch the protection switch of the drive ▶ Incorrectly connected or worn brake ▶ Check sensor settings at the switching cam. ▶ Check sensor cable at the sensor
Drive turns, but the mounting plate does not move	<ul style="list-style-type: none"> • Worm gear malfunction • Safety coupling overload / disengaged • Cam followers tear off due to massive overload • Levers broken • Cone clamping element not correctly mounted 	<ul style="list-style-type: none"> ▶ Contact TAKTOMAT ▶ Remove outside blockade / latch the safety coupling ▶ Contact TAKTOMAT ▶ Contact TAKTOMAT ▶ Mount cone clamping element correctly according to operating instruction of manufacturer
Drive turns, but mounting plate does not move, mounting plate is not free of play	<ul style="list-style-type: none"> • Cam follower tear off due to overload 	<ul style="list-style-type: none"> ▶ Contact TAKTOMAT
Drive turns with strong humming noise	<ul style="list-style-type: none"> • Drive operates on 2 phases 	<ul style="list-style-type: none"> ▶ Check fuse or drive contactor ▶ Measure current on all 3 phases; voltage measurement is not enough

Fault	Possible cause	Remedy
No signal from sensor	<ul style="list-style-type: none">• Sensor not activated / not fully activated• Cable defective• Sensor defective• No supply voltage	<ul style="list-style-type: none">▶ Remove blockage▶ Check cable, exchange if necessary▶ Exchange sensor▶ Check supply voltage

7 Disposal

WARNING



Risk of environmental damage caused by improper disposal!

Improper disposal of components can cause environmental damage to persons and environment.

- ▶ Disposal of the components in accordance with the applicable local rules
- ▶ Environmentally compatible disposal of auxiliary substances such as chemicals, paints, acids, alkalis, adhesives
- ▶ Essentially components of the machine consists of following materials: copper (drive unit, electrical lines) Steel, aluminium and grey cast iron (housing, structures, shaft, bearings, ...) Plastics (tooth belt, isolation, components of bearings).

DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched.

Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

Before starting disassembly:

- ▶ Disconnect all power supplies to the partly completed machinery, ensure that it cannot be reconnected and verify that the circuit is de-energized
- ▶ Wait 15 Minutes, until all live parts are full discharged
- ▶ Disassemble assemblies and components, observing any local environmental protection regulations

8 Spare part and wear part RT - TT

Spare part must meet the manufacturer's technical specifications. This is always ensured if original Spare parts are used.

Spare part and wear part of the product Rotary indexing table are basically order specific. To accelerate the order process of the Spare part and wear part, we need the following information which is located on the nameplate: Serial number of the Rotary indexing table RT - TT (see chapter nameplate).

9 Annex

9.1 Safety data sheets

No.	Designation
1	EP 2 Grease Data Sheet HI
2	MOBILGEAR 600 XP 460