FORKARDT

INDEXING CHUCKS

WORKHOLDING SOLUTIONS WORLDWIDE

This catalogue describes the key components of an indexing chucking system.
Should you require further information beyond the data contained in this catalogue, please refer to the following FORKARDT publications, for example:

Special Chucks
Clamping Jaws

Contents

- For more information visit:

www.forkardt.com

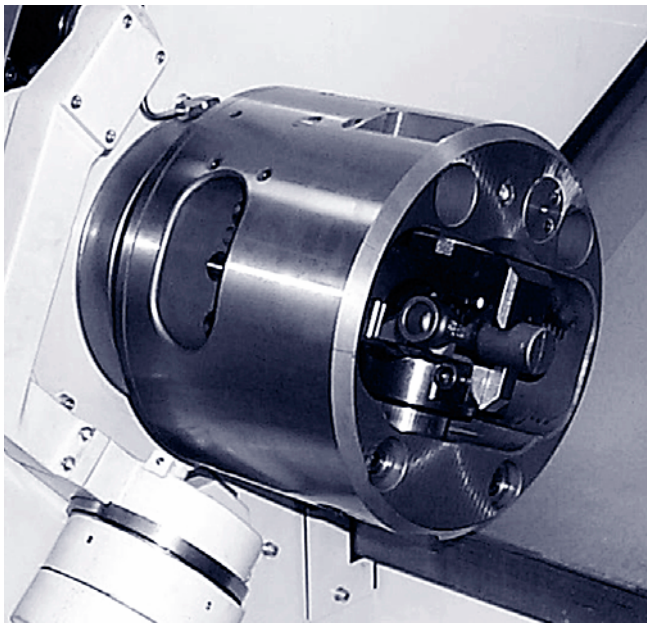
As we are constantly striving to improve our products, the dimensions and specifications in this catalogue cannot always represent the latest state of the art;they are therefore given as an indication only and are not binding.

322.10.01 E 12/07

Indexing Chucks

General

The manufacture and machining of work pieces with crossing axes requires a chucking solution that takes into account the peculiarities of such work pieces. Special machines or transfer lines generate non-productive times equal to conventional lathes in several chucking operations.



The efficient solution from FORKARDT consists of hydraulically operated indexing chucks that offer all features necessary to remain independent of special machines and transfer lines.

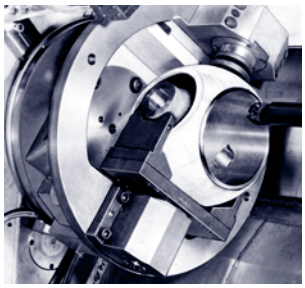
The plain design, simple control and flexible mounting options of these indexing chucks make them suitable for use on relatively simple turret-type and NC lathes. Work pieces can be machined in one chucking operation in a fully automatic cycle – with up to six different indexing positions with the machine spindle rotating!

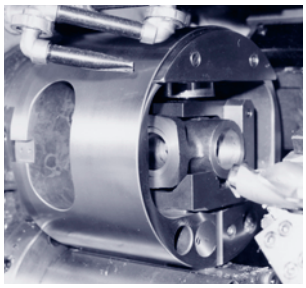
The rationalisation effect for your production is clear: one person can operate several machines that finish machine the parts in one single chucking operation. The number of work pieces that can be efficiently machined with FORKARDT indexing chucks covers diverse applications. FORKARDT hydraulically operated indexing chucks are used not only for large batch production due to their short chucking and indexing times and ease of mounting, but also due to their highly efficient use for small batch production.

This brochure gives an overview of the FORKARDT range of indexing chucks. Special designs developed for special applications are shown briefly. If you should have any specialised requirements, talk to our experts who will be happy to provide sound advice on special chucking systems.

322.10.01 E 12/07

Hydraulic Indexing Chuck Type HSR





Assembly and Function

Clamping, indexing, locking and unclamping of the jaws are performed by integral hydraulic cylinders. The oil is fed to the different cylinders via a multiple oil supply system mounted on the spindle end and a pipe bundle running through the spindle bore.

The rough component is automatically centered by the jaws, prisms and by the concentric clamping pressure. The successive machining cycle produces equal shapes (minimum out of balance) and dimensional accuracy.

The automatic indexing chuck is hydraulically controlled via two four way solenoid valves.

Control cylinder and limit switch are mounted on the hydraulic unit and on the solenoid control block. In case of proximity scanning the indexing mechanism cover will be designed according to the requirements of the customer.

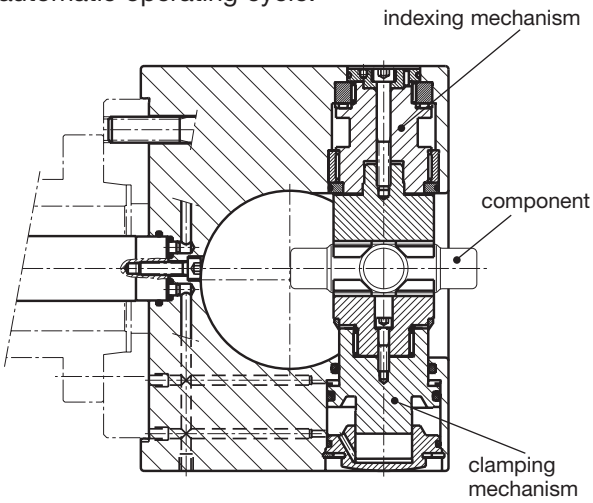
The chuck clamps unilaterally via the clamping piston of the lower jaw. Two hydraulically operated opposed flanges working in sequence, index and lock the fulcrum pin.

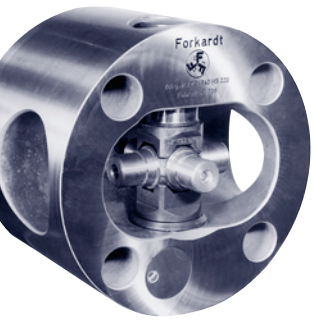
The angular position of the jaws is matched to the number of component axes and maintained with a high degree of accuracy.

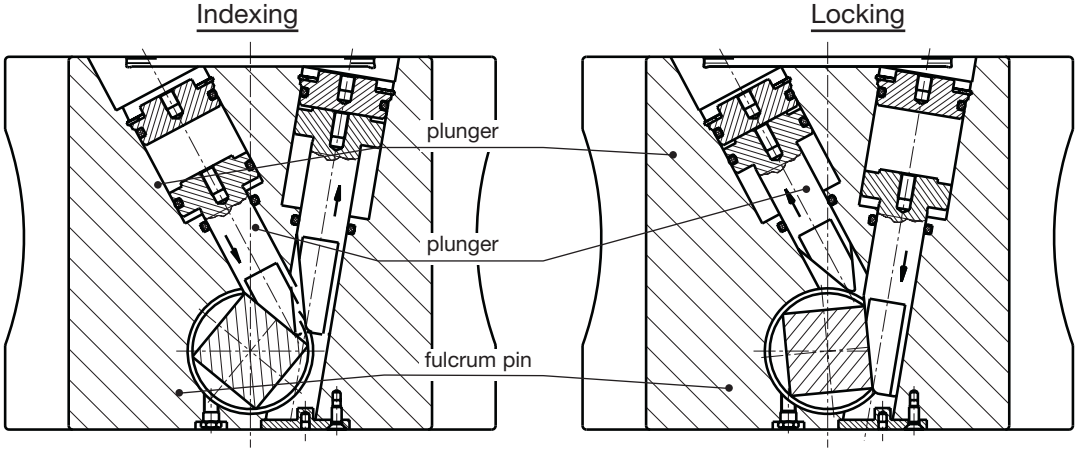
In addition, the electrical circuit includes an adjustable time lag relay to incorporate a short time lag between the indexing and locking cycles.

The completed indexing cycle is acknowledged via an additional oil channel, operating a control cylinder to actuate a

In this way the appropriate programme sequence of the tools in relation to the work piece position is warranted, so that a multiple machine assignment with sufficient safety and control can be performed at semiautomatic operating cycle.







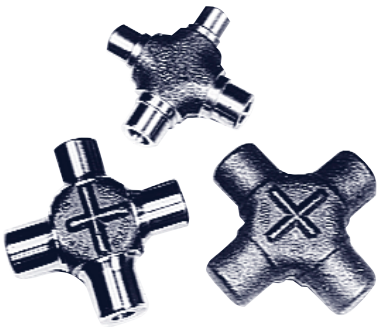
322.10.01 E 12/07

Spider Machining with FORKARDT Chucks Type HSR

Spider machining

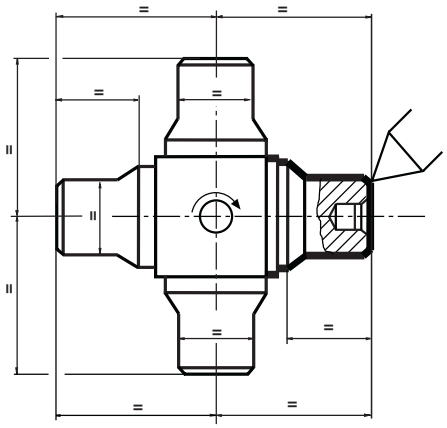
Universal joint shaft spiders, with their symmetrical shape and location of bearing surfaces, are predestined parts for finish processing on machines with stationary tools, bearing in mind what has previously been said about the advantages of complete processing in one chucking operation.

As the bearing surfaces can also be turned for larger batches with one tool on a copy turning lathe with automatic indexing chuck, this method is more economical than using special machines, such as automatic compound table machines and transfer lines with stationary tool clamping and indexing fixtures. Modern motor-car manufacturers and their subcontractors have discontinued making spiders on special high-volume machines in favour of distributing the production to several copy turning lathes with automatic indexing chucks.

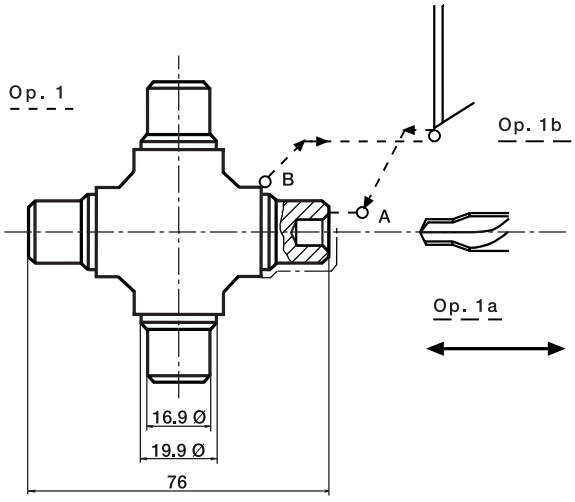


This also solves the following problem: If the production of spiders is performed on one or a few high-volume special machines, a breakdown of one machine can create a considerable production loss. If, however, the production is distributed to several copy turning lathes with a lower production figure, a breakdown of one machine will not reduce the production figure to a large extent.

It is, of course, also possible to retool a copy turning lathe for components of other types if the necessity arises.



Component: Universal joint spider forged, stock allowance approx. 2 mm. Material: 15 CR 3



Sequence of operations:	Time (minutes)
(1) Spindle idle, remove finished component from chuck, load chuck with rough component and clamp.	0.12
(1 a) Component pin centering	
Drilling speed: 2350 rpm Cutting speed: 14 m/minute Feed: 0.15 mm/rev.	
(1 b) Copy turn path A - B	
Spindle speed: 1800 rpm Cutting speed: 14 m/minute Feed: 0.25 mm/rev.	
(1 a) and (1 b) change after every 90° indexing cycle of the component at running spindle. After machining the fourth bearing surface, the spindle is stopped and the chuck positioned for operation (1).	0.94
Total time	**1.06**

322.10.01 E 12/07

FORKARDT

Spider Machining with FORKARDT Chucks Type HSR

Indexing accuracy

For machining journal crosses in small and medium lot sizes, the accuracy of rough machining is normally adequate. For very large journals such as differential spiders with a total length of 300 mm and longer, the indexing accuracy can be improved by finish machining.

Rough-machining accuracy:
About 0.1 mm at a distance of 100 mm to the indexing centre

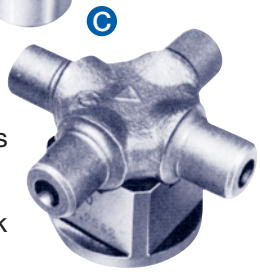
Fine-machining accuracy:
About 0.03 – 0.05 mm at a distance of 100 mm to the indexing centre
All journals are initially rough-machined and then finish-machined in a second indexing cycle.

As a matter of fact the accuracy of the machined component is not determined by the chuck mechanism, but only by the secure seating of the component in the clamping jaws. One important prerequisite is that the work piece shape renders a secure gripping and design of the inserts.

Methods of Holding

The best and most reliable type of holding in any indexing chuck is obtained by crossing prisms (cardanic).
For this purpose, the clamping inserts are designed as two crossing prism axes, and with every clamping insert only one prism axis contacts the component during gripping. They are 90% offset at the installed clamping inserts.
The second prism of every clamping insert has only to exert one locating effect and is not in contact after completed gripping operation.

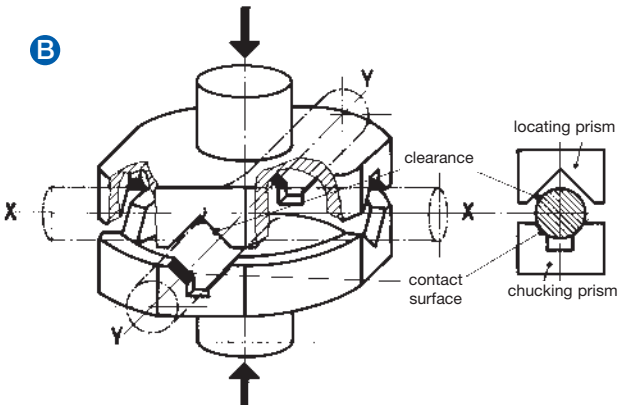
In this way overdetermination on chucking the component is avoided.
The effect of this chucking operation is as follows:
The component is held in the X axis by two clamping Vees in the upper jaw and in the Y axis by two clamping Vees in the lower jaw. The component is automatically set to the accurate position.



In this way a save gripping against all power components of cutting is achieved Simultaneously, all dimensional fluctuations of the forging blank are compensated.

The opposed free prisms are determined for locating. For distinguishing purposes, the gripping prisms are provided with a groove, whereas the locating prisms are not provided with a groove. (Fig. B and Fig. C).

The operator has to pay attention that in every position a prism with groove stands opposite one without a groove (see Fig. A and Fig. B).



Use of Automatic Indexing Chucks Type HSR

for the Production of Fittings

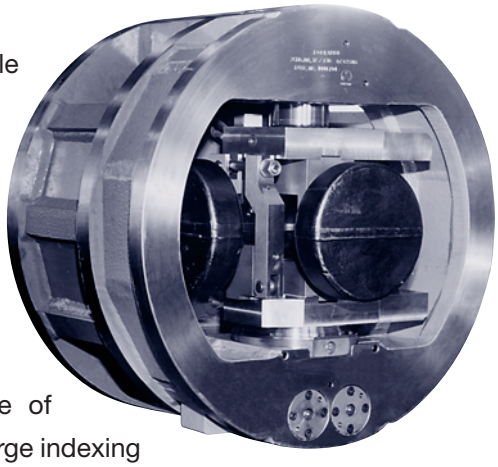
Machining of fittings

For the manufacture of valves and fittings in small and large lot sizes, the use of automatic indexing chucks is highly economical from a size above 1". The reason for this in addition to the rational relation between setup and machining time lies in the more effective utilisation of machine capacities.

Recommended for the large batch production of valves and fittings in particular is the use of indexing chucks with external diameters of about 1000 mm and indexing radii of 400 mm.

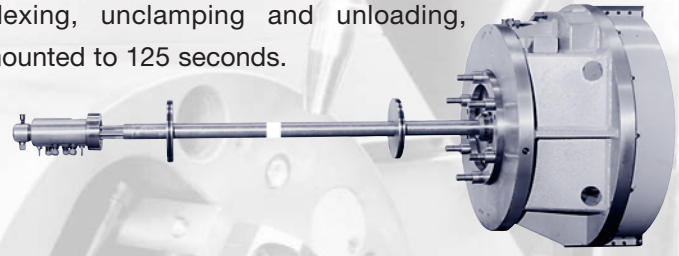
A hydraulic indexing chuck of welded construction with an outside diameter of 1000 mm (40") and an indexing radius of 400 mm (16") was developed to accommodate the shown valve body. It is used as work holder on the rotary table of a vertical boring and turning mill.

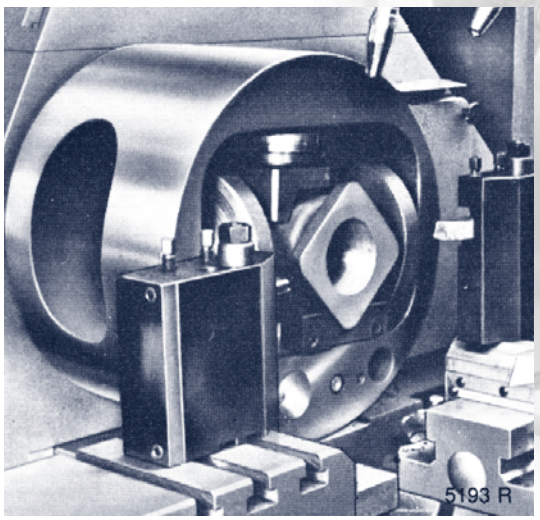
The weight of chuck and component is compensated by thrust bearings in the case of a vertical boring and turning mill, and therefore it does not put a critical load on the spindle bearing which could result in vibrations which in turn involve poor quality of the turned surface.



A further advantage of the set up of such large indexing chuck for a vertical boring and turning mill is the high degree of operational safety. This is achieved by enveloping the component in a box type structure, which provides good access for loading and unloading.

The measured floor to floor time, i.e., loading, 4x 90° indexing, unclamping and unloading, amounted to 125 seconds.



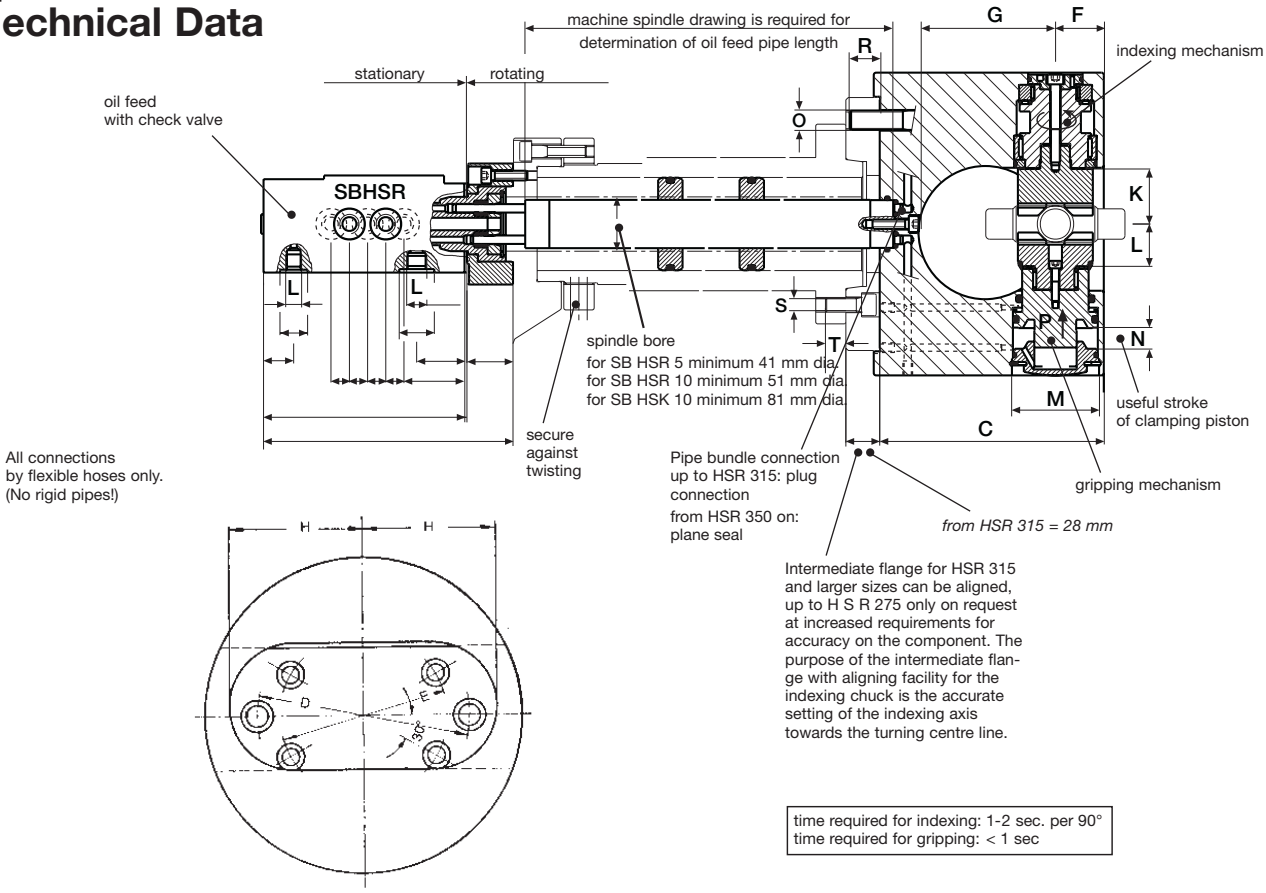


322.10.01 E 12/07

FORKARDT

Hydraulic Indexing Chuck Type HSR

Technical Data



It can be assumed that the chuck speed at which an indexing of the part during the rotation of the machine spindle can be carried out roughly corresponds to 2/3 of the indicated speed.
The prerequisite for this figure is, however, that the unbalance caused by the clamping inserts and work piece is minimized.

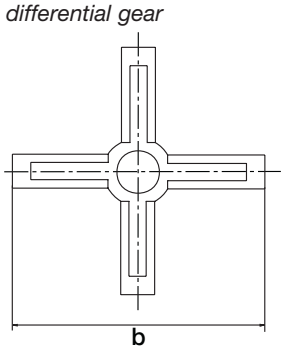
As these phenomena cannot be predicted in advance, the maximum practical machining and indexing speeds are best determined empirically at the machine on the basis of operating smoothness, the degree of precision with which the work piece is machined, the work finish and the correct indexing.

If required, the indexing operations during the full speed of the machine spindle can be controlled through a built in STHS indexing control unit. The index position feedback signal is provided by a system of pneumatic pressure switches.

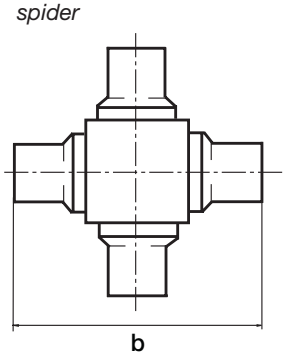
The following sizes are recommended for spiders and differential gears:

Type	Total width „b"		Jaw stroke mm
HSR 200	50	2"	12
HSR 225	75	3"	12
HSR 230	115	41/2"	15
HSR 250	180	6"	17
HSR 275	215	81/2"	17
HSR 315	268	101/2"	20

differential gear



spider



For the installation of an indexing control unit to existing applications, we can recommend our GHS 4. With this unit, as with indexing control units employing proximity switches, the indexing speed has to be reduced to approx. 200 rpm, depending on the initial speed and the diameter of the chuck.

The available indexing space of the different types is also specified in our dimensional sheets. However, this information alone is not sufficient for the determination of a chuck type.

Decisive factors for the particular processing are:

- Clamping force
- Clamping piston stroke
- Component overhang or total width °b°.*)

For a qualified consulting please contact our team of experts.

Type	HSR 200 ◈	HSR 225	HSR 250 ◈	HSR 275	HSR 315	HSR 350 ◈	HSR 400 ◈	HSR 450	HSR 500 ◈	HSR 600 ◈	HSR 670	HSR 700	HSR 820	HSR 890
A	200	225	250	275	315	350	400	450	500	600	870	700	820	590
BH6	185	185	210	210	235	290	290	290	380	380	380	380	380	380
C	141	149	185	208	227	235	253	277	301	375	400	423	500	
D ± 0.2	133.4		171.4	-	-	235	235	-	330.2	330.2	330.2	330.2	330.2	330.2
E ± 0.2	104.8	133.4	133.4	171.4	171.4	171.4	171.4	235	235	235	-	-	-	-
F	30	35	40	48	50	50	60	60	68	70	70	85	85	85
G	82	84	113	126	136	148	170	190	205	268	293	310	325	38
H	85	95	106	125	136	145	170	190	205	280	285	290	325	380
K	38.5	46	46	57	69.5	83	95	119	131.5	181.5	206	165	212	247
L	46	58	55	67	85	102	114	133	155	207	232	218	225	310
M	50	60	70	85	85	85	100	100	115	115	115	130	130	130
N	12	12	17	17	20	20	28	28	30	30	30	30	30	30
0	2xM 12	-	2xM 16	-	-	4xM 20	4xM 20	-	4xM 24	4xM 24	6xM 24	6xM 24	6xM 24	6xM 24
R	18	-	25	-	-	25	-	-	-					
S	4xM 10	4xM 12	4xM 12	4xM 16	4xM 16	4xM 16	4xM 16	4xM 20	4xM 20	6xM 20	-	-	-	-
T	15	20	18	25	27	27	25	-	-					
Piston surface [cm²]	19.5	28.5	38.5	56.5	56.5	56.5	75.5	78.5	103.5	103.5	103.5	103.5	132.5	132.5
♦ F_{max} [daN]	2300	3300	4600	6800	6800	6800	9400	9400	12400	12400	12400	12400	15600	15600
J [kg m²]	0.125	0.2	0.38	0.6	1.25	2	3	6.5	11	20	24	30	40	65
GD2 [kpm²]	0.5	0.8	1.5	2.4	5	8	12	26	44	80	96	120	160	260
Weight [kg]	20	26	39	49	73	91	115	175	217	330	350	390	440	610
• nR [1/min]	4200	3800	3600	3400	2600	2200	2000	1800	1500	1100	800	650	550	500
Weight of jaws [kg]	0.5	0.8	1.0	2.0	2.7	3.5	5.0	8.0	11.0	19	25	30	40	50
Δ Main bearing dia.	70-80	90-100	100-105	120-135	120-135	120-135	135-150	160	160-170	160-170	170-190	170-190	170-190	220-000
Δ Spindle head size	5+6	6	6+8	8	8	6+11	8+11	11	11+15	11+15	15	15	15	15+20

◈ *These types are provided with two different pitch circles.*

♦ *Clamping force at 60 bars.*

• *Indicated speed (DIN 6386) consideration with the jaw weights.*

Δ *Our proposal for front spindle main bearing and spindle head size.*

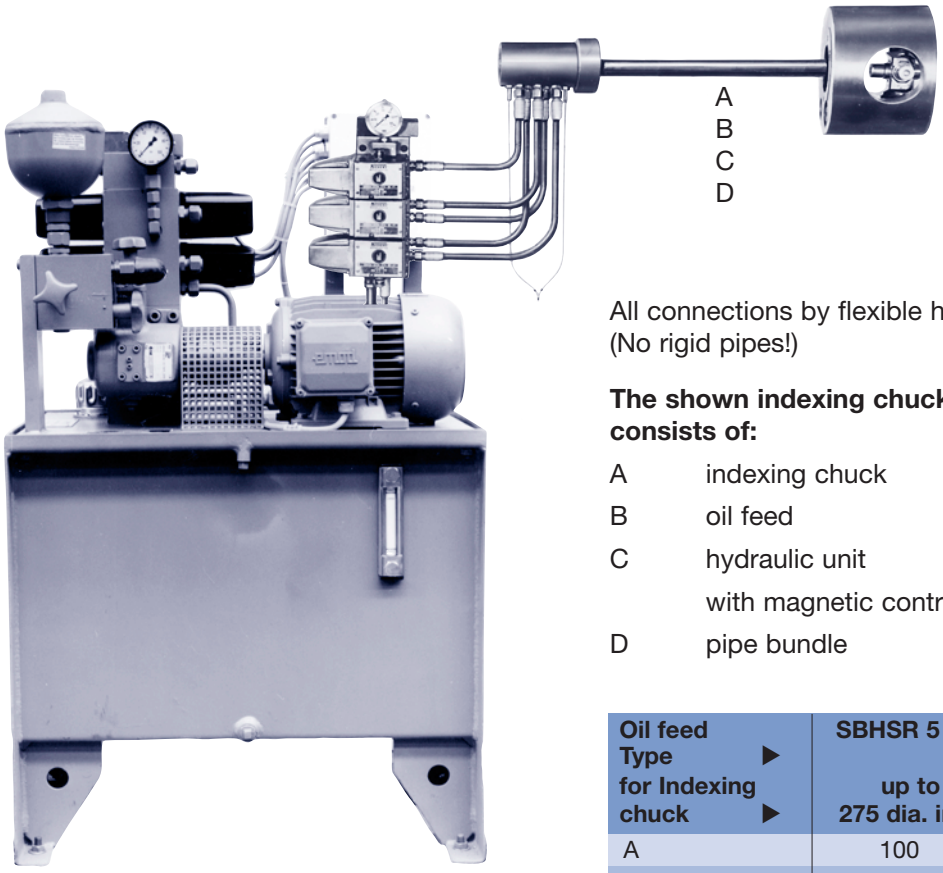
Chuck with 3 x 120° indexing on request.
Chuck body of aluminium is possible for 5 sizes 450 to 500 mm dia.

322.10.01 E 12/07

FORKARDT

Assembly of an Indexing Clamping Fixture Type HSR

Indexing Clanping Fixture



All connections by flexible hoses only.
(No rigid pipes!)

The shown indexing chuck clamping fixture consists of:

A	indexing chuck
B	oil feed
C	hydraulic unit
	with magnetic control unit
D	pipe bundle

Oil feed Type ▶ for Indexing chuck ▶	SBHSR 5 up to 275 dia. incl.	SBHSR 10 275 dia. and larger	SBHSK 10 HSK
A	100	120	145
B	80	90	115
CH7	62	75	95
D	80	100	120
E	168	184	310
F	38	41	46
G	36	30	49
H	20	21	24
J	15	18	24
K	15	18	24
L	30	34	45
M	R1/4"	R 3.8"	R 3.8 "
Quantity	5	5	8
N	M8	M1O	M12
Qty. x pitch	4 x 90°	4 x 90"	4 x 90°
0	26	34	55
P	7.2	12.2	12.2
Qty. x pitch	5 x 72°	5 x 72°	8 x 45°
nmax [rpm]	4200	3000	2000
Weight [kg]	8.5	13.0	31.5

Prefix 'R' means: *acknowledgement = indexing control for tooling sequence with identical operations on the component.*

Prefix 'K' means: *oil supply for indexing chuck with auxiliary piston for machining gate valve bodies.*

Flange A with bushing B can be turned to every desired position by releasing bolt X.

Bushing B is not part of our supply.

322.10.01 E 12/07

Magnetic Control Unit
STHS-R-K

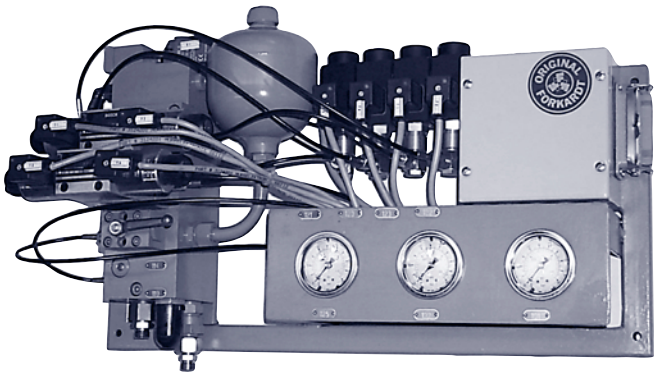
The magnetic control unit is a complete hydraulic control for clamping and unclamping as well as for indexing.

The magnetic control system type STHS-R-K is additionally equipped with an acknowledgement cylinder, a safety valve system, a limit switch, pressure switch, pressure accumulator and accumulator safety system (UVV).

The type STHS-R-K is the standard design for type HSR indexing chucks.

Control units with two pressure device, etc., are supplied on request.

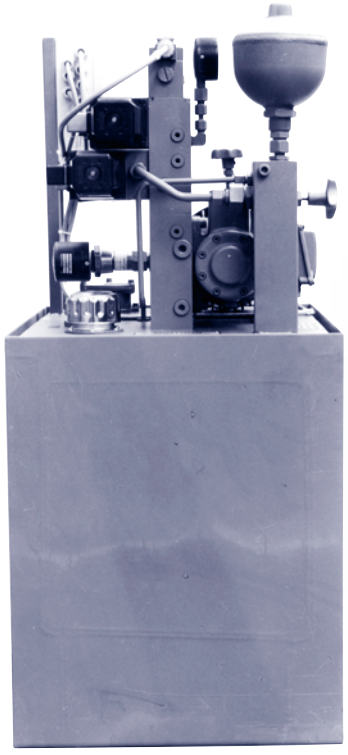
A complete set of pressure hoses and transparent leakage oil hoses ready for connection of the oil supply with the hydraulic unit and the magnetic control system is included in our supply.

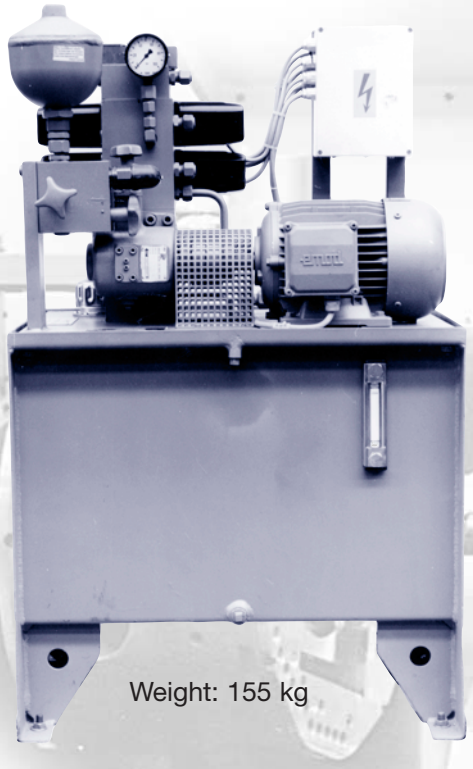


A control for two pressure clamping is necessary for the machining of delicate components.

Hydraulic Unit
HAHS-R-K

The hydraulic unit is completely equipped with oil pump, motor, pressure accumulator, suction basket, non return valves, solenoid valves and pressure switch.



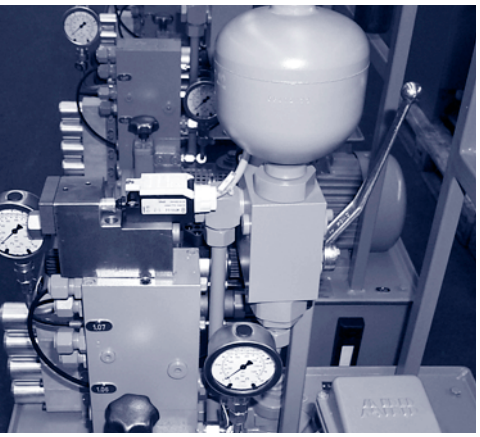


Weight: 155 kg

322.10.01 E 12/07

Hydraulic Unit HAHS-R-K
Hydraulic Control Stand STHS-R-K

STHS-R-K Hydraulic control stand



The STHS-R-K hydraulic control stand has been designed for the control of the HSR chuck. The chuck functions are switched via two solenoid valves. Four pressure switches are provided for monitoring the clamping/releasing function and indexing positions.

A feedback cylinder with normally closed contact indicates the indexing operation. The control stand is also provided with a hydraulic accumulator which, in the event of interruption of the oil supply, maintains work piece clamping up to machine spindle standstill.

The hydraulic control stand is electrically prewired. All signals are routed to a switchbox and can be tapped off via a connector.

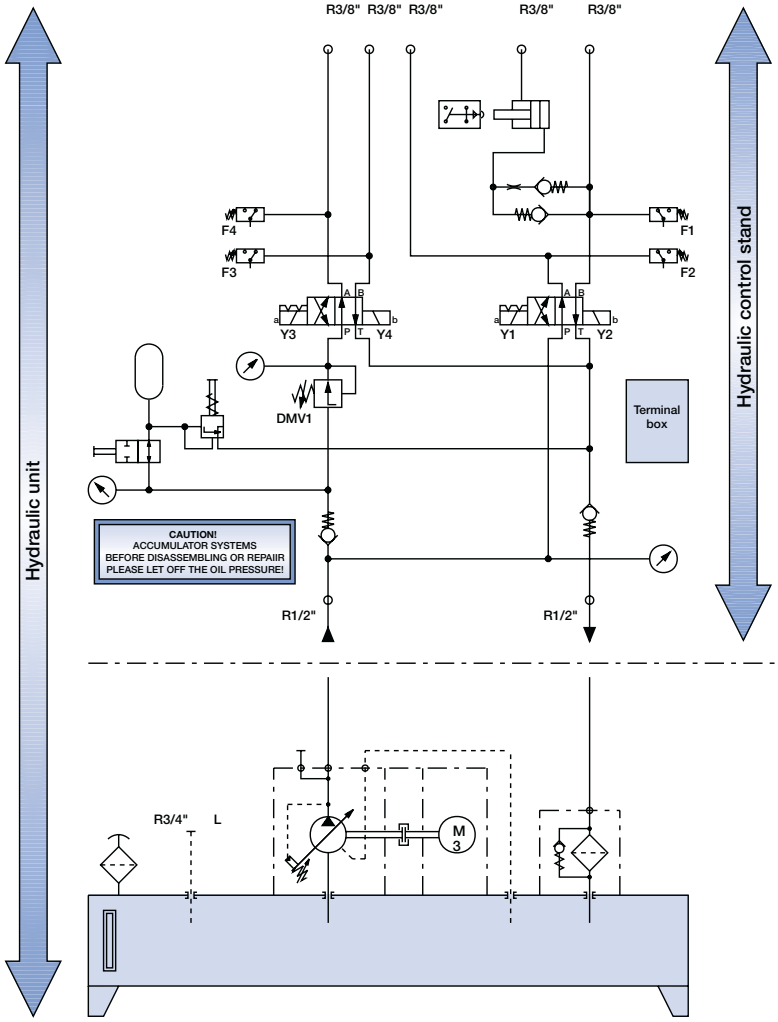
The diagrams show the hydraulic control stand and hydraulic unit in a standard version for HSR indexing chucks.

For machining work pieces sensitive to deformation, the use of control stands or units with dual pressure chucking is necessary.

Both the hydraulic units and control stands include a complete set of ready to connect pressure hoses and a transparent leakage oil hose.

HAHS-R-K Hydraulic unit

The hydraulic unit is fully equipped with tank, oil pump, electric drive and all hydraulic control stand components. All electrical signals are similarly routed to a switchbox and can be tapped off on a terminal strip.

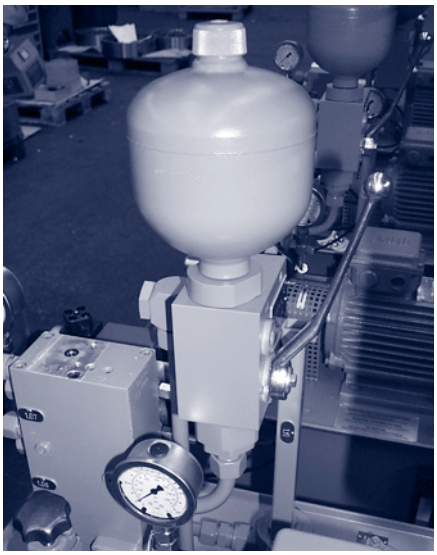


322.10.01 E 12/07

Technical data of HAHA-R-K Hydraulic unit and STHS-R-K Hydraulic control stand

Hydraulic unit | **Hydraulic control stand**

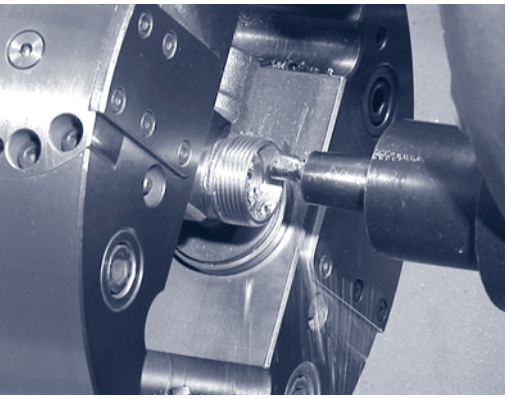
Hydr. connection	Outlet 1 – 5 Inlet P Outlet T Leakage oil return	R3/8" GE12-LR R1/2" GE15-LR (only control stand) R1/2" GE15-LR (only control stand) R3/4" GE22-LR
Feedback cylinder	Function Changeover contact	Hydraulic feedback of indexing movement Switching current 2A at < 30 VDC and ohmic loadt
Pressure switch	Pressure range Changeover contact Electrical connection	Adjustable from 5 - 70 bar Switching current 2 A at < 30 VDC und ohmic load Angular socket to DIN 43650/ISO 4400 with LED
Solenoid valves	Type Electrical data Electrical connection	Electrically operated, latching NG6 4/2-way valve 24 VDC +/-10%, 30 W, 100% duty cycle Angular socket to DIN 43650/ISO 4400 with LED
Pressure indicator	Pressure gauge	63 mm, 0 - 100 bar, filled with glycerine
Pressure reducing valve	Pressure range Operation	Hydraulically adjustable from von 3 - 70 bar Handwheel operated for clamping pressure adjustment
Accumulator systems	Diaphragm accumulator Accumulator safety block	0.7l nominal volume, Pmax 160bar, P0 20bar According to accident prevention regulations
Vane pump	Operating pressure Capacity	p = 20 - 70 bar, Q = 24 l/min
Drive motor	Speed Power Operating voltage Degree of protection	n = 1500 1/min P = 1.5 kW 230/400 VAC 50 Hz (3.7 A at 400 VAC) IP54, type B5
Oil tank	Capacity Components	V = 80 l Return filter Oil level indicator Filling filter with magnetic separator and air compensation
Hydraulic oil		ISO VG 32/46 DIN 51519 (not filled on delivery)
Dimensions	Height x width x depth Height x width x depth	1600 x 610 x 450 mm (unit) 380 x 700 x 250 mm (control stand)



322.10.01 E 12/07

FORKARDT

Centrically Clamping Hydraulic Inde ZHSR/ZHSRST



The development of the centrically clamping indexing chuck ZHSR is based on the proved HSR chuck design.

For most of the parts the chucks with one movable jaw are practicable and economical.

For some parts (precision cast pieces, pipe couplings etc.), due to the required accuracy between machined and unmachined surfaces, centrically clamping indexing chucks are essential.

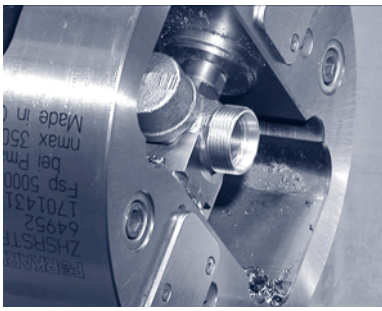
With these chucks the clamping force is obtained by two axial parallel located clamp pistons with wedge onto the cylindrical base jaws. Both base jaws are simultaneously driven. The indexing mechanics correspond to the HSR design.

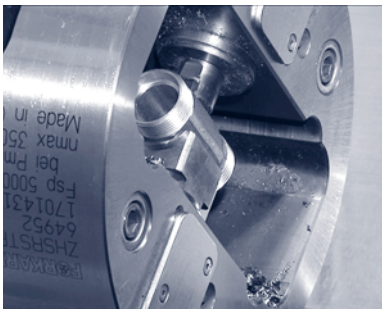
The centering accuracy is comparable with standard power chucks of same size.

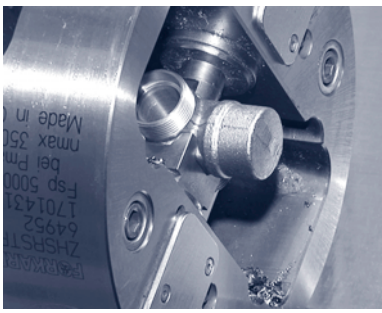
Advantages at a glance:

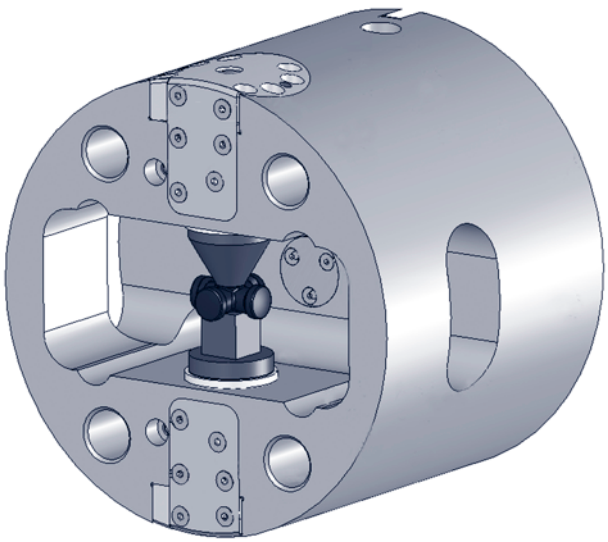
- large clamping capacity
- rigid closed chuck body
- direct support of the wedges in the chuck body
- proved ram indexing drive
- light weight base jaws
- high clamping force
- no design dependent out of balance in all indexing positions
- jaw fastening from outside

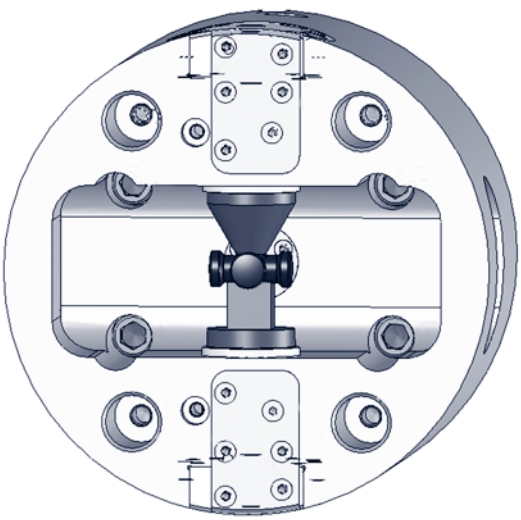
The indication ”ST” with the ZHSRST model means air sensing position control.











FORKARDT

Technical Data

The maximum speed for indexing the part should not exceed 2/3 of the indicated speed, provided good balancing conditions of clamping inserts and part.
Considering the true out of balance at the individual index positions the work speed and the indexing speed have to be reduced.
It must be considered that chip removal at one side of the part will automatically cause out of balance when the part is indexed to the next position. In such cases work and index speed will be subject to reduction.
Because of these unknown parameters the possible work and index speeds should be determined at the machine in practice. The requested criteria are vibration free running of the machine, achieved accuracy at the machined part surface finish and the trouble free function during the indexing sequence.
On request, the individual indexing position can be monitored at full speed by the FORKARDT indexing control unit STHS-R-K. Pneumatic pressure switches will feedback the indexed position.

The ZHSR chucks are provided to be used in connection with indexing control STHS-R-K.

Type	ZHSR ZHSRST 200	ZHSR ZHSRST 235	ZHSR ZHSRST 260	ZHSR ZHSRST 280	ZHSR ZHSRST 315	ZHSR ZHSRST 355
A	200	235	260	280	315	355
B	62	82	94	104	132	162
C	Z6	Z6	Z6	Z6	Z8	Z8
D	38	45	45	55	55	65
Ident no.	153174	153175	153176	153177	153178	153179
B1	155	180	200	220	250	260
E	170	170	170	170	220	220
F	69	79	79	79	89	89
G	M1O	M12	M12	M12	M16	M16
H	163	176	195	230	245	255
J	18	18	24	24	24	24
J1	26	35	35	43	43	48
J2	70	80	90	100	115	120
K	14	14	16	16	16	16
L+0.2	133.4	133.4	133.4	133.4	171.4	171.4
M_{min}	25	34	38	43	55	70
M_{max}	30	40	46	51	65	80
N	5	6	8	8	10	10
♦ F_{max} [daN]	2300	3300	4600	5800	6800	6800
J [kgm2]	0.15	0.3	0.5	0.8	1.4	2.2
GD2 [kpm2]	0.6	1.2	2.0	2.4	5.6	8.8
Weight [kg]	28	40	52	75	100	145
• n_R [1/min]	4200	3800	3600	3400	2600	2200
Jaw weight [kg]	0.4	0.7	0.9	1.8	2.5	3.2
Δ Spindle nose size	6	6	8	8	8	8/11

♦ *Total clamping force at 60 bar*
• *Indicated speed (DIN 6386) in consideration with the jaw weights indicated*

Δ *Our suggestion for spindle head size*

Chuck with 3 x 120° switching on request

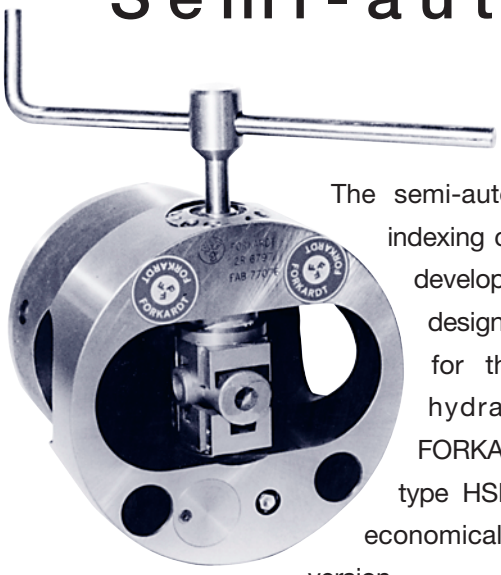
However, this information alone is not sufficient for the determination of a chuck type.
Decisive factors for the particular processing are:

- Clamping force
- Clamping piston stroke
- Component overhang or total width

If you are in doubt about choosing the right indexing chuck or wish to machine particularly large work pieces, our experienced team of experts will be happy to provide sound technical advice.

322.10.01 E 12/07

Semi-automatic Indexing Chuck



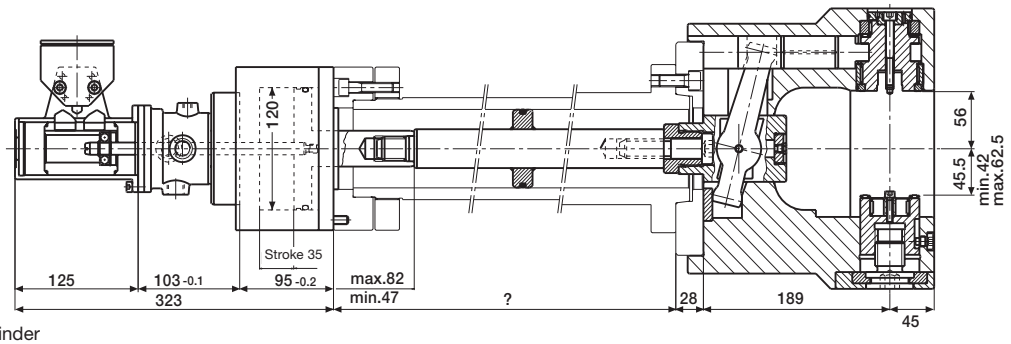
The semi-automatic FORKARDT indexing chuck, type HC, was developed as an alternative design at a favourable price for the fully automatic, hydraulically operated FORKARDT indexing chuck type HSR, and it also is as economical as the automatic version.

The chuck type HC is used for components in particular which alternately require typical indexing chuck machining and standard power chuck clamping.

The connecting dimensions at the spindle end of the chuck type HC are therefore selected in a way that they correspond to the standard power chuck type KT, and the same actuating cylinders can be used The clamping insert connecting dimensions are predominantly the same as with the chuck type HSR so that numerous proved designs for the component holder can be utilized.

The semi-automatic indexing chuck type HC has the following design characteristics:

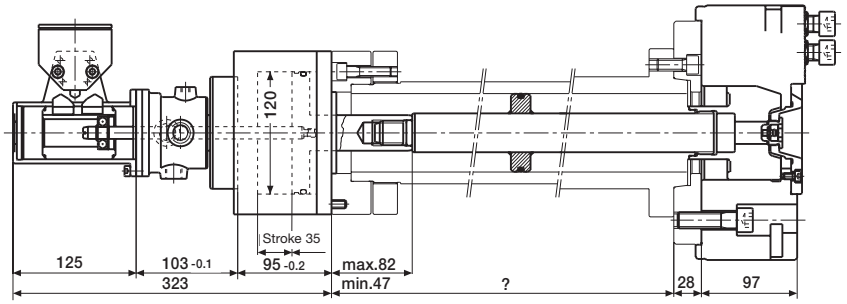
- Manual clamping of the component by wrench.
- 4x90° automatic indexing of the component with locking after every indexing cycle. The operation is effected by a hydraulic or pneumatic actuating cylinder with travel control of standard design, as it is used for standard chucks. Indexing can be performed while the spindle is running.
  The sequence of operations can be programmed by numerical control.
- Quick and easy mounting on the machine like with a standard turning chuck is particularly suitable for the retooling of existing machines.



Semi automatic indexing chuck type HC

9027/3/1

Rotating cylinder
Type OZRJ/
Type PZRJ



Power operated chuck type KT

9027/3/2

322.10.01 E 12/07

H C

Indexing is controlled via two limit switches on the switch panels at the rear end of the actuating cylinder:

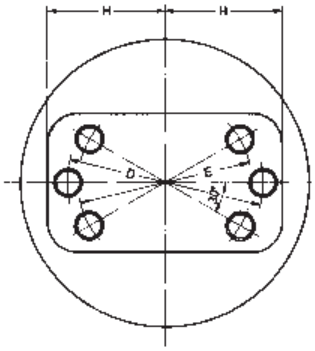
First trip cam at the end of the draw movement of the actuating cylinder.

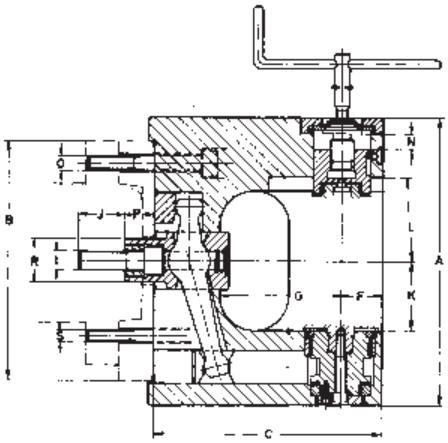
Second trip cam at the end of 75° to 90° indexing with locking.

Indexing time: E.g. type HC 250 about 3 seconds from 0° to 90°.

In case of components with different tool inserts for each working surface, indexing can also be controlled by the pneumatic indexing control unit, type GHS 4.

If components, the working surfaces of which are 90° offset have to be produced and for which a fully automatic indexing chuck type HSR cannot be employed on a sufficiently economical basis due to small batches, the semi-automatic indexing chuck type HC thus is a suitable solution.

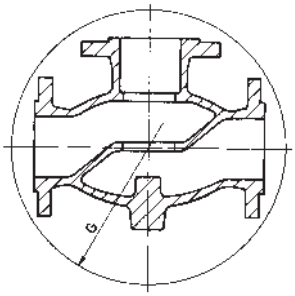




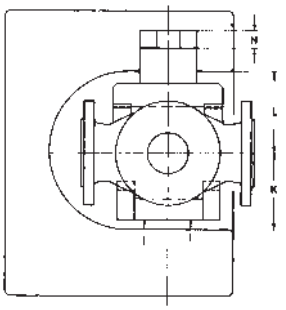
Type	HC 200	HC 225	HC 250	HC 275	HC 315	HC 350	HC 400	HC 500
Direct mounting for spindle size DIN 55021, shape A	5-6	6	6	6	6	6-11	11	11-15
Exchange chucks 2KT, 3KT, 4KT	160 20	200	200	250 315	250 315 400	250 315	400 500	400
A	200	225	250	275	315	350	400	500
B^{H6}	165	165	210	210	235	290	290	360
C	164	164	224	234	264	260	340	365
D ± 0.2	133.4	-	171.4	-	-	235	235	330.2
E ± 0.2	104.6	133.4	133.4	171.4	171.4	171.4	171.4	235
F	30	30	40	45	50	50	70	65
G	75	75	112	117	140	145	170	205
H	85	95	106	120	136	145	165	205
	M20	M20	M20	M20	M24	M24	M24	M24
J	45	45	45	45	56	56	56	56
K	36.5	49	46.5	57	70	84	95	131.5
L	46	58.5	55	67	85	102	114	155
N	12	12	17	17	20	20	28	30
G	2xM 12	-	2xM 16	-	-	4xM 20	-	4xM 24
min. P	39	39	39	39	52	52	52	52
max. P	50	50	52	52	69	69	69	69
R	50	50	50	50	60	60	68	68
S	4xMIO	4xM12	4xM12	4xM16	4xM16	4xM16	4xM20	4xM20
F_{max} [daN]	1200	1200	1500	1500	2000	2000	3000	3000
n_{max} [1/min]	2000	2000	1800	1600	1300	1000	800	600
Clamping force daN at torque moment mkp (x10 = Nm)	850 3.5	850 3.5	1200 4	2500 7	2500 7	2500 9	4000 12	4000 12
Chuck key hexagon SW	10	10	14	17	17	17	17	17
Weight [kg]	22	30	44	56	68	100	145	230
GD^2 [kpm^2]	0.57	0.8	1.7	2.8	5.5	8.9	15.4	47

Determination of the chuck size

1. Ascertain maximum swing radius G



2. Check component thickness to chuck windows L and K

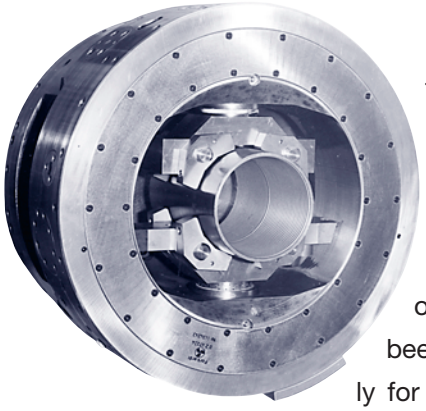


3. Take into consideration design of clamping jaw and useful stroke N of clamping piston

322.10.01 E 12/07

FORKARDT

Further powerful solutions by FORK



The extensive FORKARDT archive for indexing chuck in special designs contains a large number of variants that have been developed specially for individual to unusual chucking problems or specific applications.
For a number of applications it is, however, necessary to use other types of indexing chucks.

Some type designations of current versions as follows:

HSZ = indexing chuck with HS principle and rack drive

ZHSZ = centrically clamping indexing chuck with HS principle and rack drive

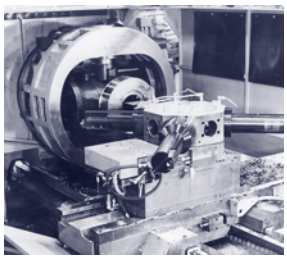
ZHSZF = centrically clamping indexing chuck with HS principle and rack drive, with hydraulic centrifugal force compensation

Indexing Chuck Type HSZ / ZHSZ / ZHSZF

Components with two opposing contours as well as components with crossing axes (4x90°) can be machined with these chucks.
Indexing and locking is effected by indexing square and tangential wedge according to the proved HSR principle, and a synchronous ring is provided for the centric movement of the two clamping jaws. The oil feed is in general in accordance with that of the chuck type ZS.
Chucks type ZHS are used for strong cutting and were initially developed for machining couplings on doublespindle lathes for which the use of chucks type ZS is no longer possible on account of space restrictions.
For chucks type HSZ and ZHSZ, indexing is effected via racks with locking of the entire system after the indexing cycle has been finished by means of locking cylinders which are located in the chuck body.

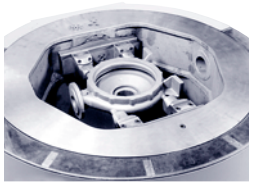
The chuck type ZHSZ can also be supplied with hydraulic centrifugal force compensation (type ZHSZF).

Hydraulically operated self centering indexing chuck with multiple jaws, equally spaced to minimize the deformation of ring shape parts (i. e. couplings)



Hydraulic indexing chuck light weight design for the machining of valve bodies

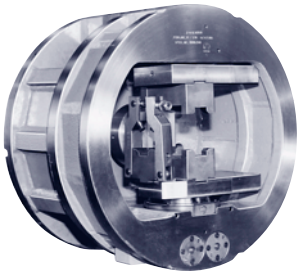
Hydraulic indexing chuck, in small size, for glass bottle moulds



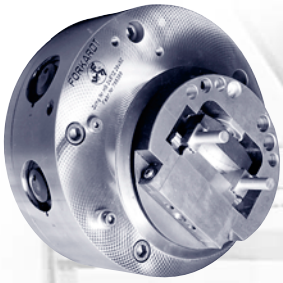
View onto an automatic indexing chuck on a vertical lathe: Processing of pump housings

322.10.01 E 12/07

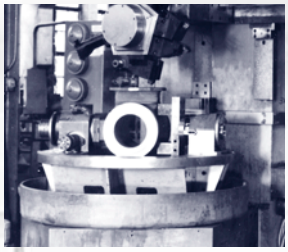
ARDT



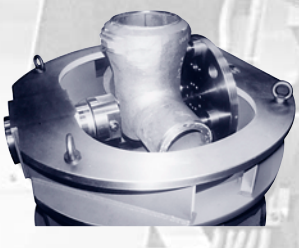
Big hydraulic automatic indexing chuck for machining valve bodies at all four flanges on a vertical lathe



Radial indexing chuck, hydraulically actuated, with eccentrically located part carrier for indexing part 180° for two identic machining operations



Hydraulic indexing chuck with big diameter tooled for the manufacturing of valve bodies



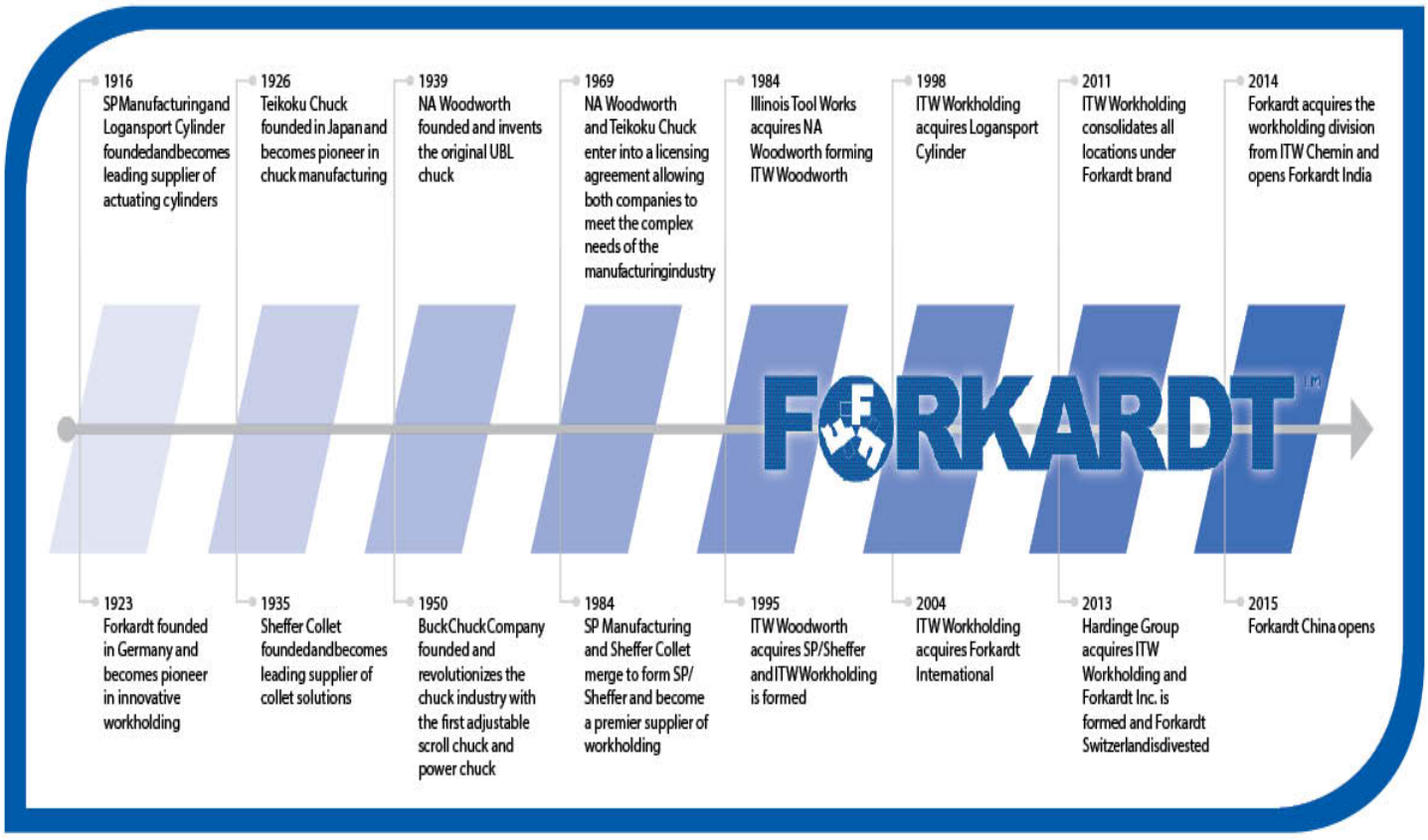
Hydraulic indexing chuck for heavy duty machining, but also precise finishing operations on big parts

Selection criterions of indexing chucks

Type	for machines...	Chuck indexing position	Full automatic chuck operation	Semi-automatic chuck operation	Chuck with centrifugal force compensation	Typical parts
HSR Two-jaw consol chuck	Universal NC-lathes, horizontal, Front turning lathes, Chuck diameter up to 800 mm	4 x 90°, 8 x 45° 3 x 120° 2 x 180°	X			Universal joints, Fittings, Bottle molds, Pump bodies, Trunnions
ZHST Centrically clamping two-jaw chuck	Universal NC-lathes, Front turning lathes	4 x 90° 2 x 180°	X			Fittings, Bodies, etc. Machining with high accuracy
HC Two-jaw consol chuck	Universal NC-lathes, horizontal, Front turning lathes, Chuck diameter up to 500 mm, to be used as exchange to a standard power-operated chuck and to a collet	4 x 90° 2 x 180°		X		Small- and middle-sized lots of fittings, pump bodies etc.
HSZ Two-jaw consol chuck	Special designs according to customers° requirements		X			
ZHSZ Centrically clamping two-jaw chuck			X			
ZHSZF Centrically clamping two-jaw chuck with centrifugal force compensation			X		X	

322.10.01 E 12/07

OUR HISTORY



Innovative Technology by FORKARDT

L O C A T I O N S W O R L D W I D E

FORKARDT GMBH
Lachenhauweg 12
72766 Reutlingen-Mittelstadt
D-40699 Erkrath
Phone: (+49) 211 25 06-0
E-Mail: info@forkardt.com

FORKARDT USA
2155 Traversefield Drive
Traverse City, MI 49686, USA
Phone: (+1) 800 544-3823
(+1) 231 995-8300
Fax: (+1) 231 995-8361
E-Mail: sales@forkardt.us
Website: www.forkardt.com

FORKARDT FRANCE S.A.R.L.
28 Avenue de Bobigny
F-93135 Noisy le Sec Cédex
Phone: (+33) 1 4183 1240
Fax: (+33) 1 4840 4759
E-Mail: forkardt.france@forkardt.com

FORKARDT CHINA
Precision Machinery (Shanghai) Co Ltd
1F, #45 Building, No. 209 Taigu Road,
Waigaoqiao FTZ CHINA 200131,
CHINA
Phone: (+86) 21 5868 3677
E-Mail: info@forkardt.cn.com
Website: www.forkardt.com

FORKARDT INDIA LLP
Plot No. 39 D.No.5-5-35
Ayyanna Ind. Park
IE Prasanthnagar, Kukatpally
Hyderabad - 500 072
India
Phone: (+91) 40 400 20571
Fax: (+91) 40 400 20576
E-Mail: info@forkardtindia.com

www.forkardt.com

3 ZL 200 E 04/15 0.0 FK Edition 12/11 Printed in Germany