

TSR Series

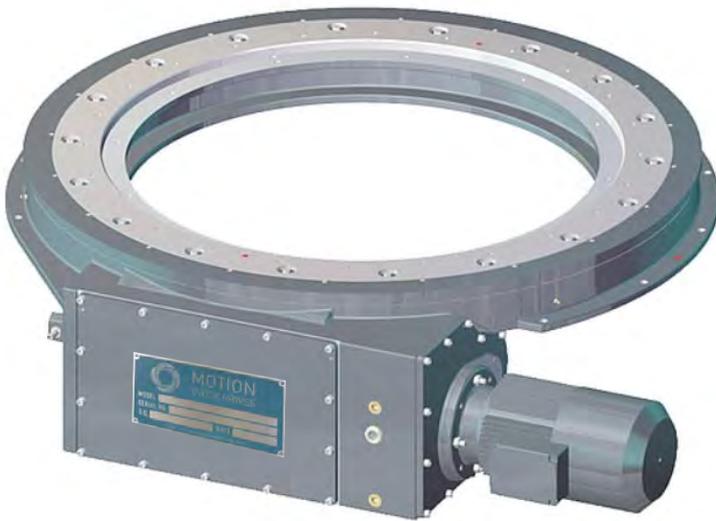
Ring Index Drives - Circular Indexing



MOTION INDEX DRIVES

RING INDEX DRIVES – TSR Series

The Motion Index Drives TSR Series Rotary Indexing Ring Table encompasses a range of sizes that offer solutions for many applications. Four different models are available in our standard line: TSR600, TSR1000, TSR1400 and the TSR1900. Our Rotary Ring Index Drive are ideal for applications that require large, open center accessibility for tooling and other devices. The Rotary Indexing Ring Table can be manufactured with a fixed number of stations or as a flexible turntable with a servo motor or standard AC brake motor with encoder.



Advantages for design engineers and special machine builder

- Easy synchronization of other mechanical devices
- Open center for mounting equipment
- Tooling designs can be up to 20' (6 meters) in diameter
- Oscillation indexing operation capabilities are standard

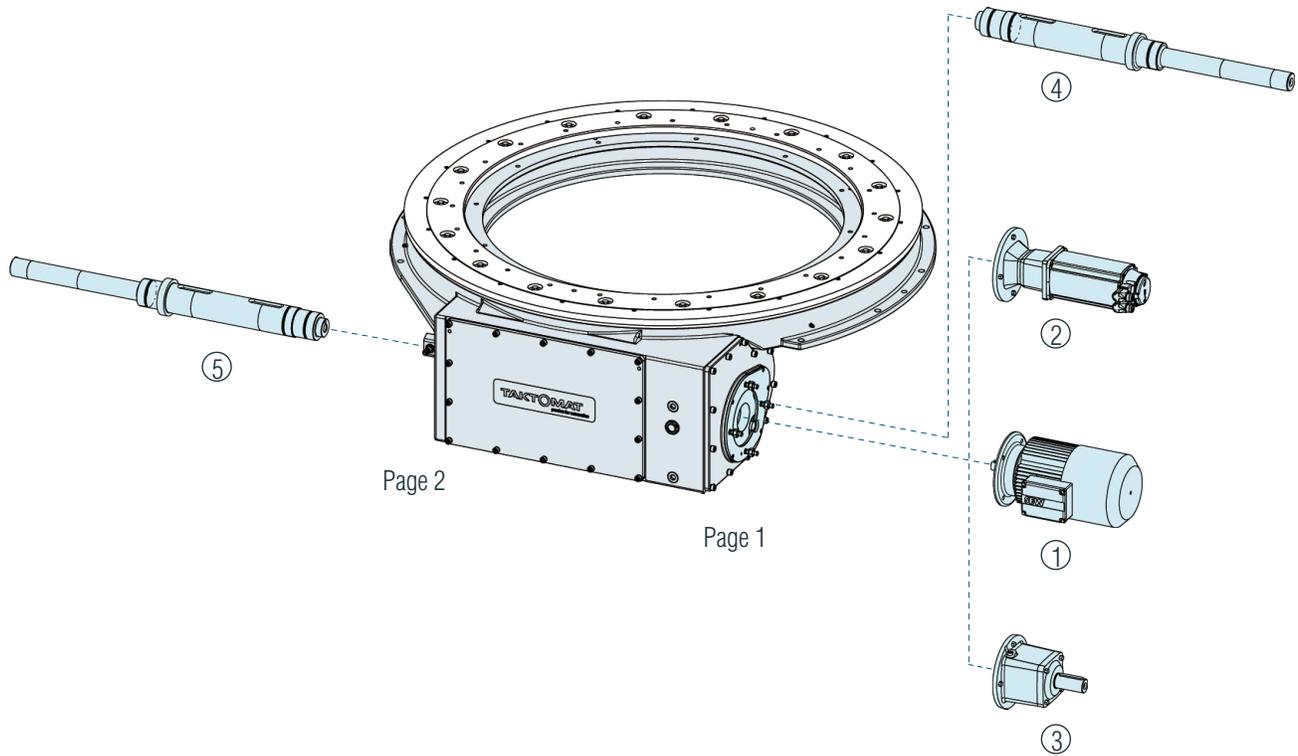
Options for individual customer requirements

- Extremely reliable with long service lives
- Flame hardened cams and cam followers
- Internal components immersed in oil bath
- Accuracies of up to ± 0.023 mm (0.0009")
- 4-Point contact bearing increases load capacities
- 2 to 96 station indexing step capability
- Custom indexing and dwell periods available for synchronization.

Technical benefits for users

- Custom riser base weldments
- Custom top dials
- User-controlled stations
- Clean room ready
- Extremely high accuracy applications
- More Options

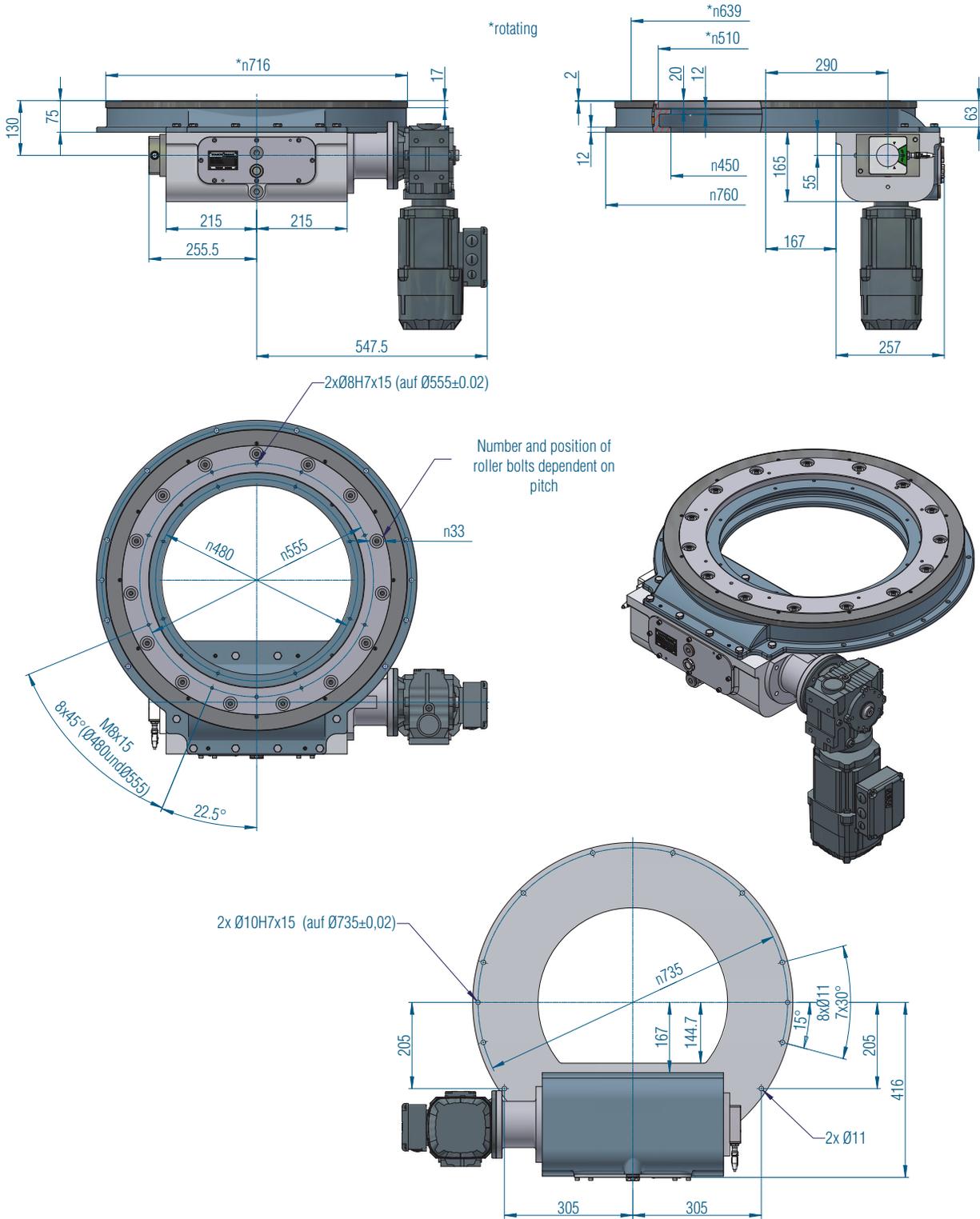
Variable drive concept



	Drive	Positional query	Internal translation
①	Three-phase brake motor (standard)	Inductive sensor on side 2	Internal spur gear with a total of 11 different transmission possibilities (non-finite pitch ratio).
②	Adapter for servo motor	Angle measurement system on side 2	
③	Adapter with input shaft for external drive	Inductive sensor or angle measurement system on side 2	Direct drive, one revolution of the free input shaft = one revolution of the drive curve = one step on the ring
④	Free shaft for external drive (side 1)	Inductive sensor or angle measurement system on side 2	
⑤	Free shaft for external drive (side 2)	Inductive sensor or angle measurement system on side 2	
		Inductive sensor or angle measurement system on side 1	



TSR600



The drive unit shown is an SEW brake motor of size IEC 90

Dimensions

The dimensions shown here indicate the standard. Of course, we are happy to machine the output ring according to your specifications. The drive can also be designed with a servo motor or free shaft upon request.

If you would like to install the TSR vertically or in a different position, please inform us so that we can make the necessary changes.

Attention! Never drill through the housing or the output ring.

Attention! Depending on the drive size used, the dimensions for the motor may vary.



Load table TSR600

Stage		1	2	3	4	5	6	7	8	9	10	11	12
n													
4	t				0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J				33	69	146	224	296	370	562	749	1243
6	t			0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J			56	104	209	435	665	875	1092	1658	2207	4568
8	t			0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J			76	141	284	589	900	1183	1476	2242	2983	
10	t		0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J		41	100	184	369	765	1168	1535	1915	2908	3869	
12	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J	27	51	123	227	453	938	1432	1882	2348	3565	4743	
16	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72		
	J	38	70	215	393	783	1275	1945	2556	3189	4841		
20	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	49	90	215	393	783	1618	2468	3242	4045			
24	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	59	110	260	475	945	1954	2979	3914	4883			
30	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	40	75	179	327	652	1348	2056	2702	3371			
36	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	49	90	215	394	785	1622	2474	3250	4056			

n = pitch (number of stops/360° output drive rotation)

J = Mass moment of inertia (body plate + devices and steps) in kgm²

t = step time in seconds
Step = Step speed

Intermittent mode

In the standard version (load table), the switching angle of the curve is 300°. The bosh angle is 60°. The TSR has its own drive.

Continuous mode

In fast-running machines, the TSR is often connected rigidly to other mechanical systems via a free drive shaft. In order to achieve a certain ratio between the switching and bosh phases, the switching and bosh angles of the drive curve can be adjusted over a wide range.

Approach any angle

With a special drive cam, servo motor and measurement system, it is possible to drive any angle, speed and acceleration shape with the output ring. In this case, the TSR behaves like an NC axis.

Technical data

Main dimensions

Output ring outer/inner Ø [mm]	639/ 510
Height (clamping surface to output ring)	75
Centre bore Ø [mm]	450*
Recommended max. body size Ø [mm]	2400
Stop numbers	4, 6, 8, 10, 12, 16, 20, 24, 30, 36 (other stop numbers upon request)
Rotary table weight [kg]	235
Rotational direction	right, left, oscillating
Mounting position	horizontal **

Load output ring

Axial force [kN]	561
Radial force [kN]	264
Tilting torque [kNm]	81.1

Accuracy

Pitch accuracy ["]	±20***
Axial runout at output flange [mm]	±0.03
Radial runout at output flange [mm]	±0.03

Standard drive

Motor	SEW
Series size	IEC71-90
Voltage [V]	230/400
Rating [kW]	0.37-1.5

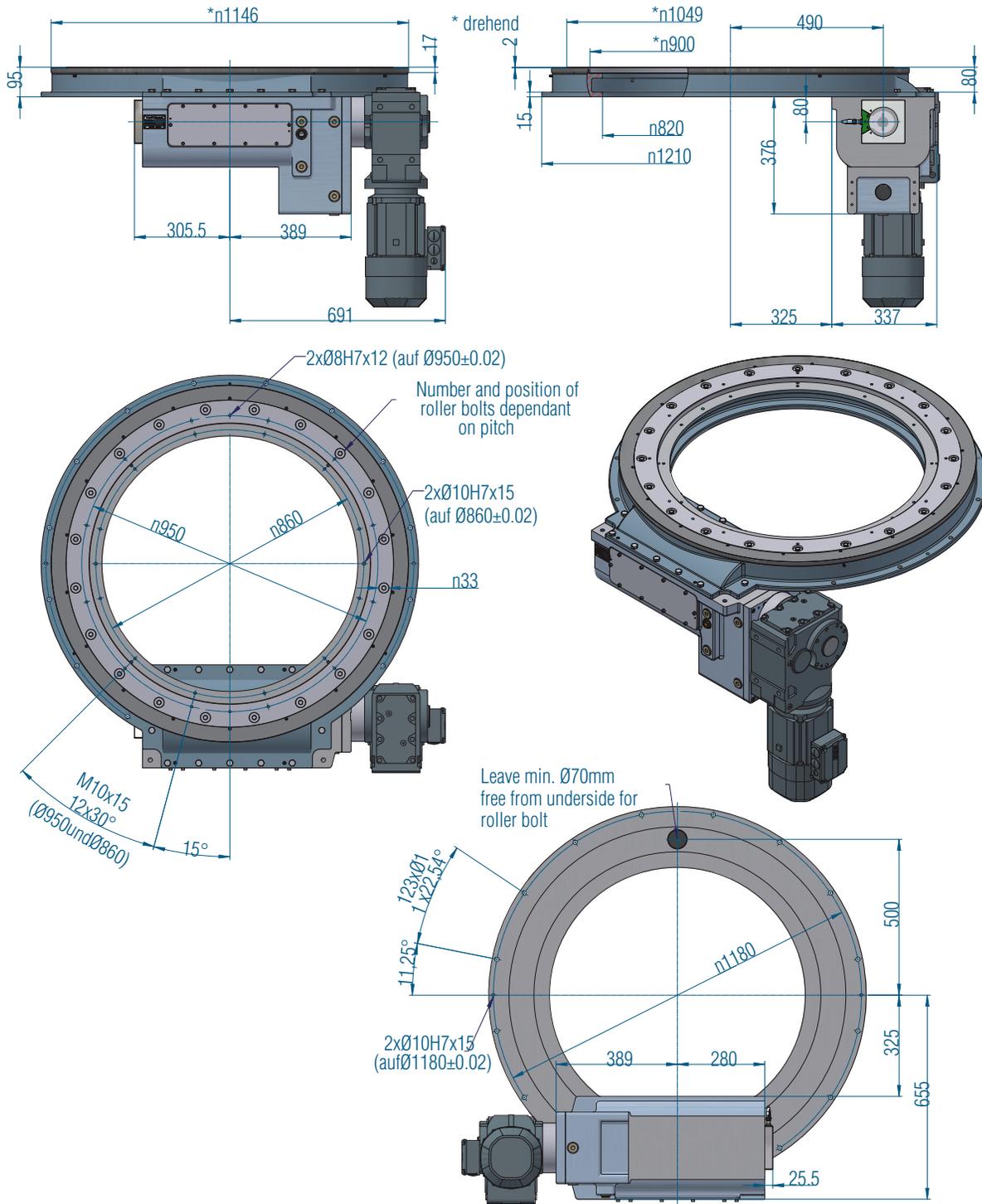
* Pay attention to the interference contour of the gearbox!

** When using additional lubrication systems, any installation position is possible.

*** Increased pitch accuracy < 5" is possible upon request.



TSR1000



Dimensions

The drive unit shown is an SEW brake motor of size IEC 90

The dimensions shown here indicate the standard. Of course, we are happy to machine the output ring according to your specifications. The drive can also be designed with a servo motor or free shaft upon request.

If you would like to install the TSR vertically or in a different position, please inform us so that we can make the necessary changes.

- ⚠ Attention! Never drill through the housing or the output ring.
- ⚠ Attention! Depending on the drive size used, the dimensions for the motor may vary.



Load table TSR1000

Stage		1	2	3	4	5	6	7	8	9	10	11	12
n													
6	t			0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J			98	199	420	895	1378	1817	2273	3463	4615	9572
8	t			0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J			149	292	603	1272	1953	2573	3216	4894	6518	
10	t		0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J		70	198	380	779	1635	2506	3299	4122	6267	8345	
12	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J	39	91	246	468	953	1993	3051	4016	5016	7624	10150	
16	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72		
	J	62	132	341	641	1296	2702	4132	5435	6786	10310		
20	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	84	172	436	814	1639	3408	5208	6848	8549			
24	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	107	213	531	985	1977	4106	6272	8245	10291			
30	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22			
	J	140	273	670	1238	2479	5141	7849	10316	12875			
36	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00				
	J	132	259	637	1178	2360	4896	7476	9826				

n = pitch (number of stops/360° output drive rotation)

J = Mass moment of inertia (body plate + devices and steps) in kgm²

t = step time in

seconds Step = Step speed

Intermittent mode

In the standard version (load table), the switching angle of the curve is 300°. The bosh angle is 60°. The TSR has its own drive.

Continuous mode

In fast-running machines, the TSR is often connected rigidly to other mechanical systems via a free drive shaft. In order to achieve a certain ratio between the switching and bosh phases, the switching and bosh angles of the drive curve can be adjusted over a wide range.

Approach any angle

With a special drive cam, servo motor and measurement system, it is possible to drive any angle, speed and acceleration shape with the output ring. In this case, the TSR behaves like an NC axis.

Load table TSR1000

Main dimensions

Output ring outer/inner Ø [mm]	1049/ 900
Overall height (clamping surface to output ring)	95
Centre bore Ø [mm]	820*
Recommended max. body size Ø	4000
Stop numbers (other stop numbers upon request)	4, 6, 8, 10, 12, 16, 20, 24, 30, 36
Rotary table weight [kg]	575
Rotational direction	right, left, oscillating **

Load output ring

Axial force [kN]	1130
Radial force [kN]	531
Tilting torque [kNm]	281.2

Accuracy

Pitch accuracy ["]	±20***
Axial runout at output flange [mm]	±0.03
Radial runout at output flange [mm]	±0.03

Standard drive

Motor	SEW
Series size	IEC71-90
Voltage [V]	230/400
Rating [kW]	0.37-1.5

Pay attention to the interference contour of the gearbox!

* When using additional lubrication systems, any mounting position is possible.

** Increased pitch accuracy < 5" possible on request.



Load table TSR1401

Stage		1	2	3	4	5	6	7	8	9	10	11	12
n													
6	t			0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J			76	195	455	1013	1581	2098	2635	4034	5389	11219
8	t			0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J			144	320	702	1522	2356	3117	3905	5961	7953	19162
10	t		0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J		57	227	469	997	2132	3286	4337	5428	8271	11026	26528
12	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	4.00
	J	18	87	297	596	1249	2652	4078	5378	6726	10241	13646	32808
16	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J	51	147	436	849	1750	3684	5652	7445	9305	14154	18851	
20	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J	82	204	568	1088	2225	4664	7146	9406	11751	17866	23788	
24	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J	114	260	698	1325	2695	5633	8622	11345	14170	21536	28671	
30	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72	3.13	
	J	161	345	897	1686	3409	7107	10869	14297	17851	27122	36101	
36	t	0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22	2.72		
	J	208	430	1094	2043	4117	8568	13096	17220	21498	32656		

n = pitch (number of stops/360° output drive rotation)

J = Mass moment of inertia (body plate + devices and steps) in kgm²

t = step time in seconds
Step = Step speed

Intermittent mode

In the standard version (load table), the switching angle of the curve is 300°. The bosh angle is 60°. The TSR has its own drive.

Continuous mode

In fast-running machines, the TSR is often connected rigidly to other mechanical systems via a free drive shaft. In order to achieve a certain ratio between the switching and bosh phases, the switching and bosh angles of the drive curve can be adjusted over a wide range.

Approach any angle

With a special drive cam, servo motor and measurement system, it is possible to drive any angle, speed and acceleration shape with the output ring. In this case, the TSR behaves like an NC axis.

Technical data

Main dimensions

Output ring outer/inner Ø [mm]	1499/ 1320
Overall height (clamping surface to output ring)	99.5
centre bore Ø [mm]	1270*
Recommended max. body size Ø	6000
Stop numbers	4, 6, 8, 10, 12, 16, 20, 24, 30, 36
(other stop numbers upon request)	
Rotary table weight [kg]	1225
Rotational direction	right, left, oscillating **

Load output ring

Axial force [kN]	1552
Radial force [kN]	730
Tilting torque [kNm]	540.3

Accuracy

Pitch accuracy ["]	±20***
Axial runout at output flange [mm]	±0.03
Radial runout at output flange [mm]	±0.03

Standard drive

Motor	SEW
Series size	IEC71-90
Voltage [V]	230/400
Rating [kW]	0.37-1.5

* Pay attention to the interference contour of the gearbox!

** When using additional lubrication systems, any mounting position is possible.

*** Increased pitch accuracy < 5" possible on request.



Load table TSR1900

Stage		1	2	3	4	5	6	7	8	9	10	11	12
n													
12	t					0.71	1.00	1.43	1.75	2.00	2.22		
	J					670	1562	3478	5426	7202	9043		
16	t				0.54	0.71	1.00	1.43	1.75	2.00	2.22		
	J				440	994	2206	4805	7449	9858	12356		
20	t			0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22		
	J			130	622	1325	2862	6158	9512	12567	15735		
24	t			0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22		
	J			208	803	1654	3512	7500	11557	15252	19086		
30	t			0.36	0.54	0.71	1.00	1.43	1.75	2.00	2.22		
	J			323	1072	2143	4482	9500	14606	19257	24082		
36	t		0.28	0.36	0.54	0.71	1.00	1.43	1.75	2.00			
	J		138	440	1344	2636	5458	11513	17674	23287			
48	t		0.28	0.36	0.54	0.71	1.00	1.43	1.75				
	J		265	669	1876	3603	7375	15467	23701				

n = pitch (number of stops/360° output drive rotation)
 J = Mass moment of inertia (body plate + devices and steps) in kgm²

t = step time in seconds
 Step = Step speed

Intermittent mode

In the standard version (load table), the switching angle of the curve is 300°. The bosh angle is 60°. The TSR has its own drive.

Continuous mode

In fast-running machines, the TSR is often connected rigidly to other mechanical systems via a free drive shaft. In order to achieve a certain ratio between the switching and bosh phases, the switching and bosh angles of the drive curve can be adjusted over a wide range.

Approach any angle

With a special drive cam, servo motor and measurement system, it is possible to drive any angle, speed and acceleration shape with the output ring. In this case, the TSR behaves like an NC axis.

Technical data

Main dimensions

Output ring outer/inner Ø [mm]	1959/ 1790
Overall height (clamping surface to output ring)	110
Centre bore Ø [mm]	1710*
Recommended max. body size Ø [mm]	7800
Stop numbers	4, 6, 8, 10, 12, 16, 20, 24, 30, 36
(other stop numbers on request)	
Rotary table weight [kg]	3300
Direction of rotation	right, left, oscillating
Mounting position	horizontal **

Load output ring

Axial force [kN]	2088.2
Radial force [kN]	982
Tilting torque [kNm]	977

Accuracy

Pitch accuracy ["]	±20***
Axial runout at output flange [mm]	±0.03
Radial runout at output flange [mm]	±0.03

Standard drive

Motor	SEW
Series size	IEC71-90
Voltage [V]	230/400
Rating [kW]	0.37-1.5

* Pay attention to the interference contour of the gearbox!

** When using additional lubrication systems, any in-stallation position is possible.

*** Increased pitch accuracy < 5" is possible upon request.



Accessories: Universal control type TIC



Properties and user benefits

A rotary indexing table can be controlled in many different ways. With this universal control, we would like to provide you with a tool with which you can optimally operate the rotary table without much effort.

- Cycle time optimisation through exact stopping of the drive in the bosh phase
- Minimisation of the costs of installation and hardware
- Simple integration through fieldbus connection (ProfiNet, EtherCAT, Ethernet/IP) and aids for integration (step-by-step instructions and video tutorials)
- Motor protection switches and mechanical or electronic contactors can be omitted. Only line protection is necessary.
- Fast, gear-protecting braking during emergency stop
- Safety functions STO, SS1, SLS for max. PL e (SIL 3) with STO
- Smooth restart from intermediate positions or after emergency stop
- Machine-friendly jogging operation possible even with large tables
- Oscillation or reversal of direction of rotation possible with no additional hardware
- Easy to change the speed
- No brake wear, the brake only closes after emergency stop
- Monitoring of the engine temperature
- Compact, space-saving design

Frequent fields of application

The universal control TIC is optimally suited for all three-phase motor-driven indexing gearboxes:

- Rotary tables type RTX and RTF
- TSR circular tables
- TG globoidal gearboxes
- XT and TP stepper gears
- Timing chains type LFA





MOTION
INDEX DRIVES

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