FORKARDT

PSA

INDEPENDENT CHUCKS
AMERICAN VERSION
BILSING SYSTEM

ENGLISH

OPERATING INSTRUCTIONS

Contents

1.0 General information on documentation

This user manual contains the essential information for the proper use of the clamping device. It is addressed to technically qualified people.

Qualified people are:
- those who have received instruction on using the clamping device.
- those who have received training on setting up and repairing clamping devices, and work as repair and servicing staff.

For the operation, maintenance and repair of the clamping device it is essential that the information in this manual is read and understood.

We reserve the right to make technical changes to the descriptions and statements in this instruction manual that are essential to improve the clamping device.

1.1 Explanation of the symbols

Safety advice to prevent danger to life or reduce damage to property is shown in this manual by the symbols and pictograms indicated here.

indicates potential risk. Death, severe physical injury or substantial damage to property may occur if the precautions are not undertaken or the safety advice not adhered to.

indicates important information on avoiding damage to property or undesirable operating states.

indicates information on handling or additional information.

2.0 General safety advice

2.1 General

Clamping devices may produce risks if the use and handling do not meet the requirements for safety technology. The clamping device is produced to the current state of the technology and is safe to operate. Even so this clamping device may produce risks if it is used improperly by unqualified people. The following information is to be used for personal safety and to prevent damage to the product described or the connected devices.

Read this manual before working with the clamping device and observe all safety information. Not adhering to the instructions contained in this manual may result in danger to life, severe personal injury or substantial damage to property.

- Only qualified people may work with the clamping device.
- It is not permitted to change or alter the clamping device yourself.
- Only use the clamping device when it is in perfect condition.
- Before working on the clamping device, switch the machine off and ensure it can not be switched on again.
- Only use original manufacturer components and spare parts. The warranty lapses if parts from other manufacturers are used.
- Before starting to use the clamping device check whether all protective devices have been attached.
- The "lathe – clamping device – work piece" system is primarily influenced by the work piece being produced, which may result in a remaining risk. The operator must assess the remaining risk.

The manufacturer is not liable for damage arising from not adhering to the manual.

2.2 Intended Use

The clamping device may only be used to clamp work pieces on machine tools. When doing so the maximum axial force, clamping force and revolutions of the clamping device may not be exceeded. The required clamping force must be determined for the application in line with the applicable technical rules (e.g. VDI 3106). If in doubt or if accessories are used that were not provided by the manufacturer, the manufacturer must approve or restate the thresholds.

The following must be considered:

- Variable adhesion coefficients between work piece and top jaw
- Relationship between clamping diameter and working diameter
- Size of cutting force on the cutting tool
- Top jaws overhang from the clamping location

- Reduction in clamping force via the centrifugal force for external clamping
- The maximum revs stated only apply to hard standard top jaws
- For special top jaws that are to be used for this chuck the maximum revs are engraved on the jaws

Proper use includes adhering to the manufacturer's prescribed assembly, set-up, operation and maintenance terms. All other uses are considered to be unauthorised.

The manufacturer is not liable for damage thus caused.

2.3 Transport, handling and storage

Notify the forwarder if there is transport damage. Notify the manufacturer in writing without delay if parts are missing. If the clamping device is not assembled immediately after delivery it must be stored in a protected location. Cover the parts properly and protect from dust and moisture.

In order to protect all the blank parts, the clamping device and pressure oil cylinder, and all accessories are covered with a protective substance on delivery.

2.4 Operating information

As per the regulations of the trade association, revolving clamping devices must be secured from touching using appropriate covers or protective doors.

If faults occur on the clamping device during operation, the machine must be switched off immediately and only restarted when the fault has been resolved.

After switching off the clamping power the work piece may release itself from the clamping device.

The local safety regulations and accident prevention rules of the appropriate trade association apply to operating the clamping device.

2.5 Maintenance and repair

For maintenance and monitoring work ensure the clamping device is without pressure.

At the high revs that are common on lathes, the clamping device is exposed to high loads. It can be damaged during collisions between the tool and clamping device that may occur occasionally, e.g. if the program process has faults damage may occur.

After a collision switch off the lathe immediately and check the clamping device for damage. In addition to easily recognised damage, hidden damage may also occur, e.g. hairline fractures in the chuck body or the base jaws. Remove the clamping device immediately from the machine spindle.

Analyse the affected parts of the clamping device with an appropriate, non-destructive testing procedure to ensure there are no fractures and exchange it if damage has occurred.

Only use original parts.

2.6 Safety technology conditions for clamping devices

The safety technology conditions for operating clamping devices under pressure are defined in the trade association's testing guidelines and the DIN, VDE and VDI guidelines. The individual test conditions are ensured via the following activities:

Test condition	Ensured via:
The machine spindle may only start when the minimum clamping pressure in the clamping cylinder has been built up.	Pressure switch in the clamping lines
The clamping may only be released when the machine spindle has stopped.	Standstill monitoring on the machine spindle
If the power fails and restarts the switching positions do not change.	Impulse-controlled way valve with detent end positions
If the clamping energy fails, a signal to automatically or manually stop the spindle is given. At 1/5 of the maximum activation power the clamping device used must open and close.	Pressure switch in the clamping line

3.0 Technical data

3.1 Note

Read and precisely follow these operating instructions before unpacking and commissioning the hand operated chuck type PSA!

The hand operated chuck type PSA may only be used, maintained and repaired by persons over the age of 18 who are familiar with the operating instructions.

3.2 Application and intended use

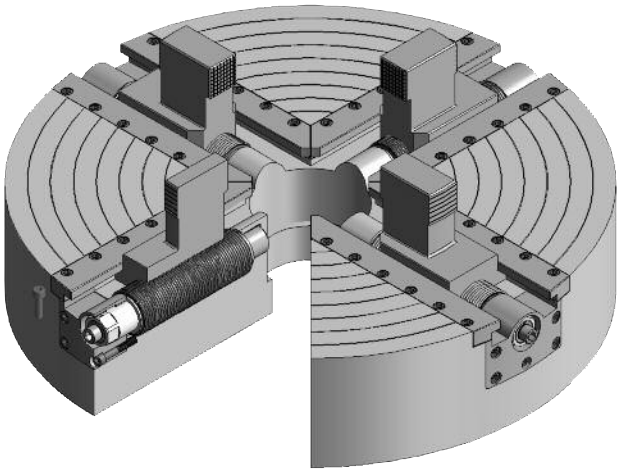
The hand operated chuck type PSA, called faceplate in the following, is operated with a chuck key. The force applied to the chuck key is transmitted to the base jaws and corresponding top jaws via the screw and generates the force necessary to grip the work pieces to be machined. The hand operated chuck type PSA must only be used for the intended purpose.

The intended purpose is the clamping of work pieces on:

lathes and
other machine tools (rotating).

The maximum torque, maximum gripping force and maximum speed of the hand operated chuck must not be exceeded. The permissible speed or necessary gripping force must be determined for the respective machining operation in compliance with the relevant safety codes of practice (e.g. VDI 3106).

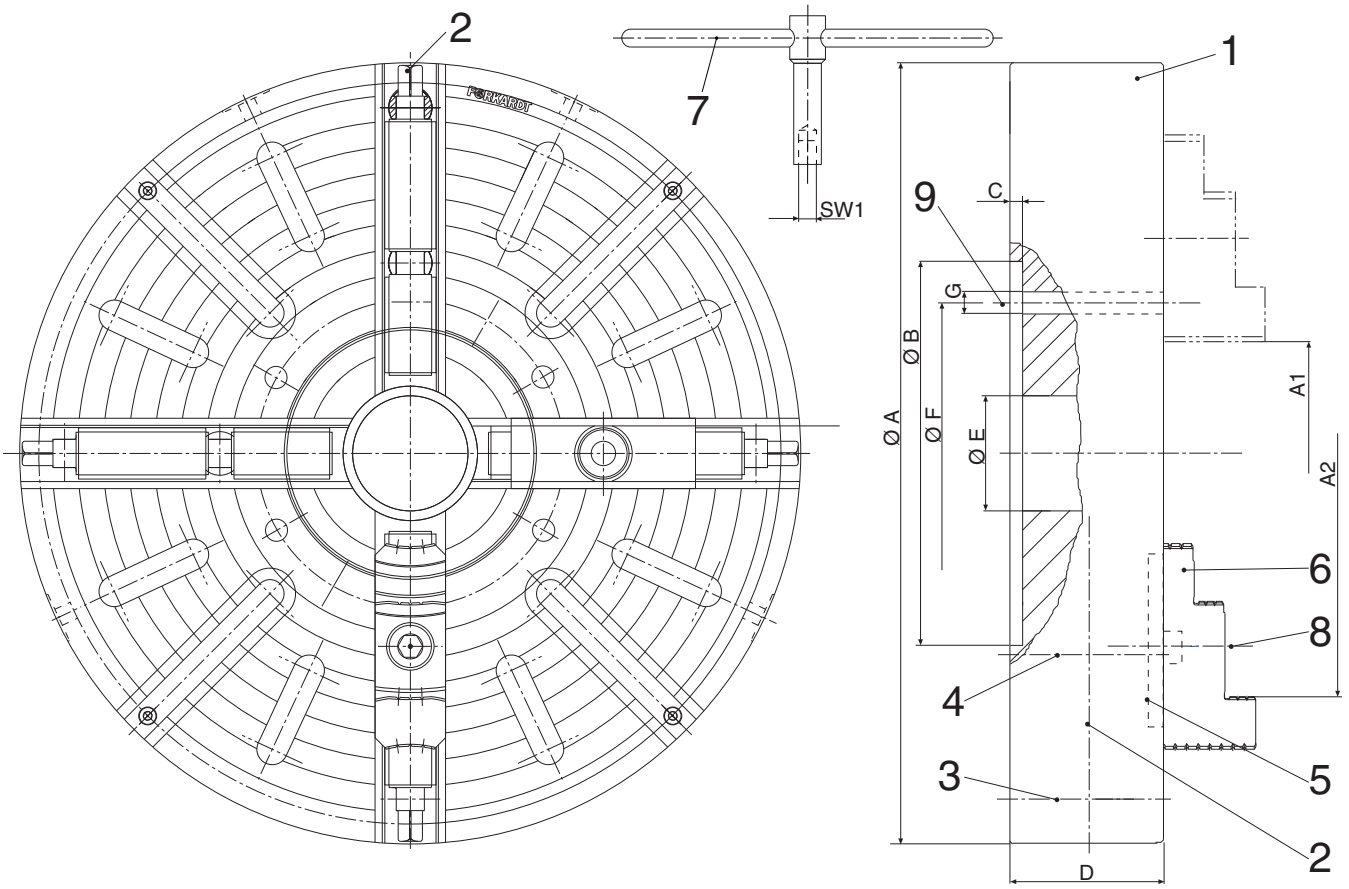
The intended use also includes observing the commissioning, assembly, operating and maintenance conditions specified by the manufacturer. Use for any other than the intended purpose is regarded as misuse. The manufacturer disclaims all liability for any damage attributed to such use.



3.3 Hand operated chuck components

3.3.1 Cylindrical machining centres

From size 355 with T-slot and clamping slots



Item	Designation	Pos.	Bezeichnung
1	Body PSA	**6**	Base jaw
2	Spindle	**7**	Key SW 1
3	Spindle bolt	**8**	Socket head screw
4	Spindle bolt (open)	**9**	Socket head screw
5	Base nut		

3.3.2 Important data at a glance

Chuck type PSA	**250**	**300**	**355**	**400**	**450**	**500**	**560**	**610**	**630**
Ident. No. FORKARDT	DP169990000	DP170001000	DP170010000	DP169250000	DP169250000	DP169254000	DP169920000	DP169930000	DP169937000
Ident. No. BILSING	DP252572120	DP253073120	DP253573120	DP254074120	DP254574120	DP255074120	DP255675120	DP256175120	DP256375120
ØA	250	300	355	400	450	500	560	610	630
B HB	145	160	160	200	200	260	260	260	260
C	6	6	6	10	10	13	13	13	13
D	65	80	90	100	100	110	110	120	120
E	50	60	90	90	90	90	90	90	90
F	120	133.36	133.36	172	172	220	220	220	220
G	M12	M16	M16	M16	M16	M20	M20	M20	M20
O. D. A1 min.	30	35	35	40	40	40	40	45	45
I. D. A2 min.	250	300	355	400	450	500	560	610	630
Max. torque Mdmax.	95	95	150	180	180	250	250	350	350
Max. Gripping force Fspmax.	7500	7500	11700	12600	12600	16000	16000	19600	19600
Max. speed nmax. 1/min.	2450	2040	1750	1530	1360	1220	1100	1020	980
Weight G	19	25	42	58	71	106	111	140	155

Chuck type PSA	**710**	**710**	**800**	**800**	**900**	**900**	**1000**	**1000**	**1200**
Ident. No. FORKARDT	DP169944000	DP169945000	DP169955000	DP169956000	DP169966000	DP169967000	DP169974000	DP169975000	DP169982000
Ident. No. BILSING	DP257175120	DP257176120	DP258075120	DP258076120	DP259075120	DP259076120	DP250075120	DP250076120	DP250275120
ØA	710	710	800	800	900	900	1000	1000	1200
B HB	260	370	260	370	260	370	260	370	370
C	13	13	13	13	13	13	13	13	13
D	135	135	135	145	150	150	150	150	160
E	110	110	120	120	120	120	120	120	120
F	220	330	220	330	220	330	220	330	330
G	M20	M20	M20	M20	M20	M20	M20	M20	M20
O. D. A1 min.	50	50	60	60	60	60	60	60	100
I. D. A2 min.	710	710	800	800	900	900	1000	1000	1200
Max. torque Mdmax.	350	350	550	550	550	550	550	550	550
Max. Gripping force Fspmax.	19600	19600	28600	28600	28600	28600	28600	28600	28600
Max. speed nmax. 1/min.	875	875	765	765	680	680	610	610	510
Weight G	187	187	298	298	380	380	475	475	715

3.4 Chuck mounting bolt tightening torques

Bolts according to DIN 912		Quality 10.9			Type according to DIN 267		
Thread		M8	M10	M12	M16	M20	M24
Tightening torque	Nm	25	43	56	124	244	420
Max. bolt load	N	16940	23100	25200	42400	66400	95600

Bolts according to DIN 7984		Quality 10.9		Type according to DIN 267		
Thread		M4	M5	M8	M10	M12
Tightening torque	Nm	3.5	7.0	20	35	45
Max. bolt load	N	4560	7440	13552	18480	20160

3.5 Jaw mounting bolt tightening torques

Bolts according to DIN 912		Quality 10.9		Type according to DIN 267		
Thread		M6	M8 x 1	M12 x 1,5	M16 x 1,5	M20
Tightening torque	Nm	15	29	75	155	305
Max. bolt load	N	13200	19360	39200	74200	116200

4.0 Set up and function

4.1 Hand operated chuck type PSA

The gripping force of a hand operated chuck largely depends on the force application principle, i.e. how gripping force is generated and transmitted to the gripping jaws.

This is a simple work piece chuck with which work pieces of all shapes can be clamped both centrically and eccentrically. Faceplates have four individually adjustable gripping jaws as standard, i.e. they are not operated via a central drive. The possibility of individual adjustment over virtually the entire faceplate diameter allows work pieces to be positioned and clamped at different points on the faceplate.

The drive transmission elements – steel spindles and bolts – are made of case-hardened steel and must be lubricated at regular intervals. Compared to other manufacturers, our steel spindle has double bearings for safety to keep the jaw in place should the steel spindle break.
The clamping jaws are made of case-hardened steel, hardened and ground and are reversible. The two-part gripping jaw is a quick-change gripping jaw, i.e. the jaw can be rotated through 180° after loosening the socket head screw (for internal and external gripping). It is important that the top and base jaws are pulled firmly together by the socket head screw. Every faceplate is supplied with an operating key complying with the requirements of DIN, so that the supplied standard key is sufficient for tightening the steel spindle.

Attention
To be noted is that the maximum speed specified on the faceplate or machine must be maintained. The speed is only permissible for work pieces that do not exceed a specific unbalance of 25 mmg/kg.

Attention
When clamping with the chuck key, the use of a tube extension must be avoided as this will subject the chuck internal components to excessive load!

Attention
The chuck key must immediately be removed from the screw square after clamping.
The key must never be left in the chuck for safety reasons!

4.2 Safety advice

- The torque for generating the gripping force must be adjusted to the maximum permissible torque of the hand operated chuck used and must not exceed this limit.
- When clamping with the chuck key, the use of a tube extension must be avoided as this will subject the chuck internal components to excessive load!
- The chuck key must immediately be removed from the screw square after clamping. The key must never be left in the chuck for safety reasons!
- The machine spindle must only be started when clamping takes place within the permissible operating range of the hand operated chuck.
- If machining of a clamped work piece is interrupted for several hours, the work piece must be removed from the hand operated chuck!

5.0 Gripping force

5.1 General

The connection between the hand operated chuck PSA is non-positive, i.e. force is transmitted by the top jaw being pressed against the work piece. The contact pressure necessary for establishing this non-positive connection is termed gripping force.

The gripping force is subject to different direct or indirect influences:

- variable coefficients of gripping force between the work piece and top jaw;
- clamping diameter and working diameter ratio;
- magnitude of the cutting force on the cutting tool;
- top jaw overhang from the clamping point;
- reduction of gripping force due to the centrifugal force of the jaws with external gripping.

Rotating chucks are subject to the influence of centrifugal force, which increases with the speed squared. With external gripping, the centrifugal forces work against the gripping force; this is the reverse with internal gripping.
The force of the gripping jaws still available at high speed for gripping the work piece depends on the magnitude of the gripping force available in a static condition, the weight of the top jaw and its gravity radius.

5.2 Gripping force

The maximum gripping force Fspmax (= Fspo) specified in the table in section 3.3.2 on page 9 can only be achieved under favourable conditions.

Preconditions are:

- perfect condition of the hand operated chuck;
- optimal lubrication of all sliding surfaces;
- maximum torque on chuck key;
- short jaw overhang;
- static n = 0 (or slow speed).

The gripping force in a static condition is measured with a static gripping force meter, e.g. SKM 1200/1500. SKM 1200/1500, see also publication 930.10.02D. For strength calculations, e.g. for the design of special top jaws, the Fspmax value in the table can be used for reference.

5.3 Operating gripping force Fsp

The operating gripping force Fsp is the total gripping force (daN) of all gripping jaws (base jaws with top jaws) during operation and is a minimum value for the usable gripping force under normal operating conditions. This is understood to be the

- perfect condition and
- adequate lubrication of all sliding surfaces of the power chuck

The hand operated chuck data shows the gripping force in a static condition.
Not only this value alone is important for operation. The base jaws also have a considerable influence of the operation of a hand operated chuck. The top jaw to be used depends on each particular application.

The top jaws influence the gripping force and in turn also the speed. The specified basic speed (according to DIN 6386) for the hand operated chuck type PSA is the speed at which the calculated centrifugal force of the heaviest corresponding jaw type is two thirds of the gripping force available in a static condition at maximum operating force.

5.3.1 Safety advice

- Check that the gripping force of the chuck is sufficient for the machining operation under the selected operating conditions.
- The calculated gripping force values are only achieved with the chuck in a perfect condition (the gripping force values can be higher with a freshly lubricated chuck).
- Use light top jaws at high speeds.
- Determine the dynamic gripping force loss with each setup and ensure that the gripping force is adequate for the machining operation.
- If the gripping force measured with a gripping force meter falls below the calculated value, the hand operated chuck must be lubricated. See also section 8.2.
- According to the regulations of the trade association, work with rotating machines at high speeds must only be carried out with the provision of an adequately dimensioned safety guard door! The guard door must be closed and locked when the machine is in operation!

5.4 Determination of the necessary gripping force Fspz for a machining operation

The gripping force necessary for every machining operation must be determined. If this gripping force cannot be provided by a chuck, taking into account the safety factors defined in VDI 3106, the permissible speed or permissible cross-section of cut must be determined.

Example:

To be machined is a solid steel work piece (without bore) with a clamping diameter of Dsp = 60mm, a turning diameter of dz = 50mm and a cross-section of cut, having a main cutting force of Fs = 1200daN, at a speed of 2760 rpm. Non-hardened jaws, rebored to the clamping diameter, are used to prevent damage.

This results in a gripping coefficient of μsp = 0.1. The safety factor Sz for the machining data is assumed as Sz = 2.

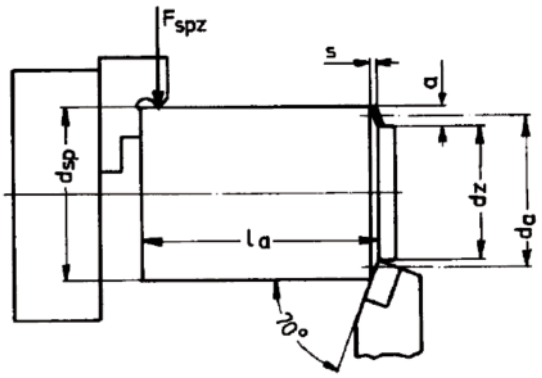
The gripping force loss Fsp is 2000 daN.

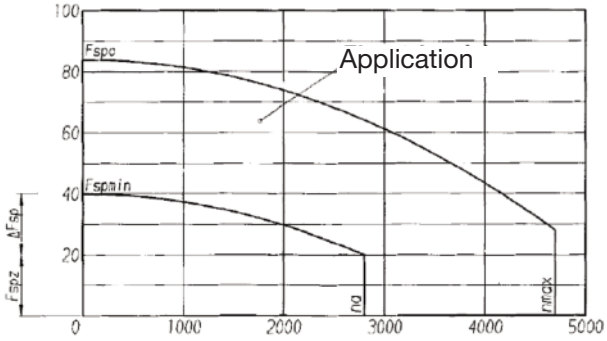
The example shows:

- taking into account the gripping force loss Fsp with the spindle of the machine tool stationary, that a minimum gripping force of

Fspmin = Fspz + Fsp
= 2000 + 2000 = 4000 daN

is necessary. The gripping force Fs is influenced mainly by the main cutting force Fs, which is determined from the cross-section of cut and specific cutting force.





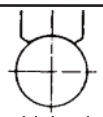
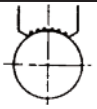
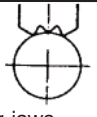
Fs = a *s * ks

The following applies to the gripping force necessary for machining:

$$Fspz = \frac{Fs*dz}{\mu sp*dsp} = \frac{a*s*ks*dz}{\mu sp*dsp} \quad 1)$$

Terms used in the formulas:

la = Work piece projection
a = Cutting depth
s = Feed rate
Ks = Specific cutting force
dz = Cutting diameter
dsp = Clamping diameter
μsp = Gripping coefficient
Fs = Main cutting force

Gripping coefficients μsp				
Jaw type	Material	Work piece surface at the clamping point		
		ttt	tt.t	~
 Finish-machining jaws	Steel	0.1	0.15	-1)
	Al	0.1	0.14	-
	Ms	0.09	0.14	-
	GG	0.08	0.12	-
 Multiple jaws 2)	Steel	0.12	0.20	0.32
	Al	0.11	0.19	0.30
	Ms	0.11	0.18	0.27
	GG	0.10	0.16	0.26
 Roughing jaws 2)	Steel	0.25	0.35	0.50
	Al	0.24	0.33	0.48
	Ms	0.23	0.32	0.45
	GG	0.20	0.28	0.40
1) Avoid, smooth jaws are only suitable for machined work pieces. 2) Indentations are produced in the work piece depending on the gripping force.				

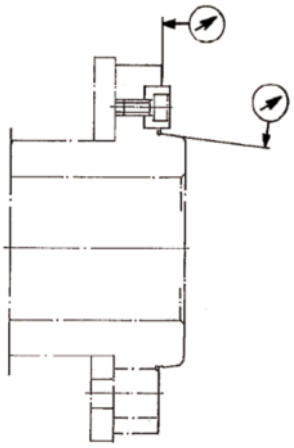
Cutting forces increase as cutting tools become blunt. To cover all uncertainties from the machining operation, an additional safety coefficient Sz=2 is recommended.

6.0 Assembly

6.1 Measures prior to starting assembly

6.1.1 Checking the spindle nose for receiving the chuck flange

To ensure maximum concentricity of the hand operated chuck after assembly, the locating surfaces on the spindle nose must be checked with a dial gauge.



Concentricity of centring: max. 0.005 mm.

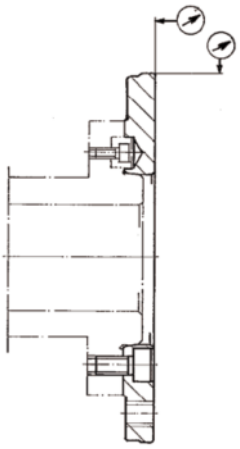
Axial run-out of locating surface: max. 0.005 mm.

Check plane surface for evenness with a hairline gauge.

The plane surface must be deburred on the holes and clean.

6.1.2 Checking the mounted chuck flange

The hand operated chuck PSA has a centric mounting arrangement. For mounting the hand operated chuck directly on the spindle nose with short taper according to DIN, ISO and ASA standards, an appropriate chuck flange must be attached to the spindle nose of the lathe.



For self-fabrication by the user, the chuck flange on the machine spindle must be finish-machined and balanced prior to assembly of the hand operated chuck.

7.0 Starting up, operation

7.1 Notes

Initial commissioning has a considerable influence on the optimal operation of the hand operated chuck, whereby a check must be made for any errors made during assembly of the hand operated chuck.
Mount the top jaws (with slot and tenon) or SWB system and establish a connection with the base jaws with the jaw mounting bolts. The jaw mounting bolts must be tightened with the specified torque!

Do not overload the hand operated chuck PSA! The torque for generating the gripping force must correspond to the maximum permissible torque of the hand operated chuck used and must not exceed this value!

Attention:
Do not use a tube extension when using the chuck key!

Sluggishness of the hand operated chuck can be caused by distorted base or top jaws. Remove the base jaws together with the top jaws from the chuck body.

7.2 Starting up, operation

Place the work piece in the hand operated chuck PSA and clamp. Start the machine and wait for the machine program to release the machine spindle to start the same.

Machining of work pieces at high speeds must only take place with the provision of an adequately dimensioned safety guard door!

Close the safety guard door and mount protective devices!

The safety guard door must be locked when the machine spindle is rotating and should only be opened when the machine spindle has come to a standstill!

The local safety regulations apply to the operation of the hand operated chuck in any event! Reference is made here to the applicable regulations for the prevention of accidents of the respective trade association.

Listen for abnormal noise!

Check material samples!

The accuracy of the hand operated chuck is reflected in the running accuracy of repeatedly clamped work pieces machined in several successive chucking operations.

If the centre of the clamping cross-section deviates from the turning centre beyond the specified tolerance, this will lead to faulty work pieces and waste!

7.3 Inadmissible operating modes

Any system unbalance on the hand operated chuck must be eliminated immediately!

7.4 Actions in the event of faults

Independent of the following instructions, the local safety regulations apply to the operation of the hand operated chuck in any event!

It is recommended to provide a lockable local switch to prevent unintentional starting of the machine spindle when carrying out repairs or in the event of faults. Signs, causes and measures to be taken in the event of faults on the hand operated chuck are shown in the following table.

The completeness of this information cannot be guaranteed due to certain factors (knowledge of operating personnel, etc.).

Cause	Cause	Measures
Machine has vibration problems	Unbalance of chuck flange and possibly chuck due to incorrect assembly	Check concentricity on the test surface of the hand operated chuck and immediately eliminate any system unbalance Rebalance chuck flange if necessary Readjust spindle bearing
Gripping force too low	Fouling Insufficient lubrication	Clean hand operated chuck Check lubrication; if inadequate, disassemble hand operated chuck, clean and lubricate
Jaw stroke not reached	Wedge block groove fouled	Clean hand operated chuck
No gripping force	Clamping jaws distorted	Check locating surfaces Possibly a different make

7.5 Recommissioning following a fault

See section 7.1 and section 7.2, page 15.

7.6 Measures for extended periods of non-use

Remove the work piece from the hand operated chuck!

Clean and grease the hand operated chuck!

Do not clean the hand operated chuck with compressed air as there is a risk of eye injury from chip and coolant! – Risk of injury!

Coat bright parts with a preservative. Observe the safety instructions of the preservative manufacturer!

7.7 Measures following extended periods of non-use

Clean parts to remove preservative.

Lubricate the hand operated chuck, remove any excess grease.

Perform an idle stroke to distribute the lubricating grease.

Check the gripping force Fspmax on the hand operated chuck with the machine spindle stationary!

Load a work piece. Otherwise proceed as described in section 7.2, page 15!

7.8 Clamping

Gripping force is built up when the chuck key SW 1 Item 7 is turned clockwise. A torque wrench must be used for power chucking and fine alignment.

7.8.1 Unclamping

Unclamping takes place by turning the chuck key SW 1 Item 7 counter-clockwise up to the rear fixed stop; this relieves the clamping mechanism.

8.0 Maintenance, repair

8.1 Notes

For checks, repairs or maintenance of the hand operated chuck, refer to Section 2 "Safety instructions"!

Due to different operating conditions, the frequency of maintenance, wear control or repair cannot be determined in advance and depends on the degree of load and fouling.

Operating hours / period	Check point / Maintenance instructions
After 24 hours; for initial commissioning or repair	Lubrication of hand operated chuck Check screwed connections for tightness
Weekly	Lubrication of base jaws and screw
Weekly	Check Fspmax with a gripping force meter, e.g. SKM 1200/1500
Monthly	Check base jaw and screws

8.2 Maintenance

Before carrying out maintenance, checks or other work on the machine, always first stop the machine spindle and lock the lathe to prevent reconnection (with a lockable local switch)!

Provide a warning sign!

If the calculated gripping force Fspmax specified in section 3.4, page 9 is not achieved in a static condition – even after lubrication, the hand-operated chuck PSA must be removed from the machine spindle, disassembled, cleaned and re-greased!

8.3 Disassembly and assembly of the hand operated chuck PSA

Loosen the chuck mounting bolts Item 9 and remove the hand operated chuck PSA from the centring collar of the chuck flange. Place the hand operated chuck PSA on a pallet or workbench.

Turn and loosen the screw Item 2 with the chuck key SW and remove the spindle bolts Items 3 and 4.

Assembly takes place in reverse order.

Check all parts for damage, wash and clean. Replace faulty parts. Relubricate with FORKARDT lubricating grease, e.g. PF 5 or PF 6!

9.0 Spare parts and service

9.1 Spare parts

In the interests of safety and to ensure perfect functioning of the chuck, only use original FORKHARDT parts.

The article numbers are shown in the component list.

The manufacturer's warranty only covers original FORKARDT parts. Any damage attributed to the use of parts from other manufacturers will invalidate claims under our product liability obligation.

The most important spare and wearing parts should be carried in stock at the place of use to ensure consistent perfect functioning and availability of the power chuck.

Spare parts can be ordered with the spare parts list or appropriate parts list.

- In the interest of safety, only use ORIGINAL FORKARD spare parts!
- The use of non-original parts will discharge us from our product liability obligations should any damage be attributed directly or indirectly to the use of such parts.
- Only ORIGINAL spare parts supplied by us are covered by the warranty.

Please note that there are often special production and delivery specifications for original and non-original parts and the parts we supply conform to current industry standards.

9.2 Service

The following data should be provided when ordering spare parts:

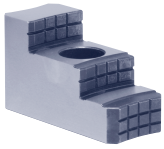
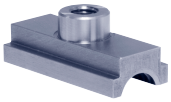
Designation
Quantity
Ident. Number

FORKARDT DEUTSCHLAND GMBH

Heinrich-Hertz-Straße 7
D-40684 Erkrath

Phone	+49 211 2506 334	Mr. Neuenfeldt
	+49 211 2506 284	Mr. Cordes
Fax	+49 211 2506 236	

9.3 Spare parts for hand operated chuck type PSA

							
Type	**Hardened** Quick-change top jaw	**Hardened** Base jaw	**Hardened** Adjusting spindle	**Hardened open** Spindle bolt	**Hardened closed** Spindle bolt	**Hardened** Key	
Pcs.	4	4	4	4	8	1	
Size	Ident. No.	Ident. No.	Ident. No.	Ident. No.	Ident. No..	SW	Ident. No.
250	DP169990016	DP169990015	DP169990002	DP169474004	DP169474003	12	DP225500000
300	DP169474016	DP169474015	DP169474002	DP169474004	DP169474003	12	DP225500000
355	DP170010016	DP170010015	DP170010002	DP170010004	DP170010003	14	DP225500000
400	DP169247016	DP169240015	DP169247002	DP169247004	DP169247003	15	DP240500000
450	DP169247016	DP169247015	DP169247002	DP169247004	DP169247003	15	DP240500000
500	DP169586016	DP169586015	DP169586002	DP169586004	DP169586003	17	DP240500000
560	DP169586016	DP169586015	DP169586002	DP169586004	DP169586003	17	DP240500000
610	DP169930016	DP169930015	DP169930002	DP169930004	DP169930003	19	DP261500000
630	DP169930016	DP169930015	DP169930002	DP169930004	DP169930003	19	DP261500000
710	DP169944016	DP169944015	DP169930002	DP169930004	DP169930003	19	DP261500000
800	DP169955016	DP169955015	DP169955002	DP169955004	DP169955003	22	DP280500000
900	DP169955016	DP169955015	DP169955002	DP169955004	DP169955003	22	DP280500000
1000	DP169974016	DP169974015	DP169974002	DP169974004	DP169974003	22	DP280500000
1200	DP169974016	DP169974015	DP169974002	DP169974004	DP169974003	22	DP280500000

10.0 Appendix

10.1 Tools and accessories

Lubricating grease PF 5 and PF 6, grease gun, see table!

Degreasers and preservatives must be provided by the customer, but can be ordered from us.

Designation	Type	Ident. No.	Contents
Special grease	PF 5	101400 / 84	1.0 kg
Special grease	PF 6	101400 / 88	1.0 kg
Lever grease gun	HH 1	101400 / 121	

10.2 List of related publications:

Gripping force meter	SKM 1200 / 1500	930.10.02D

11.0 Declaration of incorporation

The manufacturer

FORKARDT Deutschland GmbH
Heinrich-Hertz-Str. 7
D - 40699 Erkrath

herewith declares the following incomplete machines with the designations:

Type designation:: Independent chucks - American version
BILSING system

Type: **PSA**

- The general health and safety requirements according to Appendix I of the aforementioned directive have been referred to and observed.
- The special technical documents according to Appendix VII B have been prepared.
- The aforementioned special technical documents will be submitted to the responsible authority as required.
- Commissioning is forbidden until it has been verified that the machine in which the aforementioned machines are to be incorporated comply with the specifications of the machinery directive.

Responsible for the documentation:

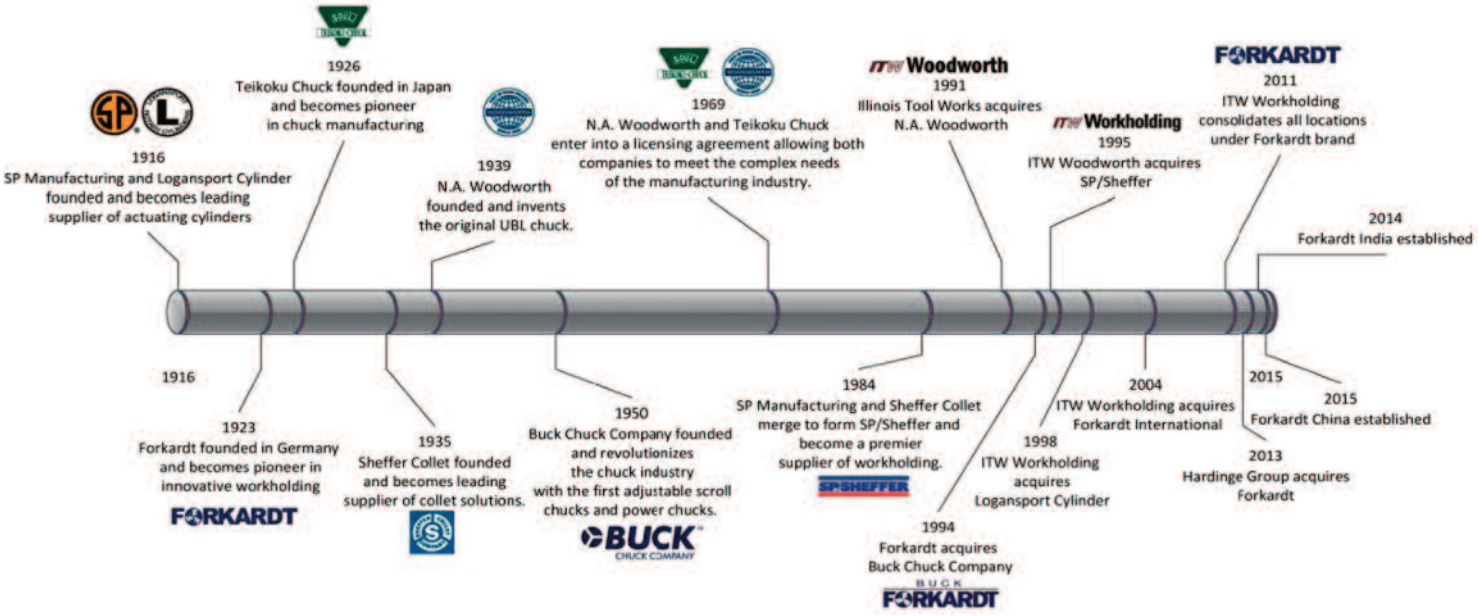
Oskar Weinert
Heinrich-Hertz-Str. 7
D - 40699 Erkrath

Date/Manufacturer's signature: 12.02.2013

Place: Erkrath .....
(Head of Design Mr Weinert)

Declaration of incorporation number: PSA.E

OUR BRANDS



Innovative Technology by FORKARDT

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