

## INDEXING ROTARY TABLES

IR1001 - IR1301

# IR TABLES



- Sealed cast iron gear housing.
- Indexing output plate with fixed central through hole.
- Input shaft and worm screw on opposite taper roller bearings.
- Rotary plate with thrust bearing.
- Worm gear reducer directly mounted on housing.
- Precise and repeatable index motion.
- Self-locking dwell position ensuring no clearance in station.
- Smooth movement and noiseless drive.
- Bi-directional sense of motion.
- High load bearing capacity.
- Absolutely regular operation at any speed.
- Possibility of mounting the unit in any plane.
- Very low maintenance.
- Wide range of standard movements.



**COLOMBO FILIPPETTI**  
COLLABORATIVE ENGINEERING

<http://www.cofil.com> - E-mail: [cofil@cofil.com](mailto:cofil@cofil.com)  
Via G. Rossini 26 - 24040 Casirate D'Adda Bg IT  
Phone +39 0363 3251 - Fax +39 0363 325252



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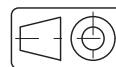
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The units of measurement correspond with System International /Severity Index SI General tolerances of manufacture are conform to UNI – ISO 2768-1 UNI EN 22768-1

Illustrations and drawings according to UNI 3970 (ISO 128-82).

Method of projection of the drawings.



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This catalogue supersedes all earlier ones.

# INDEXING ROTARY TABLES

SERIE  
IR1001•IR1301

## 1. General information

### Variants / Number of stations

Tab. 1

<b>Variants</b>	See : IR 1001 MCN 211 / IR 1301 MCN 210														
<b>Number of stations</b>	2	3	4	5	6	7	8	9	10	12	16	18*	20*	22*	24*

For the number of stations marked with (\*), each complete cycle is achieved in 180° of the cam rotation  
It is possible to realise IR tables with different number of stations on request.

- Installation - With horizontal or vertical axis
- Central hole - Without central hole  
- With hole for cable passage.
- Motion input - Direct on cam shaft using conical lockers.  
- With clutch torque limiter on input drive on request .

Tab. 2

Series	Standard execution	
	Cam	Rollers
IR 1001	∅ 360	∅ 65 e ∅ 80
IR 1301	∅ 420	∅ 80 e ∅ 100

## 2. Faces designation

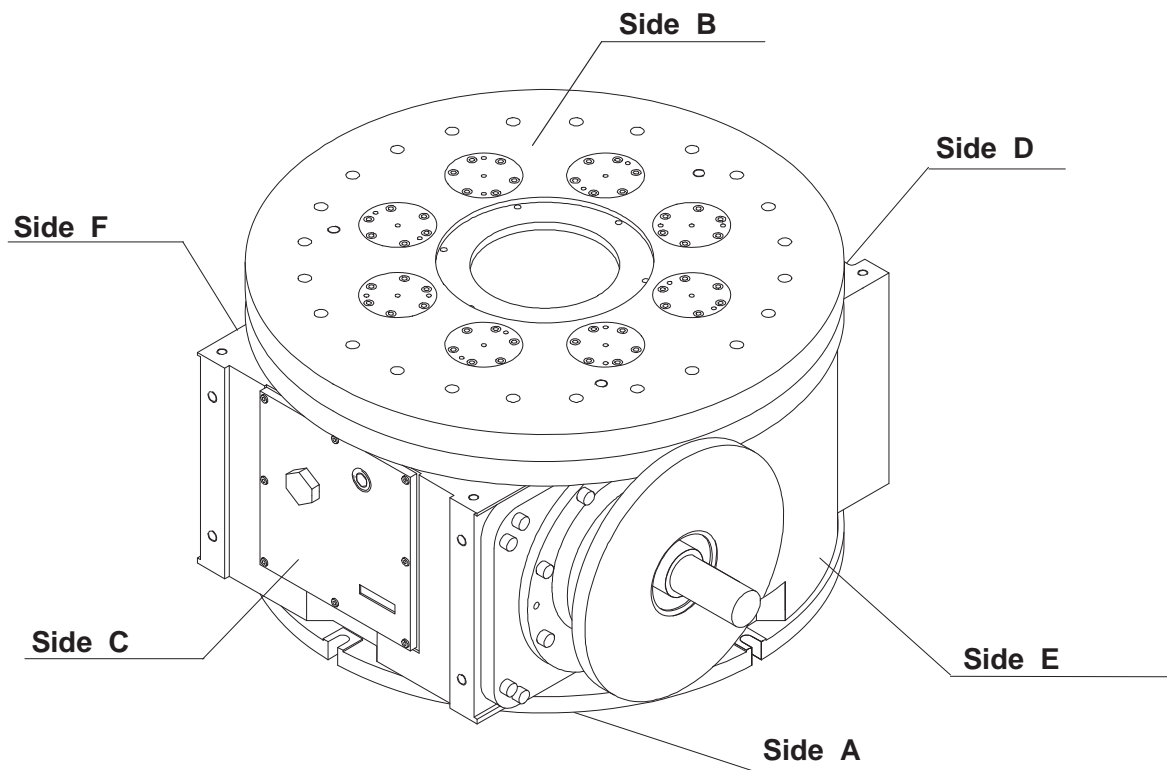


Fig. 1

### 3. Main technical data

#### Series IR 1001

#### Series IR 1001 - Tables without central hole - Cams Ø 360

Tab. 3

<b>Variants</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Stations</b>	2	3	4	5	6	7	8	9	10	12	16	18	20	22	24
<b>Rollers diameter</b>	65	80	80	80	65	65	80	80	80	80	65	80	80	80	80
<b>Number of rollers</b>	8	9	8	10	12	14	8	9	10	12	16	9	10	11	12
<b>Displacement angle [°]</b>	330	310	310	310	300	300	300	300	300	310	310	330	330	330	330
<b>Motion law number</b>	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1

#### Series IR 1301

#### Series IR 1301 - Tables without central hole - Cams Ø 420.

Tab. 4

<b>Variants</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Stations</b>	2	3	4	5	6	7	8	9	10	12	16	18	20	22	24
<b>Rollers diameter</b>	80	100	80	100	100	80	80	100	100	100	80	100	100	100	100
<b>Number of rollers</b>	8	9	12	10	12	14	16	9	10	12	16	9	10	11	12
<b>Displacement angle [°]</b>	330	310	310	300	300	300	300	300	300	310	310	330	330	330	330
<b>Motion law number</b>	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1

#### Motion laws:

Tab. 5

**Number - Name**

- 1 - Modified sine curve**
- 2 - Modified sine with 1/3 constant velocity**
- 3 - Modified sine with 1/2 constant velocity**
- 4 - Generic motion law G\_R\_U**

<b>Symbol</b>	<b>Cv</b>	<b>Ca</b>	<b>Cc</b>
MS	1.76	5.53	± 0.99
MS33	1.40	6.62	± 0.79
MS50	1.27	8.01	± 0.72
GRU	Max 2.00	Min 4.00	--

## 4. Overall dimensions - IR 1001

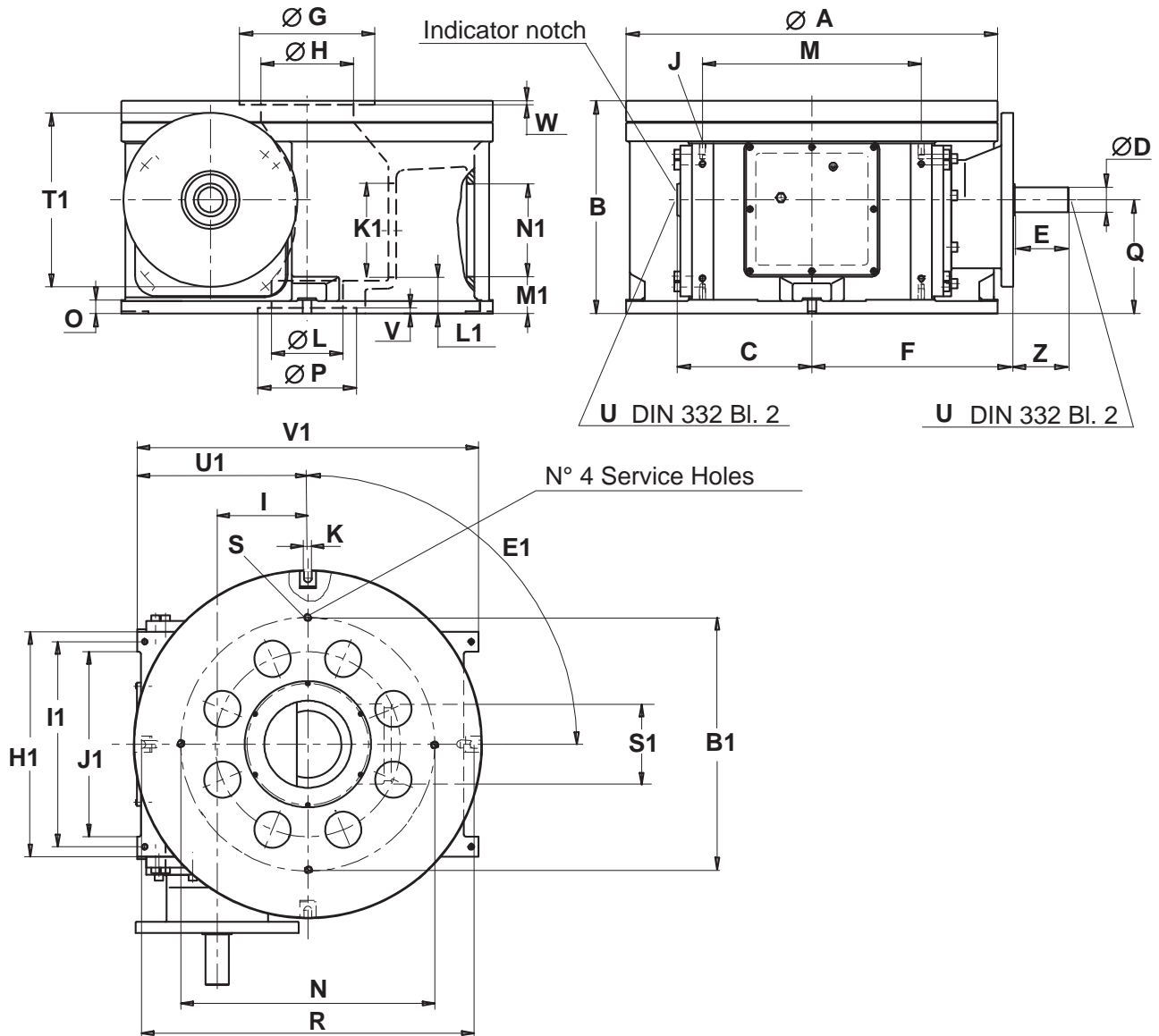


Fig. 2

The reducers are connected on the input shaft with conical lockers in substitution of feather key.

For standard holes on indexing plate see Pag.7.

An Indicator notch executed on the opposite front of the input shaft will be in the vertical position when the table is in the middle of cam dwell period. See Pag. 10.

Anchoring system informations. See Pag.8.

Tab. 6

Series	A	B	C	D <sup>k6</sup>	E	F	G <sup>H7</sup>	H <sup>H7</sup>	I	J	K	L	M	N
IR 1001	960	550	345	65	140	520	350	250	250	M16x30	22	185	565	776
Series	O	P <sup>H7</sup>	Q	R	S	U	V	W	Z	B1	E1	P1		
IR 1001	35	255	295	916	M20x32	M20	15	10	144	695	4x90°	32		
Series	Q1	H1	I1	J1	ØK1	L1	M1	N1	S1	T1	U1	V1	Peso [kg]*	
IR 1001	22	620	565	510	160	135	95	240	220	450	470	940	~1220	

\* Housing without oil.

## 5. Overall dimensions - IR 1301

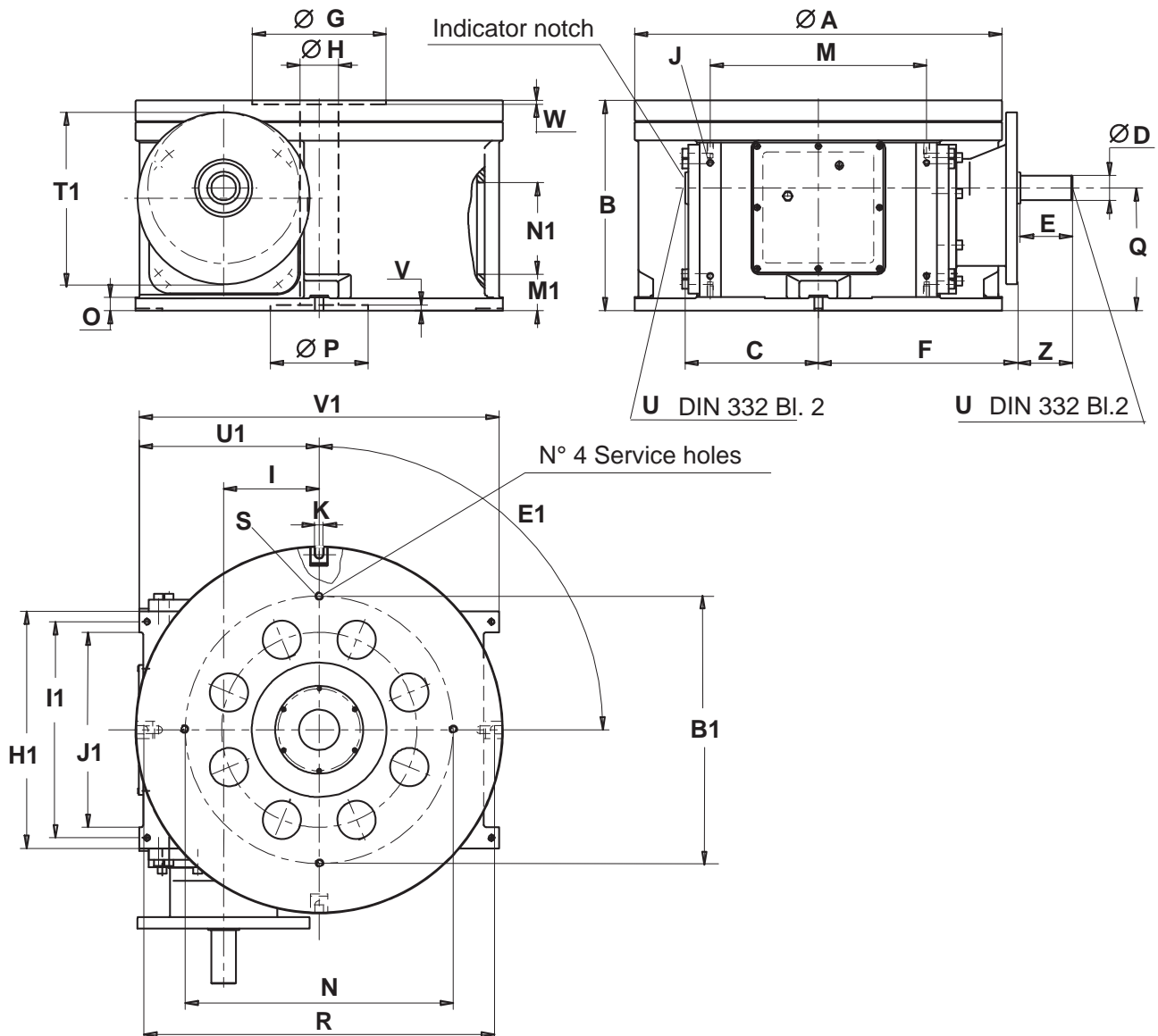


Fig 3

The reducers are connected on the input shaft with conical lockers in substitution of feather key.

For standard holes on indexing plate see Pag7.

An Indicator notch executed on the opposite front of the input shaft will be in the vertical position when the table is in the middle of cam dwell period. See Pag 10.

Anchoring system informations. See Pag.8.

Tab. 7

Series	A	B	C	D <sup>k6</sup>	E	F	G <sup>H7</sup>	H <sup>H7</sup>	I	J	K	M	N
IR 1301	1330	650	495	110	210	710	450	180	350	M24x40	26	820	1020

Series	O	P <sup>H7</sup>	Q	R	S	U	V	W	Z	B1	E1
IR 1301	45	380	375	1270	M24x40	M24	25	10	215	1020	4x90°

Series	P1	Q1	H1	I1	J1	M1	N1	T1	U1	V1	Weight [kg]*
IR 1301	40	24	900	820	740	140	270	450	630	1260	~2700

\* Housing without oil.

## 6. Load types on thrust bearing

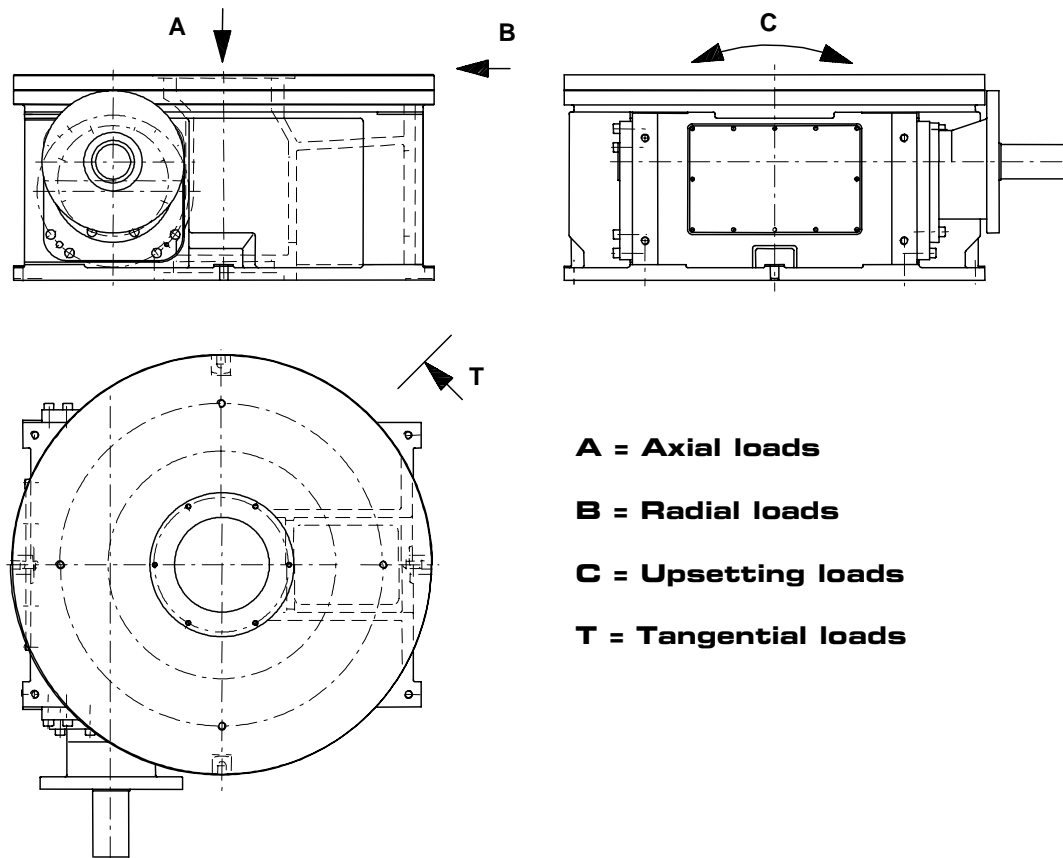


Fig. 4

Tab. 8

Series	Load coefficients [kN]			
	Static		Dynamic	
	Axial $C_{oa}$	Radial $C_{or}$	Axial $C_a$	Radial $C_r$
IR 1001	3657	1463	629	504
IR 1301	5098	2039	743	594

Tab. 8 shows load coefficients of indexing plate thrust bearing.

Various types of loads with different strength apply contemporary on rotary tables in displacement and dwell periods.

Therefore actual admissible axial and radial loads are not to be compared simply with table data.

In any case our technical office may verify loads conditions and bearing endurance on request.

## 1. Indexing plate precision

Tab. 9

Series	Plate concentricity [mm]	Plate flatness (B) [mm]	Indexing precision [1 cycle] [degrees]	Indexing precision [2 cycles] [degrees]
IR 1001	on $\varnothing 220 \div 0.1$	on $\varnothing 960 \div 0.1$	$\pm 0.008^\circ$	$\pm 0.016^\circ$
IR 1301	on $\varnothing 450 \div 0.1$	on $\varnothing 1300 \div 0.1$	$\pm 0.008^\circ$	$\pm 0.016^\circ$



## 8. Standard drilling scheme of indexing plate

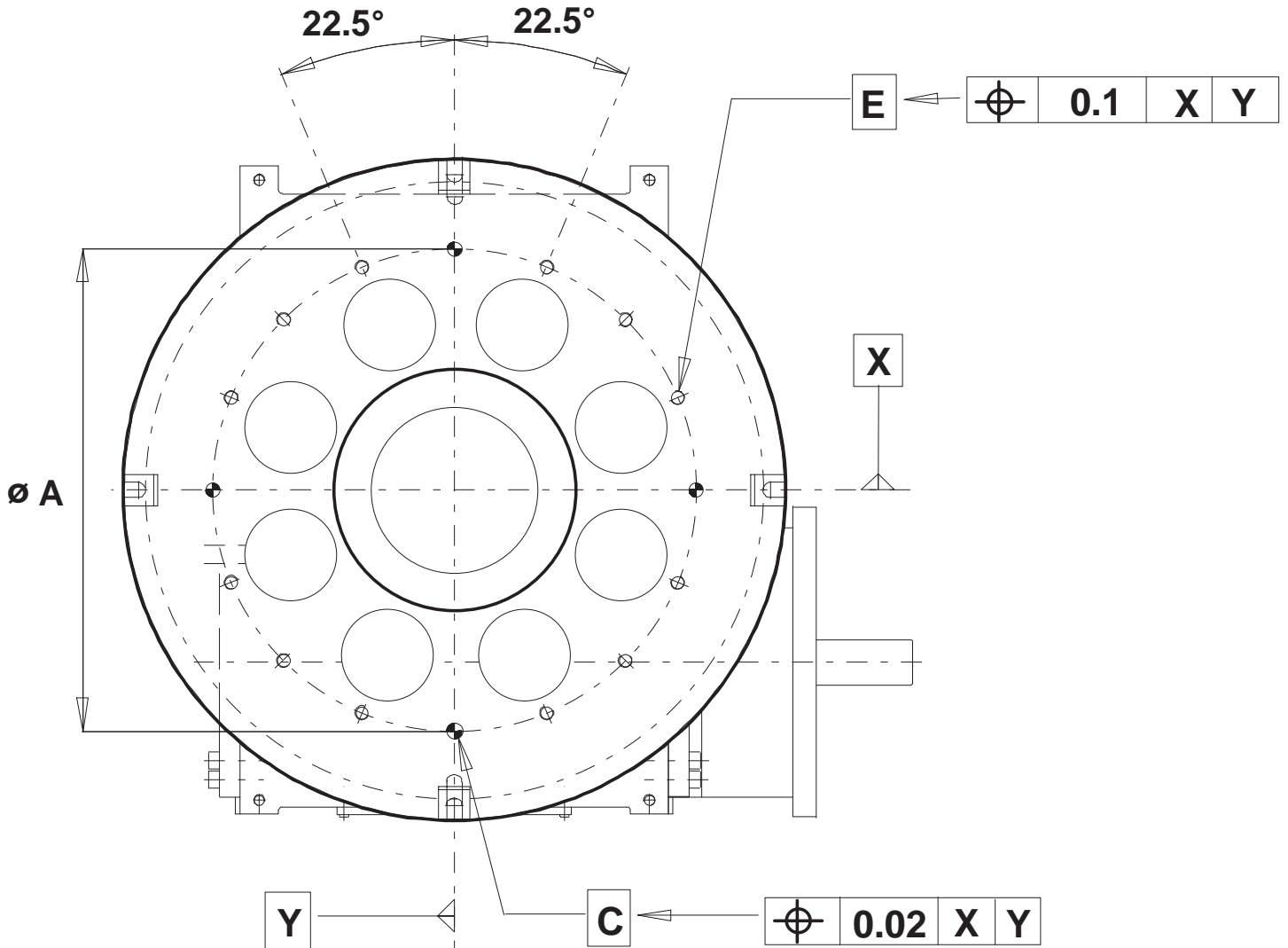


Fig. 5

N.B. IR table is represented in the middle of a dwell in a station.

Tab. 10

Series	$\varnothing A$	C HOLES	N°	E HOLES	N°
IR 1001	700	$\varnothing 20H7 \times 25$	4	M20 x 32	12
IR 1301	1020	$\varnothing 20H7 \times 25$	4	M24 x 40	12

On demand, can be supplied, INDEXING TABLE with special holes.

## 9. Anchoring system

Indexing tables of this series are built with a centring diameter obtained in the lower side of the table aligned with the rotation axis of indexing plate.

Two radial slots, also on the underside and perpendicular to the axis of rotation, enable the use of precision blocks (DIN 6322/B). By centring at least one block a very rigid torsional anchorage and a quick and accurate alignment of the table to the structure is obtained without any need of control equipment. The rectangular plate is not supplied by Colombo Filippetti SPA.

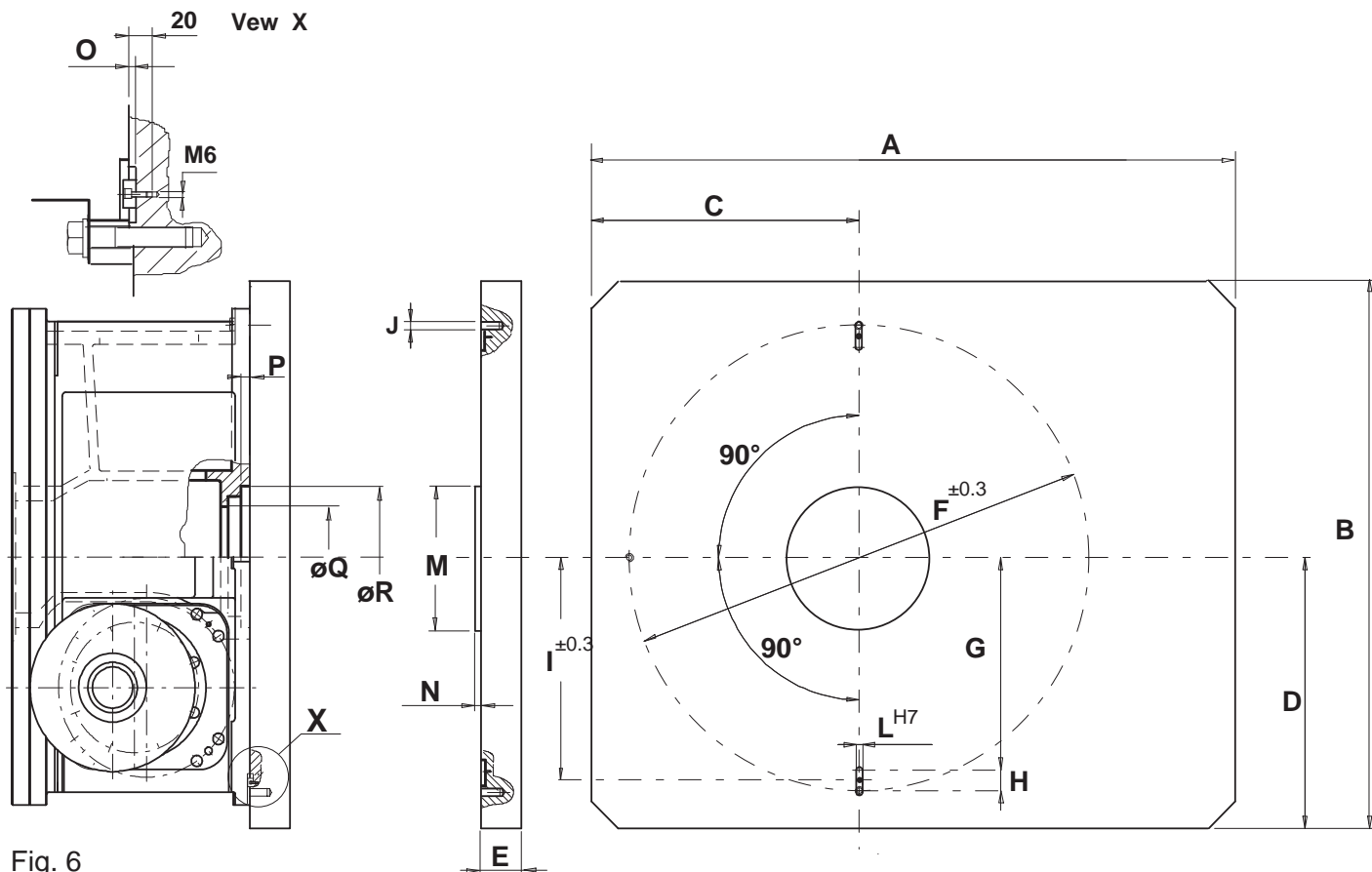


Fig. 6

Anchoring Table Dimensions

Tab. 11

Series	A	B	C	D	E	F	G	H	J	I	L <sup>H7</sup>	M <sup>g7</sup>	N	O	P	Q <sup>H8</sup>	R <sup>H7</sup>
IR 1001	1600	1200	600	600	50	921	420	24	M20x40	432	20	255	10	5	20	550	680
IR 1301	1900	1500	750	750	60	1284	586	34	M24x60	603	22	380	20	7	25	620	760

## BLOCKS TABLE

Tab. 12

Series	BLOCKS				CENTERING		ANCHORING BOLTS		
	b	h	l	t	∅	≠	∅	L	N°.
IR1001	20	10	22	6	255 <sup>g7</sup>	10	M 20	75	4
IR 1301	22	12	32	6	380 <sup>g7</sup>	20	M 24	90	4

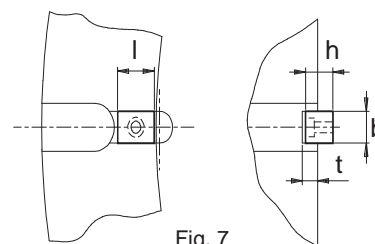


Fig. 7

## 11. Mounting positions

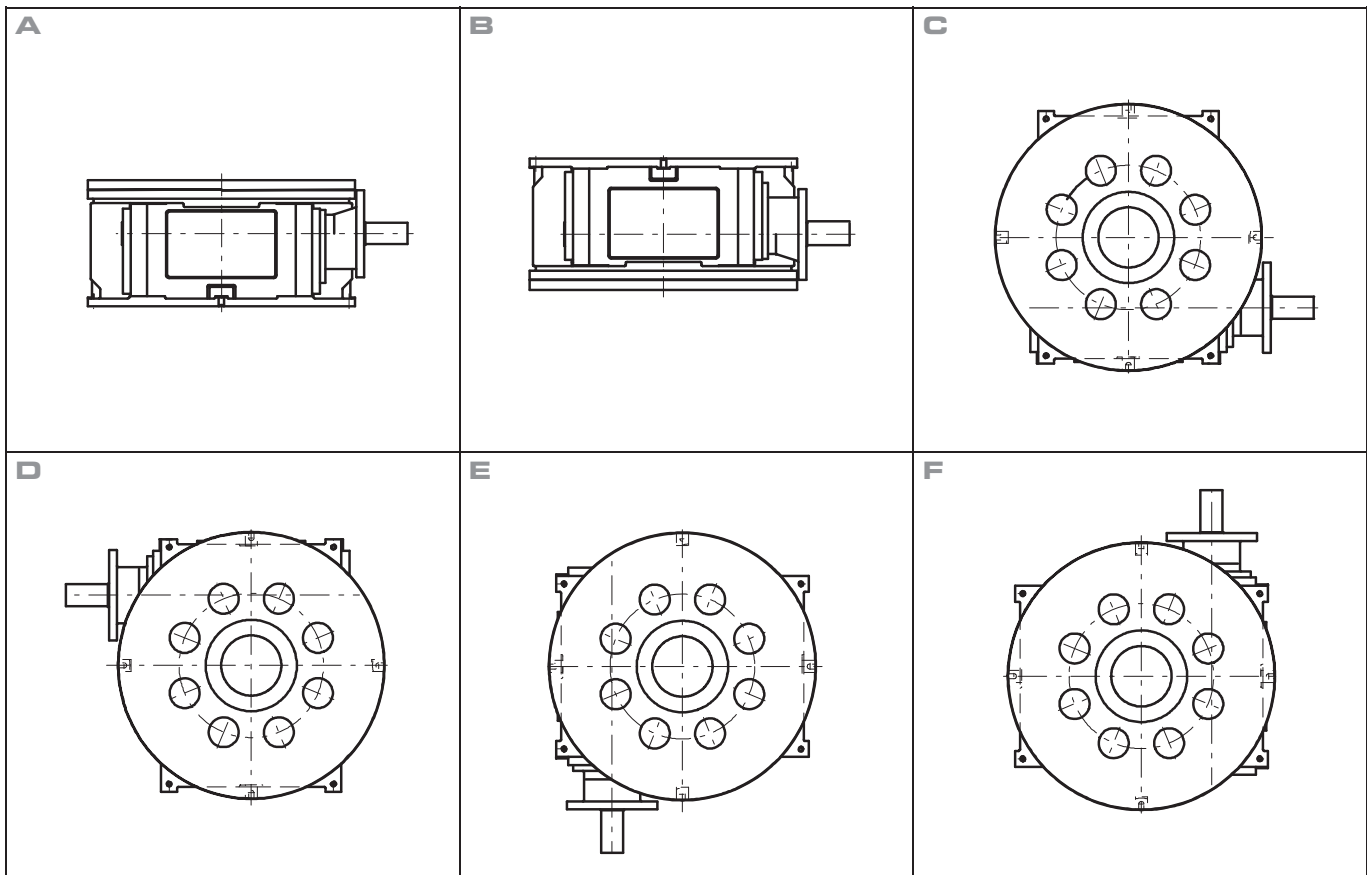


Fig. 8

Standard mounting position of IR tables is Position **A**.

The **B, C, D, E, F** positions are optional and must be explicitly requested at the time of order.

In **A** mounting position the lubrication of IR 1001 and IR 1301 tables is by oil. In **B, C, D, E, F** mounting positions lubrication is by synthetic grease.

The table in **E** and **F** positions can be anchored only with frontal holes

## 11. Motorizations

COLOMBO FILIPPETTI SPA can also supply the motorization and overload protection systems for this rotary table.

Other than the different possible solutions, depending on customer requirements and applications, a more defined and dimensional motorization can be used.

Please contact our technical office for more informations.

## 12. Assembly of control cam for microswitches

In applications for INDEXING TABLES is frequently required a cam-limit switch unit to interrupt the motor drive at each cycle.

The stop can have the function of extending the rest period of the cycle and/or of reversing the sense of rotation of the motor and consequently of the INDEXING TABLE and in which case will operate as a rocker unit.

Limit switch cams are available in three standard shapes, each suitable for a particular type of limit switch as follows:

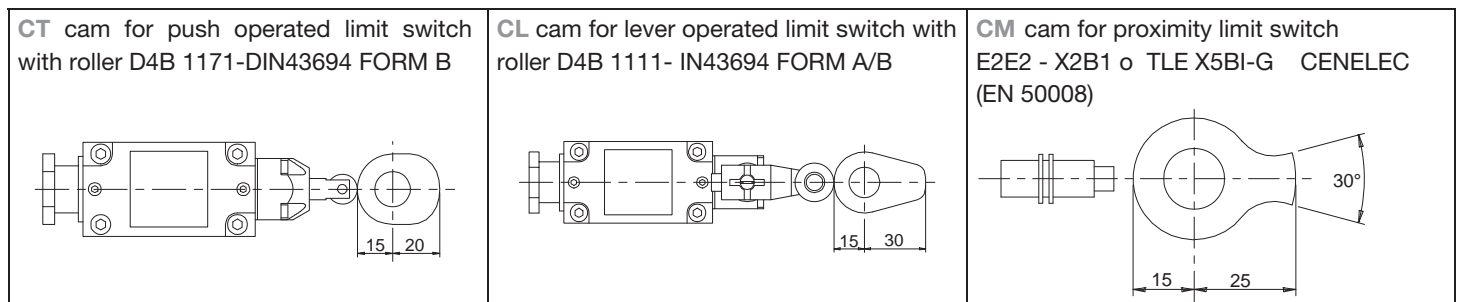


Fig. 9

### Overall dimensions

On INDEXING TABLES, an "indicator notch" executed on both exposed front and rear end faces of the input shaft reveals its position, halfway along the cam's rest period, and makes it possible to identify the exact point where the limit switch must be operated.

A plate is used as a support for the limit switch, while a pin screwed into the main shaft head end thread serves as a holder for one or more limit switch operating cams.

These cams are secured to the pin and kept in place by means of grub screws.

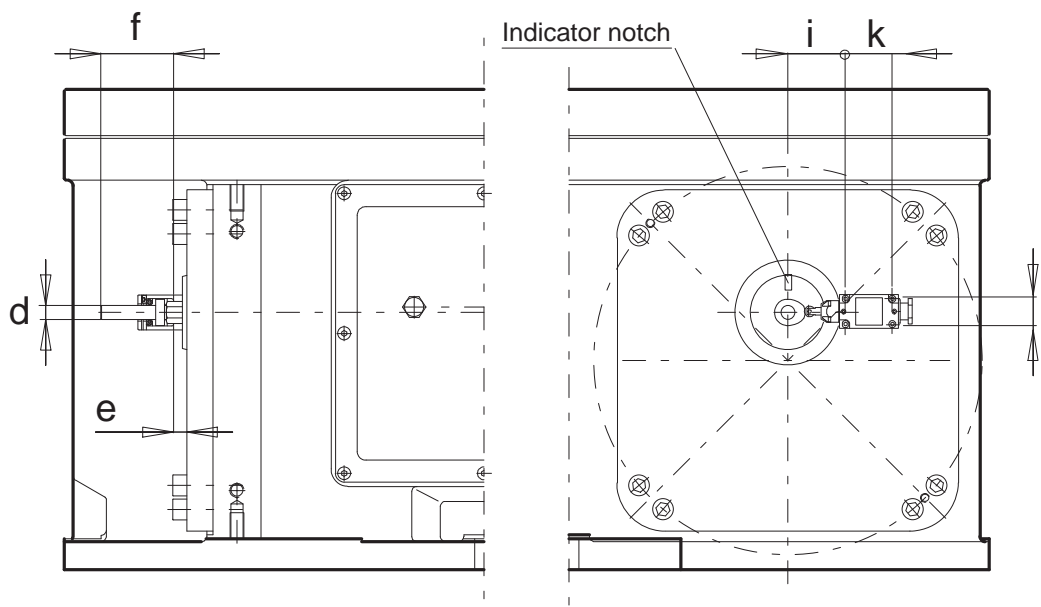


Fig. 10

Tab. 13

Series	∅ d <sup>h9</sup>	e	f	i	k	l
IR 1001	16	15	84	48	60	30
IR 1301	16	15	85	48	60	30

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## 13. FC and FCR Micro Groups

This simple micro groups permit identification only of the fact that the cam is in a certain position. If this position be the dwell period, the IR table must be in any one of perhaps several stations. It is sometimes necessary to know which particular station e.g. tables where oscillation between stations is required which is achieved by motor reversal.

For machine start-up and for prevention of possible over-run, extra positional information is needed.

One may also need several separate control signals for processes which are to be synchronised with the IR cam position.

**FC** are micro groups driven by the camshaft in ratio 1:1. These groups cannot distinguish particular station positions but can provide up to 6 control microcams as standard; each of which is synchronised with the IR camshaft.

Tab. 14

FC Type	N. Push Switches	A	B	C	D
FC2	2	46	200	66	125
FC3	3	60	200	66	125
FC4	4	95	200	66	125
FC5	5	95	200	66	125
FC6	6	95	200	66	125

**FCR** are microgroups driven by the camshaft in various ratio; none of which is 1:1, the result is that these can identify particular stations and detect oscillator over-run. Standard types are shown in the following table.

Other possibilities exist to satisfy individual needs.

Tab. 15

SERIE	I	Q	E	F	G	H	L	M	N	P
IR1001	250	295	210	102	86	TAB.	70	25	36	6.5
IR1301	350	375	210	102	86	16	70	25	36	6.5

Tab. 16

N. MICRO CAMS	WIDTH H	TRANS. RATIO	APPLICATION
4	115	0.75	IR Oscillating Tab. 0°-180°, 0°-120°, 0°- 90°, 0°- 60°
2	115	0.50	IR indexing Table 2 stations
3	115	0.33	IR indexing Table 3 stations
4	115	0.25	IR indexing Table 4 stations
5	115	0.20	IR indexing Table 5 stations
6	115	0.16	IR indexing Table 6 stations



ATTENTION: the phase cam is not a safety device.

FC micro groups  
Overall Dimensions

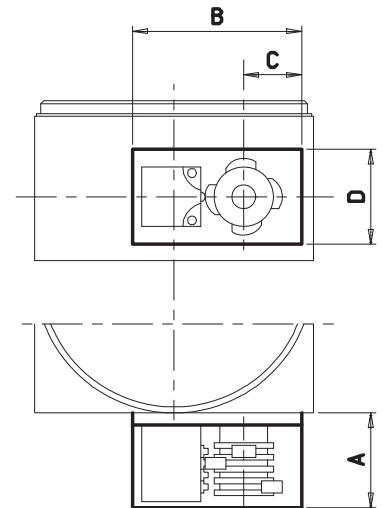


Fig. 11

FCR micro groups  
Overall Dimensions

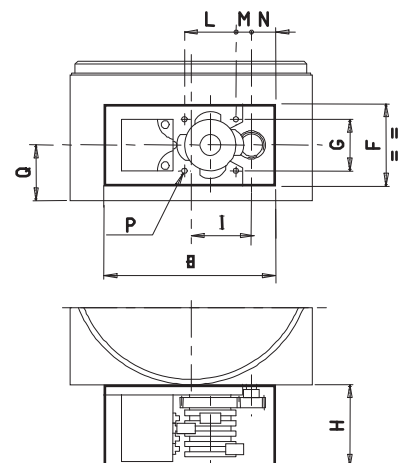


Fig. 12



## 14. Example Of Application For Oscillating Rotary Tables

Ex. : 2 Stations oscillating table ( $180^\circ$  rotation) with displacement angle  $\beta^\circ = 330^\circ$

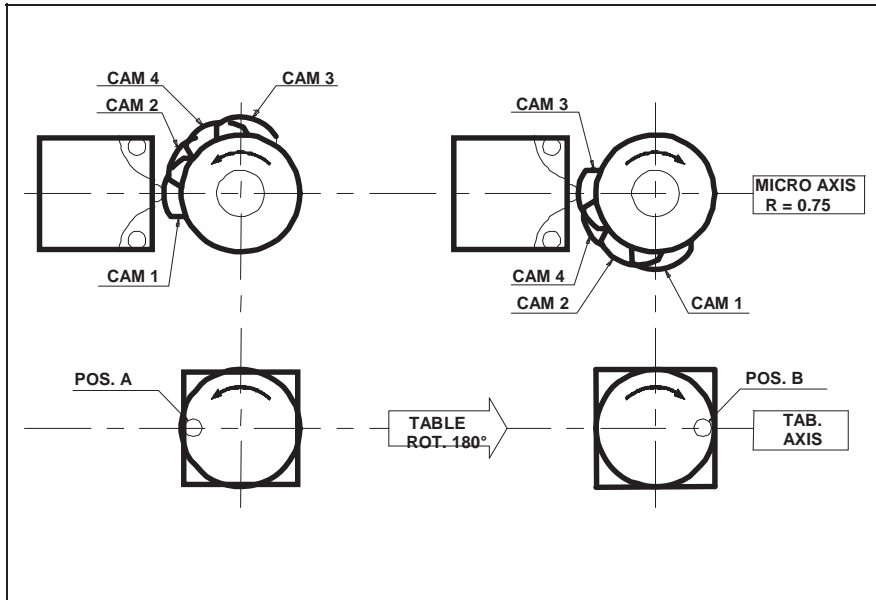


Fig. 13

Tab. 17

MICROSWITCH FUNCTIONS		
1	Micro Stop	POS. A
2	Micro Over stroke	POS. A
3	Micro Stop	POS. B
4	Micro Over stroke	POS. B

## Example Of Application For Indexing Rotary Tables

Ex. : 4 Stations indexing table ( $90^\circ$  rotation) with displacement angle  $\beta^\circ = 270^\circ$

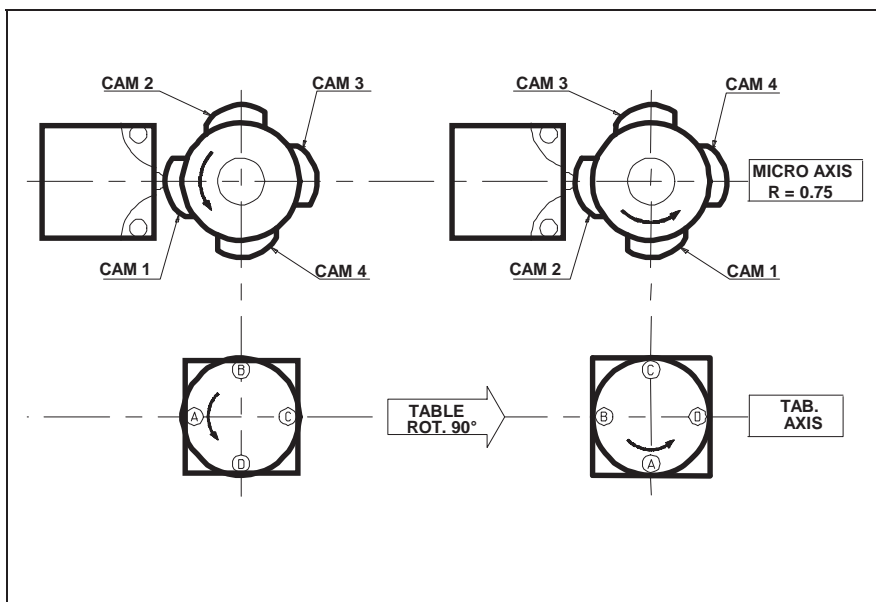


Fig. 14

Tab. 18

MICROSWITCH FUNCTIONS		
1	Micro Stop	POS. A
2	Micro Stop	POS. B
3	Micro Stop	POS. C
4	Micro Stop	POS. D

## 15. Lubrication

IR 1001 and IR 1301 long-life lubricated tables are delivered already filled with oil on the ground of mounting position.

In **B, C, D, E, F** mounting positions lubrication is by synthetic grease.

In **A** mounting position the lubrication of IR 1001 and IR 1301 tables is by oil bath, only the rollers are lubricated by conveyance of lubricant. The recommended lubricant is ISO VG 320 mineral oil or similar.

Lubrication frequency, unless leakage or external pollution have occurred, is as shown in **Tab. 19** and depends on the temperature achieved by the oil under standard operating conditions.

For **D, E, F** mounting positions the upper bearings of cam shaft are equipped with NILOS rings for taper roller bearing and lubricated by grease.

The thrust bearing of indexing plate must be lubricated by specific grease cups every 1600 hours of work with 8 cm<sup>3</sup> of ISO XM 2 grease.

Indexing tables are delivered with this bearing already lubricated, therefore they do not require lubrication for the first 1600 hours of operation.

No other lubricant is provided with the indexing tables before delivery and therefore it will be customer's care to fill up to half of the level plug on the front cover.

When filling, it is best to use a filter to avoid dirt entering into the housing.

For lubrication of reduction gears and other accessory mechanical groups, the manufacturers' directions and instructions should be followed

**Tab. 19**

Series	Mounting Position Oil quantity [dm <sup>3</sup> ]	Mounting Position Grease quantity [kg]				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>IR 1001</b>	~ 40	~35	~40	~20	~40	~40
<b>IR 1301</b>	~ 55	~50	~55	~25	~55	~55

## TABLE OF CORRESPONDING LUBRICANTS

**Tab. 20**

ROTARY TABLES IR 1001 - IR 1301		
	HOUSING (OIL)	BEARING (GREASE)
<b>ISO</b>	VG - 320	XM 2
<b>AGIP</b>	BLASIA 320	GR MU EP2
<b>ESSO</b>	SPARTAN EP - 320	BEACON EP 2
<b>BP</b>	ENERGOL GR-XP-320	ENERGREASE LS-EP 2
<b>MOBIL</b>	MOBILGEAR 630	MOBILUX EP 2
<b>SHELL</b>	OMALA OIL 320	ALVANIA EP2

## TABLE OF LUBRICATION INTERVALS

**Tab. 21**

OIL TEMPERATURE (°C )	LUBRICATION INTERVAL (h)
< = 65	5000
65 - 80	2500
80 - 95	1500

## 16. Position of lubrication holes

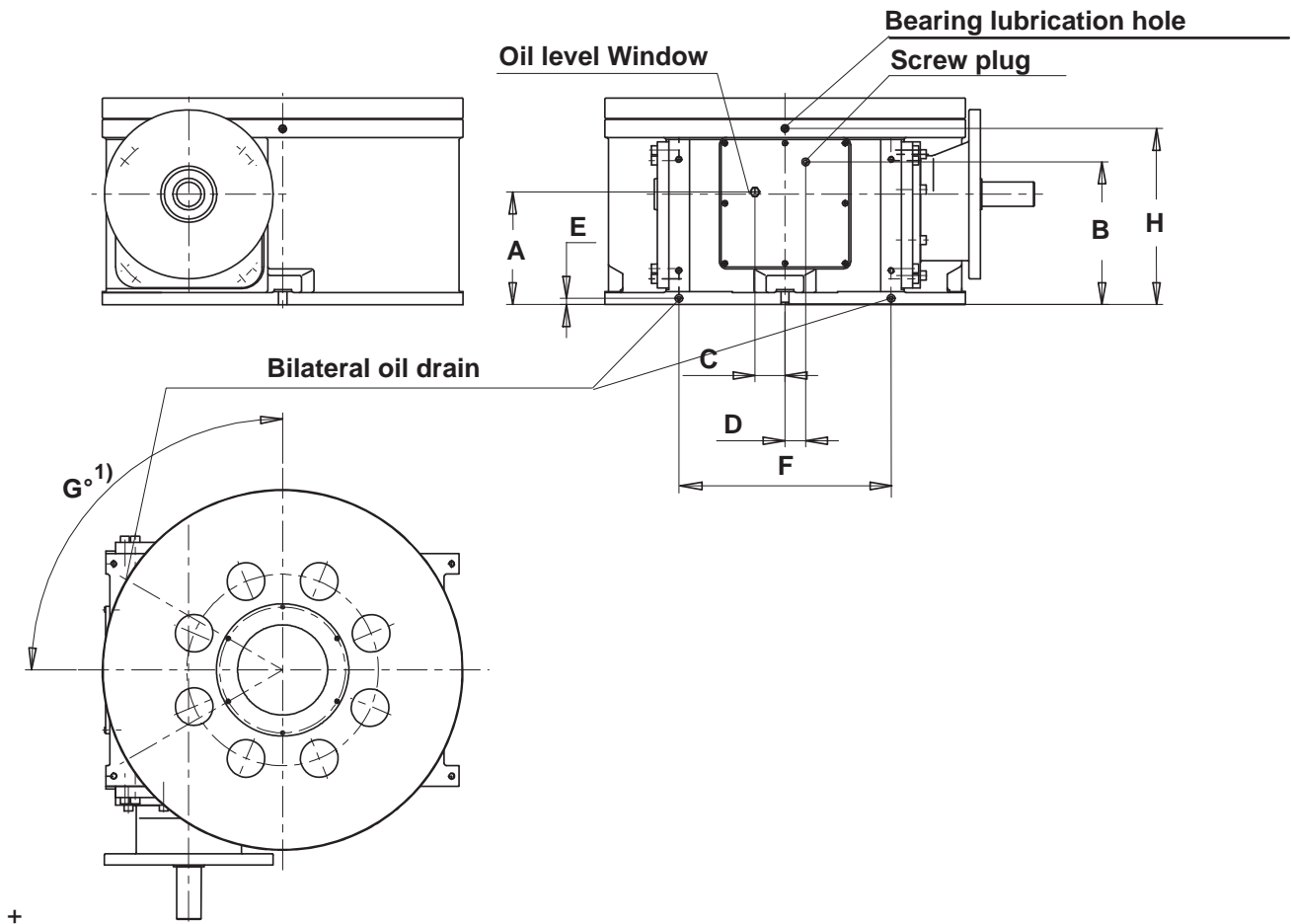


Fig. 15

Tab. 22

Series	A	B	C	D	E	F	G <sup>1)</sup>	H
IR 1001	300	380	80	55	18,5	480	3x120°	485
IR 1301	350	450	80	55	35	763	4x90°	579,5

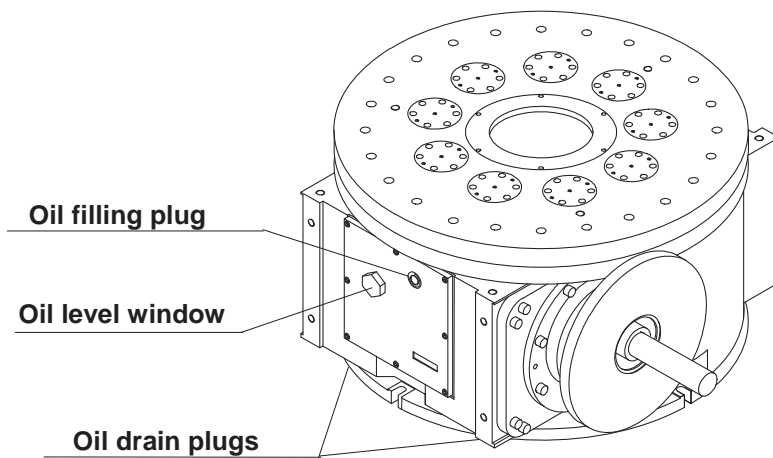


Fig. 16

<sup>1)</sup> Position of lubrication holes.



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## 17. TABLE OF DYNAMIC CAPACITIES

Tab. 23

TABLE CODE				Static torque <b>Ms</b> [daN m]	Dynamic torque (at output) cycles/min <b>Mu</b> [daN m]					Coeff. of Velocity <b>Cv</b>	Coeff. of Accel. <b>Ca</b>	Coeff. of Trasm. <b>Kj</b>	Number and type of roller
Series	Number of Stations <b>S</b>	Angle of displace <b>B°</b>	Angle of Dwell <b>Bp°</b>		15 cycles/1'	25 cycles/1'	50 cycles/1'	75 cycles/1'	100 cycles/1'				
<b>IR 1001</b>	2	330	30	1194	1188	1176	1120	1026	896	1.40	6.62	0.43 / 0.76	8-65H
<b>IR 1301</b>				2620	2584	2510	2166	1592	789	1.27	8.01	0.39 / 0.69	8-80H
<b>IR 1001</b>	3	310	50	2329	2324	2315	2272	2200	2100	1.40	6.62	0.31 / 0.54	9-80H
<b>IR 1301</b>				4462	4435	4379	4116	3679	3066	1.27	8.01	0.27 / 0.49	9-100H
<b>IR 1001</b>	4	310	60	2245	2241	2234	2198	2139	2057	1.76	5.53	0.28 / 0.51	8-80H
<b>IR 1301</b>				3397	3370	3314	3056	2625	2022	1.40	6.62	0.22 / 0.41	8-100
<b>IR 1001</b>	5	300	60	2470	2467	2461	2432	2385	2318	1.76	5.53	0.23 / 0.42	10-80H
<b>IR 1301</b>				4559	4549	4519	4375	4136	3800				10-100H
<b>IR 1001</b>	6	300	60	1600	1598	1592	1569	1530	1475	1.76	5.53	0.19 / 0.35	12-65H
<b>IR 1301</b>				4932	4919	4893	4773	4573	4292				12-100H
<b>IR 1001</b>	7	300	60	1664	1662	1657	1637	1303	1556	1.76	5.53	0.17 / 0.30	14-65H
<b>IR 1301</b>				3689	3678	3656	3554	3383	3145				14-80H
<b>IR 1001</b>	8	300	60	2810	2808	2805	2787	2758	2716	1.76	5.53	0.15 / 0.26	8-80H
<b>IR 1301</b>				3825	3816	3797	3707	3557	3348				16-80H
<b>IR 1001</b>	9	300	60	2868	2866	2863	2847	2821	2784	1.76	5.53	0.13 / 0.23	9-80H
<b>IR 1301</b>				5553	5544	5527	5448	5315	5129				9-100H
<b>IR 1001</b>	10	300	60	2911	2910	2907	2892	2869	2835	1.76	5.53	0.12 / 0.21	10-80H
<b>IR 1301</b>				5669	5661	5646	5574	5455	5321				10-100H
<b>IR 1001</b>	12	310	50	2971	2969	2967	2955	2935	2907	1.76	5.53	0.10 / 0.17	12-80H
<b>IR 1301</b>				5832	5826	5813	5753	5653	5513				12-100H
<b>IR 1001</b>	16	310	50	1839	1938	1836	1827	1812	1791	1.76	5.53	0.07 / 0.13	16-65H
<b>IR 1301</b>				4236	4231	4222	4177	4102	3998				16-80H
<b>IR 1001</b>	18*	330	30	2450	2202	2197	2176	2141	2091	1.76	5.53	0.13 / 0.23	9-80H
<b>IR 1301</b>				5095	4577	45614	4488	4366	4195				9-100H
<b>IR 1001</b>	20*	330	30	2481	2231	2226	2207	2176	2130	1.76	5.53	0.12 / 0.21	10-80H
<b>IR 1301</b>				4864	4369	4356	4290	4180	4027				10-100H
<b>IR 1001</b>	22*	330	30	2797	2514	2511	2495	2464	2423	1.76	5.53	0.11 / 0.19	11-80H
<b>IR 1301</b>				4931	4430	4418	4357	4258	4118				11-100H
<b>IR 1001</b>	24*	330	30	2818	2534	2530	2514	2487	2449	1.76	5.53	0.10 / 0.17	12-80H
<b>IR 1301</b>				4985	4474	4467	4412	4320	4191				12-100H

On demand INDEXING TABLE with special movement can be supplied. The IR Rotary table denoted by (\*) with a complete rotation of the input shaft produce two complete cycles of the output shaft: "displacement-dwell, displacement-dwell".



## 18. Designation

The ordering code of the IR INDEXING TABLES is composed of an alphanumerical combination according to the chart here below.

**IR TABLE**

Series											
Type of roller											
N° of stations											
Displacement angle											
Version											
Face with cam shaft											
Face with indexing plate											
Face with clamping holes											
Face with oil filling plug (long-life lubrication L V)											
Constructive shape or bottom face after assembly											
Reduction gear assembly position (not for VSS and VSL)											

**REDUCTION GEAR**

Type			
Version			
Reduction ratio			
Technical characteristics			

Torque limiter Type :

Torque limiter setting :

daNm

Coupling type:

Allowable torque:

daNm

**MOTOR**

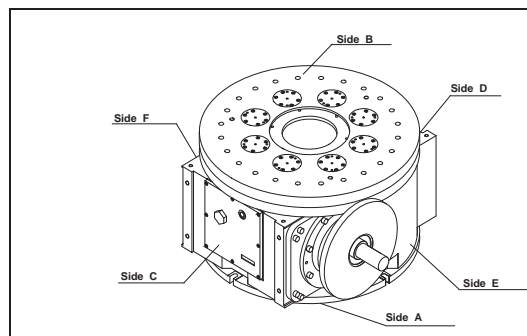
Normal  
 Self-braking  
 Inverter

			<b>Kw</b> /		<b>P</b> /		<b>V</b> /		<b>Hz</b>	
Supplier										
Size and version										
Power										
N° of poles										
Voltage ( V )										
Frequency										
Brake supply										

<b>INVERTER CHARACTERISTICS:</b>		<b>kW</b>	<b>V</b>
Type			
Power			
Voltage			

Face with cam shaft  
 Face with output shaft  
 Face with clamping holes  
 Face with oil filling plug  
 Bottom face at assembly

	A	B	C	D	E	F
1					<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>				
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4			<input type="checkbox"/>			
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		





[to create]

in movement with the times

# Products

Cam Mechanisms and special products



Compact double spherical cam mechanism for mechanical automation



Combination of flat cam and globoidal profiled cam



Barrell shaped cam



Globoidal cam mechanism with four synchronized intermittent movements. Bilateral outputs.



Mechanism with different cams producing seven synchronized intermittent and oscillating movements in output



Parallel shaft mechanism with flat cam



Flat cam with conjugate profiles

... the culture of precision

