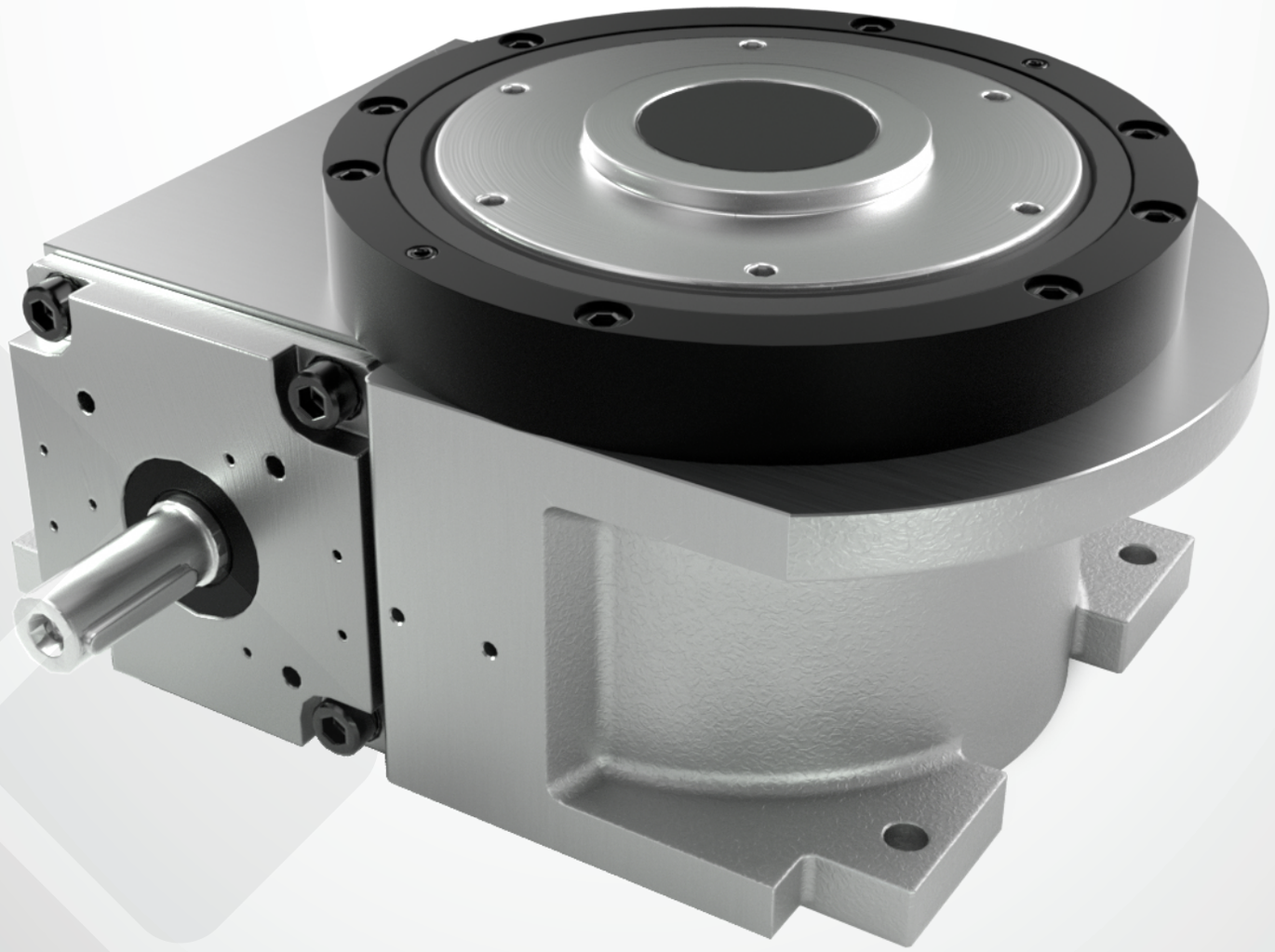
Smart Automation

RIGIDIAL
Globoidal Cam Indexing Tables

TECHNICAL CATALOGUE



ideas of automation

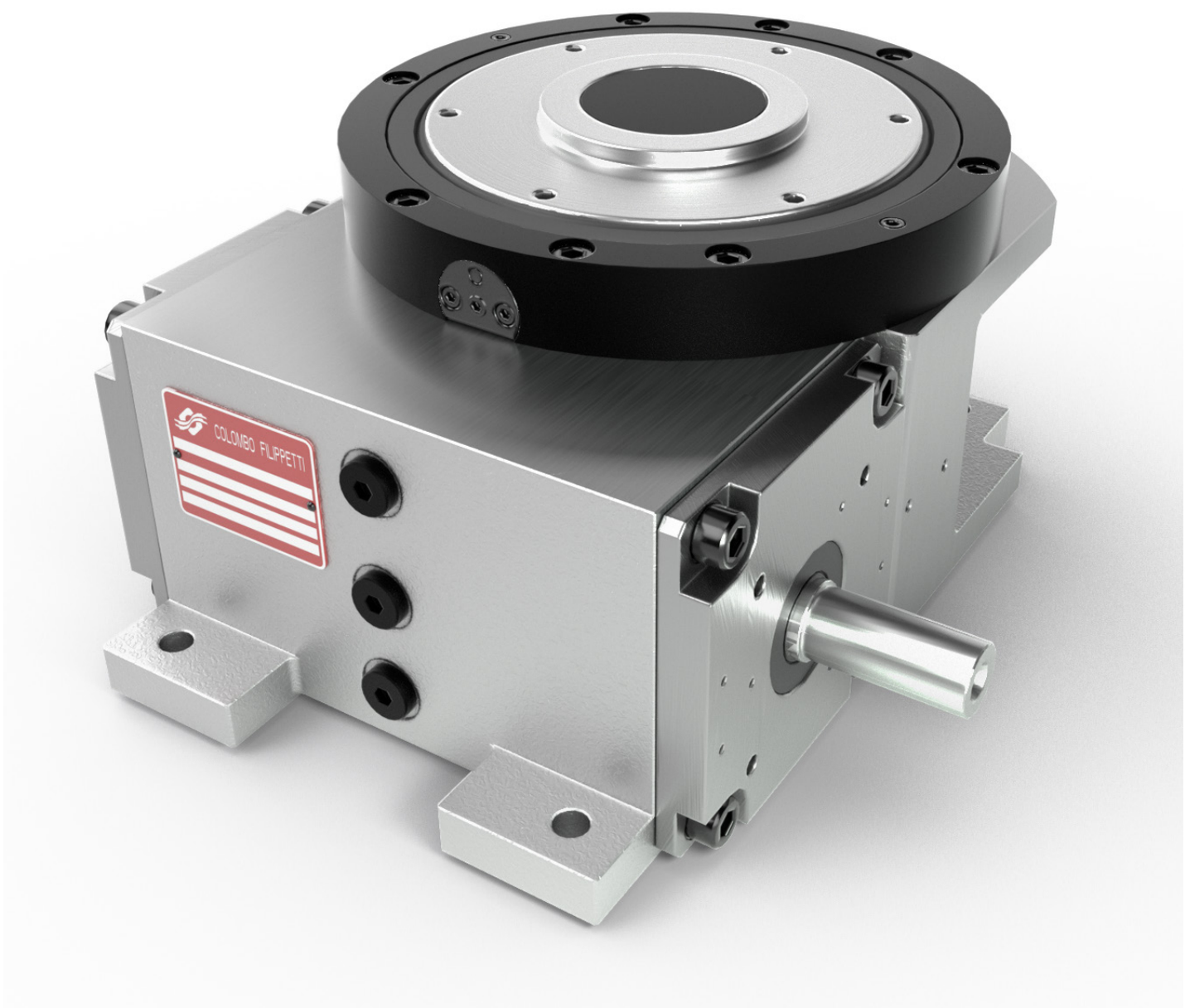
CoFIL
A COLOMBO FILIPPETTI COMPANY

Content index

RIGIDIAL

Globoidal cam indexing tables

RIGIDIAL tables are globoidal cam indexing tables that transform continuous rotary motion into indexing motion. The indexing plate rests on a large-diameter crossed roller bearing that can withstand high axial and tilting loads while maintaining excellent levels of accuracy and rigidity. The cam assures high wear resistance, smooth running, accurate and repeatable positioning without any backlash at the station. A wide range of standard movements is available, including the 2-station movement (180° rotation), which is ideal for tilting or piece exchange applications. The table is highly adaptable to applications in tight spaces and can be mounted in any position. Upon request, the table can be supplied with a central through hub, fixed or rotating. Again upon request, the table can be configured with the output ring for ceiling or upside down mounting. The motorized RIGIDIAL tables are supplied, in the standard version, with a self-braking motor and worm reduction gear with friction torque limiting device. This device contributes to making the table safe, preventing damages that may be caused by emergency stops or stoppages of the output plate during the rotation phase.



Operation

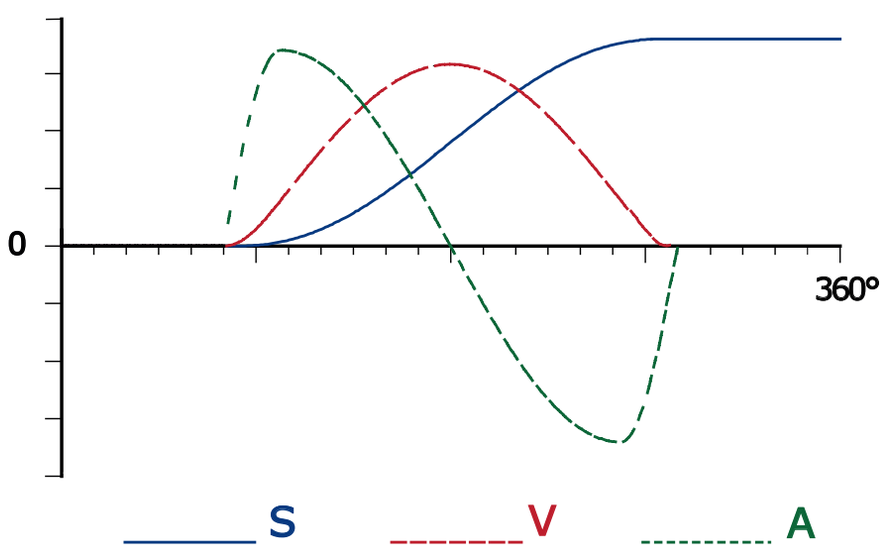
RIGIDIAL tables can be used in two different ways:

Cycle on demand

This is used for applications featuring a long dwell period compared to the indexing period. In this operating mode, the dwell period is determined by means of a cam which, mounted directly on the table input shaft, operates a sensor that signals to the PLC to stop the motor or disengage a clutch-brake unit in the mechanical dwell period of the cam. At the end of the assembly, production and checking operations, the PLC restarts the motor in order to rotate the output plate up to the next station, then waits for the signal that the cam mechanical stop phase has been reached in order to stop the motor once again.

Continuous rotation

This is used in fast applications with high production rates where the machine cycle is carried out in one revolution of the input shaft.
Each single work operation is synchronized within a particular sector of main shaft rotation.

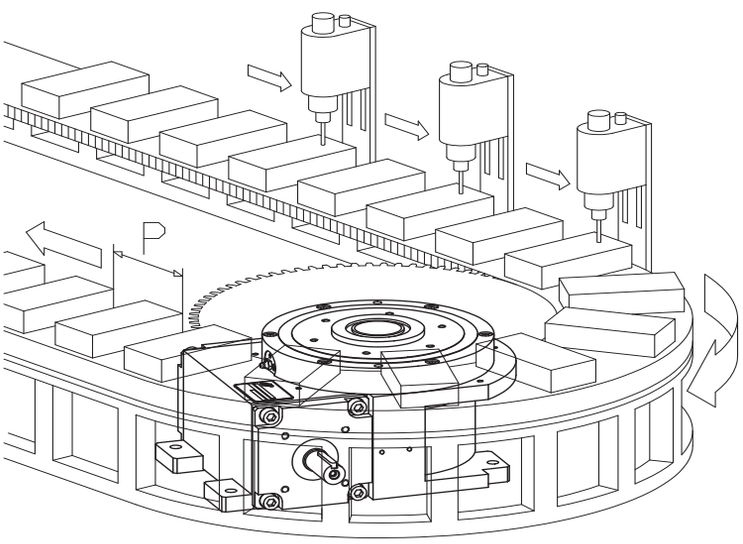


Sizing of the table

The rotary table is sized starting from a calculation of the torque required at the output. This torque has to take into account the inertia of the customer's application, the moment of friction, and the torques due to external, static or dynamic forces requested at the output.
For the purpose of avoiding vibrations during rotation, it is important to evaluate the ratio of the equivalent ratio of inertia to the pitch radius of the table cam followers.
It is also important to use the proper service factor when sizing the reduction gear.

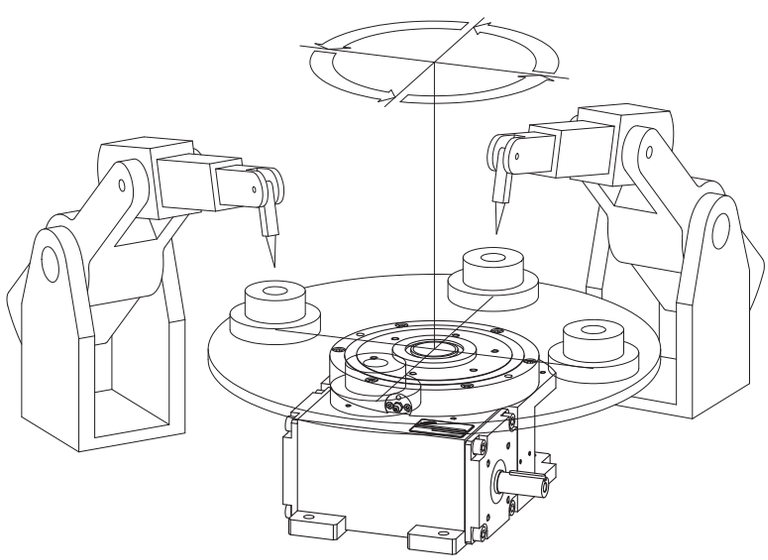
Examples of applications

The use of this table is equally effective in both linear and rotary indexing systems of small and medium size, where the available space is limited and where very fast indexing movements must have positioning accuracy, repeatability and no vibrations.
Typical examples are: assembly systems, transfer systems, welding systems, etc.



RIGIDIAL *used as an indexing table on an assembly machine*

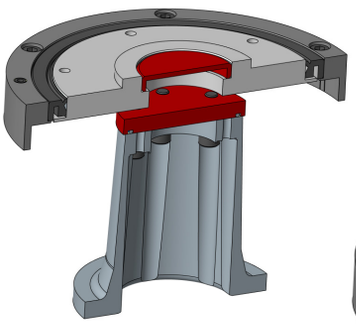
RIGIDIAL *used as a presenting device to a welding robot*



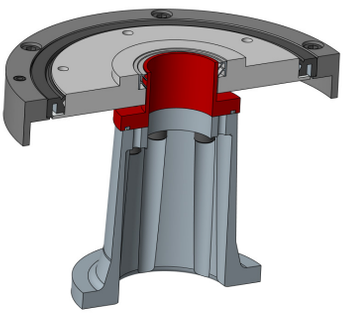
Configurations and Variants Diagram

1

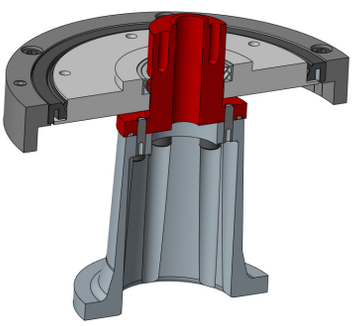
VCS



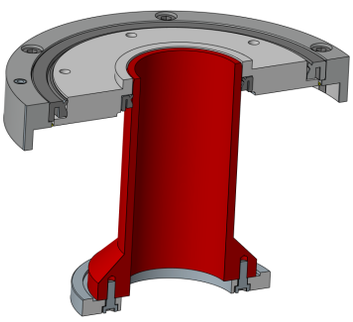
VCT



VCP



VCM



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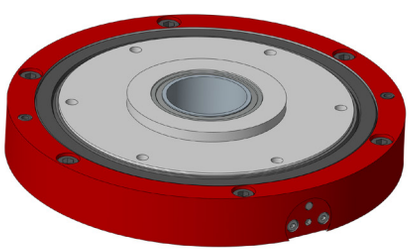
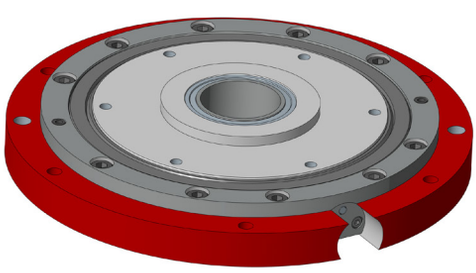


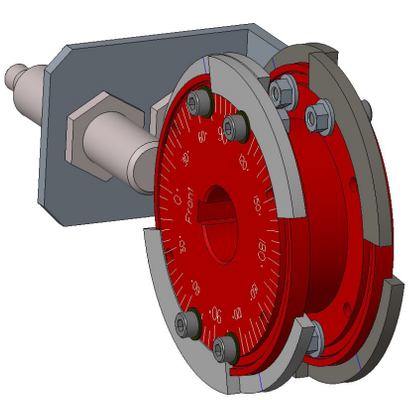
Standard ring



Ring for ceiling or inverted mounting

3

E-Cam

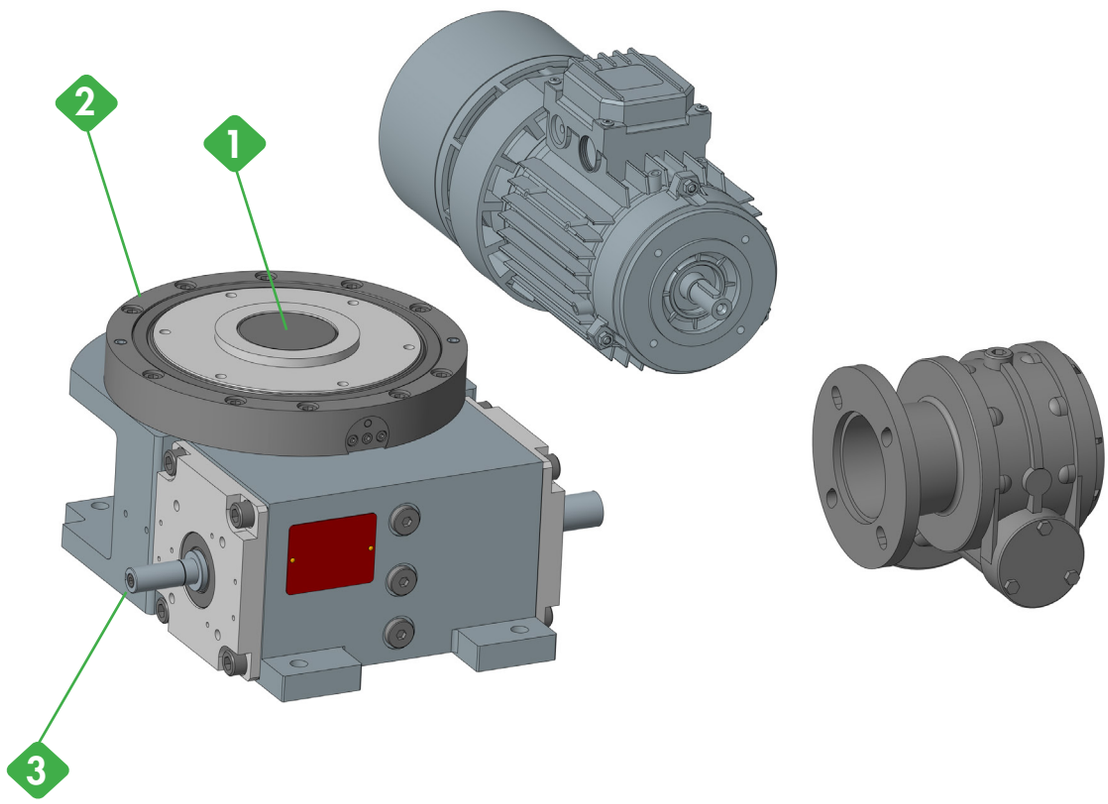


MID PHASE CAM
P.N.P n.c. Sensors

Configurations and Variants Diagram

Standard Configuration

- ✓ Table centre with cover seal (VCS version)
- ✓ Crossed roller bearing ring
- ✓ Universal mounting
- ✓ Worm reduction gear with torque limiter and self-braking motor
- ✓ MID or CM4 type cam assembly with double phase switch for consent operation

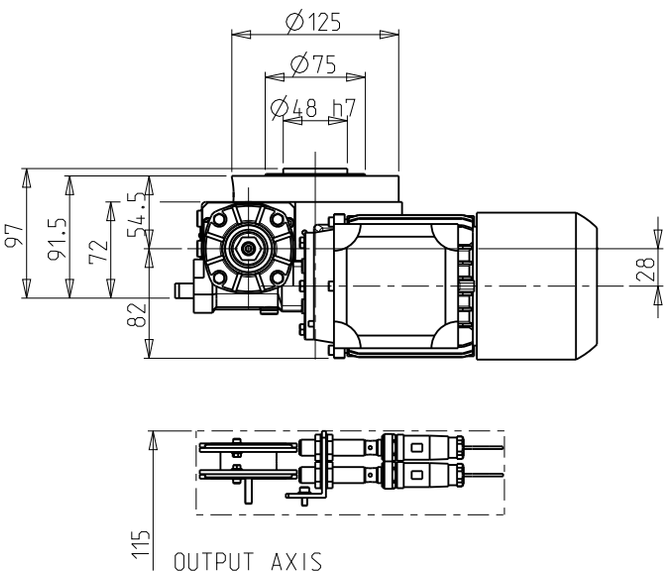


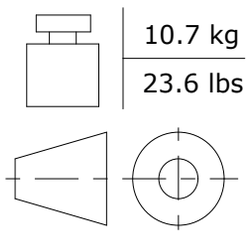
Accessories and Variants

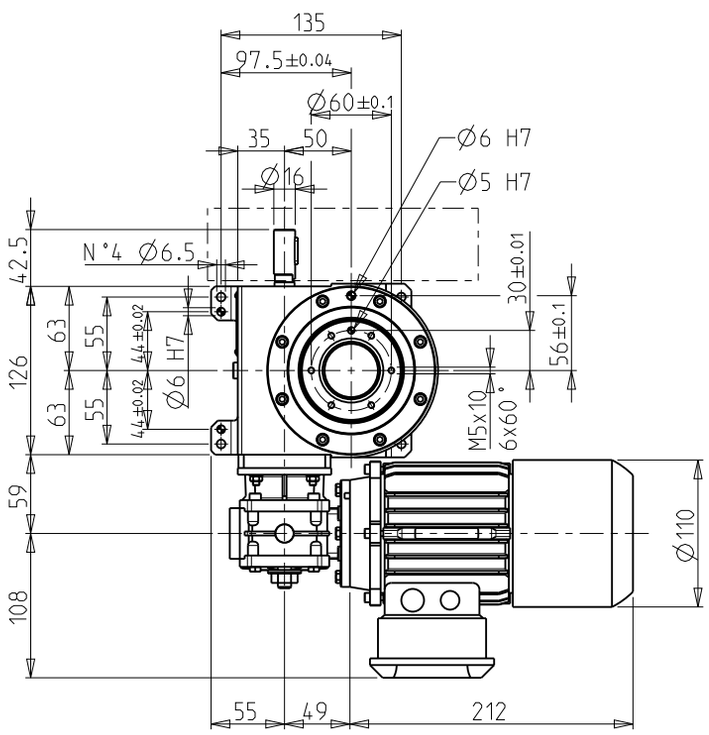
- ✓ Cam with hardened and ground profile
- ✓ Reversed direction pertaining to the rotation of the motion input shaft-output plate
- ✓ Output version normal fixed central through hole without fixing holes (VCT version)
- ✓ Output version with large fixed central through hole without fixing holes (VCM version)
- ✓ Output version with projecting fixed central hub, through hole and fixing holes (VCP version)
- ✓ Version with ring for ceiling mounting
- ✓ Holes for reference pins on output plate and box
- ✓ Reduction gear with LF-type torque limiter or without limiter
- ✓ Smaller reduction gear
- ✓ Regular motor
- ✓ Motorization on opposite side of the table
- ✓ Supply of table only without motorisation and micro assembly (VS version)
- ✓ E-Cam control system for stopping the table and auxiliary equipment command

RIG03

Configuration with reduction gear and self-braking motor (VLRA)







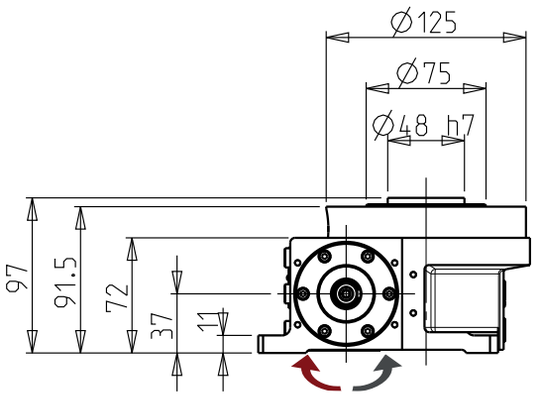
Reduction gear
RMI 28F1-PAMB14 - LCB

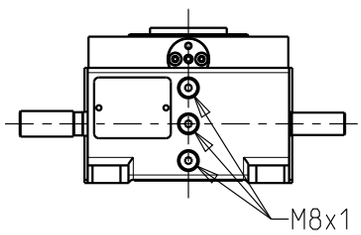
Notes

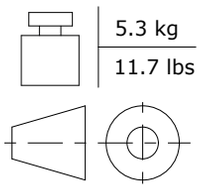
- By reversing the direction of rotation of the input shaft, the direction of rotation of the output shaft is reversed, while the kinematic characteristics of the intermittent motion in standard mechanisms remain unchanged.
- The 6 holes M5x10 on the output plate are in the position shown (pg.6 and 7) when the table is in the dwell period at one of the stations
- The input shaft notches are in the position shown (pg.7) when the table is halfway through its dwell period
- Some combinations of motors and reduction gears limit the performance of the tables
- Standard direction of rotation (right helix of the cam) as indicated by the arrows
- The pin with Ø16x42.5 screwed on the input shaft must only be used as support for the control cams of the micro switches
- E-cam not available for this size
- On some motors, the terminal box is rotated by 45° compared to the one shown in the drawing

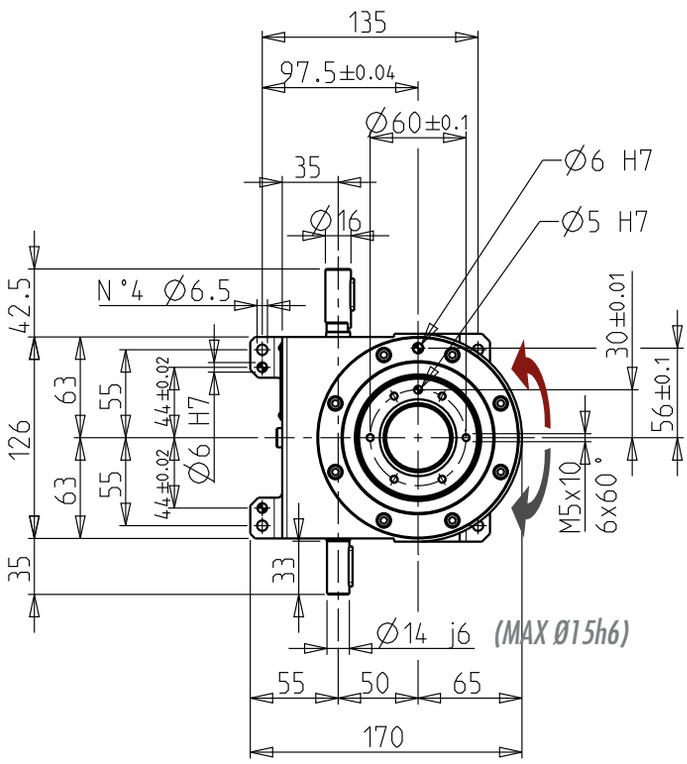
RIG03

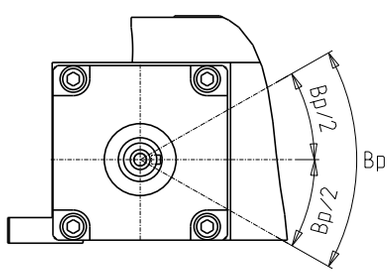
Configuration with short input shaft (VS)









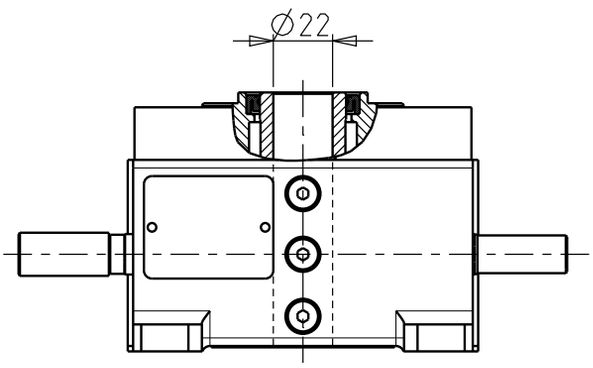


Concentricity		Plate Planarity	Division Precision			
Precision	on Ø	Precision	Single cycle (up to 12 stations)		Double cycle (from 16 stations)	
0.01 mm	48 mm	0.01 mm	±60″	±0.015 mm /40 mm	±90″	±0.02 mm /40 mm

RIGO3

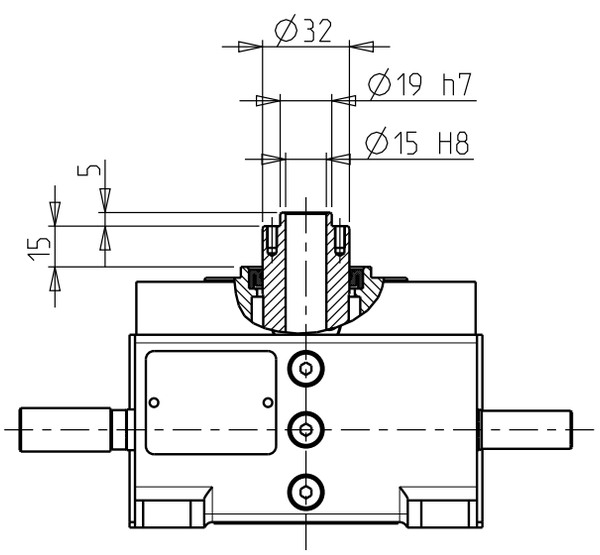
Optional configurations of the Output Plate

VCT

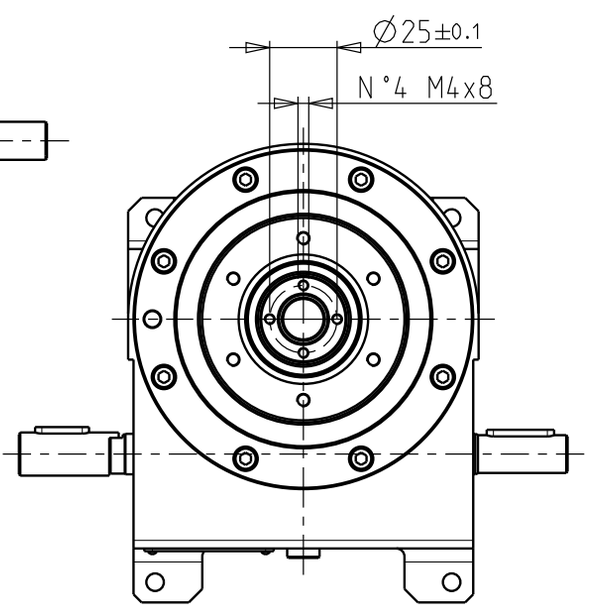


Central fixed through hub, without fixing holes.

VCP

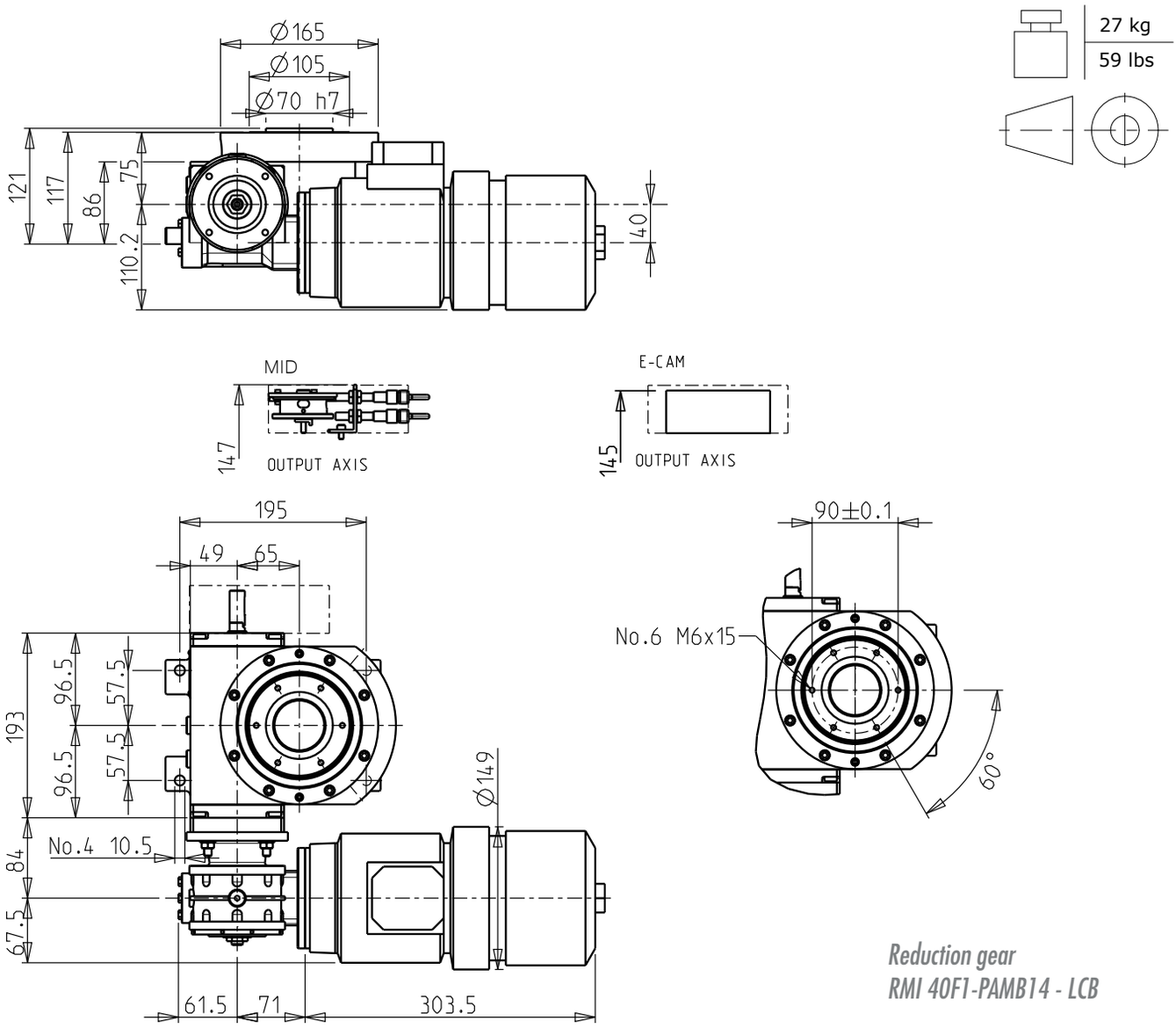


Central fixed through hub, Ø15H8, projection Ø 32x15 and fixing holes with centring Ø 19h7x5.



RIG04

Configuration with reduction gear and self-braking motor (VLRA)



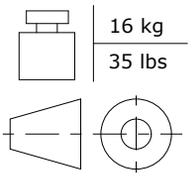
Reduction gear
RMI 40F1-PAMB14 - LCB

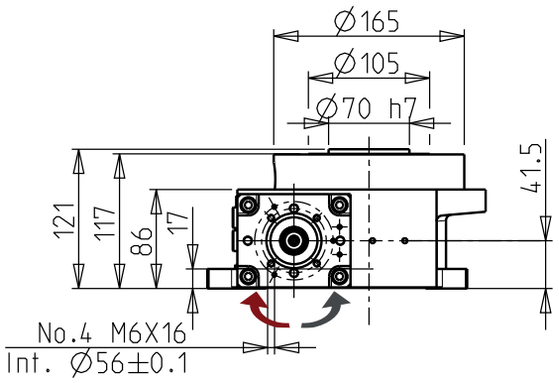
Notes

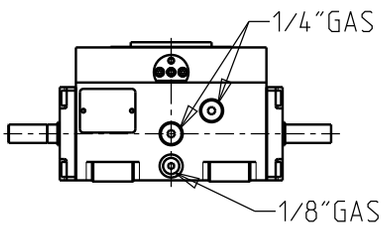
- By reversing the direction of rotation of the input shaft, the direction of rotation of the output shaft is reversed, while the kinematic characteristics of the intermittent motion in standard mechanisms remain unchanged.
- The 6 holes M6x15 on the output plate are in the position shown (pg.6 and 7) when the table is in the dwell period at one of the stations
- The input shaft notches are in the position shown (pg.7) when the table is halfway through its dwell period
- Some combinations of motors and reduction gears limit the performance of the tables
- Standard direction of rotation (right helix of the cam) as indicated by the arrows
- The pin with Ø16x44.5 screwed on the input shaft must only be used as support for the control cams of the micro switches
- On some motors, the terminal box is rotated by 45° compared to the one shown in the drawing

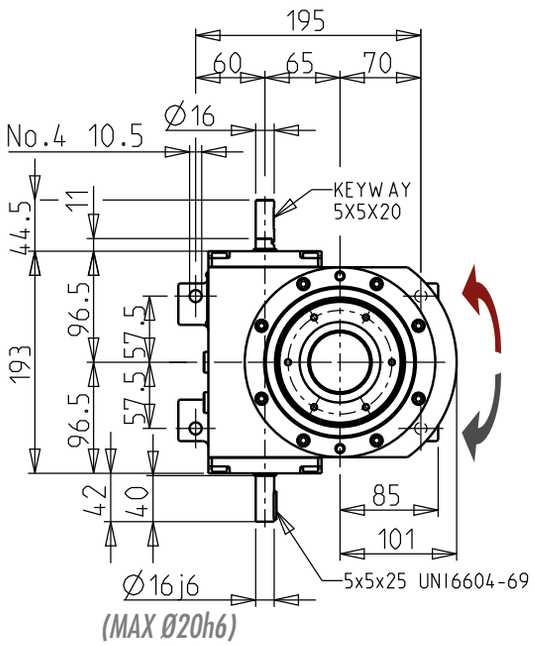
RIG04

Configuration with short input shaft (VS)

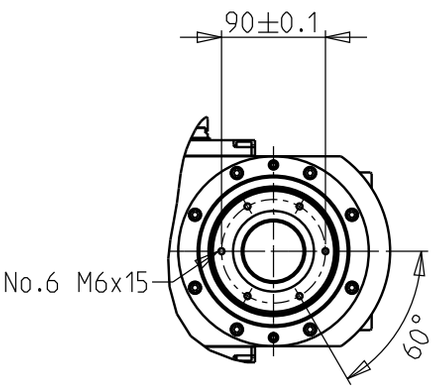


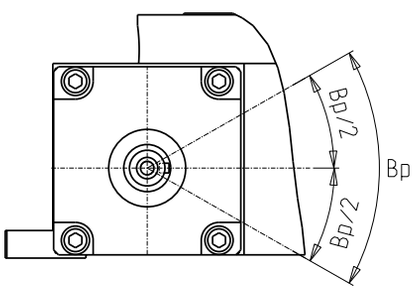






(MAX Ø20h6)



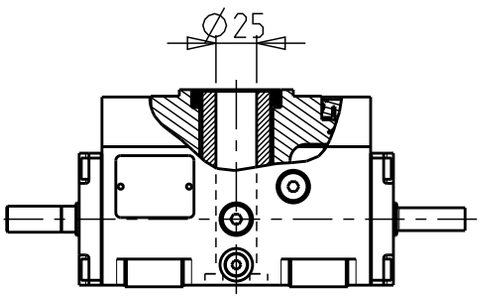


Concentricity		Plate Planarity	Division Precision			
Precision	on Ø	Precision	Single cycle (up to 12 stations)		Double/quadruple cycle (from 16 stations)	
0.02 mm	70 mm	0.01 mm	±60"	±0.015 mm /50 mm	±90"	±0.02 mm /50 mm

RIG04

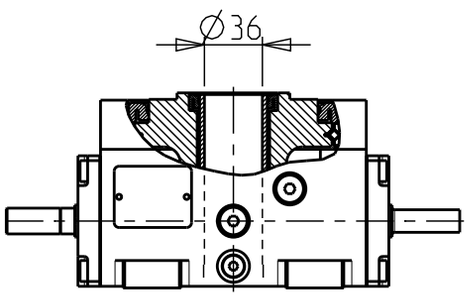
Optional configurations of the Output Plate

VCT



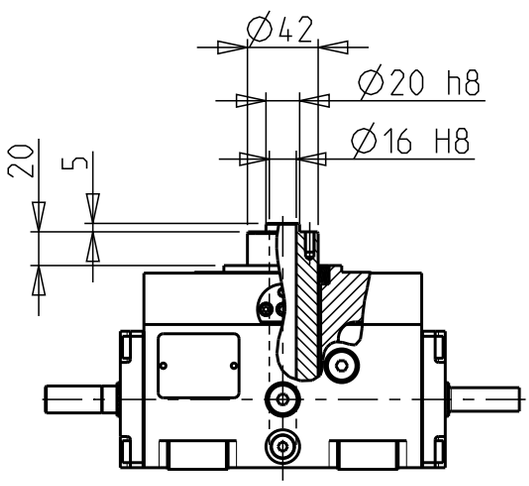
Central fixed through hub, without fixing holes.

VCM

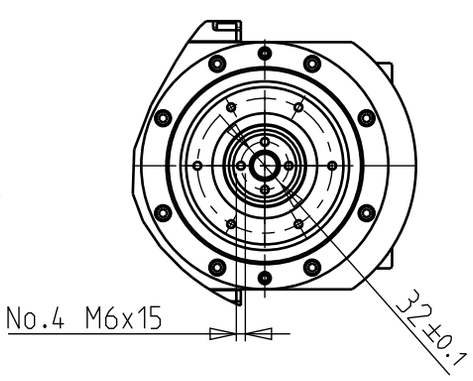


Large central fixed through hub, without fixing holes.

VCP

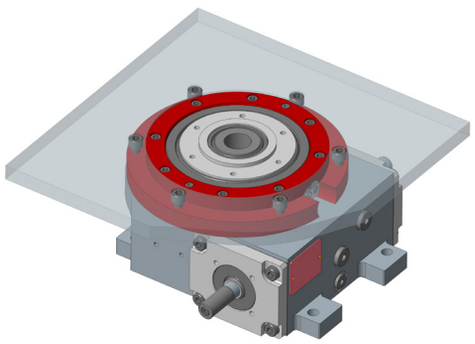


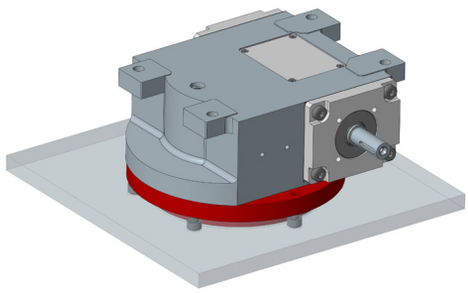
Central fixed through hub, Ø16H8, projection Ø 42x20 and fixing holes with centring Ø 20h8x5.

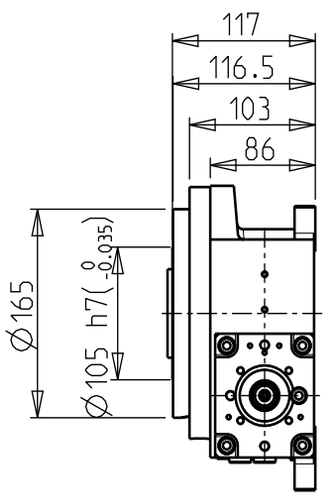


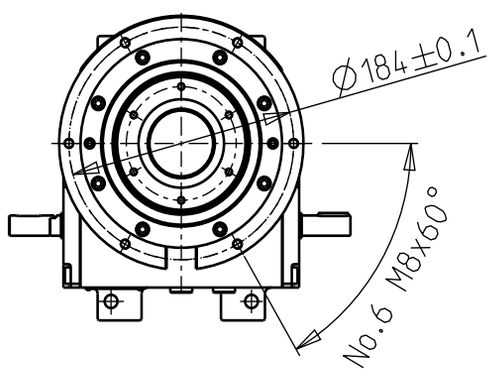
RIG04

Optional configuration for ceiling or inverted mounting

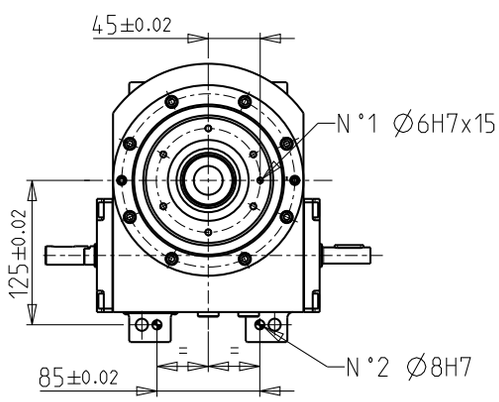




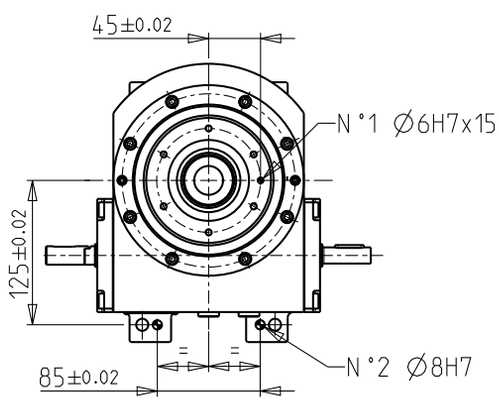




Optional reference holes



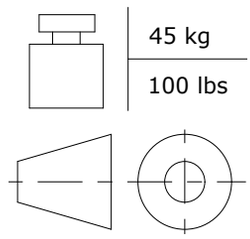
Three dowel holes can be drilled in the output plate and in the table feet. The purpose of the hole in the output plate is to guarantee precise and repeatable assembly of the equipment. The two holes in the feet, on the other hand, allow precise positioning and make the table interchangeable.

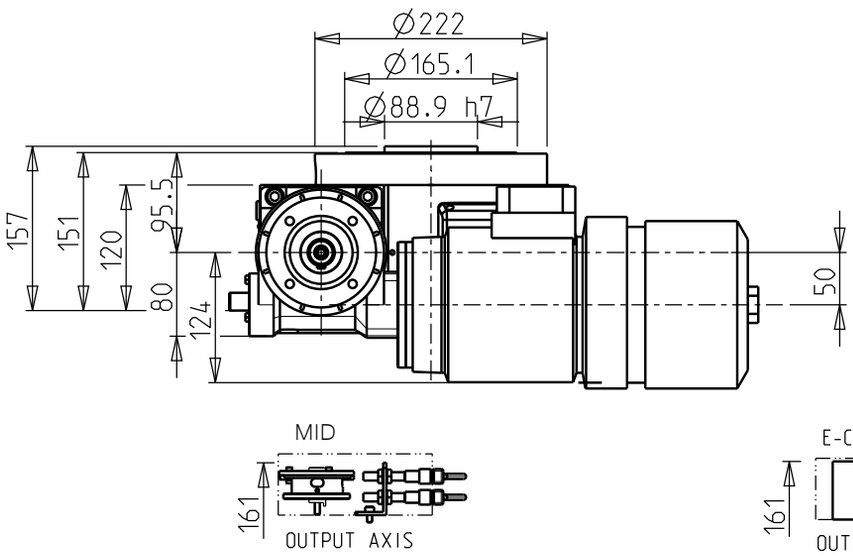


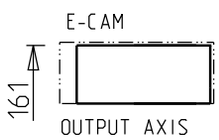
Three dowel holes can be drilled in the output plate and in the table ring. The purpose of the hole in the output plate is to guarantee precise and repeatable assembly of the equipment. The two holes in the feet, on the other hand, allow precise positioning and make the table interchangeable.

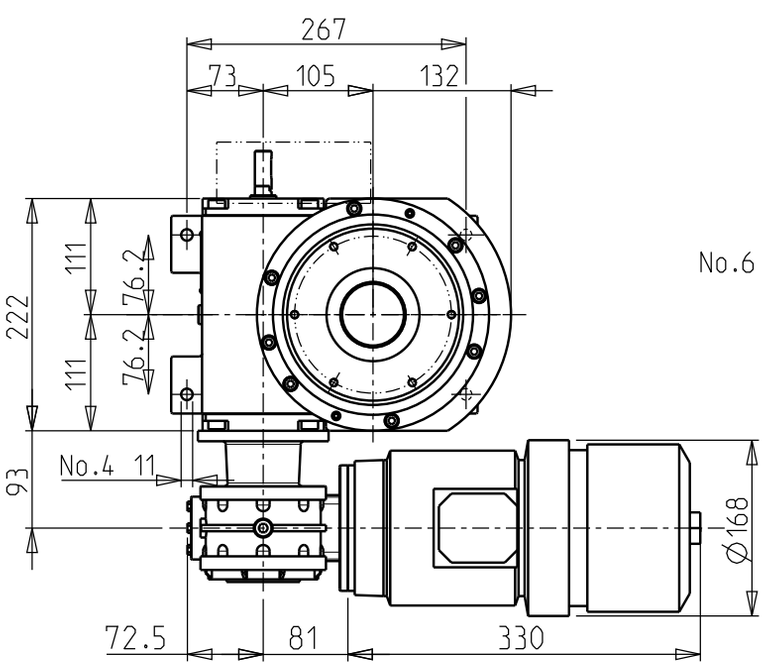
RIG06

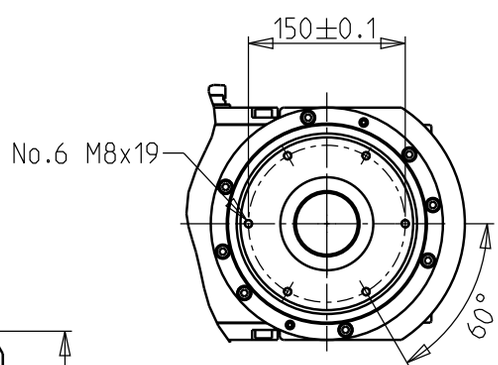
Configuration with reduction gear and self-braking motor (VLRA)











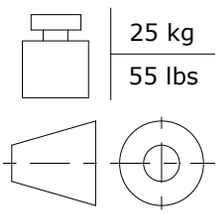
Reduction gear
RMI 50F1-PAMB14 - LCB

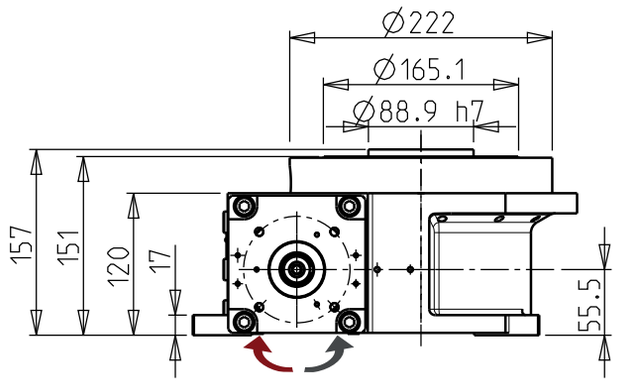
Notes

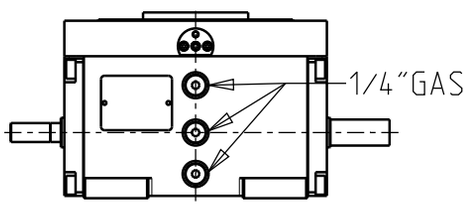
- By reversing the direction of rotation of the input shaft, the direction of rotation of the output shaft is reversed, while the kinematic characteristics of the intermittent motion in standard mechanisms remain unchanged
- The 6 holes M8x19 on the output plate are in the position shown (pg. 13 and 14) when the table is in the dwell period at one of the stations
- The input shaft notches are in the position shown (pg.14) when the table is halfway through its dwell period
- Some combinations of motors and reduction gears limit the performance of the tables
- Standard direction of rotation (right helix of the cam) as indicated by the arrows
- The pin with Ø16x44.5 screwed on the input shaft must only be used as support for the control cams of the micro switches
- On some motors, the terminal box is rotated by 45° compared to the one shown in the drawing

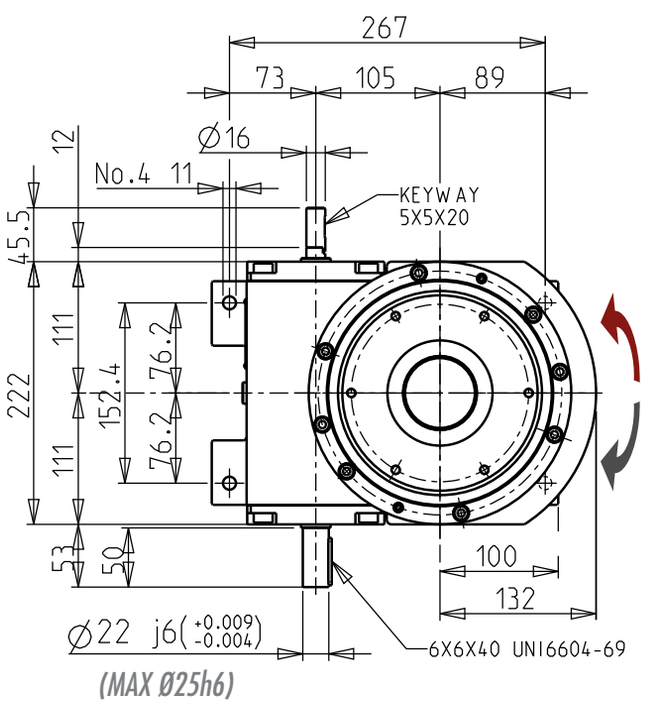
RIG06

Configuration with short input shaft (VS)

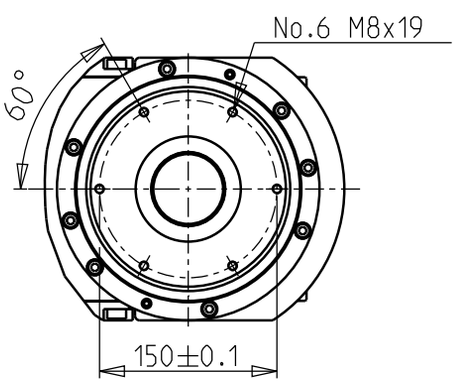


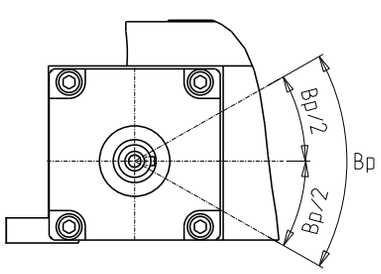






(MAX Ø25h6)



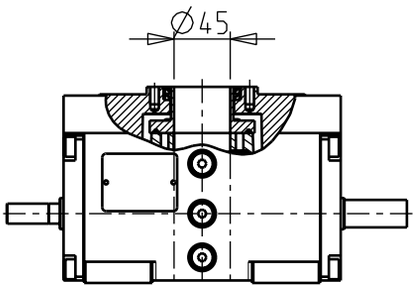


Concentricity		Plate Planarity	Division Precision			
Precision	on Ø	Precision	Single cycle (up to 16 stations)		Double cycle (from 20 stations)	
0.03 mm	88.9 mm	0.01 mm	±30″	±0.015 mm /100 mm	±60″	±0.03 mm /100 mm

RIG06

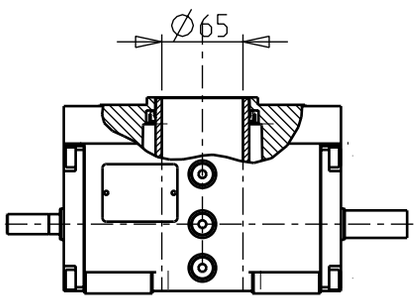
Optional configurations of the Output Plate

VCT



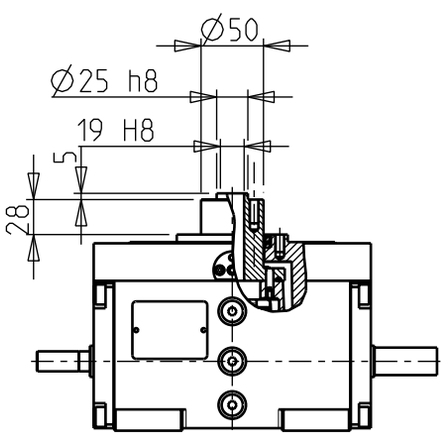
Central fixed through hub, without fixing holes.

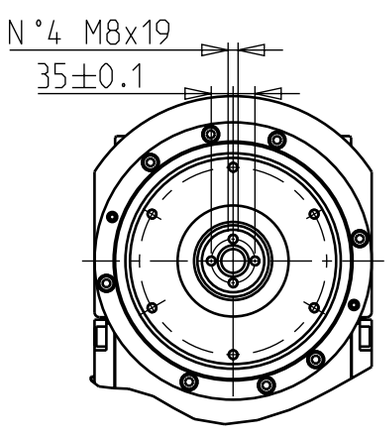
VCM



Large central fixed through hub, without fixing holes.

VCP

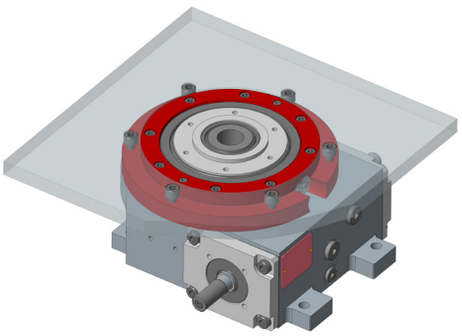


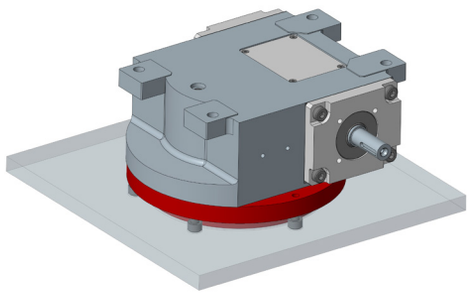


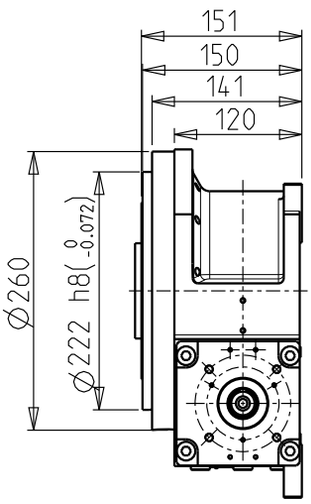
Central through hub Ø19H8, projection Ø50x28 and fixing holes with centring Ø25h8x5.

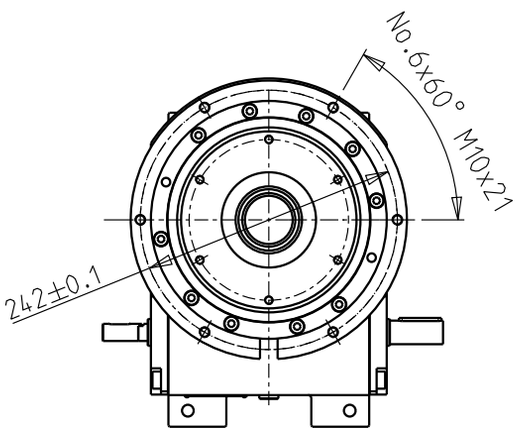
RIG06

Optional configuration for ceiling or inverted mounting

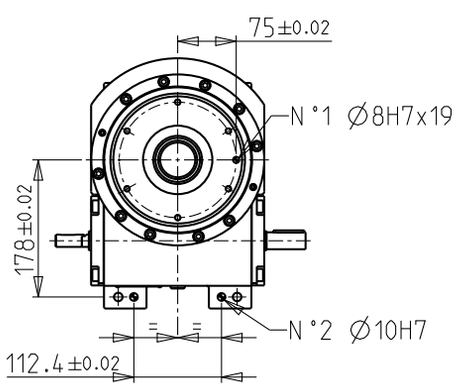




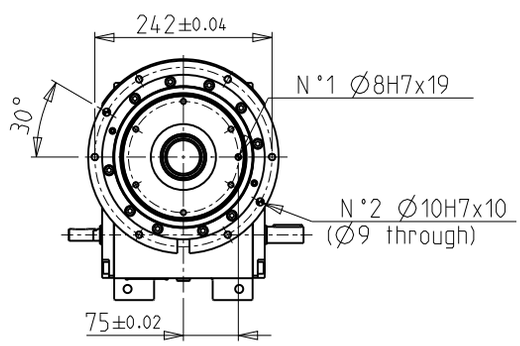




Optional reference holes



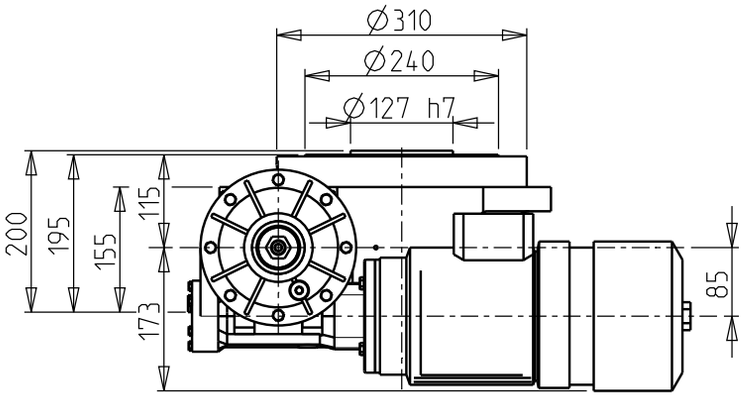
Three dowel holes can be drilled in the output plate and in the table feet. The purpose of the hole in the output plate is to guarantee precise and repeatable assembly of the equipment. The two holes in the feet, on the other hand, allow precise positioning and make the table interchangeable.

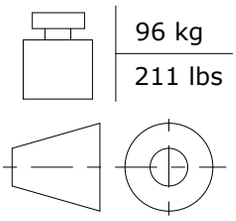


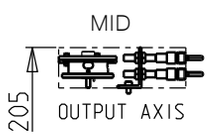
Three dowel holes can be drilled in the output plate and in the table ring. The purpose of the hole in the output plate is to guarantee precise and repeatable assembly of the equipment. The two holes in the feet, on the other hand, allow precise positioning and make the table interchangeable.

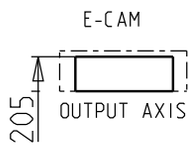
RIG09

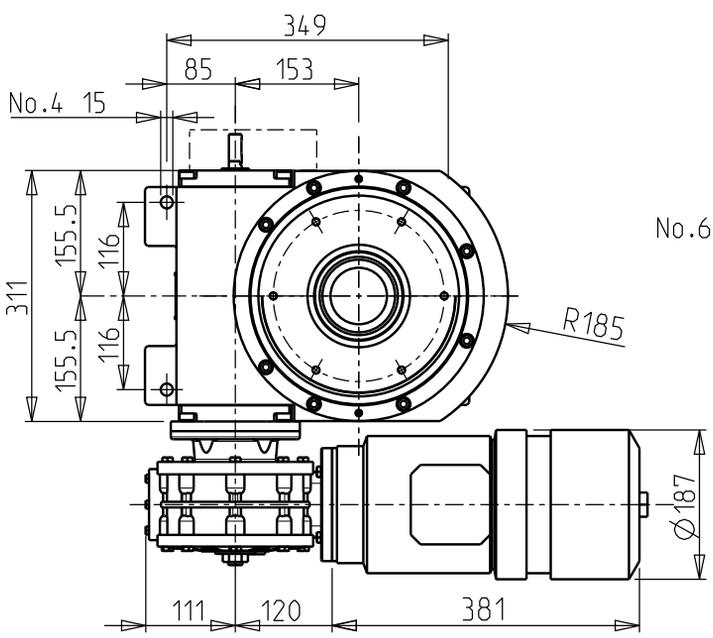
Configuration with reduction gear and self-braking motor (VLRA)

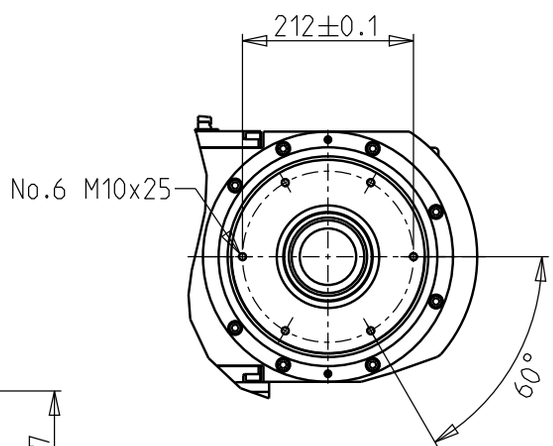












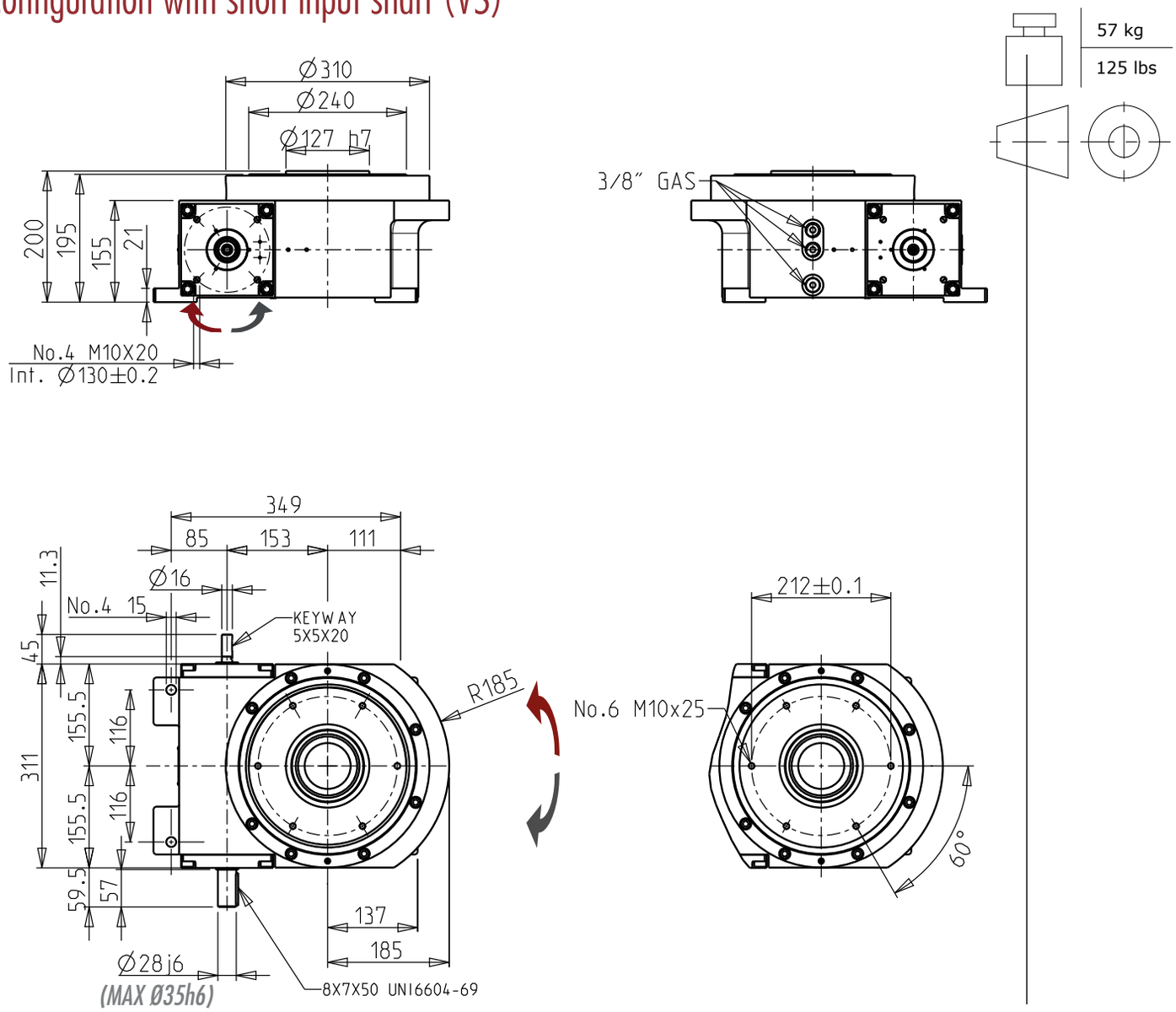
Reduction gear
RMI 85F3-PAMB14-LCB

Notes

- By reversing the direction of rotation of the input shaft, the direction of rotation of the output shaft is reversed, while the kinematic characteristics of the intermittent motion in standard mechanisms remain unchanged.
- The 6 holes M10x25 on the output plate are in the position shown (pg.17 and 18) when the table is in the dwell period at one of the stations
- The input shaft notches are in the position shown (pg.18) when the table is halfway through its dwell period
- Some combinations of motors and reduction gears limit the performance of the tables
- Standard direction of rotation (right helix of the cam) as indicated by the arrows
- The pin with Ø16x45 screwed on the input shaft must only be used as support for the control cams of the micro switches.

RIG09

Configuration with short input shaft (VS)

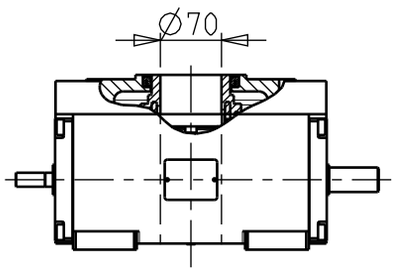


Concentricity		Plate Planarity	Division Precision			
Precision	on Ø	Precision	Single cycle (up to 16 stations)		Double cycle (from 20 stations)	
0.03 mm	127 mm	0.02 mm	±30″	±0.015 mm /100 mm	±60″	±0.03 mm /100 mm

RIG09

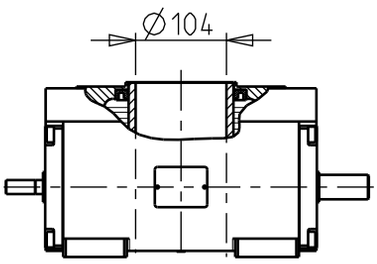
Optional configurations of the Output Plate

VCT



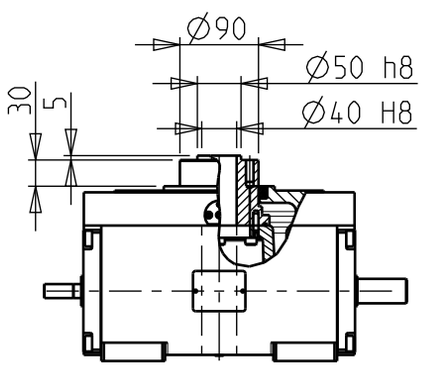
Central fixed through hub, without fixing holes.

VCM

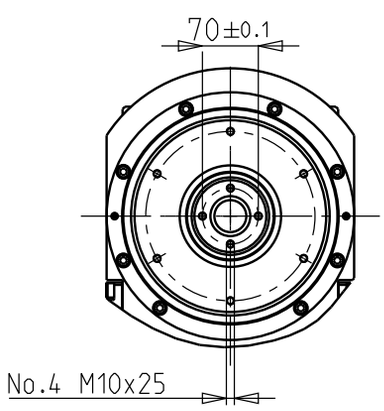


Large central fixed through hub, without fixing holes.

VCP

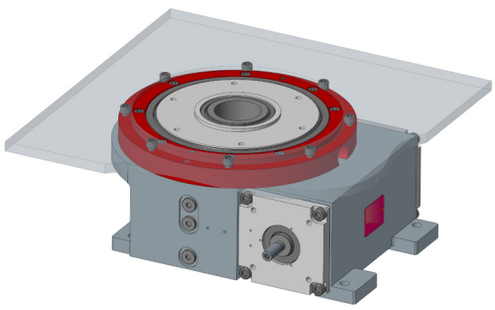


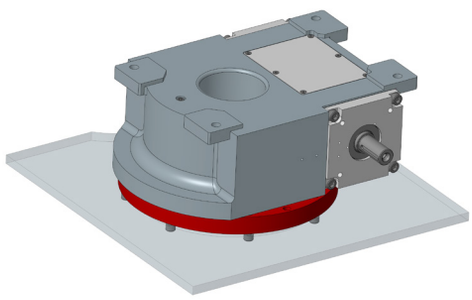
Central through hub Ø40H8, projection Ø90x30 and fixing holes with centring Ø50h8x5.

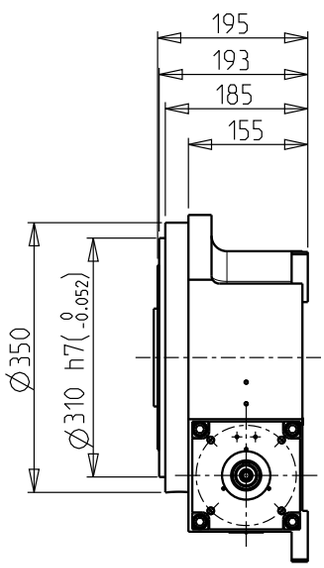


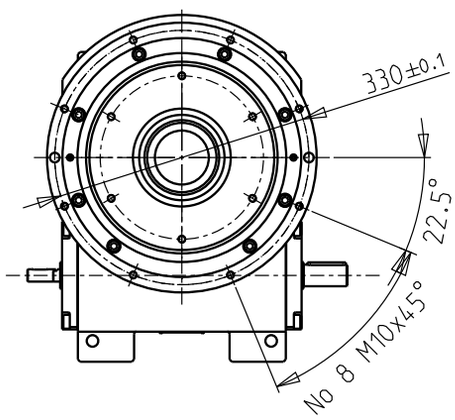
RIG09

Optional configuration for ceiling or inverted mounting

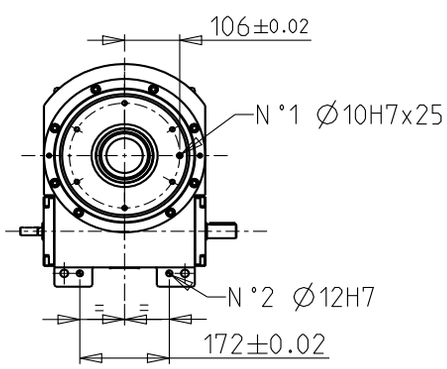




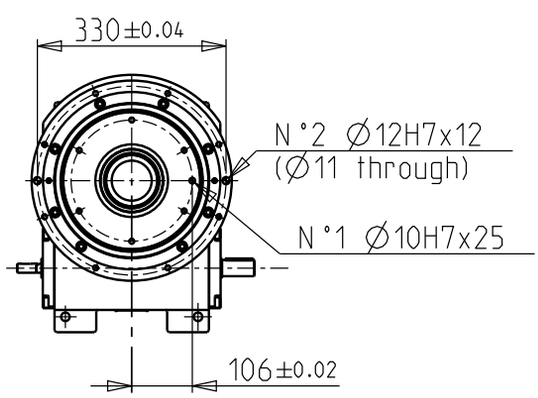




Optional reference holes



Three dowel holes can be drilled in the output plate and in the table feet. The purpose of the hole in the output plate is to guarantee precise and repeatable assembly of the equipment. The two holes in the feet, on the other hand, allow precise positioning and make the table interchangeable.



Three dowel holes can be drilled in the output plate and in the table ring. The purpose of the hole in the output plate is to guarantee precise and repeatable assembly of the equipment. The two holes in the feet, on the other hand, allow precise positioning and make the table interchangeable.

GLOBOIDAL CAM INDEXING TABLES RIG

Load Capacities

RIG CODE	Stops N°	Index Period B [°]	Dwell Period Bp [°]	Static Torque St [Nm]	Dynamic Torque Mu [Nm] 50 cicl./1'	70 cicl./1'	100 cicl./1'	Coefficients Velocity Cv	Acceler. Ca	Transmission Kj	Kl
RIG03-2-330	2	330	30	28	28	27,2	26	1.76	5.53	0.54	0.96
RIG04-2-330				128	110	89	72				
RIG06-2-330				305	297	288	275				
RIG09-2-330				800	566	458	367				
RIG03-3-330	3	330	30	39,1	39,1	37,9	36,4	1.76	5.53	0.35	0.64
RIG04-3-330				153	107	86	70				
RIG06-3-330				330	326	321	313				
RIG09-3-330				964	731	596	484				
RIG03-4-310	4	310	50	42,1	42,1	40,8	39,2	1.76	5.53	0.29	0.51
RIG04-4-310				170	110	89	72				
RIG06-4-310				346	343	339	333				
RIG09-4-310				1077	942	768	626				
RIG03-5-270	5	270	90	48,8	48,8	47,3	45,4	1.76	5.53	0.26	0.47
RIG04-5-270				159	108	87	71				
RIG06-5-270				335	332	328	322				
RIG09-5-270				1006	926	775	616				
RIG03-5-310		310	50	48,8	47	45,6	43,7	1.76	5.53	0.23	0.41
RIG04-5-310				159	100	90	81				
RIG06-5-310				335	326	316	311				
RIG09-5-310				1006	920	768	610				
RIG03-6-270	6	270	90	48,4	48,4	47,3	45,4	1.76	5.53	0.22	0.39
RIG04-6-270				173	119	96	78				
RIG06-6-270				345	342	339	335				
RIG09-6-270				1095	947	773	631				
RIG03-6-310		310	50	48,7	48,7	47,2	45,3	1.76	5.53	0.19	0.34
RIG04-6-310				173	115	94	76				
RIG06-6-310				345	334	325	305				
RIG09-6-310				1095	920	750	625				
RIG03-8-270	8	270	90	49,9	48,4	46,4	45	1.76	5.53	0.16	0.29
RIG04-8-270				190	118	95	77				
RIG06-8-270				356	354	352	348				
RIG09-8-270				1216	1132	924	756				
RIG03-8-310		310	50	50,4	50,4	48,9	46,9	1.76	5.53	0.14	0.26
RIG04-8-310				190	111	90	74				
RIG06-8-310				356	340	335	312				
RIG09-8-310				1216	1088	888	727				
RIG03-10-150	10	150	210	50,7	50,7	49,2	47,2	1.76	5.53	0.24	0.42
RIG04-10-150				167	118	96	77				
RIG06-10-150				341	336	329	348				
RIG09-10-150				1140	1088	886	756				
RIG03-10-180		180	180	51,2	51,2	49,7	47,6	1.76	5.53	0.20	0.35
RIG04-10-180				179	120	97	74				
RIG06-10-180				350	346	342	312				
RIG09-10-180				1142	1111	906	727				

GLOBOIDAL CAM INDEXING TABLES RIG

Load Capacities

RIG CODE	Stops N°	Index Period B [°]	Dwell Period Bp [°]	Static Torque St [Nm]	Dynamic Torque Mu [Nm] 50 cicl./1'	70 cicl./1'	100 cicl./1'	Velocity Cv	Coefficients Acceler. Ca	Transmission Kj	Kl
RIG03-10-270	10	270	90	51,4	51,4	49,9	47,8	1.76	5.53	0.13	
RIG04-10-270				200	124	101	77				
RIG06-10-270				361	359	357	348				
RIG09-10-270				1291	1152	941	756				
RIG03-10-310		310	50	51,4	51,4	49,9	47,8	1.76	5.53	0.11	
RIG04-10-310				200	120	97	74				
RIG06-10-310				361	345	340	312				
RIG09-10-310				1291	1110	905	727				
RIG03-12-120	12	120	240	50,7	50,7	49,2	47,2	1.76	5.53	0.25	
RIG04-12-120				180	121	97	79				
RIG06-12-120				350	342	332	318				
RIG09-12-120				1145	1110	902	730				
RIG03-12-150		150	210	51	51	49,5	47,4	1.76	5.53	0.20	
RIG04-12-150				179	121	97	79				
RIG06-12-150				350	346	340	333				
RIG09-12-150				1142	1111	906	738				
RIG03-12-180		180	180	51,5	51,5	50	47,9	1.76	5.53	0.16	
RIG04-12-180				190	123	99	80				
RIG06-12-180				356	353	349	344				
RIG09-12-180				1216	1131	923	754				
RIG03-12-270		270	90	51,8	51,8	50,2	47,9	1.76	5.53	0.11	
RIG04-12-270				207	126	101	83				
RIG06-12-270				364	363	101	359				
RIG09-12-270				1339	1164	951	779				
RIG03-12-310		310	50	51,8	51,8	50,2	48,2	1.76	5.53	0.10	
RIG04-12-310				207	130	110	88				
RIG06-12-310				420	400	380	351				
RIG09-12-310				1339	1250	1120	1000				
RIG03-16-150	16*	150	210	49,5	49,5	48	46	1.76	5.53	0.30	
RIG04-16-150				167	123	99	80				
RIG06-16-150	16			363	359	354	347			0.15	
RIG09-16-150				1322	1299	1060	864				
RIG03-16-180	16*	180	180	51	51	49,5	47,4	1.76	5.53	0.25	
RIG04-16-180				164	122	99	80				
RIG06-16-180	16			362	360	357	353			0.12	
RIG09-16-180				1309	1296	1058	865				
RIG03-16-270	16*	270	90	51,2	51,2	49,7	47,6	1.76	5.53	0.16	
RIG04-16-270				190	127	103	83				
RIG06-16-270	16			367	366	365	363			0.08	
RIG09-16-270				1395	1118	913	748				

(*) One complete turn of the input shaft produces two complete cycles (indexing/dwell) at the output
(**) One complete turn of the input shaft produces four complete cycles (indexing/dwell) at the output

GLOBOIDAL CAM INDEXING TABLES RIG

Load Capacities

RIG CODE	Stops N°	Index Period B [°]	Dwell Period Bp [°]	Static Torque St [Nm]	Dynamic Torque Mu [Nm] 50 cicl./1'	70 cicl./1'	100 cicl./1'	Coefficients Velocity Cv	Acceler. Ca	Transmission Kj	Kl
RIG03-20-180	20*	180	180	51,1	51,1	49,6	47,5	1.76	5.53	0.20	0.35
RIG04-20-180				179	125	101	82				
RIG06-20-180				350	347	342	336				
RIG09-20-180				1590	1483	1209	983				
RIG03-20-270		270	90	51,4	51,4	49,9	47,8	1.76	5.53	0.13	0.23
RIG04-20-270				200	129	104	85				
RIG06-20-270				361	360	358	355				
RIG09-20-270				1600	1538	1256	1027				
RIG03-24-180	24*	180	180	51,2	51,2	49,7	47,6	1.76	5.53	0.16	0.29
RIG04-24-180				190	147	119	96				
RIG06-24-180				364	361	357	352				
RIG09-24-180				1600	1510	1232	1003				
RIG03-24-270		270	90	51,4	51,4	49,9	47,8	1.76	5.53	0.11	0.20
RIG04-24-270				207	151	122	99				
RIG06-24-270				364	359	352	343				
RIG09-24-270				1600	1555	1271	1039				
RIG03-32-180	32*	180	180	51,2	51,2	49,7	47,6	1.76	5.53	0.12	0.22
RIG03-32-270		270	90	51,5	51,5	50	47,9			0.82	0.15
RIG04-32-180	32**	180	180	164	141	114	92			0.25	0.44
RIG04-32-270		270	90	190	147	119	96			0.16	0.29
RIG06-32-180	32*	180	180	362	360	357	353	1.76	5.53	0.12	0.22
RIG09-32-180				1610	1544	1260	1028				
RIG06-32-270		270	90	367	366	365	363			0.08	0.15
RIG09-32-270				1610	1575	1287	1053				

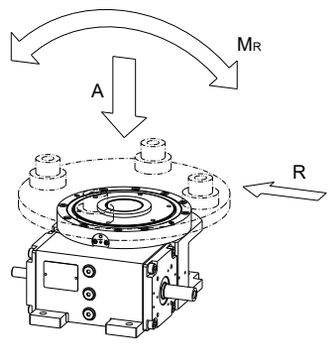
(*) One complete turn of the input shaft produces two complete cycles (indexing/dwell) at the output
(**) One complete turn of the input shaft produces four complete cycles (indexing/dwell) at the output

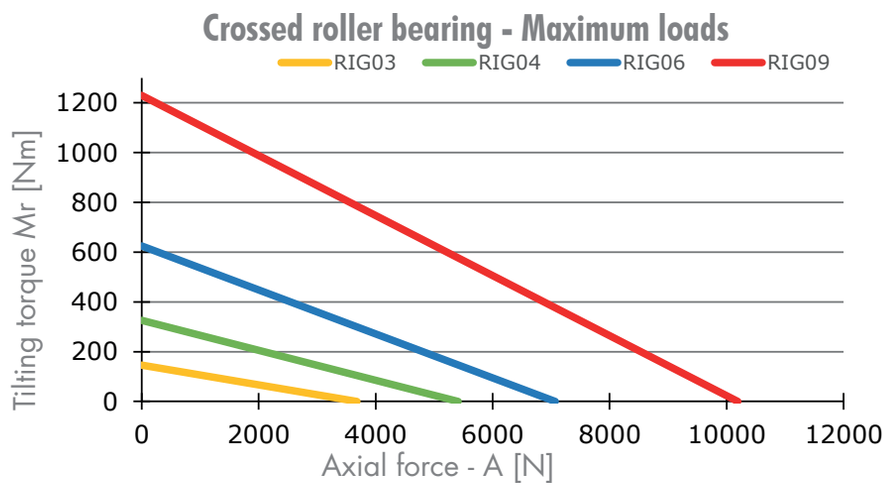
RIG03 - RIG04 - RIG06 - RIG09

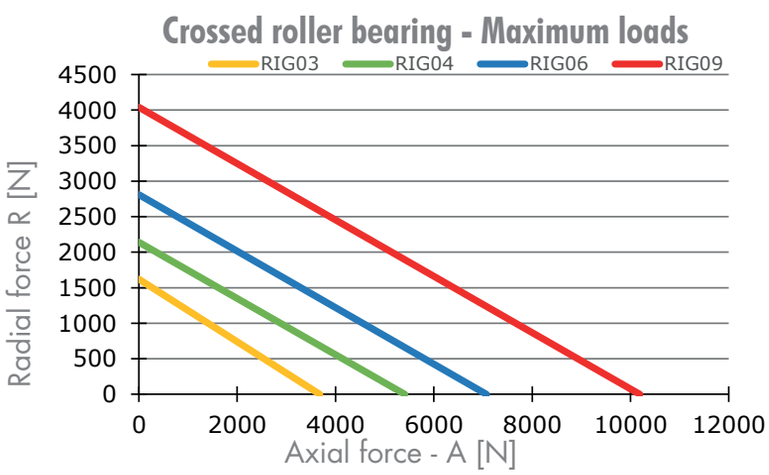
Load capacity of the output bearing

The load capacities indicated in the table and represented in the graphs below refer to the table mounted in position V5 and represent the maximum values for each type of load applied individually.
The capacity to withstand combined loads must be evaluated using the diagrams shown.

	Axial A [N]	Radial R [N]	Tilting Mr [Nm]
RIG03	3680	1620	146
RIG04	5410	2140	326
RIG06	7070	2810	625
RIG09	10190	4040	1230







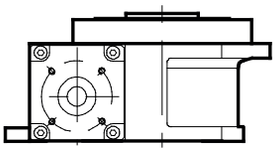
Lubrification

Lubrication of the tables is the long-life type using ISO VG150 mineral oil. RIGIDIAL tables are delivered already filled with the required quantity of lubricant. For mountings in position V5, the output plate bearing is already lubricated during assembly, so no additional lubrication is required. Lubrication of the reducers, reduction gears, speed variators, etc., is independent and must be carried out according to the instructions provided by the manufacturers of single products.

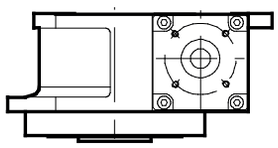
RIG03 - RIG04 - RIG06 - RIG09

Table mounting positions

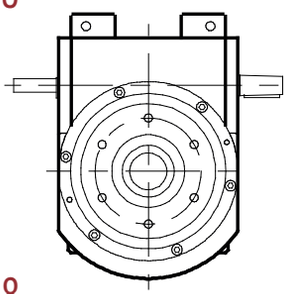
V5 STANDARD



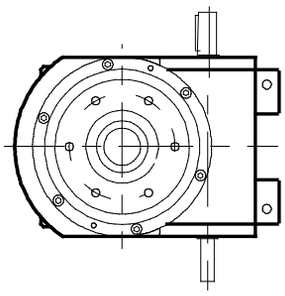
V6



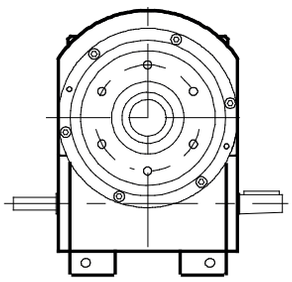
B3



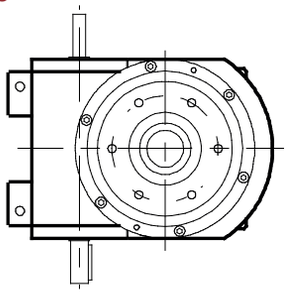
B6



B7



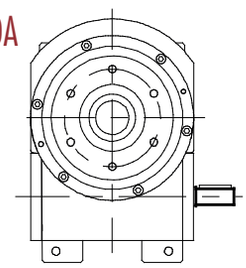
B8



Input shaft projection

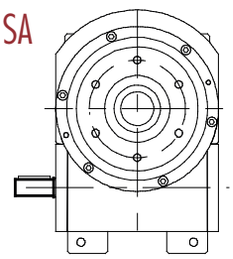
STANDARD

DA

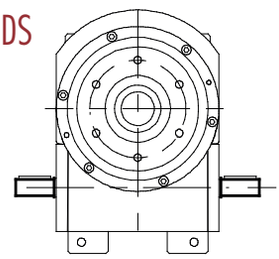


VARIANTS

SA



DS



Unless specified otherwise, the RIGIDIAL tables are supplied for the standard V5 mounting position.

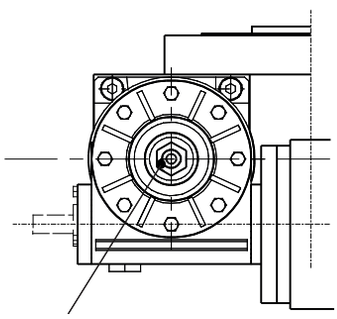
Presetting of worm reduction gears-motors

	Possible combinations				Characteristics of reduction gears with input at 1400 [g/1'] 4-poles motors n=1400 rpm									
	RIG03	RIG04	RIG06	RIG09	Ratio	i	7:1	10:1	15:1	20:1	28:1	40:1	49:1	56:1
					Output	g/1'	200	140	93.3	70	50	35	28.6	25
RMI28/F1 LCB PAM B14	● STAND.				Power	[kW]	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
					Output M2	[Nm]	2.3	3.2	4.6	6	5	6.4	7.5	8.2
RMI28/F1 LCB PAM B14		●			Power	[kW]	0.18	0.18	0.18	0.13	0.13	0.09	0.06	0.06
					Output M2	[Nm]	7.2	9.9	14	12	16	14	11	12
RMI40/F1 LCB PAM B14		● STAND.	●		Power	[kW]	0.37	0.37	0.37	0.37	0.25	0.18	0.18	0.13
					Output M2	[Nm]	15	21	30	38	33	30	35	28
RMI50/F3 LCB PAM B14			● STAND.		Power	[kW]	0.75	0.75	0.75	0.55	0.55	0.37	0.25	0.25
					Output M2	[Nm]	30	42	61	56	70	61	44	50
RMI70/F3 LCB PAM B14				●	Power	[kW]	1.5	1.5	1.5	1.1	1.1	0.75	0.55	0.55
					Output M2	[Nm]	62	88	126	120	153	141	121	134
RMI85/F3 LCB PAM B14				● STAND.	Power	[kW]	2.2	2.2	2.2	2.2	1.5	1.1	1.1	1.1
					Output M2	[Nm]	92	128	187	243	212	210	246	282

RIG03 - RIG04 - RIG06 - RIG09

Use of the input toque limiter

The worm reduction gears mounted on RIGIDIAL tables are equipped with a built-in clutch torque limiter. The limiter release torque is calibrated by means of a nut on the outside of the slow shaft of the reduction gear. The torque limiter reduces the risk of breaking of the RIGIDIAL table or of the reduction gear in case of accidental overloads occurring during the rotation, caused by emergency stops, voltage drops, seizing or collisions. The limiter must be calibrated in such a way as to make it possible to ensure a perfectly rigid motion transmission under standard operating condition, with no slipping of the clutch. However, the calibrating torque must be lower than the maximum torques which the RIGIDIAL table and the worm screw reduction gear are capable of transmitting. Unless specified otherwise, the limiter is calibrated at the highest allowed torque.

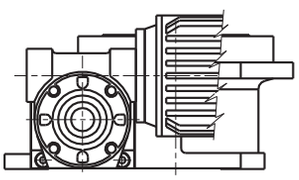


Torque limiter adjuster nut

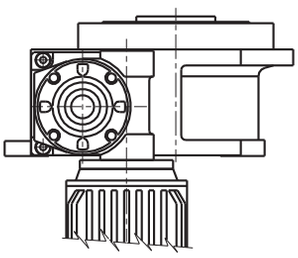
CAUTION: please remember that the torque limiter is not a safety device.

Mounting positions of the reduction gear

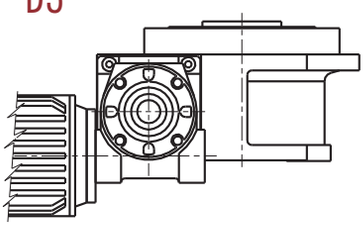
D1



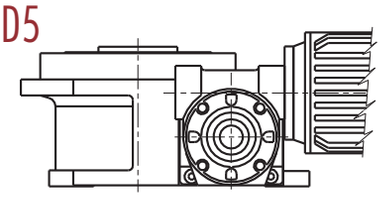
D2



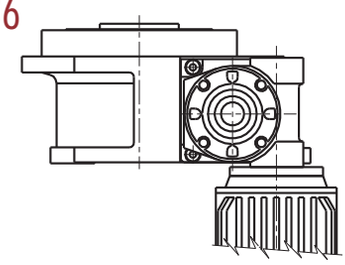
D3



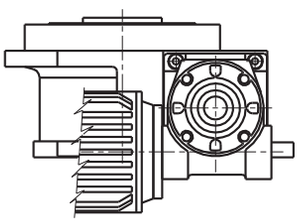
D5



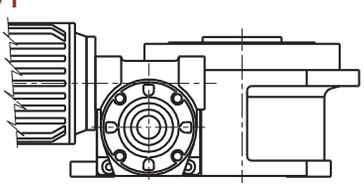
D6



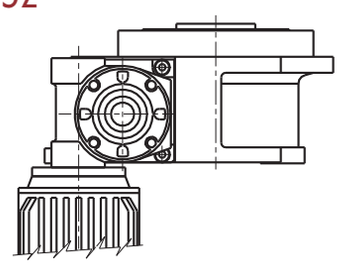
D7



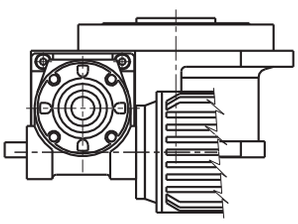
S1



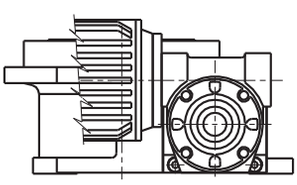
S2



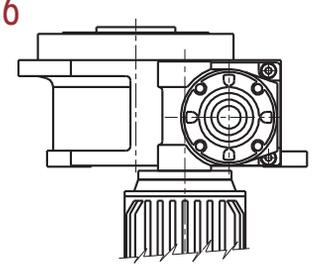
S3



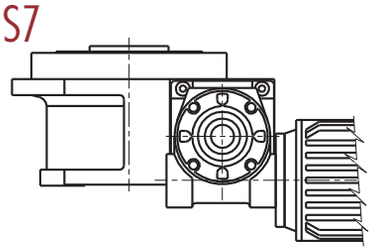
S5



S6



S7



RIG03 - RIG04 - RIG06 - RIG09

E-Cam control system

The E-Cam Motor Management System is a high-integrated solution for an easy management of the rotation and stop of the motor recognizing the position of the cam (indexing, mechanical dwell, safety dwell).
The E-Cam system is available in 4 different configurations:

Electronic phase cam E-Cam

The electronic phase cam permits an easy management of the signals used to start/stop the electrical motor. The E-Cam:

- ✓ Optimizes the cycle time of the indexer and improve the lifetime.
- ✓ Shows the current status of the system
- ✓ Can be easily tuned
- ✓ Permits an accurate motor stop
- ✓ Is easily connected with the other peripherals

Solid State Relay switch E-relay

The Solid State Relay Switch E-relay enables the E-Cam to control the start/stop of the asyncronous motor (max power 4kW).

The Solid State Relay Switch E-relay:

- ✓ Simplifies the control of the induction motor
- ✓ Minimizes the PLC software to control the motor start/stop

The Solid State Relay Switch E-Relay does not guarantee a safe re-start for the motor after an E-stop.
For safe management after E-stops a VFD/Inverter is recommended.

E-Cam with E-Inverter

For safe and easy management of E-stops, the E-Cam can be used with the E-Inverter:

- ✓ Safely manages the re-start of the motor after an E-stop
- ✓ Parameters pre programmed at the factory
- ✓ Simplifies the motor management
- ✓ Interacts with the user throught the E-Display in order to manage the motor speed and the acceleration/deceleration time

When an E-stop occurs the E-Inverter stops the motor using the deceleration time parameter imposed by the user and restarts from an E-stop with a lower speed until the indexer reaches the security dwell cam phase, then the indexer is re-started at the operating speed.

E-Cam inverter-compatibility

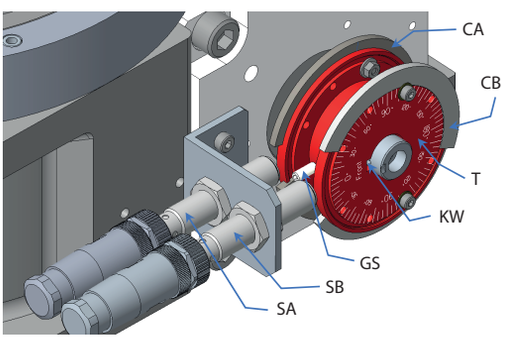
The E-Cam system can be easily connected to all VFD/Inverter available on the market, obtaining the same performances described in the previous section. In this case the VFD/Inverter parameters must be programmed by the customer.

Phase Group MID

Phase cams with proximity sensors

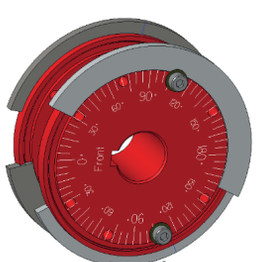
The MID phase group allows a quick and precise adjustment of the motor stop signal through a double track of adjustable cams interacting with two inductive sensors. The first track is used to verify the correct positioning of the system when stationary, the second one provides the motor stop signal with the appropriate timing for the specific application. The group is easily adjustable as it is equipped with a key for univocal positioning on the cam axis and a double graduated scale which, once defined each micro intervention angle, allows its adjustment with no need to run the machine.

Group structure

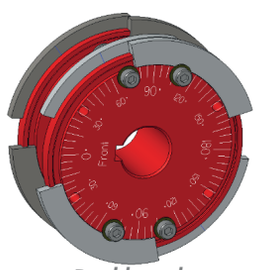


The motor stopping system in the cam mechanical stop consists of a graduated drum (T), two phase cams AC and CB and two 12mm inductive sensors (PNP n.c. type) with wire connector SA and SB.
The drum is mounted on the cam shaft through a KW tab - corresponding to the mechanical stop of the unit - and a safety set screw (GS).

Each one of the two phase cams CA and CB is composed of two sectors - in the case of simple cycle movement laws - and 4 sectors - in the case of double cycle movement laws.



Simple cycle



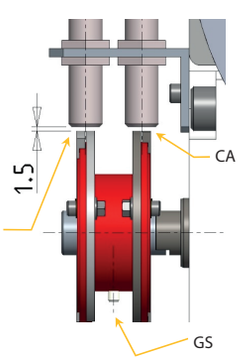
Double cycle

The AC phase cam is always the closest to the box and it checks the mechanism has actually stopped inside the cam dwell. The cam CA is adjusted in factory according to the station of the mounted cam (AA opening of the cam sectors). Consequently, no adjustment is required to the customer when the machine gets started up.

CAUTION: this adjustment modification without written authorization by Colombo Filippetti implies the immediate guarantee loss of the entire supply).

Positioning of drum and sensors

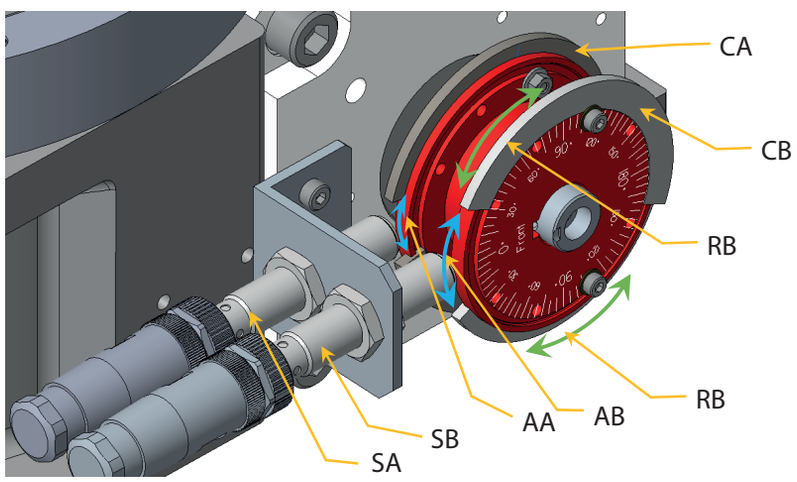
- The drum and the 2 sensors must be mounted as shown
- The drum must be positioned so that the cam sectors CA and CB are symmetrical to the relative sensors and finally locked with the GS set screw
- Then the two sensors must be positioned and locked at a distance of 1.5mm from the cam sectors as shown



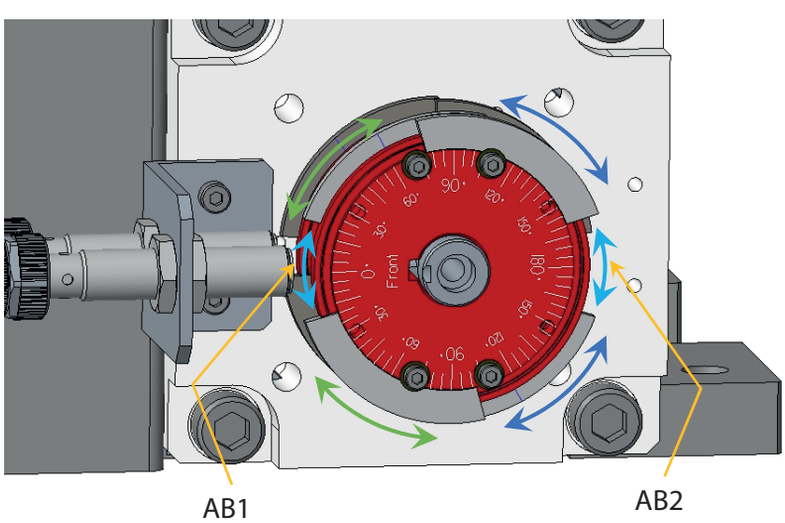
Phase Group MID

Operation

When the output signal from the SA sensor (related to the CA cam) is high, the unit is in the standstill phase AA corresponding to the mechanical stop of the cam. The phase cam CB, always the external one, supplies the stop signal to the motor. The adjustable sectors RB of the phase cam CB allows the sensor SB to anticipate the stop signal to the motor to stop the cam in its mechanical dwell - compensating for electrical and electronic components delays. The figures below show the phase cams for simple cycle and for double cycle.
The opening angles AB1-AB2 for the double cycle must be adjusted as in the graph attached – valid for MGM motors.



Phase cam for simple cycle

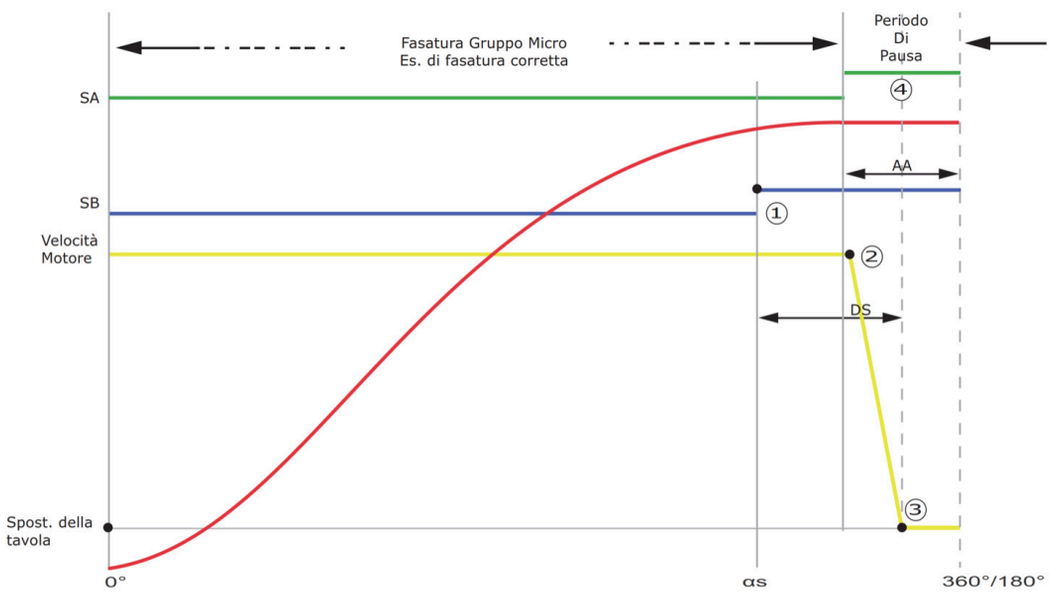


Phase cam for double cycle

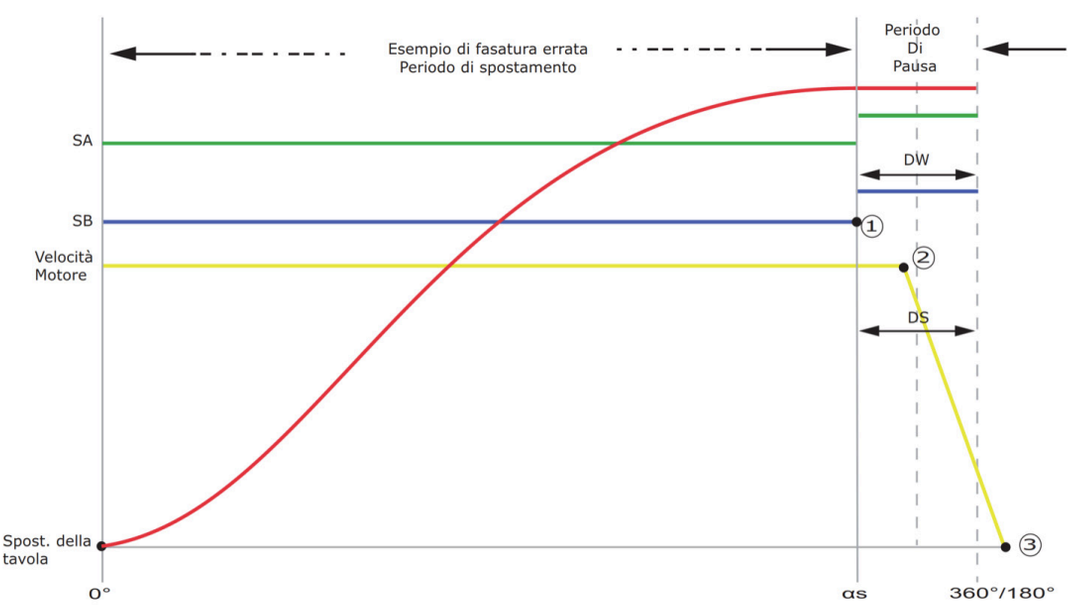
Phase Group MID

Graphical representation of the group functioning

The diagram below shows a generic cycle sequence of a mechanism and the operations required to stop the motor correctly. When the SB sensor signal becomes high, the motor braking signal is sent (Pos. 1). As a result of the electrical and mechanical brake control system response, the motor starts the deceleration phase in Pos. 2 and stops when arriving in Pos. 3, inside the mechanical cam dwell (AA).When the motor is stopped, the SA sensor signal must be high, indicating the cam has stopped correctly inside the dwell (Pos. 4). Otherwise the mechanism is located outside the correct stop position. It is therefore essential to widen - if the stop position is beyond the cam dwell - or to narrow - if the stop position is before the cam dwell - the adjustable sectors RB of the phase cam CB so that the motor stop signal is consequently advanced or delayed (opening angle of the cams AB or AB1 and AB2).



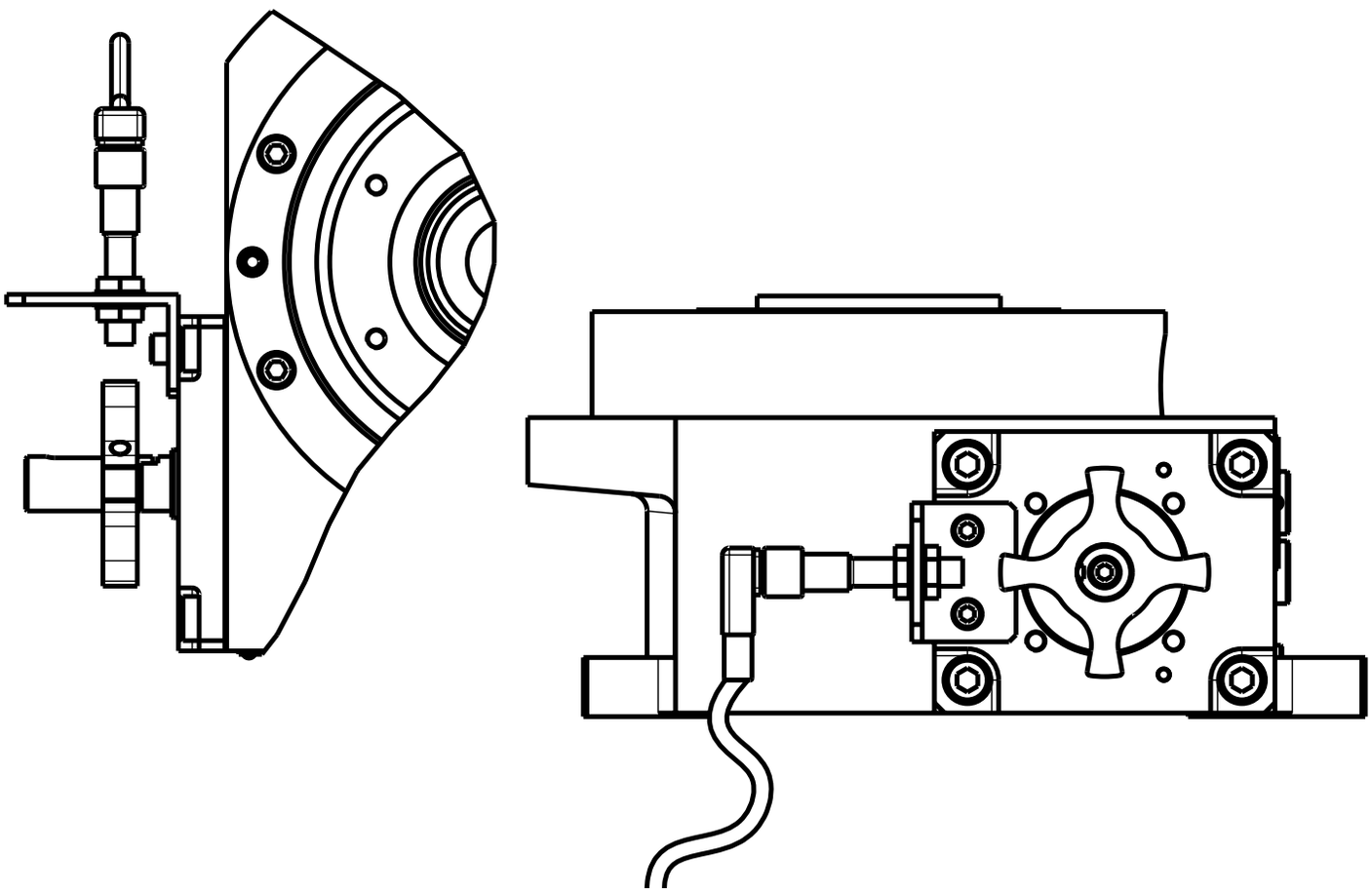
The second diagram, on the other hand, shows an example of an incorrect motor stopping sequence as the cam stops too late and already on the following movement.



Cam-phase micro assembly

E-Cam control system

The cam-micro assembly stops the table during the mechanical dwell period, with the consequent prolonging of the table dwell period. During the mechanical dwell period, the table can be restarted in oscillating mode, by reversing the direction of rotation of the motor and thus of the output plate. All tables can be equipped regardless with the E-Cam control system or the MID phase micro assembly, except for tables RIG04 with a 32-station cam. These tables can fit the E-Cam system but not the MID micro assembly, which is replaced by the CM4 micro assembly. The CM4 micro assembly fits a 4-tip cam combined with an inductive sensor type PNP. n.o..
The footprint of the CM4 micro assembly is the same as the MID assembly.



Adjustment of the micro assembly and of the E-Cam control system

The adjustment and phasing jobs of the MID and CM4 micro assemblies are always the user's responsibility, and must be carried out during table installation.
The adjustment and phasing of the E-Cam system, on the other hand, is carried out at the factory, by setting standard parameters.
The user is responsible for verifying and, if necessary, conducting a new calibration before the unit is commissioned.
The connection and management of the micro or E-Cam assemblies to the control system is the user's responsibility.

CAUTION: please remember that the micro assembly is not a safety device.

RIG03 - RIG04 - RIG06 - RIG09

PO description

The ordering code of the RIGIDIAL tables is created by following an alphanumeric classification and formed according to the diagram provided here below.
When placing an order, please refer to this diagram in order to avoid mistakes and misunderstandings.

RIGIDIAL

□ - □ - □ - □ - □ - □ - □ - □ - □ - □

Size (RIG03 - RIG 04 - RIG06 - RIG09)

Number of stations (Pg. 21)

Index period (Pg. 21)

Version (VLRA, VS)

Mounting position (V5, V6, ..., B8 - Pag. 25)

Simple or double input shaft (DA, SA, DS - Pag. 25)

Output hub (VCS, VCP, VCT, VCM - Pg. 8-11-15-19)

Output ring (Standard, no acronym) VC...
(Inverted mounting) VC....S

Reference holes (F) - RIG04-06-09

Stop sensor (MID Cam or E-Cam Pg. 29 - Pg. 30) - RIG03: E-CAM not available

REDUCTION GEAR

□ - □ - □ - □

Model

Ratio

Built-in torque limiter

Mounting position (D1. D2, ..., S6 - Pg. 26)

SELF-BRAKING MOTOR

□ - □ - □ - □ - □

Size

Power [kW]

Number of poles

Voltage [V]

Frequency [Hz]

Describe clearly any additional features required.

Coding example

RIG06 indexing table with 4 stations, indexing period of 310°, mounted in position V5 and with single input shaft on the right side. Output version VCS, ring for upside down mounting and reference holes.

VLRA standard motorised version with reduction gear RMI50, reduction ratio 1/28, LCB clutch torque limiter, reduction gear position S3 and self-braking motor size 80, 0.75 kW, flange B14, voltage 230/400[V] a 50/60 Hz.

RIG06 - 4 - 310 - VLRA - V5 - DA - VCSSF - MID
REDUCTION GEAR STM RMI 50 F1 - 1:28 - PAM 80B14 - S3 - LCB
SELF-BRAKING MOTOR 80b/B14 - 0.75[kW] - 4 P- 230/400 [V]- 50/60 [Hz]

COLOMBO FILIPPETTI

COLLABORATIVE ENGINEERING

CoFil

A COLOMBO FILIPPETTI COMPANY

ideas of automation

Colombo Filippetti has been present in the Industrial Automation market for seventy years as a supplier of cam systems for every handling requirement, guaranteeing extreme precision in very high-performance contexts.

The attention to every detail in the construction of customer relationships - context sharing, dedicated planning, mechanisms construction with focus on high quality, after sales service and assistance - constitutes an important and essential value of Colombo Filippetti's philosophy. This value finds application in every aspect of our daily action as an element of sharing and as expression of our professionalism.

Our positioning in the market gives us a role of international leadership and places us in the prestigious group of global players we constantly measure ourselves with. It is a great challenge that constantly stimulates our renewal and continuous innovation.

In order to be able to respond adequately to the requirements coming from the industrial automation mechanisms market - a global universe in impetuous transformation - the orientation of our activities changed. Therefore, the CoFil brand took shape: even with its own stylistic features, it stems from the long tradition of excellence, proper of Colombo Filippetti. CoFil aims to look to the future in a new and ambitious perspective - in line with the increasingly dynamic and accelerated evolution of the industrial automation industry. A new brand whose roots go back to a long history of values and skills, guaranteeing continuity in the future of what is most precious to us: our customers trust.

CoFIL

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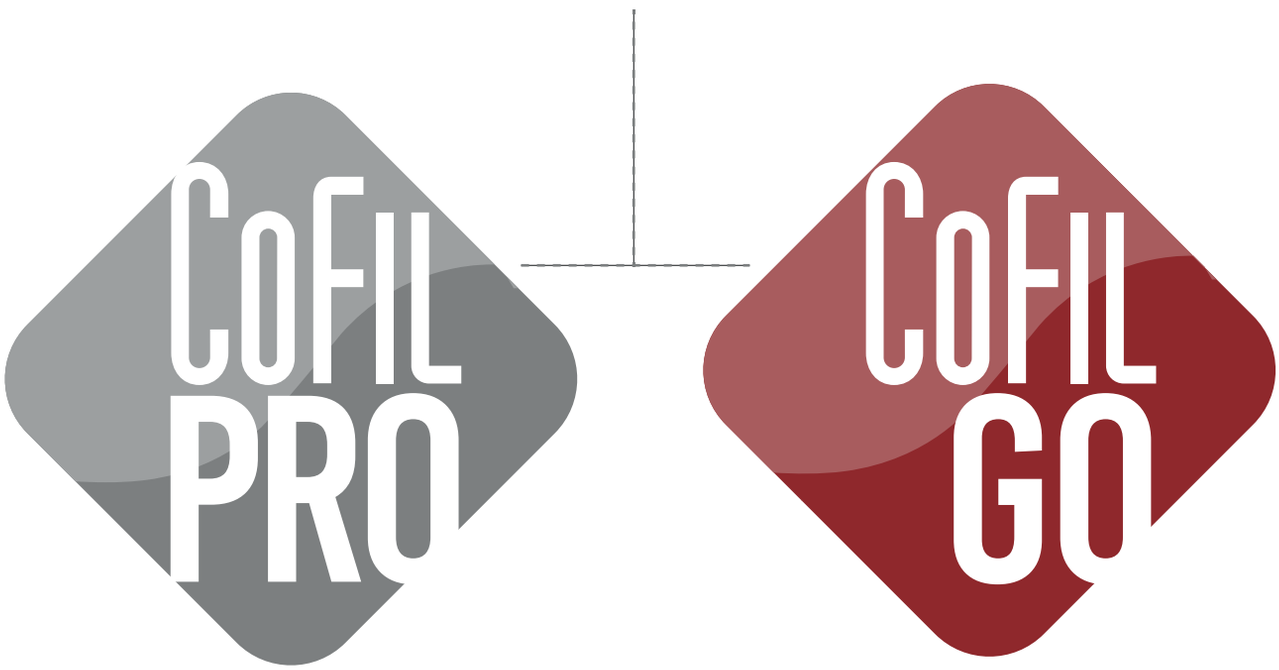

Your private engineering project & development for you

Development of new projects in collaboration with the customers, attention, listening and knowledge of the markets. Our careful and continuous consultancy and ability to meet the new demands of an increasingly high-performance automation with the most remarkable technological profile. These are the distinctive traits of a business unit completely oriented towards the evolution needs of automation considering increasingly ambitious leadership goals that our customers continually arise. A team of engineers and designers always at your disposal to meet the most interesting challenges through ongoing dialogue aimed at the design and implementation of very high-performance customized mechanisms with specific and dedicated solutions. Welcome to the world of tailor-made collaboration, where technique reaches its peak of excellence.

Standard solutions fast tailor made automation

Welcome to our business unit dedicated to speed in meeting the extremely varied automation needs of the most demanding customers. Solutions that are always ready and available, based on the wide availability of a range of standardized mechanisms in the catalogue, which combine the high quality of Colombo Filippetti products with the flexibility in mounting options together with extremely fast supply times. Indexers, oscillators, rotary tables, manipulators and tool changers in the configurations that best meet current needs for precise, reliable and long-lasting handling. The increasing demand for mechanisms that can make automation solutions reach top performance in the widest array of industrial automation. This is the meeting point between our superior production capacity and the most suitable solution provided to the customer.

www.cofil.it

Cofil in the world

COMPANY HEADQUARTER

Colombo Filippetti Spa
Italy
Via G. Rossini,26
24040 Casirate d'Adda (BG) Italia
Ph:+39 0363-3251
Fax:+39 0363-325252
info@cofil.it
www.cofil.it

SUBSIDIARIES

CoFil GmbH
Deutschland
Rudolf-Diesel-Straße 11
69115 Heidelberg
Ph:+49 6221 648 4050
info@cofil-gmbh.de
www.cofil-gmbh.de

CoFil s.a.r.l.
France
4A rue Joseph De Pauw
68320 Muntzenheim
Ph:+33 0389216867
Fax:+33 957408122
cofil@cofil.fr
www.cofil.com

CoFil Inc.
North America
2175 Point Boulevard
Suite 170
Elgin, IL 60123
Ph:1-847-844-0114
info@cofil-inc.com
www.cofil-inc.com

AGENTS IN ITALY

Tecnocamme
Via Panigale, 11
40132 Bologna - BO
Tel:+39 051 641 5568
Fax:+39 051 641 9072
tecnocamme@cofil.it

RDB Rizzardi S.r.l.
Via Massimo D'Antona, 65
Fraz. Pasta
10040 Rivalta Di Torino - TO
Tel:+39 011 398 9546
Fax:+39 011 349 7863
rdb@cofil.it

CM Engineering
Via Aldo Moro, 36
65129 Pescara - PE
Tel:+39 085 799 8879
Ph:+39 333 103 5570
info@cmengineering.it

Agenzia RDS
S.P. 336 km 20,600
81025 Marcianise - CE
Tel:+39 0823 451 233
Ph:+39 335 128 9960
Fax:+39 0823 178 0114
raffaele.desimone@agenziards.com

AGENTS IN THE WORLD

Precision Motion Ltd
United Kingdom, Eire
PO BOX 2034
Lancashire, PR5 9AD Preston
Ph:+44 01772 339633
Fax:+44 01772 336362
stuart@precisionmotion.co.uk

Erne Ltd Sti
Ikitelli O.S.B. Mah.
Aykosan Carsi B Blok
Sok Carsi B Blok 1/17
34490 Basaksehir Istanbul
Turkey
ph: +90 2125654598
fax: +90 2125653684
erne@erne.com.tr

Cuby Transmision de Potencia, s.l.
Spain
Permanyer, 34
E – 08205 Sabadell Barcellona
Ph:+34 93 7451950
Fax:+34 93 7255079
info@cuby.es

Precision International
India
108, Aashirwad
Green Park (Main),
New Delhi -110016
Ph:+91-11-26513704
precinter@gmail.com