ROTARY MANIPULATORS

H65S - H80S - H105S - H130S

H..S

- Cast iron housing.
- Complete mechanical synchronization of cycle.
- Low noise and smooth motions.
- Compact design.
- Possibility to install worm gear reducer.
- Largely maintenance free.
- Various standard movements.

COLOMBO FILIPPETTI
COLLABORATIVE ENGINEERING

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

INTERMICO manipulators of the H..S series are compactly designed devices with positive- locking, hardened and ground cams.
A globoid cam and a plate cam serve pendulum gear serve as driving elements.
The movements of the gripper arm follow a circular path. The device is available in the form of a lifting-stepping model or a lifting-oscillating model.

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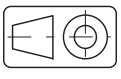
The units of measurement correspond with System International /Severity Index SI General tolerances of manufacture are conform to UNI – ISO 2768-1 UNI EN 22768-1
Illustrations and drawings according to UNI 3970 (ISO 128-82).
Method of projection of the drawings.



COLOMBO FILIPPETTI may make any changes they feel necessary for the improvement of their products without advance notice.
COLOMBO FILIPPETTI may change any market components and accessories mentioned in this catalogue as they feel necessary.
This catalogue supersedes all earlier ones.

1. General

INTERMICO manipulators of the H..S series have a gray cast iron housing. The cams operate in an oil bath. An output shaft through hole for passing services, is an option, the hole rotates.
A protective device is provided to keep out water and dirt.

1.1 What are the advantages of INTERMICO H..S manipulators?

- compact design
- short switching times
- positive locking
- low noise
- long life
- high cycle speeds
- largely maintenance-free
- central through hole (on request)
- various drive options
- no additional indexing required

1.2 Where are INTERMICO H..S manipulators used?

These manipulators can be used wherever parts need to be moved with short switching times and smooth series of motions along circular paths, e.g. in assembly lines, welding plants, transfer lines, loading and unloading equipment, pallet changers, feeders, etc.

1.3 How does an INTERMICO H..S manipulator work?

During a moving sequence, the driven flange of the manipulator performs both intermittent or oscillating movements and lifting and lowering movements. This driven flange is connected to the driving elements via lifting shafts so as to ensure positive engagement with the generating cams at all times. The intermittent or oscillating motion of the driven flange is effected via a globoid gear, and the lifting motions via a positive locking plate cam drive.
The manipulator is driven either via the cam shaft or via a built-in worm drive. One full rotation of the cam shaft generates a complete cycle, which consists of motional and dwell phases.

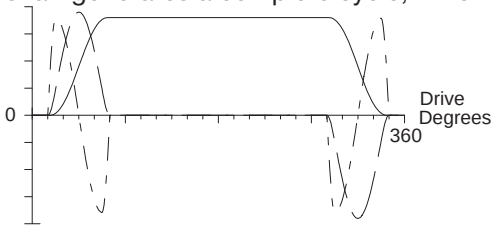


Diagram of lifting motion

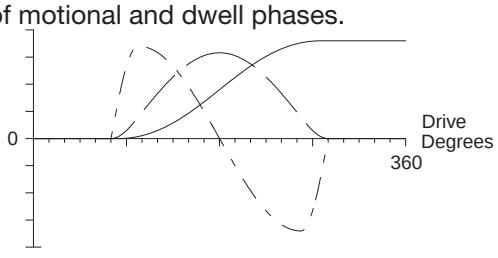


Diagram of stepping motion

Fig. 1

2. Danger zone

This being a positive-locking device, a mounted gripper arm will move constantly within its set range. It will only be arrested due to overloading of the drive motor or safety clutch if installed, or to breakage.
The danger zone is not exceeded, however.

3. Application examples of INTERMICO H..S manipulators

In many applications, you will find that, by using two or more arms with grippers, it is possible to load and unload simultaneously at high speed. By adding more dwell positions, it is also possible to perform other functions together with the loading and unloading operations.

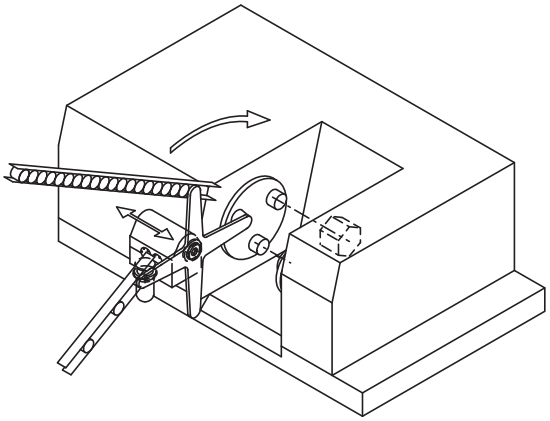


Fig. 2

INTERMICO manipulator as a workpiece feeder

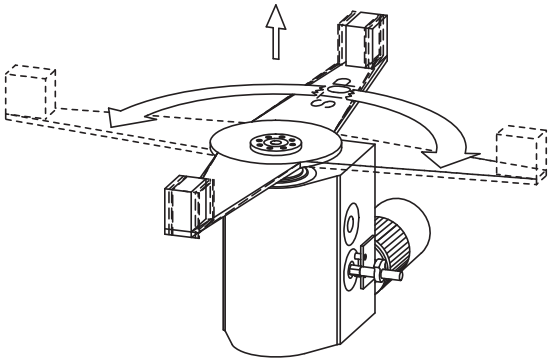


Fig. 3

INTERMICO manipulator as a transfer device

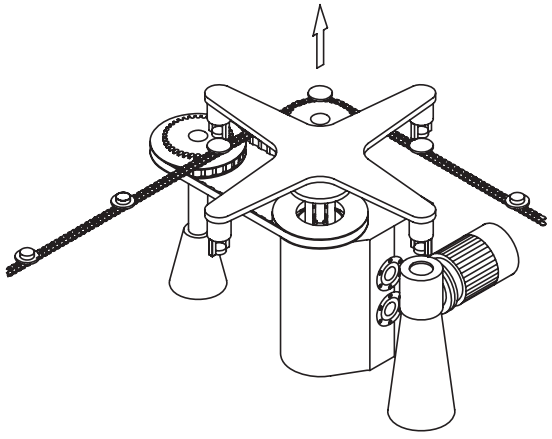


Fig. 4

INTERMICO manipulator in an insertion system. It has an additional drive for the transfer movement of a conveyor belt.

4. Selecting the right type

In order to select the right type of INTERMICO H..S manipulator, it is not sufficient to simply calculate the mass moment of inertia and lifting load and then determine the size of the INTERMICO manipulator accordingly.
In the case of cam-controlled manipulators, the ratio of the total inertial radius to the geometrical radius of the installed globoid gear is also a decisive factor.
We recommend that you get our Technical Office to calculate the right type of INTERMICO manipulator for you. For this purpose, please use the questionnaire at the end of the catalog, enclosing any relevant sketches or drawings.

If the values of $D_{max.perm.}$ and $r_{max.perm.}$ (page 11) are exceeded, the dimensioning of the manipulator should in all cases be left to our Technical Office.

5. Installation instructions

Using a brake motor INTERMICO manipulators of the series H65S, H80S, H105S and H130S can be installed in any orientation. They can be fixed to prevent torsion and displacement by means of key slots and a centering device in plane A.

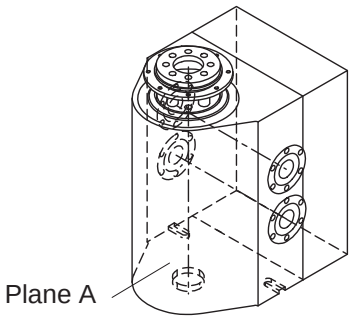


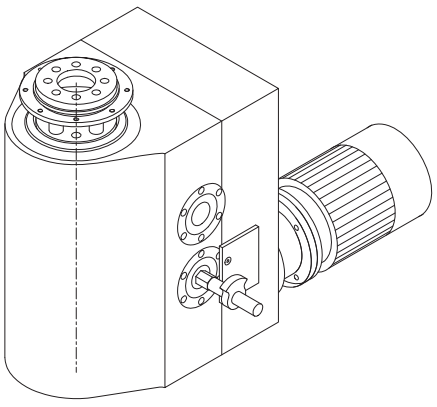
Fig. 5

5.1 Using a brake motor

A brake motor is used if the dwell phase is to be prolonged. In this case, the length of the phase time is governed by the switching off of the brake motor.
In order to move the manipulators easily into position during setting operations or when starting up again after malfunctions, we recommend that you use brake motors with manual release and a second shaft end with a handwheel.

5.2 Instructions for setting the control microcam

If a brake motor is used to drive an INTERMICO manipulator, the control microcam which causes the brake motor to stop must be set so that the drive shaft comes to a standstill in the middle of a dwell period.



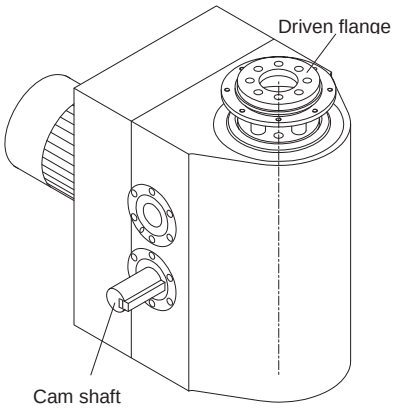


Fig. 6

Mounting of control cam on an INTERMICO manipulator driven by a brake motor

In the position shown, the mark on the end of the cam shaft or key is in the middle of a dwell period

5.3 Instructions for trouble-free operation

Elastic elements must be avoided at all costs in the drive train. Use only torsionally rigid elements. Use only hardened parallel pins to connect attachment devices, e.g. grippers. Screw fittings should be secured with a screw retention fluid.
Regular stopping of the INTERMICO manipulator when in motion period should be avoided to prevent damage to the device. If an inching control facility is provided for setting operations or if frequent emergency stops are likely during the movement phase, this must be taken into account in the design.

6. Start -up

All INTERMICO manipulators are supplied without oil and should be filled with a lubrication oil specified by the industrial standard DIN 51517 Part 3 Group CLP. The following is a list of some types of oil which comply with ISO VG 150.

AGIP	Blasia 150
BP	Energol GR-XP-150
CASTROL	Alpha SP 150
CHEVRON	NL Gear Compound 150
ESSO	Spartan EP 150
FINA	Giran 150
MOBIL	Mobilgear 629
SHELL	Omala Oil 150
TOTAL	Carter EP 150

Take care to ensure cleanliness during the filling procedure. We recommend that you use a filter or fine sieve.

See page 18 for oil quantities.

7. Maintenance instructions

INTERMICO H60G manipulators require no maintenance except for checking of the oil level. This check is performed via the oil-level gauges. If the oil level falls below the prescribed minimum, it must be topped up through the charging hole.
If frequent top-ups are necessary, the cause should be investigated and rectified immediately.

7.1 Changing the lubricating oil

The oil should be changed according to the following procedure after 8000 operating hours, or 2 years at the latest:

- Unscrew drain plug
- Drain off oil completely and screw drain plug back in place
- Top up to the prescribed level through the charging hole

7.2 General inspection

The INTERMICO manipulator must be inspected every 8000 operating hours for excessive radial play of the rollers; if necessary, all rollers must be changed simultaneously.
In this case, please contact us.

8. Models

H60G INTERMICO manipulators are available in the following models:

GS	Manipulator driven directly via cam shaft
GU	Manipulator with reducing gear on cam shaft
GU1 ⎫	Manipulator with built-in worm gear and
GU2 ⎭	free drive shaft
GUF	Manipulator with reducing gear and flange for mounting electric motors
GUF1 ⎫	Manipulator with built-in worm gear and
GUF2 ⎭	flange for mounting electric motors
GM	Manipulator with gear motor
GM1 ⎫	Manipulator with built-in worm gear and
GM2 ⎭	motor
GB	Manipulator with transmission brake motor
GB1 ⎫	Manipulator with built-in worm gear and
GB2 ⎭	brake motor

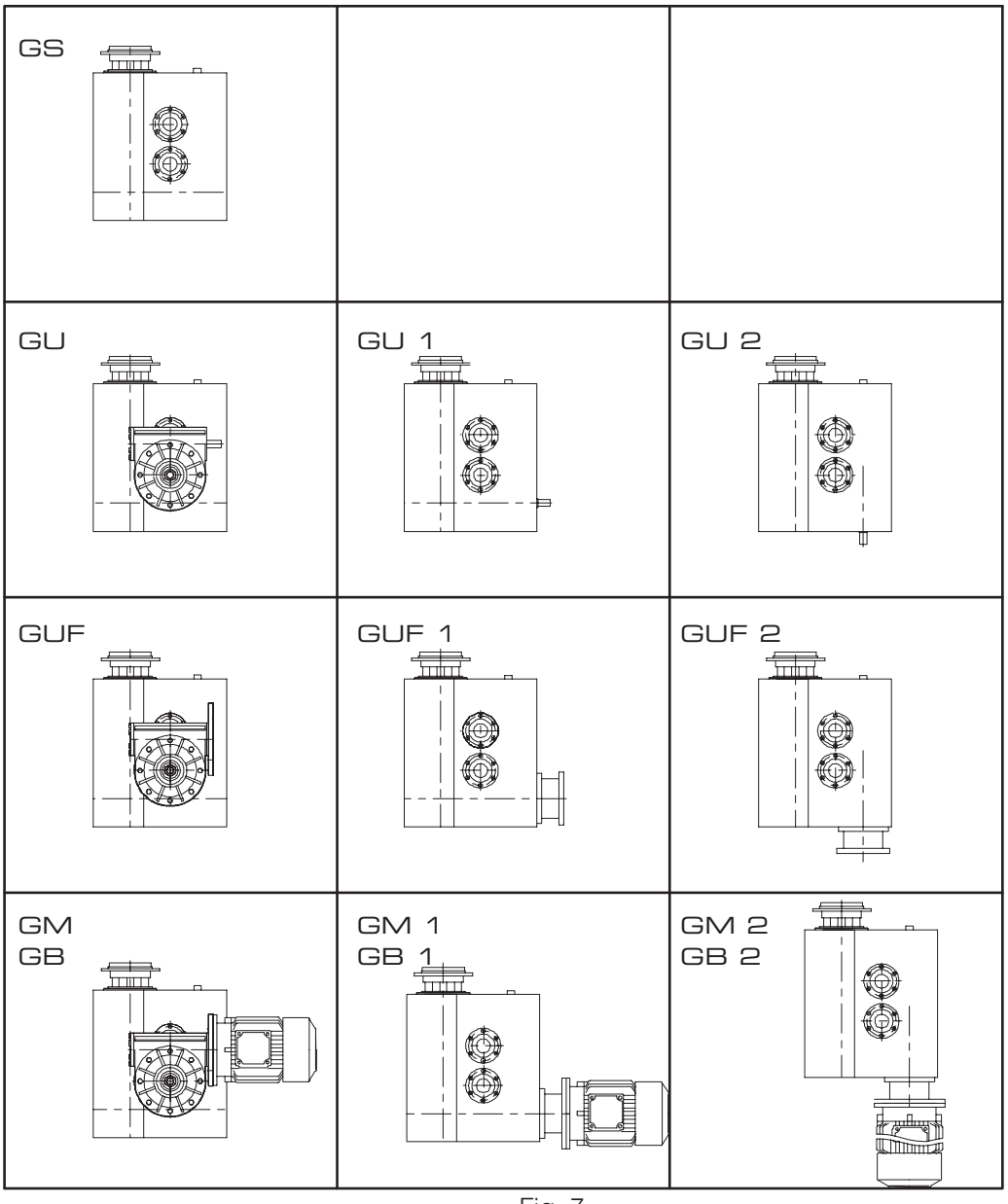


Fig. 7

9. Mounting positions for external reducing gears

The INTERMICO GS model manipulators can be equipped with external worm gears with a slipping overload clutch. By using different gear reductions, it is possible to obtain a range of 7 to 50 shifts per minute. The gears can be mounted in 16 different positions. When ordering, the following details are necessary in addition to the required mounting position:

- The transmission ratio of the worm gear or the number of cycles per minute performed by the manipulator in continuous operation
- The IEC dimensions of the motor flange, if the gear is to be supplied without a motor
- The motor ratings (power, number of poles, voltage, frequency)

If the gears are to be equipped with drives other than the one described, e.g. clutch-brake combinations, infinitely variable speed gears, etc., we will be happy to supply these too.

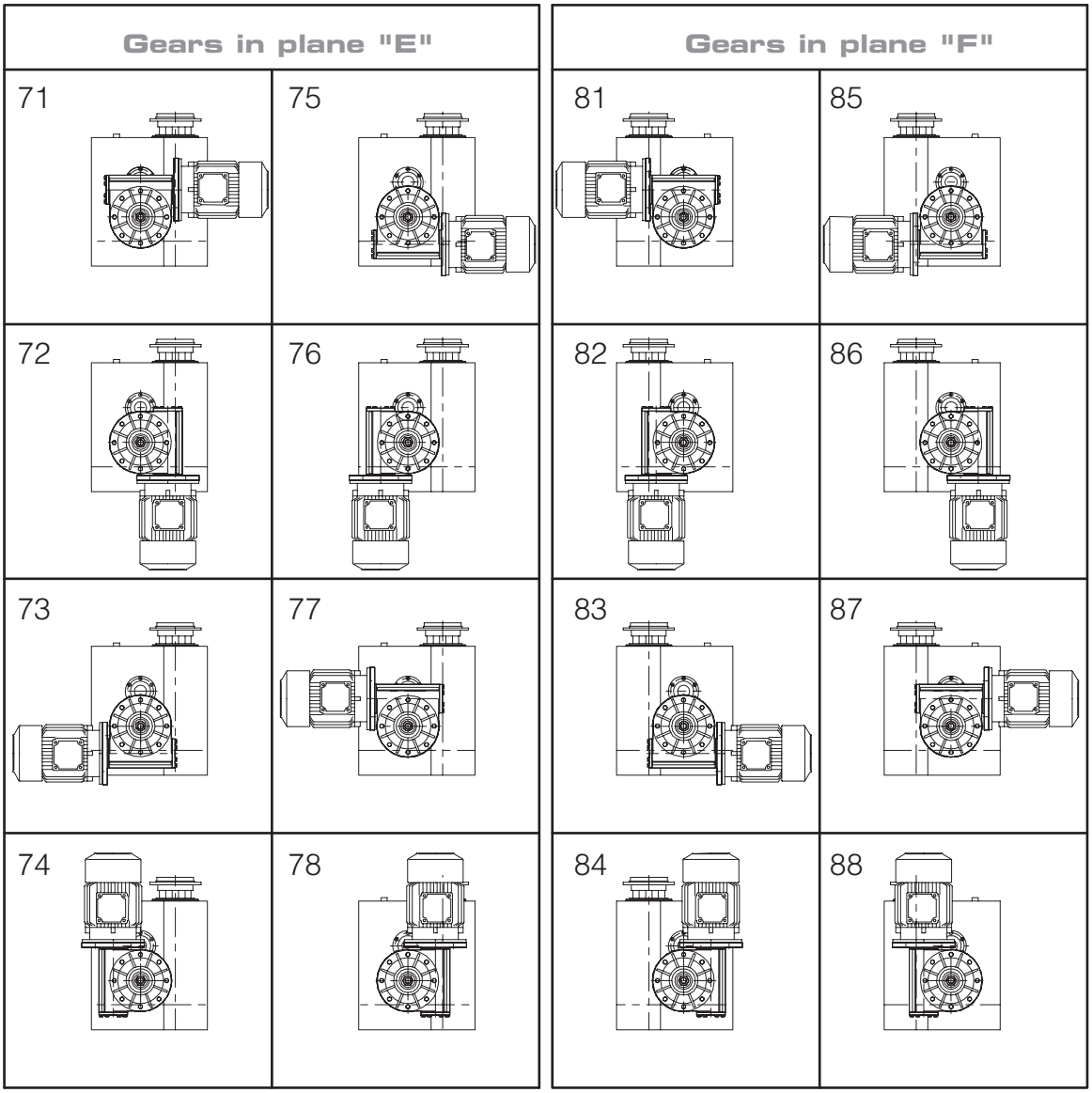
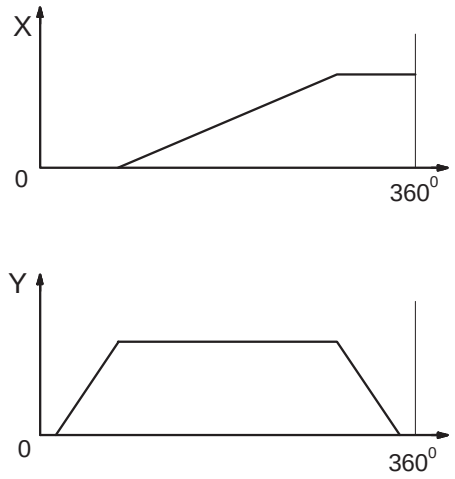


Fig. 8

10. Movement sequences

10.1. Lifting-stepping model

Movement sequence A1



Movement sequence A2

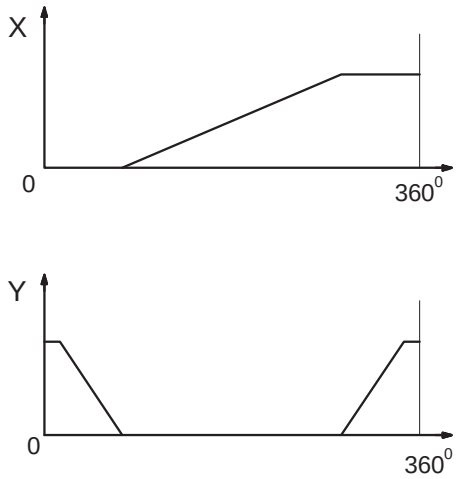


Fig. 9

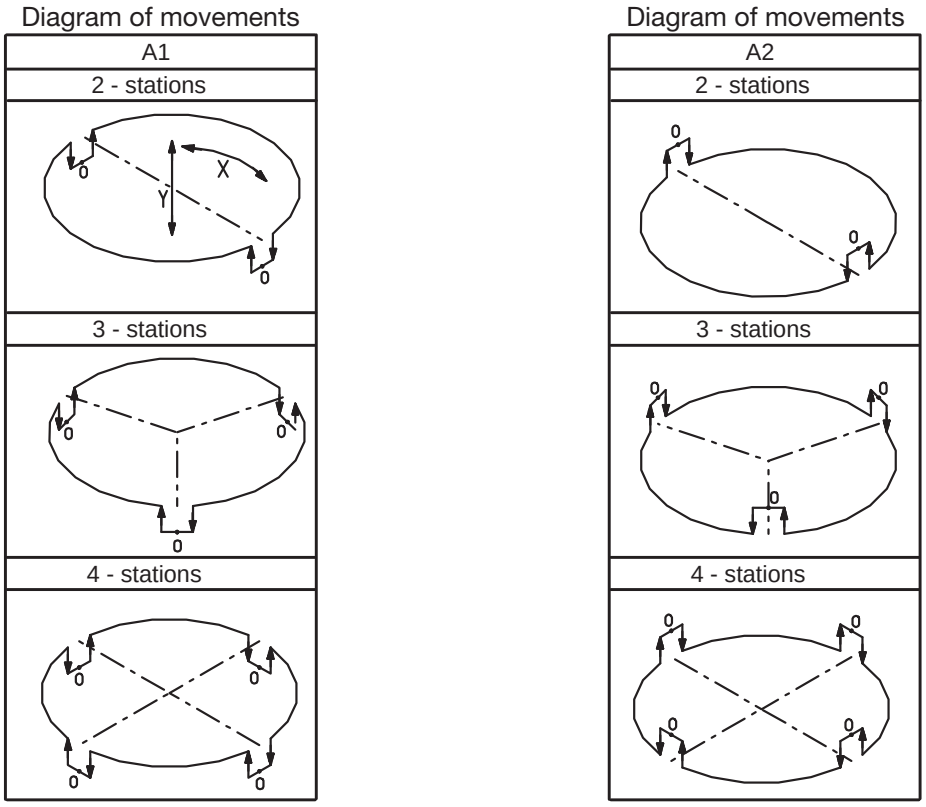


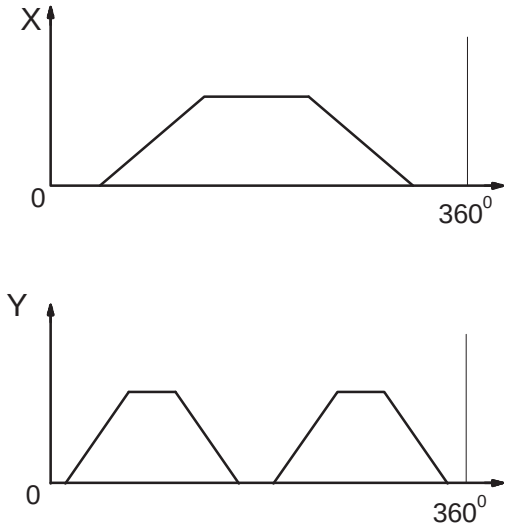
Fig. 10

Other stations on request

IMPORTANT: In the case of A1 movement sequences (rotation in extended position), the devices are supplied with an additional slewing bearing.
(See page 19 for an additional slewing bearing)

10.2. Lifting-oscillating model

Movement sequence A1



Movement sequence A2

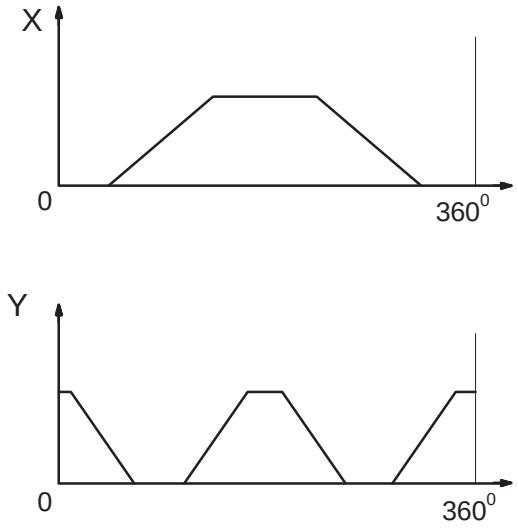


Fig. 11

Diagram of movements

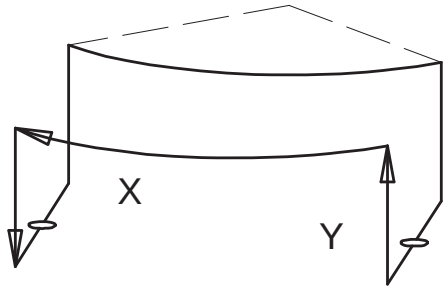


Diagram of movements

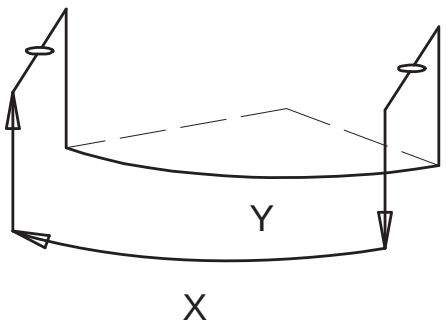
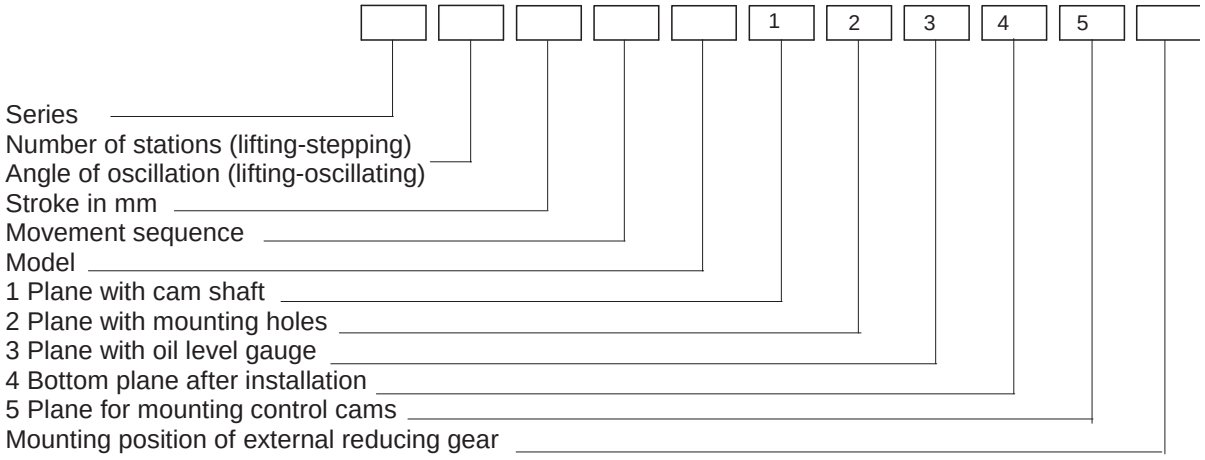


Fig. 12

IMPORTANT: In the case of A1 movement sequences (pivoting in extended position), the devices are supplied with an additional slewing bearing.
(See page 19 for an additional slewing bearing)

11. Determining the type designation

The type designation of INTERMICO H..S manipulators is made up of alphanumeric groups as shown in the table below



Possible plane combinations

Planes	A	B	C	D	E	F	0
1 Plane with cam shaft					☐	☐	☐
2 Plane with mounting holes	☐	☐	☐				
3 Plane with oil level gauge	☐	☐			☐	☐	
4 Bottom plane after installation	☐	☐	☐	☐	☐	☐	
5 Plane for mounting control cams					☐	☐	

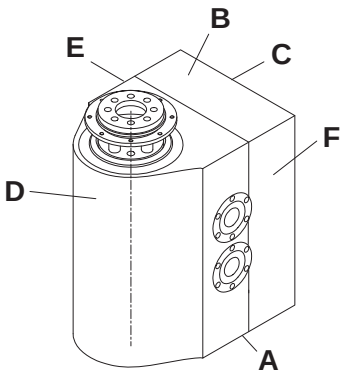


Fig. 13

Other plane combinations on request
Plane 0: cam shaft does not protrude

Example of a type designation for an H65S series manipulator, 4 stations, 60 mm stroke, A2 movement sequence, housing with built-in worm gear and braking motor

In order to identify an H..S manipulator, the required code letters and positions must be added to the order number.

Manipulator H65S-4-60-A2-GB1-10-2A-3F-4A-5F

12. Data and parameters

12.1 Lifting-stepping model

Tab. 1

Series	Number of stations	Max. output torque of rotation axis Nm
H 65 S	2	220
Max stroke	3	220
60 mm	4	220
H 80 S	2	390
Max stroke	3	590
90 mm	4	360
H 105 S	2	820
Max stroke	3	1390
120 mm	4	780
H130 S	2	1470
Max stroke	3	2250
160 mm	4	1200

Maximum values shown for n= 30 rpm

12.2 Lifting-oscillating model

Tab. 2

Series	Pivoting angle (°)	Max. output torque of rotation axis Nm
H 65 S	90	180
Max stroke		
60 mm		
H 80 S	90	250
Max stroke		
90 mm		
H 105 S	90	510
Max stroke		
120 mm		
H 130 S	90	1100
Max stroke		
160 mm		

Maximum values shown for n= 30 rpm

12.3. Permissible diameters and radii of attachments

Tab. 3

Series	$D_{max.perm.}$	$r_{max.perm.}$
H 65 S	< 0.60 m	< 0.30 m
H 80 S	< 0.80 m	< 0.40 m
H 150 S	< 1.10 m	< 0.55 m
H 130 S	< 1.40 m	< 0.70 m

For details of permissible lifting loads (grippers and workpieces) in conjunction with the relevant arm length, please do not fail to contact our Technical Office.

13. Dimensions

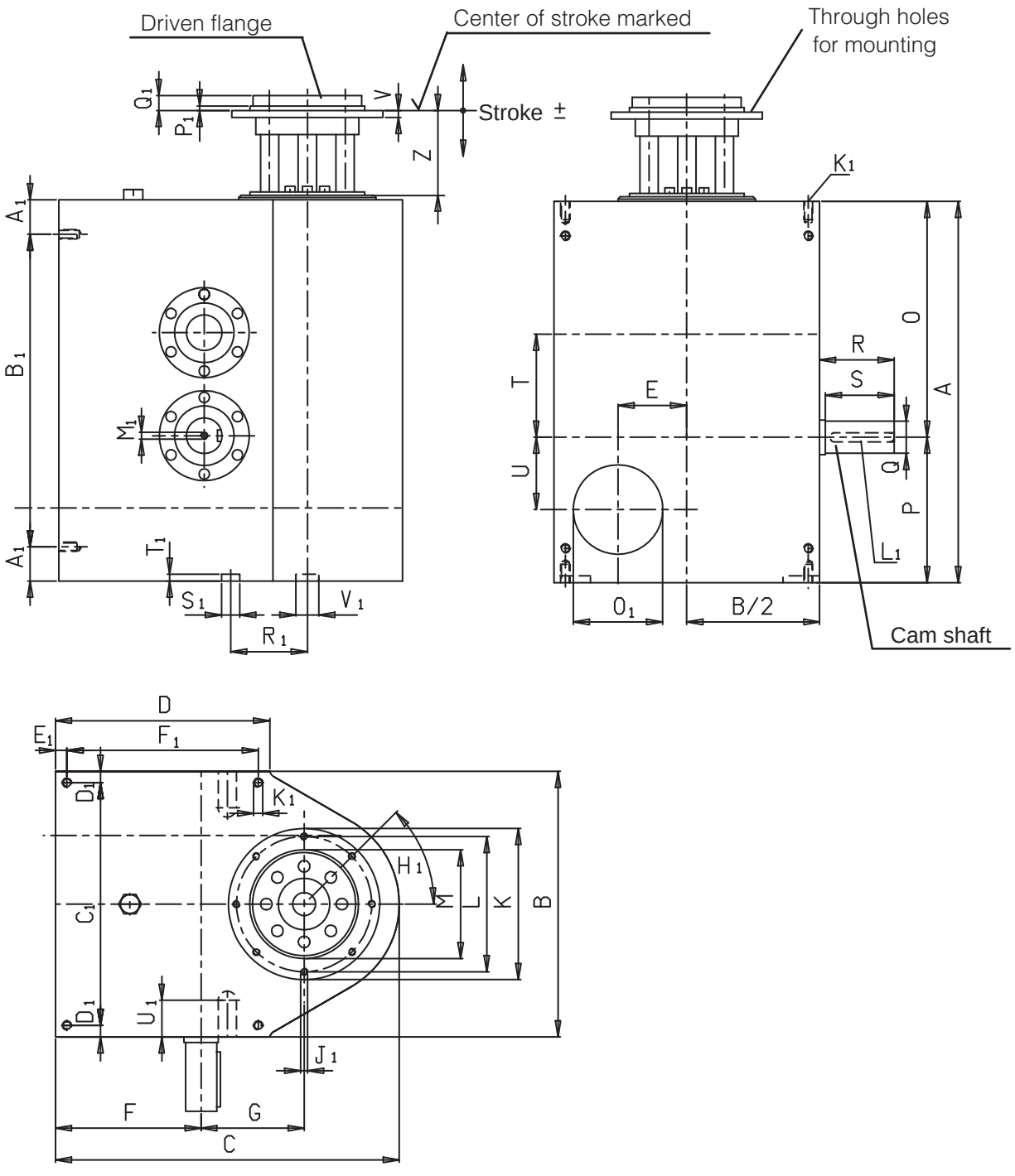


Fig. 14

Tab. 4

Series	A	B	C	D	E	F	G	K	L	M_{j6}	O	P	$\varnothing Q_{k6}$	R
H 65 S	333	232	300	187	60	127	90	132	118	100	206	127	28	65
H 80 S	420	300	380	232	75	163	110	155	140	116	255	165	30	85
H 105 S	534	370	434	346	105	179	145	168	152	136	329	205	38	85
H 130 S	645	460	550	328	125	235	185	180	160	140	410	235	50	115

Series	S	T	U	V	Z	A_1	B_1	C_1	D_1	E_1	F_1	H_1	J_1	O_{1H7}
H 65 S	60	90	63	12	69	30	273	212	10	10	167	45°	M6	78
H 80 S	80	110	80	12	92	30	360	275	12.5	12.5	205	45°	M6	100
H 105 S	80	145	100	16	112	35	464	335	17.5	17.5	308	45°	M8	115
H 130S	110	185	140	13	135	40	565	424	18	20	290	45°	M8	140

Series	P_1	Q_1	R_1	$S_{1\ H7}$	T_1	U_1								
H 65 S	4	13	67	16	6	32								
H 80 S	4	14	83	16	6	32								
H 105 S	4	16	107	16	6	32								
H 130 S	4	15	145	16	6	32								

Series	K_1	$L_{1;\ DIN6885,p.1}$	M_1	Centering $\varnothing V_{1H8}$	Max. stroke		
H 65 S	M10;16tief	8x7x56	M10;22tief	47;5tief	60		
H 80 S	M10;16tief	8x7x70	M12;28tief	50;6tief	90		
H 105 S	M12;20tief	10x8x75	M12;28tief	55;2tief	120		
H 130 S	M12;25tief	14x9x100	M16;36tief	52;10tief	160		

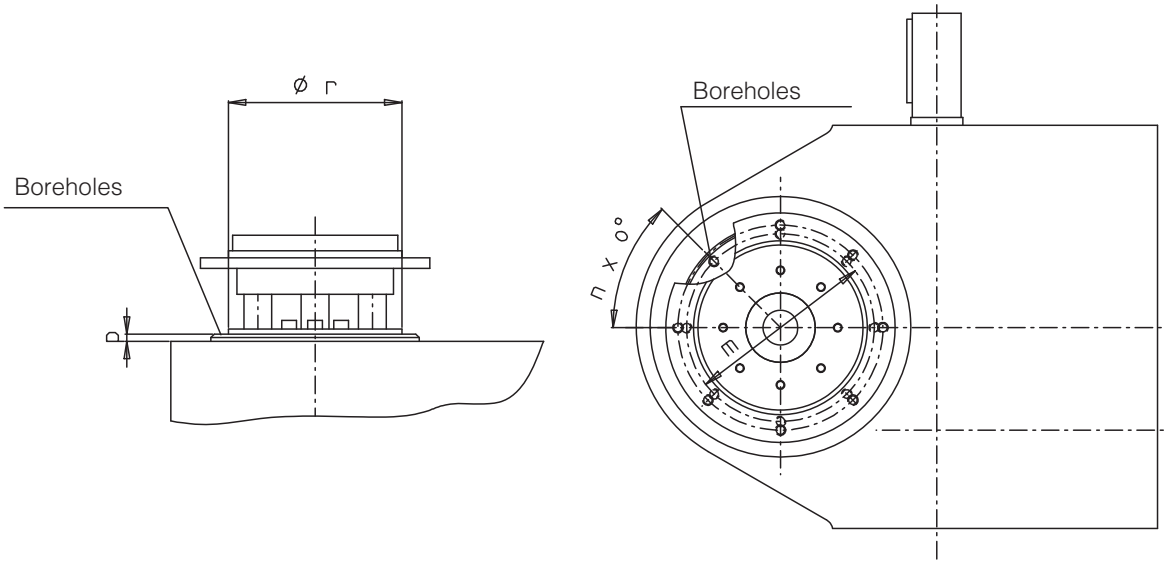


Fig. 15

Position of tap holes as shown: with stepping: in the middle of a holding notch
with oscillation: in the middle of an oscillation

Tab. 5

Series	P	n x 0°	ør	Hole circle m	Boreholes
H 65 S	4	8 x 45°	100 h7	108 ± 0.1	M6,8 deep
H 80 S	2	8 x 45°	130 h9	145 ± 0.1	M6,8 deep
H 105 S	2	8 x 45°	136 j6	148 ± 0.1	M8,9 deep
H 130 S	2	8 x 45°	160 h7	180 ± 0.1	M6,8 deep

14. Run-out and concentricity tolerances

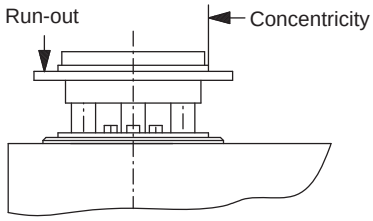


Fig. 16

Tab. 6

Series	Run-out	Concentricit
H 65 S	0.07	0.10
H 80 S	0.07	0.10
H 105 S	0.10	0.15
H 130 S	0.10	0.15

15. Static load capacities

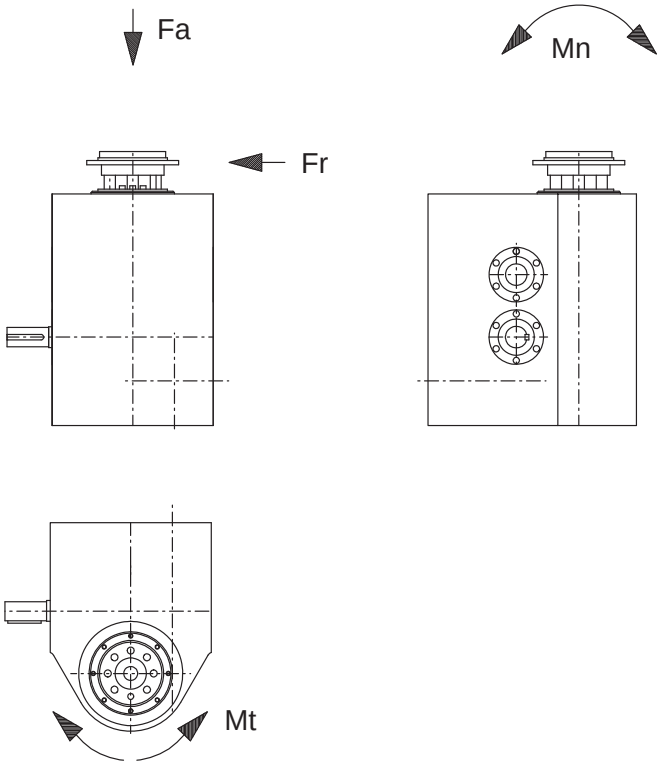


Fig. 17

Tab. 7

Series	H 65 S		H 80 S		H 105 S		H 130 S	
	Load retracted	Load extended	Load retracted	Load extended	Load retracted	Load extended	Load retracted	Load extended
Fa (N)	600		750		1100		1400	
Fr (N)	3200	1000	4000	900	8200	1200	9200	700
Mn (Nm)	100	80	160	100	340	160	380	120
Mt (Nm)	180		250		510		1100	

Attention! The values indicated are maximum values for each individual load. If more than one load acts simultaneously, please contact our technical office.

16. Built-in worm gear

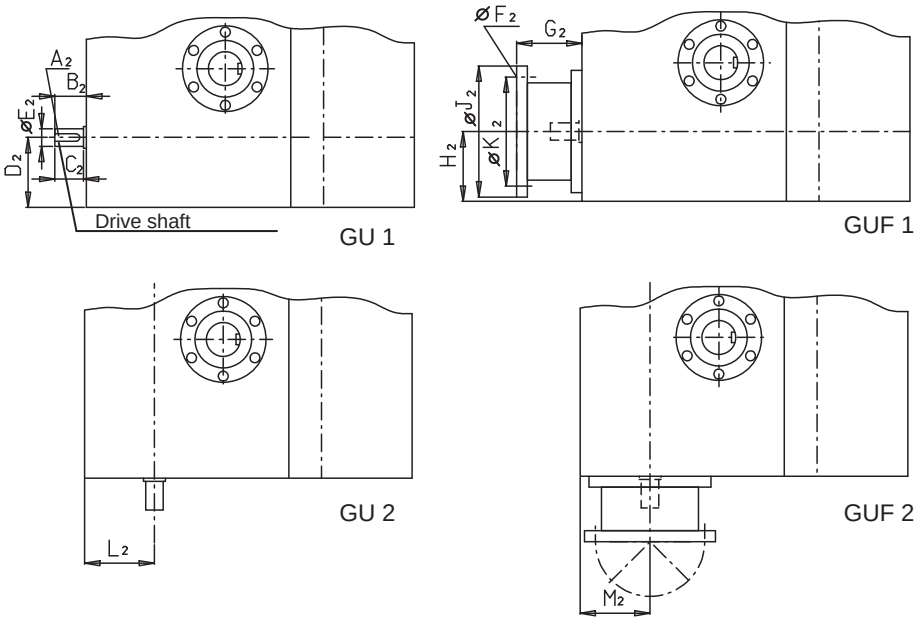


Fig. 18

Tab. 8

Series	A_2 DIN 6885, Bl. 1	B_2	C_2	D_2	$\varnothing E_{2k6}$	$\varnothing F_2$	G_2	H_2	$\varnothing J_2$	$\varnothing K_2$	L_2	M_2	Flange size
H 65 S	5x5x18	18	26	64	16	6.6	62	64	120	100	64	64	C120
H 80 S	6x6x30	24	35	85	20	9	78	85	140	115	83	83	C140
H 105 S	8x7x30	43	35	105	28	9	106	105	160	130	79	79	C160
H 130 S	10x8x50	49	58	95	38	9	116	95	160	130	95	95	C160

Other flange sizes on request

17. Worm gear transmission ratios

Tab. 9

Series	Transmission I					
H 65 S	6	12	19	26	34	48
	63	70				
H 80 S	6.75	12	20	30	50	80
H 105 S	6.75	9.25	(12.25)	14.5	19.5	(26)
	29	39	(52)	62	82	
H 130 S	5.33	6.8	8.75	10.67	13.33	16.5
	20.5	25.5	32	41	51	64

The worm gears are right-handed unless otherwise specified

18. Mounting surfaces for electric motors

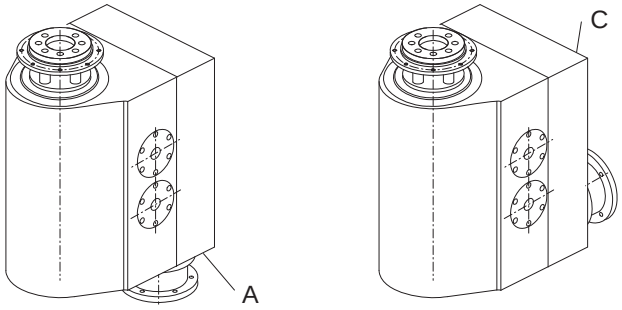


Fig. 19

Tab. 10

Series	Size of electric motors according to DIN 426/7
H 65 S	80
H 80 S	90S / 90L
H 105 S	100L / 112M
H 130 S	100L / 112M

Other motor sizes on request.

19. Mounted worm gears (RMI model)
with permanently adjusted LCB slipping overload clutch

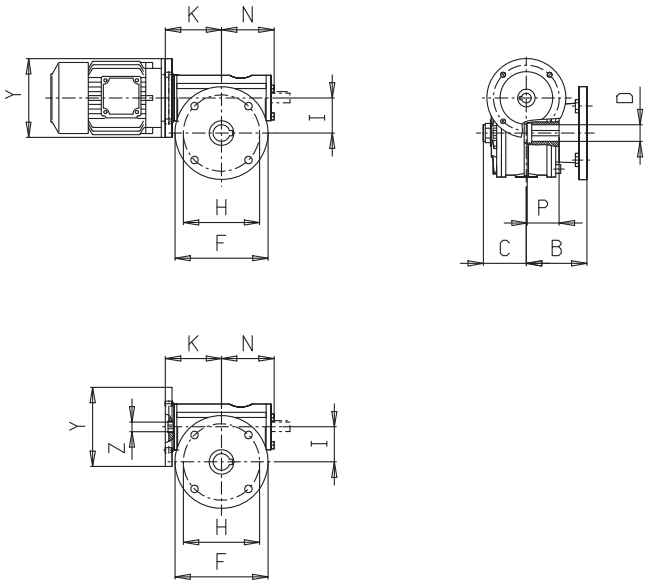


Fig. 20

Tab. 11

Series	B	C	D	F	H	I	K	N	P	YB5*	YB14*	Z*	Largest possible gearbox
H 65 S	101	62	28	160	130	70	97	92	56	A200	C120	19	RMI 70
H 80 S	100	75	32	200	165	85	116	111	60	A200	C140	24	RMI 85
H 105 S	131.5	94.5	42	270	230	110	145	142	90	A250	C160	28	RMI 110
H 135 S	131.5	94.5	42	270	230	110	145	142	90	A250	C160	28	RMI 110

Transmission ratios: 7, 10, 15, 20, 28, 40, 49, 56, 70, 80, 100

20. Mounting of control microcam

The shape of the cam depends on the type of limit switch.

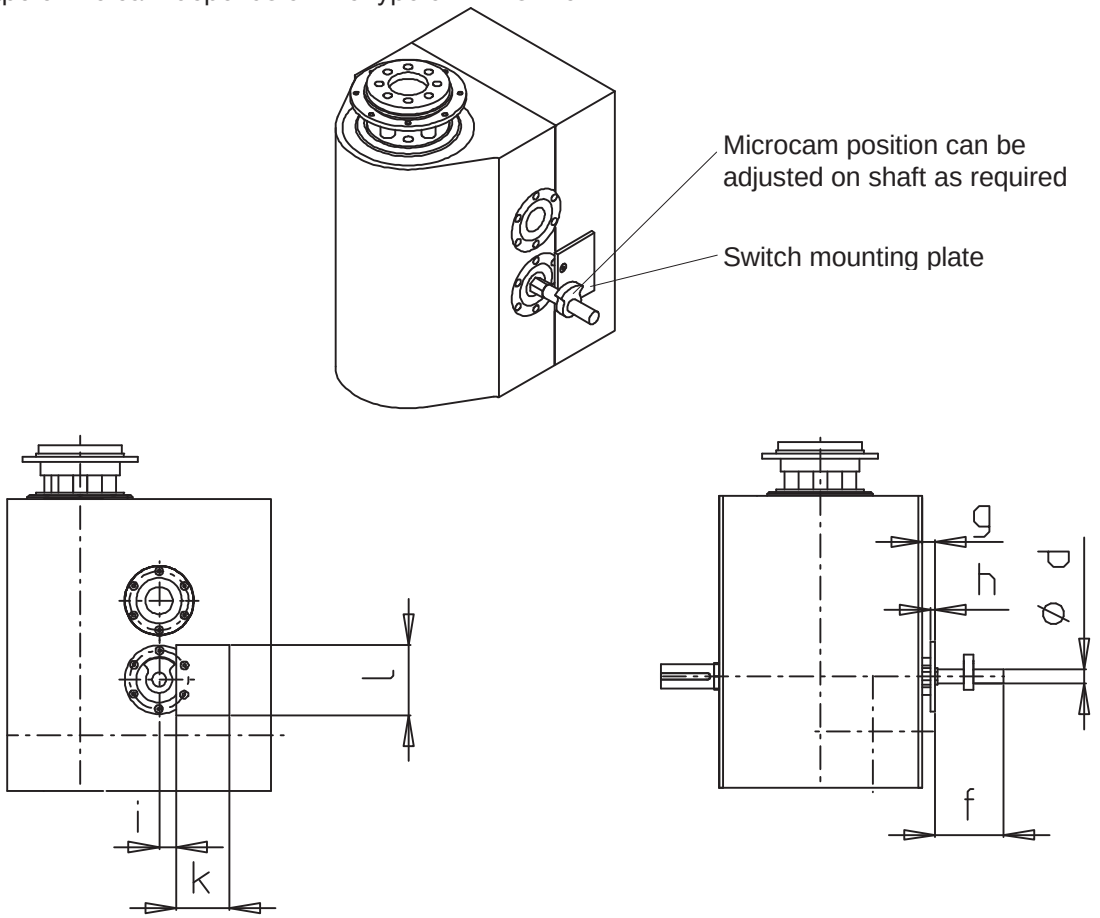
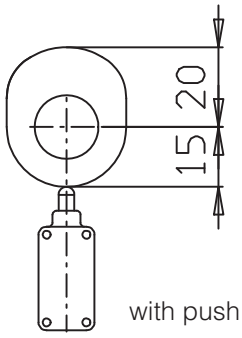


Fig. 21

Tab. 12

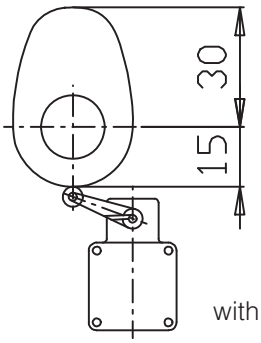
Series	⌀d	f	g	h	i	k	l
H 65 S	16	78	15	5	15	60	80
H 80 S	16	77	16	5	15	60	80
H 105 S	16	77	17	5	15	60	80
H 130 S	16	80	14	5	15	80	120

21. Control microcams for limit switches / gripper control



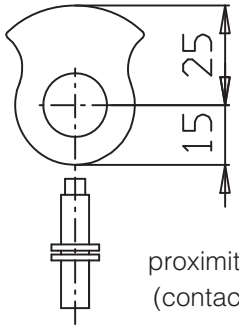
with push type

D4B 1171-DIN 43694 forma B



with roller lever

D4B 1111-DIN 43694 forma A/B



proximity
(contactless)

E2E2 - X2B1 o TLE-X5BI-G

Fig. 22

ATTENTION: the phase cam is not a safety device.

22. Dimensions of oil gauge holes

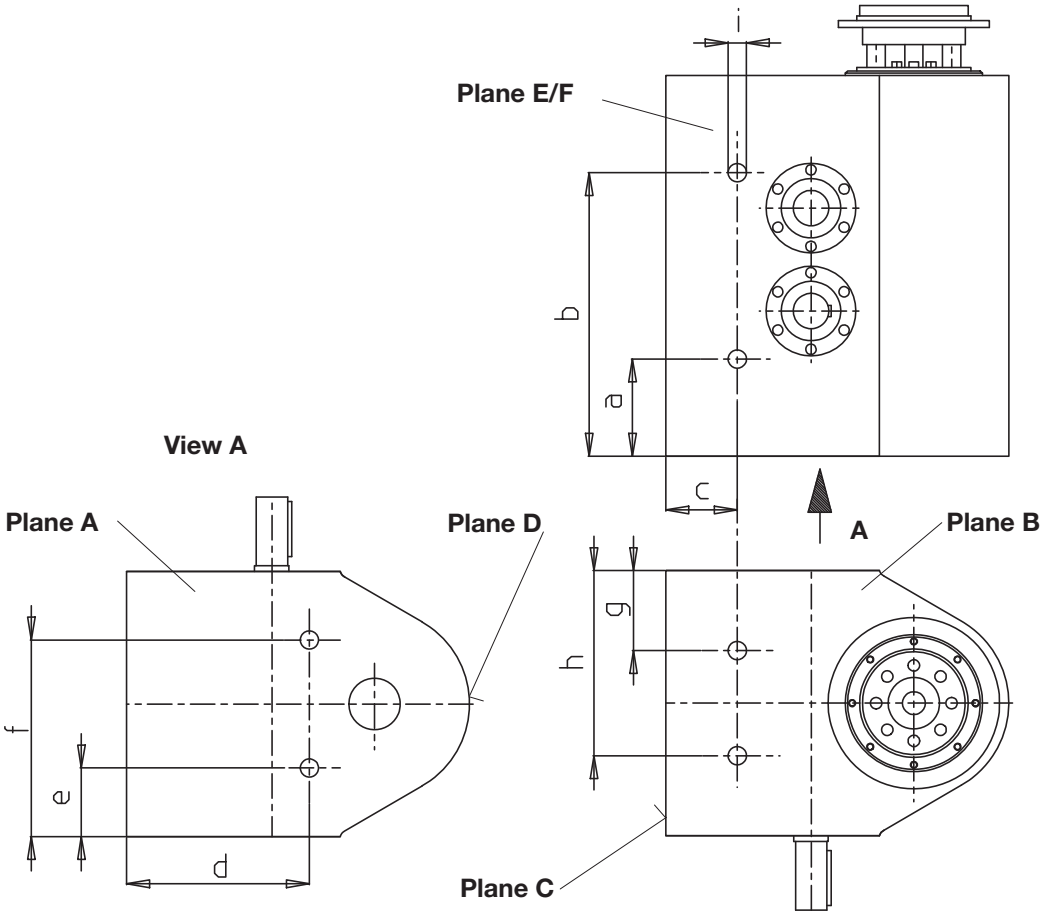


Fig. 23

The oil gauge holes also accommodate suitable ventilating filters and plug screws in all installation positions.

Tab. 13

Series	a	b	c	d	e	f	g	h	i
H 65 S	85	248	62.5	160	60	172	70	162	R 3/8"
H 80 S	90	352	65	215	80	220	96	204	R 1"
H 105 S	110	446	95	224	120	250	120	250	R 1"
H 130 S	116	545	85	320	100	360	140	320	R 1"

(Oil level gauges and plug screws are countersunk in all devices; ventilating filters project as follows: H65S: 12 mm, H80S H130S: 19 mm)

23. Oil volumes

Tab. 14

Series	Bottom plane after installation	
	A	B, C, D, E, F
H 65 S	6.5	7.5
H 80 S	19.5	21
H 105 S	32	34
H 130 S	45	48

Values indicated in litres (rounded off)

24. Slewing bearings (on request; obligatory for A1 movement sequences)

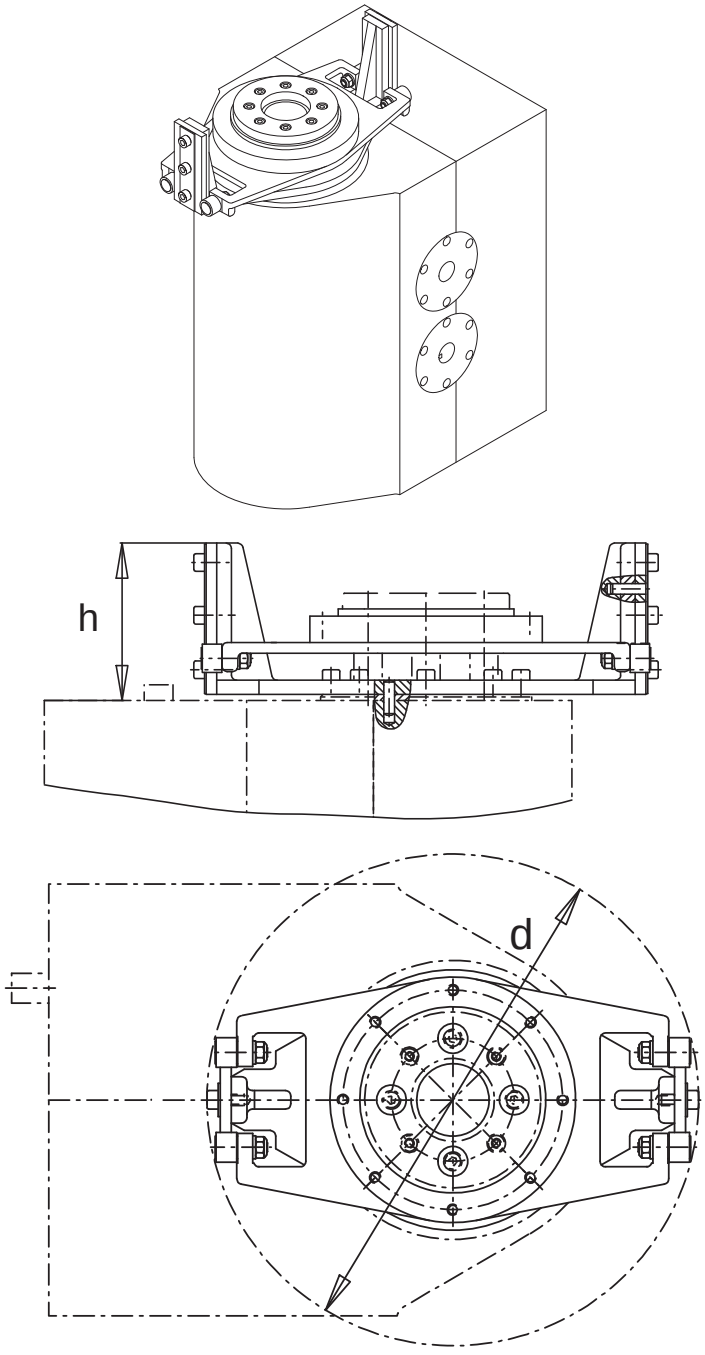


Fig. 24

Tab. 15

Series	d_{max}	h_{max}
H 65 S	264	90
H 80 S	350	120
H 105 S	370	145
H 130 S	570	185

25. Accessories, optional features

25.1. Rotary turnover module

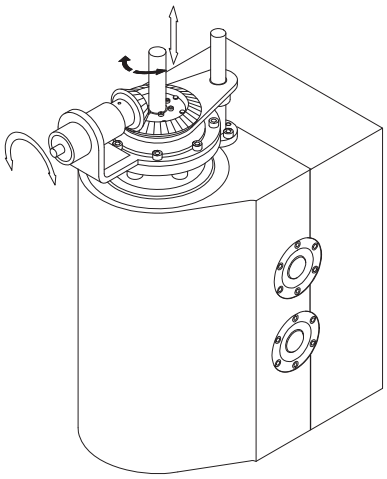


Fig. 25

25.2. Gripper arm

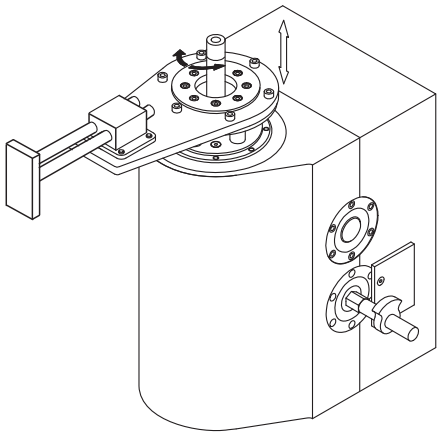


Fig. 26

Central borehole (co-rotating)

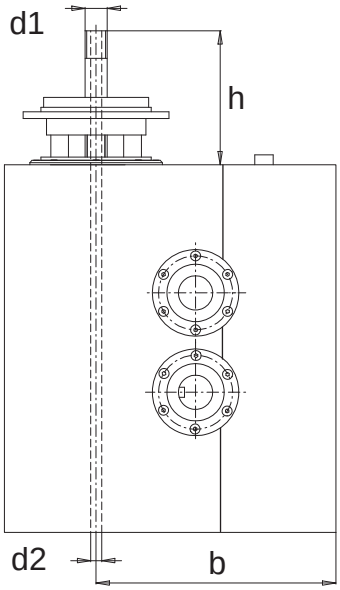


Fig. 27

Tab. 16

Size	b	d_1	d_2	h
H 65 S	217	M20x1.5	10	121
H 80 S	273	M20x1.5	12	156
H 105 S	324	M27x1.5	15	186
H 130 S	420	M27x1.5	15	233

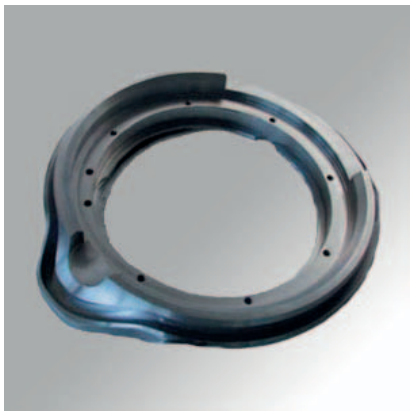
[to create]

in movement with the times

Products

Cam Mechanisms and special products

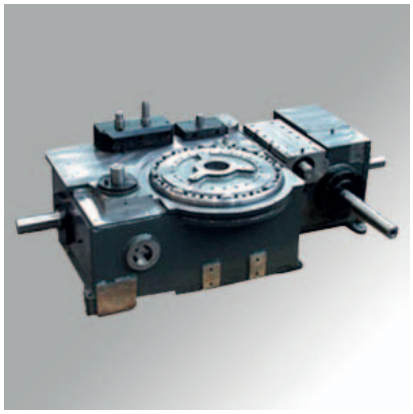
Compact double spherical cam mechanism for mechanical automation



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

COLOMBO FILIPPETTI

COLLABORATIVE ENGINEERING