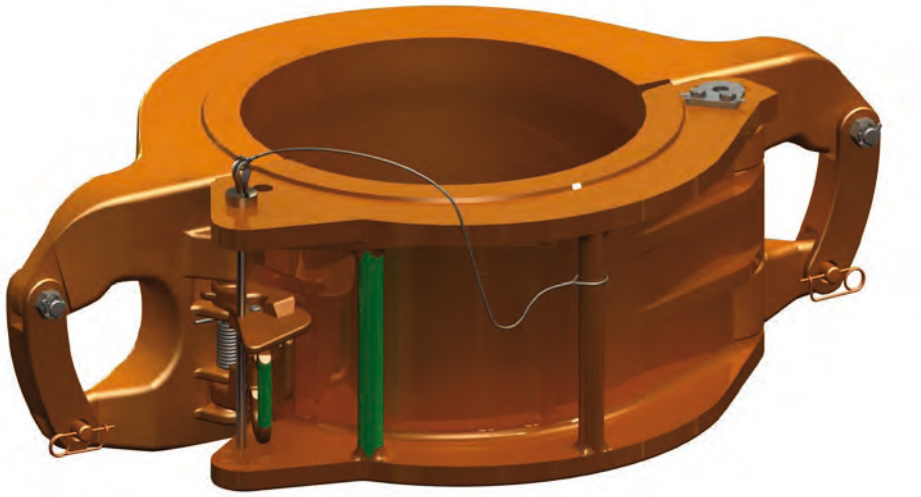
Blohm + Voss Pipe Handling Equipment

SDS Side Door Elevators

65, 100, 150, 250, 350 & 500 tons PN 642621

Technical Documentation

Original Instructions



Manual PN 642621-D Rev 003, January 2010

A Company
of ThyssenKrupp
Marine Systems

Blohm + Voss Repair

GENERAL INFORMATION

Warnings and Note

WARNING: A "WARNING" INDICATES A DEFINITE RISK OF EQUIPMENT DAMAGE OR DANGER TO PERSONNEL. FAILURE TO OBSERVE AND FOLLOW PROPER PROCEDURES COULD RESULT IN SERIOUS OR FATAL INJURY TO PERSONNEL, SIGNIFICANT PROPERTY LOSS, OR SIGNIFICANT EQUIPMENT DAMAGE.

NOTE: A "note" indicates that additional information is provided about the current topics.

WARNING: THIS TECHNICAL DOCUMENTATION CONTAINS INSTRUCTIONS ON SAFETY, INSTALLATION, OPERATION AND MAINTENANCE FOR THE BLOHM + VOSS REPAIR GMBH TOOL . IT MUST BE STUDIED BEFORE WORKING WITH THE TOOL.

Improper / Unsafe Use

The tool must only be used for the designated purpose. When using the tool, the rated load must never be exceeded.

Intended use of this manual

This manual is intended for use by field service, engineering, installation, operation, and repair personnel. Every effort has been made to ensure the accuracy of the information contained herein. Blohm + Voss Repair GmbH, will not be held liable for errors in this material, or for consequences arising from misuse of this material. Anyone using service procedures or tools, whether or not recommended by Blohm + Voss Repair GmbH, must be thoroughly satisfied that neither personal safety nor equipment safety will be jeopardized.

Intellectual property

All information contained in this manual is based upon the latest product information available at any time of printing.
Dependent on ongoing technical improvements (ISO 9001) "Blohm + Voss Repair GmbH" reserves the right to change the design and specifications without announcement.
The values specified in this manual represent the nominal values of a unit produced in series. Slight deviations in the case of the individual devices are possible.

NOTE: In the event of problems that cannot be solved with the aid of this manual, please contact one of the addresses listed below.

CE Marking

The tool complies with the Machinery Directive 98/37/EC and 2006/42/EC.

For machines containing any hydraulic or pneumatic powered parts, the Directive 94/9/EC "Equipment and protective systems in potentially explosive atmospheres" applies.
The marking is as follows: CE Ex II 2G T5 (hydraulic tools) or CE Ex II 2G T6 (pneumatic tools).

Limited Warranty

The warranty provided will be void if the tool is either:

1. Repaired or serviced by a service facility which was not authorised by Blohm + Voss Repair GmbH.
2. Replacement parts not manufactured by Blohm+Voss Repair GmbH are used.
3. Modifications were made to the tool which were not approved by Blohm+Voss Repair GmbH.

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Warning sign PN 671638

Warning sign PN 671642


Warning sign PN 611524


Warning sign PN 671640


Warning sign PN 671641

General safety issues

WARNING: One should avoid creating ignition sources, like heat, as a result of the use of the tool with other tools or equipment.

WARNING: Do not use the tool for any other purpose than given in this document within its specification.

WARNING: Failure to conduct routine maintenance could result in equipment damage or injury to personnel.

WARNING: The tool must only be serviced by trained and by an Blohm + Voss Repair GmbH authorized personnel.

WARNING: Wear personal protection equipment while working with the equipment.

WARNING: If any safety elements (like safety ropes, safety sheets, plates or washers) were disassembled due to maintenance work, do NOT re-use them. Always replace them with new safety elements.

WARNING: All warning plates, signs and labels attached to the equipment must be observed.

WARNING: Any modification to the tool carried out without the approval of Blohm + Voss Repair GmbH will void any warranty.

WARNING: Using the tool with damaged or worn parts can create serious incidents.

Warning Signs

WARNING: The warning plates, signs and labels must be present on the tool. Do not remove the labels. If they are missing, replacing is mandatory.

Safety issues

WARNING: Do never unlatch/ open the elevator while a pipe is suspended in the elevator; the pipe will be lost!

WARNING: While using the elevator, always make sure the door is completely closed with the latch/latch lock fully engaged and the verification pin properly installed.

WARNING: Never use the elevator without verification pin. This can create serious incidents.

WARNING: Do not close the door with the verification pin in place. This will damage the pin and the door will not close completely. Always close the door first and thereafter place the verification pin.

WARNING: Pay special attention to the verification pin for any signs of wear, bending or damage at any time. In case the pin is damaged or bent, replace immediatelly by a new, original one.

WARNING: When picking up horizontal pipes, always use the elevator with doors pointing upwards. Using the elevator with the doors pointing downwards may cause dropping the pipe.

WARNING: Stay away from the elevator in case it is provided with a rotation system. It may rotate forward and backward without warning.

WARNING: Non-approved exchange of any component, or use of "non - B + V components", will void any warranty. Especially as this may affect the correct functioning of the elevator and safety devices (closing signal).

WARNING: Before working on the elevator, make sure no hydraulic pressure is applied and that connecting lines are uncoupled.

WARNING: It is dangerous to pick up or set down pipes standing up vertically or standing/laying horizontally or at an angle. This must be performed carefully and be supervised

WARNING: The company operating the elevator is responsible for evaluating safe and proper use of the elevator in a hazard analysis.

WARNING: The operating company is obligated to issue working instructions for safe use and supervise observance of these working instructions.

WARNING: Every employee operating, servicing, inspecting or otherwise involved with use of the elevators in other areas, should complete regular courses of training to ensure proper use as well as safe operation, correct maintenance and inspection.

WARNING: If necessary, a reasonable, additional supervisor should be appointed during operation.

EC-DECLARATION OF CONFORMITY

We,

Blohm + Voss Repair GmbH
Oil Tool Division
Hermann-Blohm-Strasse 2
20457 Hamburg
Phone:+49(0)40 3119-1139
Fax:+49(0)40 3119-3305

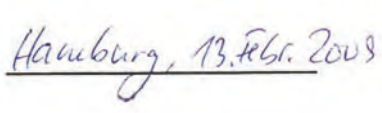
declare that the products

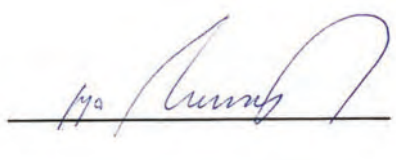
SDS 65, 100, 150, 250, 350 & 500

which are the subject of this declaration, are in conformity with the following standard(s) or normative documents

2006/42/EC:	Machinery Directive from 31 December 2009.
DIN EN ISO 12100 :	Safety of machinery, part 1 and 2
DIN EN ISO 14121-1:	Safety of machinery, Risk assessment
Directive 94/9/EC:	Devices and protection systems for intended use in explosive areas
DIN EN 13463-1:2002-04:	Non-electrical equipment for use in potentially explosive atmospheres
ISO 13535:2002/API 8C:	Petroleum and natural gas industries-Drilling and production equipment-Hoisting equipment

Place, date and signature:





Hamburg, 13 February 2009

J. Lutzhöft, Managing Director

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DESCRIPTION

1. DESCRIPTION

Intended Use

The Blohm + Voss SDS Side Door Elevator is designed to be installed into the links and pick up vertical pipes. The SDS Side Door elevator is rated for its designated tonnage. It is used for suspending tubular like casing, tubing and/or drill collars.

Horizontal pipes or pipe laying down at an angle may be picked up or laid down only with the door pointing upwards, when so permitted by the hazard analysis issued by the operating company.

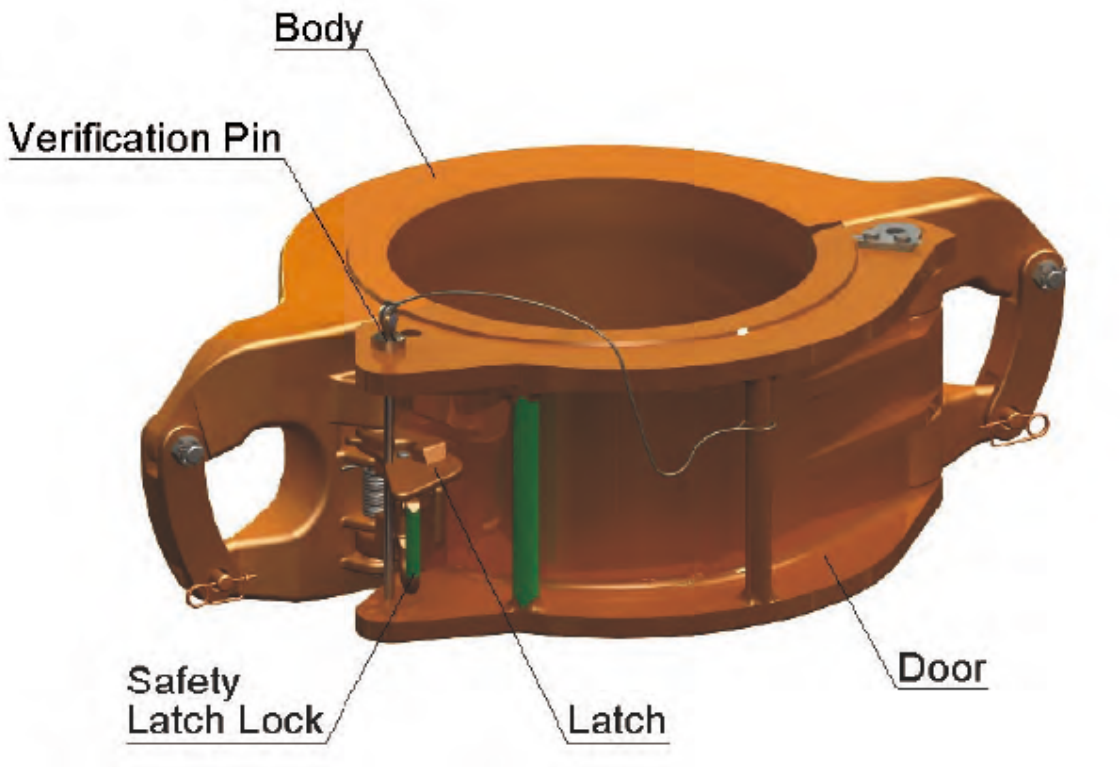
Design specification

Material and manufacturing standard in acc. to API 8C.

Main assembly

The Elevator consist of the following main parts:

1. Body
2. Door
3. Latch
4. Safety Latch Lock
5. Verification pin



Picture 2: Identification area

Identification

The identification area clearly identifies the Elevator area (manufacturer, type, material, part number, API-license number, serial number, date of manufacture). It is important to keep this information ready for the purpose of servicing and repair work.

Technical Data

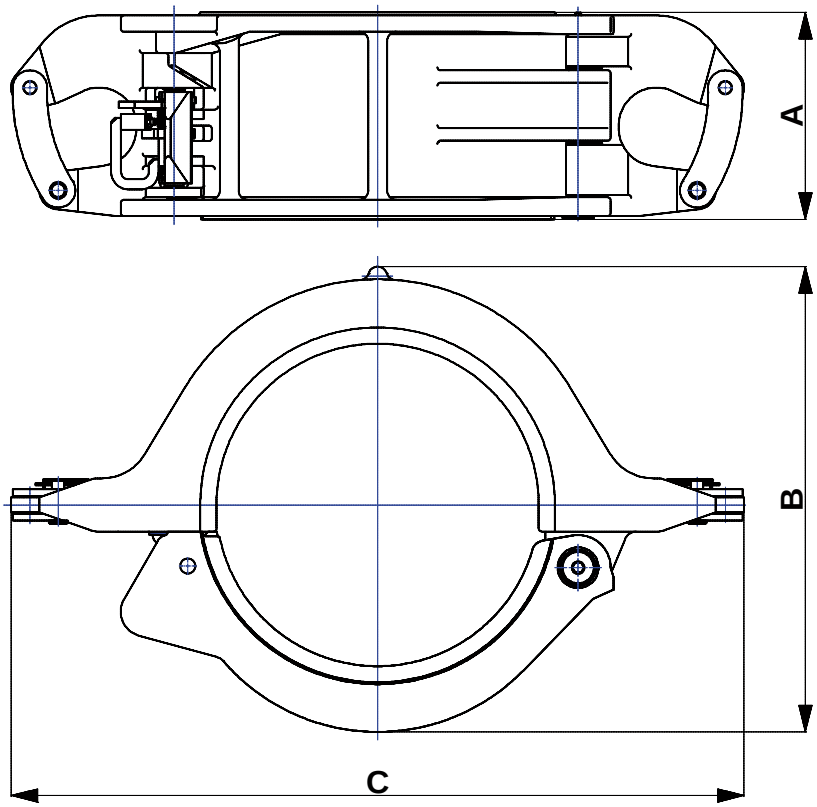
Elevator Type	SDS-65	SDS-100	SDS-150	SDS-250	SDS-350	SDS-500
Temperature working range ambient	- 20° C to + 80° C * - 4° F to 176° F					
Load Capacity	65 sh tons	100 sh tons	150 sh tons	250 sh tons	350 sh tons	500 sh tons
API test load	97,5 sh tons	150 sh tons	225 sh tons	375 sh tons	525 sh tons	750 sh tons

* Temperatures below - 20°C / -4°F on request

Pipe Diameter and Size

Elevator type	P/N	Rated capacity Tons	Minimum size	Maximum size	B + V link size Min - Max Inches	Max. Weight (Lbs/kg)
SDS 65	640600	65	1.66“	2.7/8“	1.3/4 - 2.1/4	100 / 45
SDS 100/1	641020	100	2.3/8“	4.1/8“	1.3/4 - 2.1/4	130 / 59
SDS 100/2	641000	100	4“	6.3/4“	1.3/4 - 2.3/4	250 / 113
SDS 100/3	641040	100	6.3/4“	9.5/8“	1.3/4 - 2.3/4	275 / 124
SDS 150/1	641500	150	4“	6.3/4“	1.3/4 - 3.1/2	230 / 104
SDS 150/2	641520	150	6.3/4“	9.5/8“	1.3/4 - 3.1/2	285 / 130
SDS 150/3	641540	150	9.5/8“	12.3/4“	1.3/4 - 3.1/2	350 / 160
SDS 150/4	641560	150	13“	16“	1.3/4 - 3.1/2	610 / 276
SDS 150/5	641580	150	16.3/4“	20“	1.3/4 - 3.1/2	815 / 370
SDS 150/7	641620	150	24“	30“	1.3/4 - 3.1/2	880 / 400
SDS 250/0	642600	250	6.1/2“	9.5/8“	2.1/4 - 3.1/2	530 / 240
SDS 250/1	642500	250	9.5/8“	13.3/8“	2.1/4 - 3.1/2	583 / 265
SDS 250/2	642520	250	13.3/8“	18.5/8“	2.1/4 - 3.1/2	836 / 380
SDS 250/3	642540	250	18.5/8“	20“	2.1/4 - 3.1/2	880 / 400
SDS 250/5	642580	250	24“	30“	2.1/4 - 3.1/2	1410 / 640
SDS 250/6	642620	250	30“	36“	2.1/4 - 3.1/2	1715 / 777
SDS 350/1	643500	350	6.3/4“	9.3/4“	2.3/4 - 3.1/2	940 / 426
SDS 350/2	643520	350	10.3/4“	16.3/4“	2.3/4 - 3.1/2	1510 / 685
SDS 350/4	643560	350	18.5/8“	21.1/2“	2.3/4 - 3.1/2	1395 / 632
SDS 350/5	643580	350	24“	30“	2.3/4 - 3.1/2	2375 / 1077
SDS 500	645500	500	10.3/4“	16“	3.1/2 - 4.3/4	2161/980

Main Dimensions SDS Side Door elevator



Elevator type	A (mm)	B (mm)	C (mm)
SDS 65	250	242	530
SDS 100/1	265	272	560
SDS 100/2	265	383	650
SDS 100/3	265	445	760
SDS 150/1	280	390	702
SDS 150/2	280	461	782
SDS 150/3	280	541	882
SDS 150/4	290	636	992
SDS 150/5	270	800	1106
SDS 150/7	360	1050	1484
SDS 250/0	330	455	888
SDS 250/1	330	545	996
SDS 250/2	330	688	1146
SDS 250/3	330	742	1170
SDS 250/5	340	1032	1430
SDS 250/6	370	1230	1720
SDS 350/1	370	550	950
SDS 350/2	370	727	1135
SDS 350/4	370	815	1246
SDS 350/5	370	1105	1473
SDS 500	400	780	1229

Main components & functioning

Functioning

A Side Door elevator is constructed in 2 main parts, a body and a door.
When the elevator is closed, the latch grips around the lug which is part of the body. The latch lock assures the latch is properly locked. In order to validate the latch & latch lock are fully engaged, a verification pin must be fully installed. Only then load should be transfered to the side door elevator.

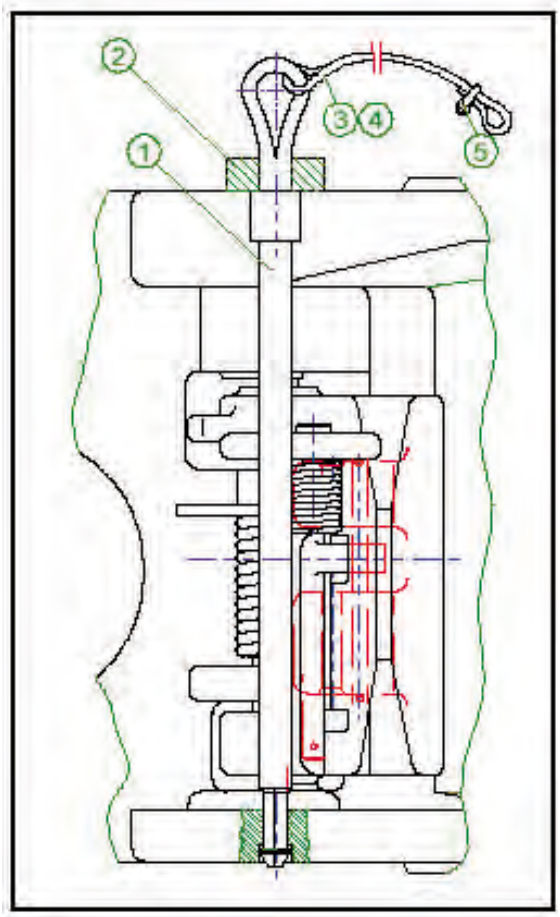
Picture 3: Verification pin

Description verification pin

1. Verification pin
2. Distance plate
3+4. Steel wire + cable clamp
5. Clamp

Warning: Make sure before operation the latch is properly closed and the verification pin is in the correct position.

***WARNING:** when picking up horizontal pipes, always use the elevator with doors pointing upwards. Using the elevator with the doors ponting downwards may cause dropping the pipe.*



Picture 4: Verification Pin (shown at SDS-type “Two hand operation“).

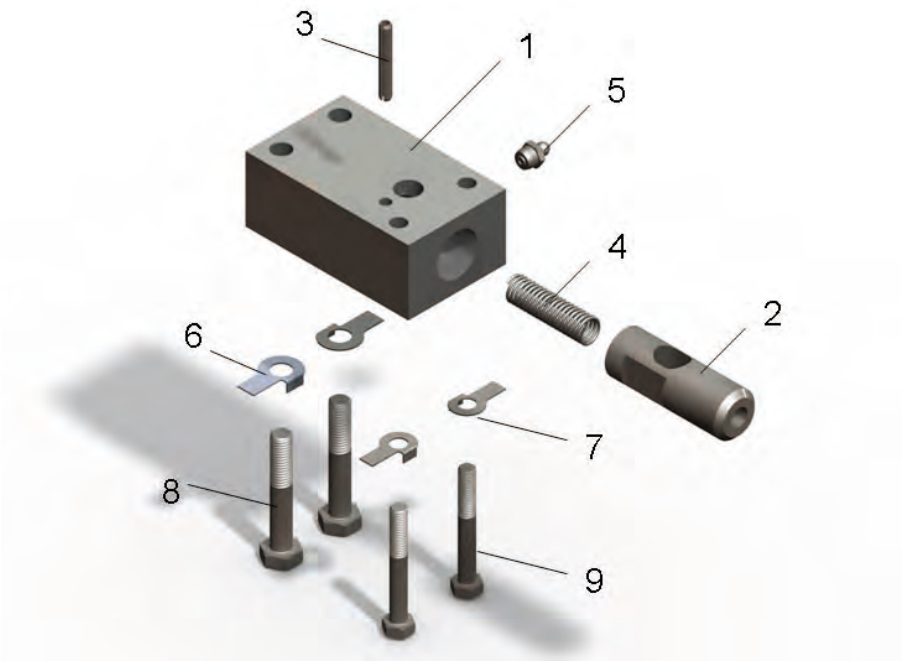
Locking Device for B + V SDS-Elevators (two-handed operation)

Effective: B + V Side Door Elevators, two handed operation which are modified in accordance with Safety Notice „2004-1“

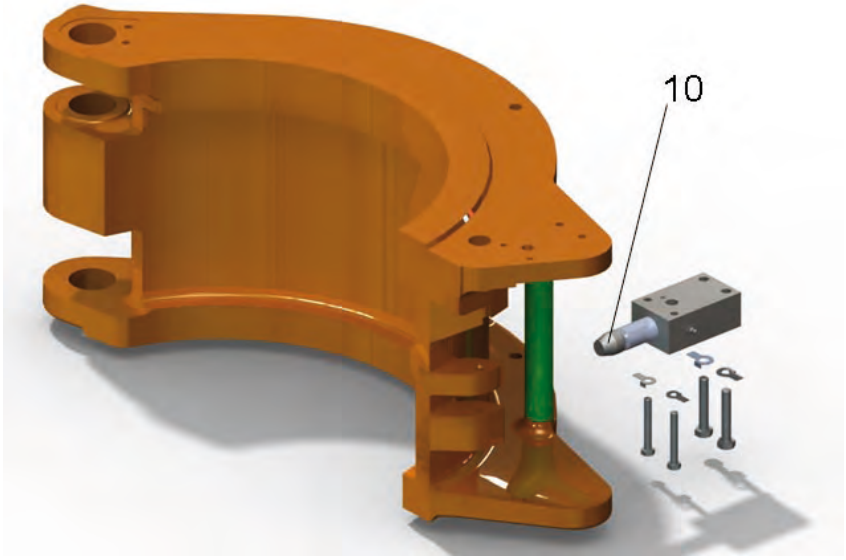
Elevator type	PN w/o locking device	PN incl. locking device	PN of optional locking device
SDS-65	640600-Y-BC	640600-Y-BC-WS	640600-3
SDS-100/1	641020-Y-BC	641020-Y-BC-WS	641020-3
SDS-100/2	641000-Y-BC	641000-Y-BC-WS	641000-3
SDS-100/3	641040-Y-BC	641040-Y-BC-WS	641040-3
SDS-150/1	641500-Y-BC	641500-Y-BC-WS	641500-3
SDS-150/2	641520-Y-BC	641520-Y-BC-WS	641520-3
SDS-150/3	641540-Y-BC	641540-Y-BC-WS	641540-3
SDS-150/4	641560-Y-BC	641560-Y-BC-WS	641560-3
SDS-150/5	641580-Y-BC	641580-Y-BC-WS	641580-3
SDS-150/7	641620-Y-BC	641620-Y-BC-WS	641620-3
SDS-250/0	642600-Y-BC	642600-Y-BC-WS	642600-3
SDS-250/1	642500-Y-BC	642500-Y-BC-WS	642500-3
SDS-250/2	642520-Y-BC	642520-Y-BC-WS	642520-3
SDS-250/3	642540-Y-BC	642540-Y-BC-WS	642540-3
SDS-250/5	642580-Y-BC	642580-Y-BC-WS	642580-3
SDS-350/1	643500-Y-BC	643500-Y-BC-WS	643500-3
SDS-350/4	643560-Y-BC	643560-Y-BC-WS	643560-3

The locking device is an optional feature for the SDS-elevators which are operated with two hands. The locking device prevents the incorrect setting of the verification pin when the elevator door is opened or not completely closed. Only when the elevator door is properly closed, the device mechanism can unlock the bore and the verification pin can be inserted.

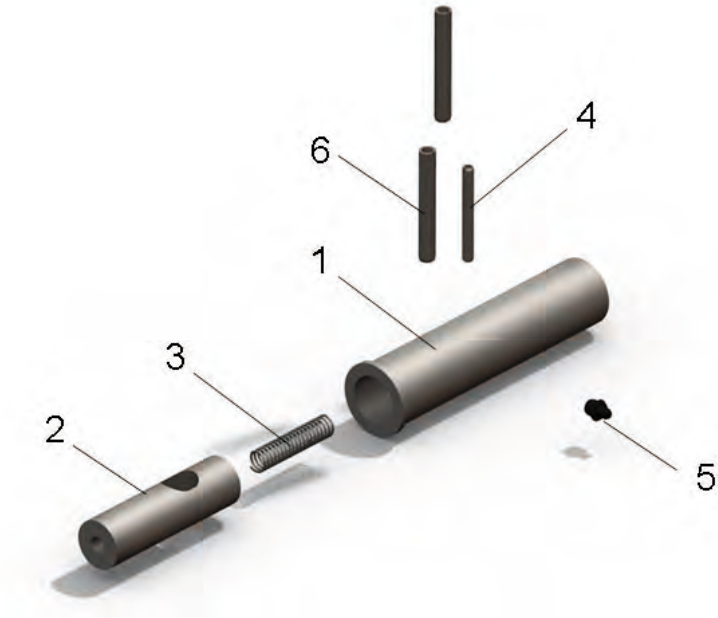
Locking device for SDS 65 up to SDS 250



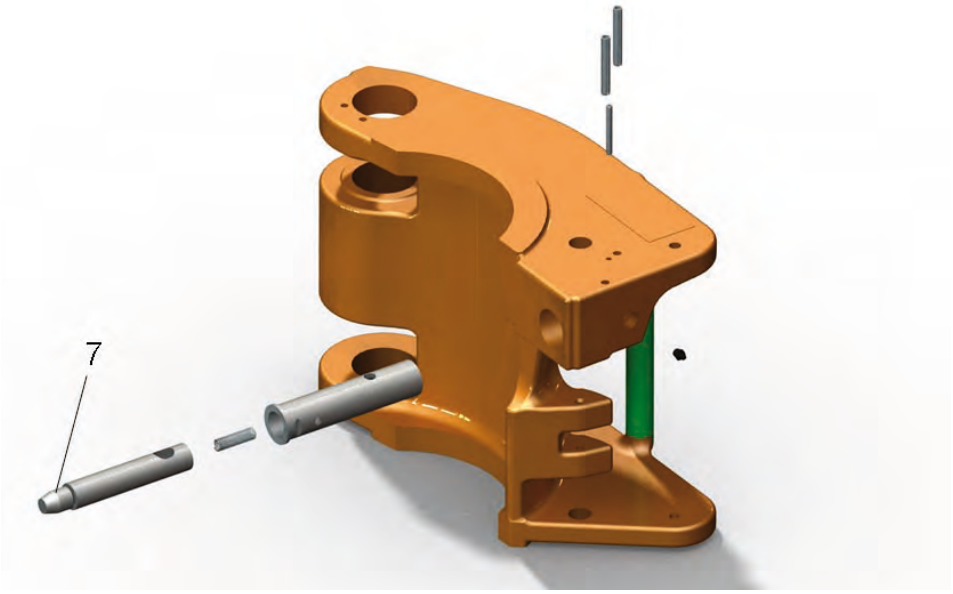
Pos.	Qty.	PN	Description
1	1	640011	Casing
2	1	640012-1	Locking bolt
	1	640012-2	Locking bolt
3	1	775114-2	Dowel pin
4	1	650216	Spring
5	1	70064	Grease fitting
6	2	735854	Washer
7	2	645059	Washer
8	2	645158	Screw
9	2	612588	Screw
10	1	640013	Welding attachment



Locking device for SDS 350



Pos.	Qty.	PN	Description
1	1	640021	Casing
2	1	640012-3	Locking bolt
	1	640012-4	Locking bolt
3	1	650216	Spring
4	1	622516	Dowel pin
5	1	70064	Grease fitting
6	2	70752	Dowel pin
7	1	640013	Welding attachment



COMMISSIONING

2. COMMISSIONING

Commissioning SDS Elevator

Blohm + Voss strongly recommends to accomplish the Elevator commissioning with the Blohm + Voss Commissioning

Read manual before first use !

OK	☐	Check crew is aware of all possible points of risk regarding handling the B+V tool.
OK	☐	Go through manual with crew.

Prior to use of the Blohm + Voss Elevator following checks must be carried out :

Scope of supply

OK	☐	Cross check all delivered parts.

Check and Lubrication

OK	☐	Check for any damage and repair if needed.
OK	☐	Check that elevator can be closed properly.
OK	☐	Check for correct seating of Hinge Pin and Latch Pin.
OK	☐	Apply grease to all greasing points until grease is visibly coming out of the bores.
OK	☐	Ensure the Verification pin is not bent or worn and functions properly.
OK	☐	Check if elevator is installed as outlined in manual.
OK	☐	Check of all bolts, nuts, washers and lock wire are in place.

Function Test

OK	☐	Check elevator opens and closes easily.
OK	☐	Check if Verification pin can be placed and removed correctly.

INSTALLATION

3. INSTALLATION

Lifting and transport

WARNING: Lift the SDS Elevator on the lifting ears only.

WARNING: Wear your personal protection equipment at all times.

Installation of Elevator

Remove the link block bolts and allow the link block assembly to swing open. Place the links in the now opened elevator ears, and secure the link block by replacing the removed bolts and safety springs.

WARNING: Keep distance from the elevator during operation and trials.

Installation Checklist SDS Elevator

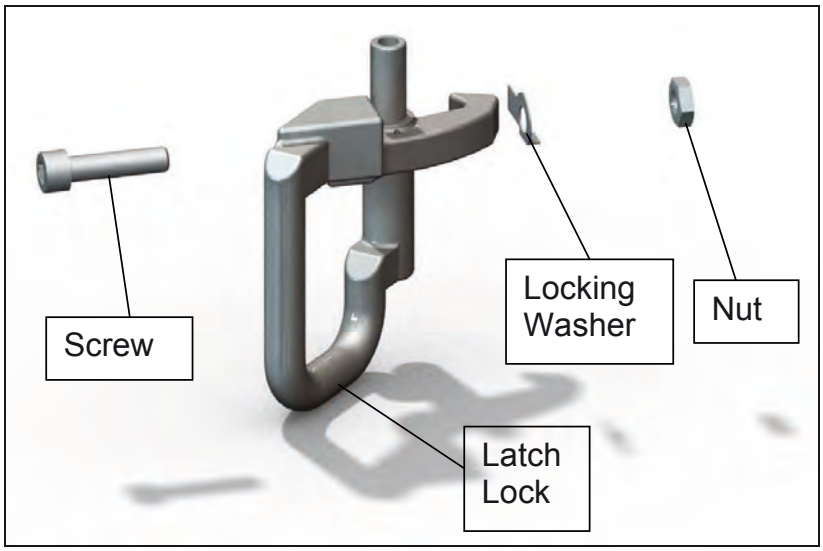
Functional test

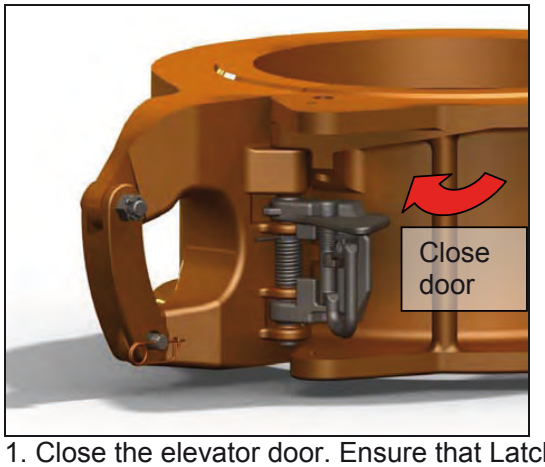
OK	☐	Close elevator.
OK	☐	Open elevator.
OK	☐	Fit verification pin.
OK	☐	Remove verification pin.
OK	☐	Check elevator opens and closes easily.
OK	☐	Check if Verification pin can be placed and removed correctly.

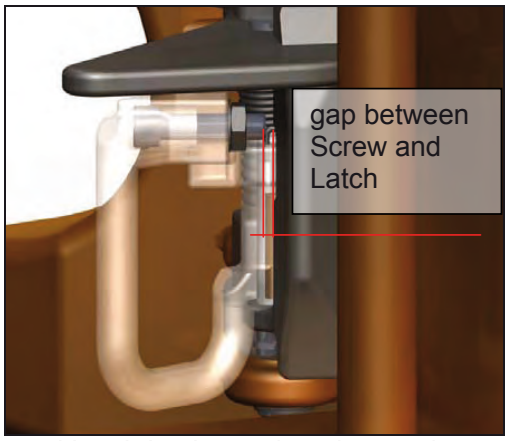
Check and Lubrication

OK	☐	Check for any damage and repair if needed.
OK	☐	Check elevator can be closed properly.
OK	☐	Check for correct seating of Hinge Pin and Latch Pin.
OK	☐	Apply grease to all greasing points until grease is visibly coming out of the bores.
OK	☐	Ensure the Verification pin is not bent or worn and functions properly.
OK	☐	Check of all bolts, nuts, washers and lock wire are in place.
OK	☐	Check correct setting of latch lock assembly as per procedure.

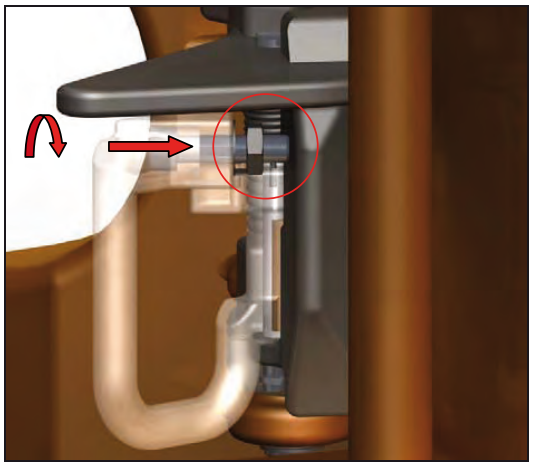
Procedure setting of Latch Lock Assembly

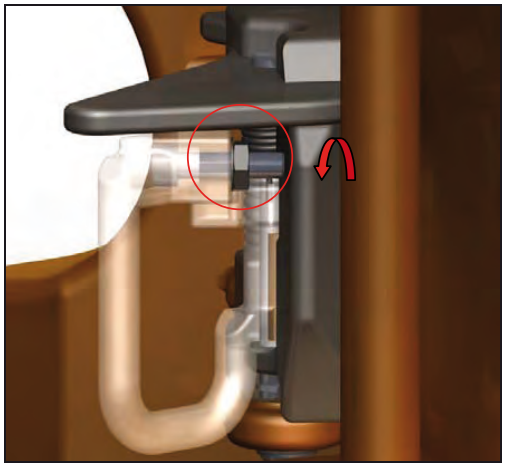






1. Close the elevator door. Ensure that Latch and Latch Lock are closed properly.





2. Use the screw to close the gap between screw and latch. When the screw attach against the latch, turn the screw approx. 1,5 – 2 turns deeper. Tighten the nut to fix the position. Afterwards secure the nut with the locking washer.

OPERATIONS

4. OPERATIONS

Operational Safety issues

WARNING: Never open the elevator when the pipe load is still suspended by the elevator.

WARNING: All warning plates, signs and labels attached to the equipment must be observed.

WARNING: Do never unlatch/open the elevator while a pipe is suspended in the elevator; the pipe will be lost!

WARNING: While using the elevator, always make sure the door is completely closed with the latch/latch lock fully engaged and the verification pin properly installed.

WARNING: Never use the elevator without verification pin. This can create serious incidents.

WARNING: Do not close the door with the verification pin in place. This will damage the pin and the door will not close completely. Always close the door first and thereafter place the verification pin.

WARNING: Pay special attention to the verification pin for any signs of wear, beding or damage at any time. In case the pin is damaged, replace immediatelly by a new, original one.

WARNING: Using the elevator with damaged or worn parts can create serious incidents.

WARNING: when picking up horizontal pipes, always use the elevator with doors pointing upwards. Using the elevator with the doors ponting downwards may cause dropping the pipe.

WARNING: Any modification to the elevator carried out without the approval of Blohm + Voss will void any warranty.

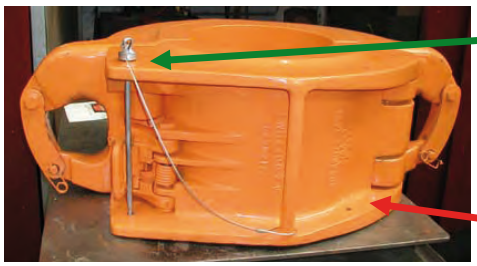
Operation MU (make up)

1. Pick up a section of pipe.
2. Now make up the stand or joint.
3. When the pipe is made up, pick up the load and open the (spider) slips.
4. Now lower the string.
5. Pick up the weight of the pipe string with the (spider) slips, before opening the SDS Elevator.
6. Open the SDS Elevator and pick up a new section of pipe.

Operation BO (break out)

1. Pick up the string with the elevator. The SDS Elevator is closed when the latch, the latch lock is closed and the verification pin is properly installed.
2. Raise the (spider) slips.
3. Pull out the string.
4. Set the (spider) slips.
5. Release the string weight from the SDS Elevator.
6. Now BO the stand or joint.
7. When the pipe is BO, pick up the stand and handle.

General operation procedure



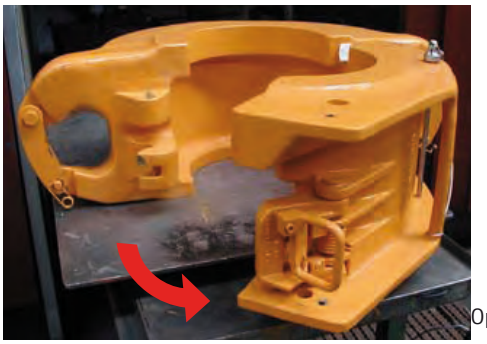
1. The elevator is closed and the verification pin is in Position 1 ”Verification position“


Position 1

2. Remove the verification pin from “Position 1” and put it into Position 2 ”Storage position“


Position 2

3. Open the elevator and remove the pipe.


Open

4. Put the pipe in and close the elevator.


Close (shown without pipe)

5. Remove the verification pin from “Position 2” and put it back in “Position 1”. If the latch is not properly locked, the verification pin can not be placed properly.

Position 1

6. Check if verification pin is not bend.

Wrong using of bent pin

Head is not directly on top of door (wrong)

7. Check if verification pin is resting in both holes and the head of the pin is resting on the top of the door.

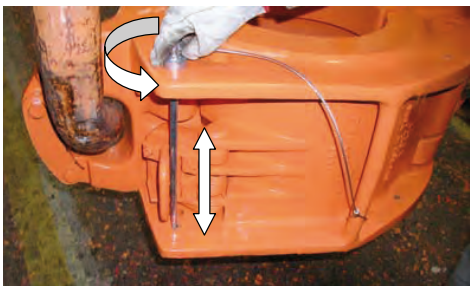
Pin is not sitting in both holes (wrong)

Warning: If the verification pin is bend, all work must be stopped and the pin must be replaced.

Head is directly on top of door (correct)

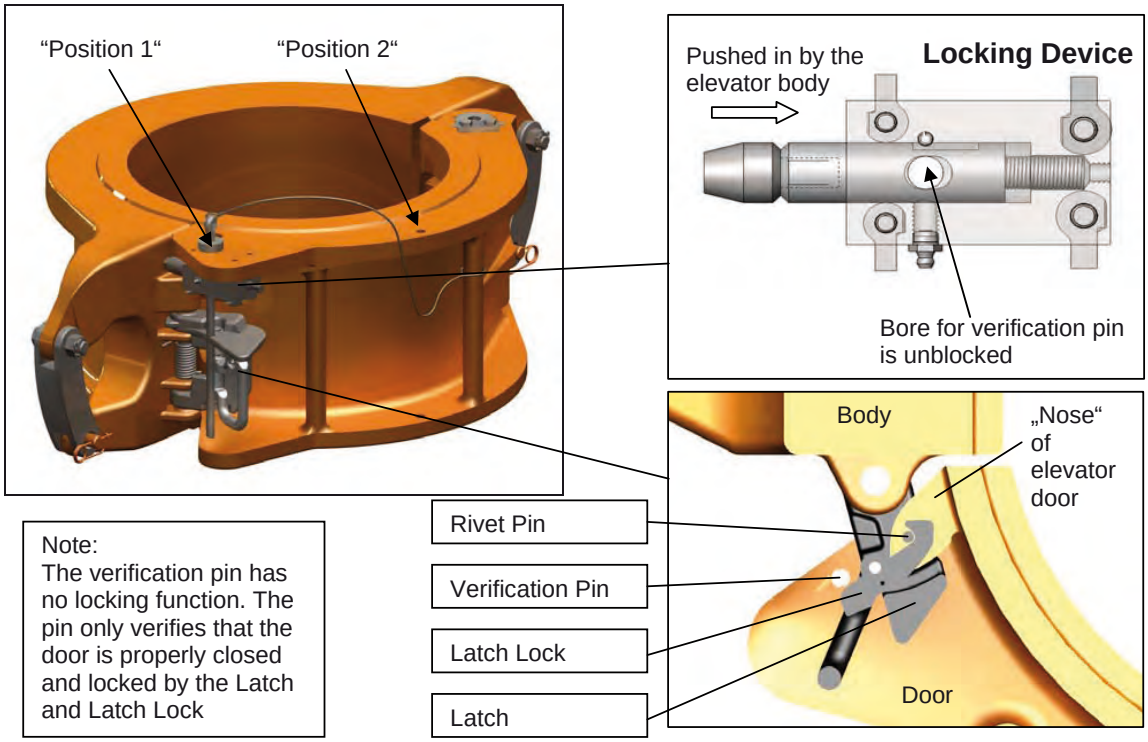
Pin is sitting in both holes (correct)

8. Check if the verification pin is loose in the holes by moving it up and down and by turning it.



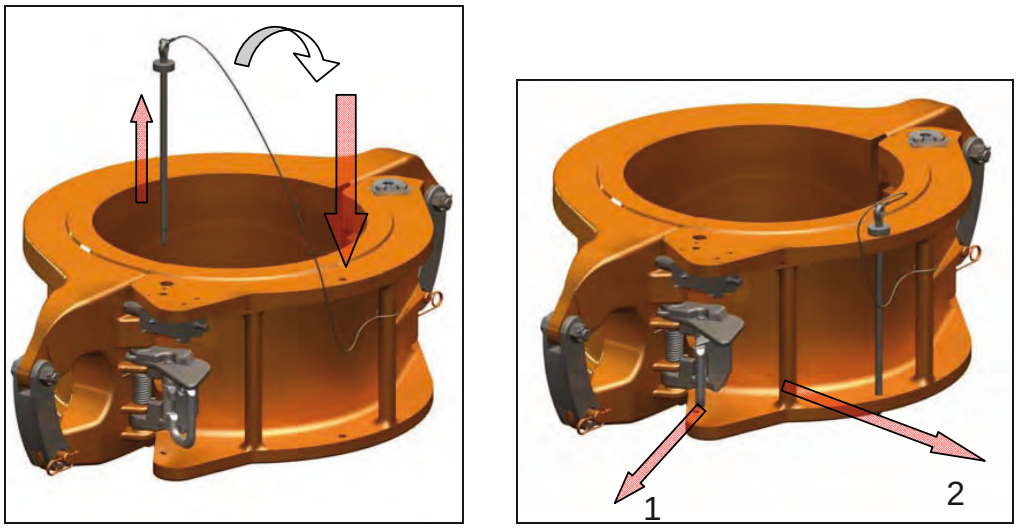
1. B+V SDS-Elevators for two-hand operation with Locking Device

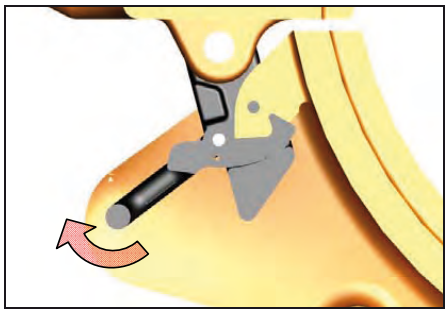
1.1 The SDS-Elevator door is closed. The Latch is attached on the elevator body and catches the “nose” of the elevator door. The Latch Lock grips around a rivet pin to hold the Latch in Position. The bore for the verification pin is unblocked by the Locking Device. The verification pin is inserted in “Position 1” and verifies that the door is properly closed and locked by the Latch and Latch Lock.



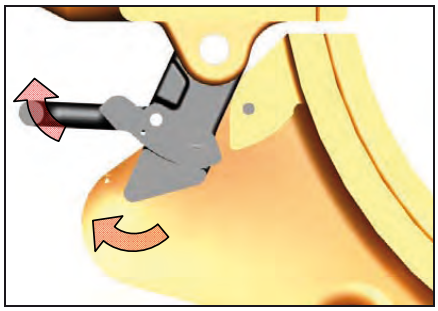
Note:
The verification pin has no locking function. The pin only verifies that the door is properly closed and locked by the Latch and Latch Lock

1.2 Remove the verification pin from “Position 1” and put it into “Position 2”. Pull the latch lock outside against the spring force with the left hand [1]. This opens the latch mechanism. Pull with the other hand the door handle to open the door [2].



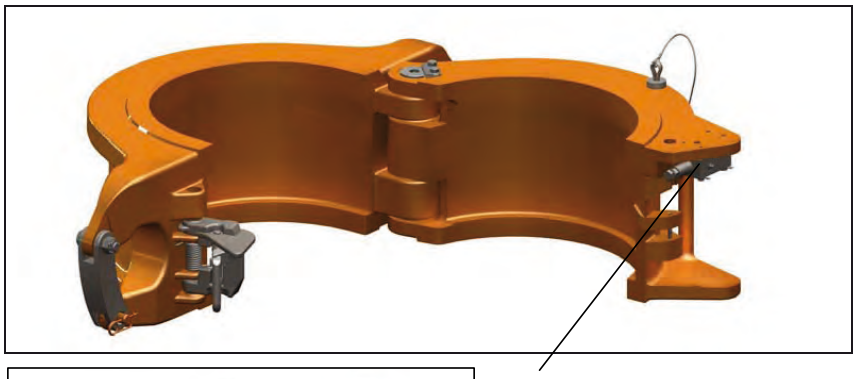


Pulling the latch lock against the spring force

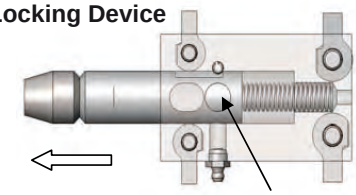


Opening of the latch mechanism

1.3 The SDS-Elevator door is opened and the mechanism of the Locking Device blocks the bore for the verification pin. This avoids the setting of the verification pin into “Position 1” when the door is opened or not completely closed.



Locking Device

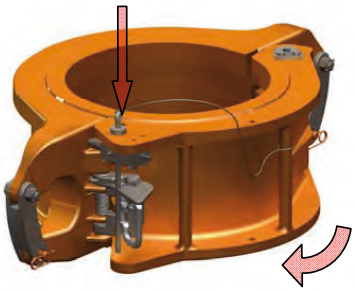


Pushed out by spring force

Bore for verification pin is blocked

1.4 Close the elevator door by slam the door against the elevator body. Check that latch and latch lock snapped into place and put the verification pin back into “Position. 1”.

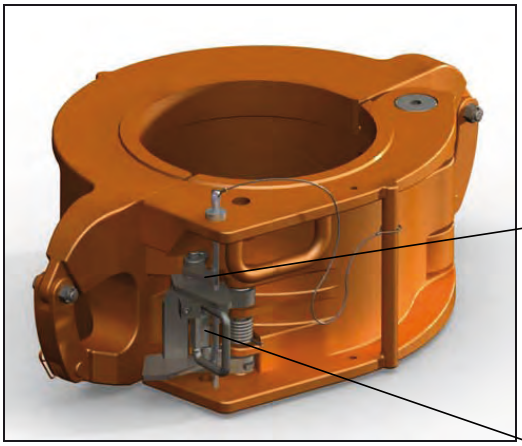
Note:
The verification pin can not be set into “Position 1” when the door is opened or not completely closed

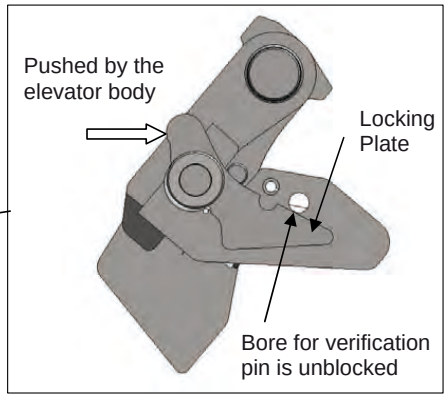


- Slam door to close the elevator
- Check that latch and latch lock has snapped into place
- Put verification pin back into “Position 1”

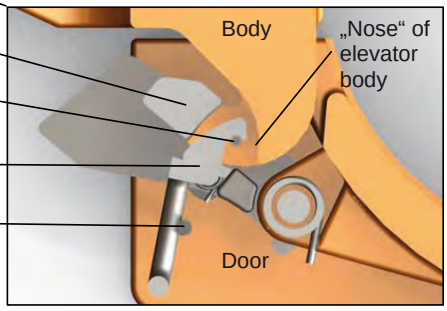
2. B+V SDS-Elevators for one-hand operation

2.1 The SDS-Elevator door is closed. The Latch is attached on the elevator door and catches the “nose” of the elevator body. The Latch Lock grips around a rivet pin to hold the Latch in Position. The bore for the verification pin is unblocked by the Locking Plate. The verification pin is inserted in “Position 1” and verifies that the door is properly closed and locked by the Latch and Latch Lock.

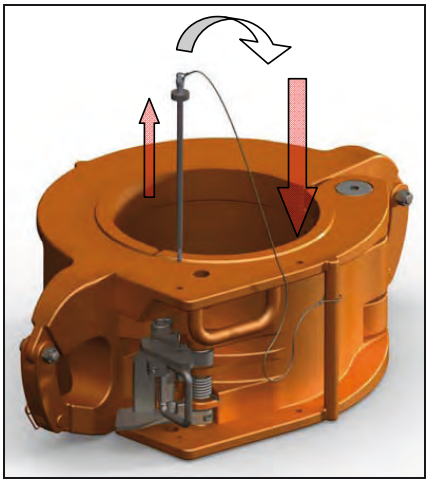


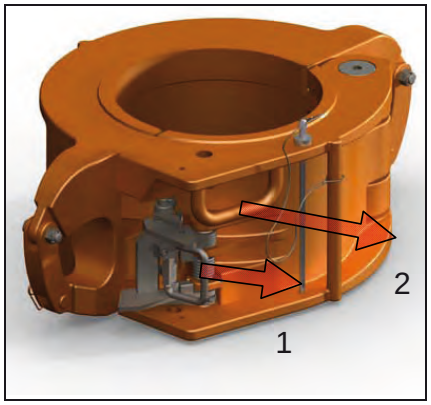


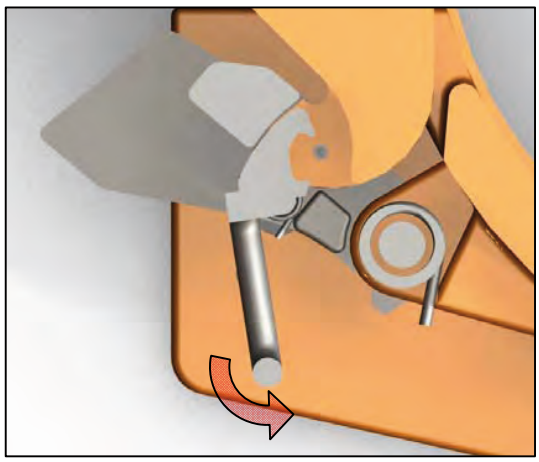
Note:
The verification pin has no locking function. The pin only verifies that the door is properly closed and locked by the Latch and Latch Lock



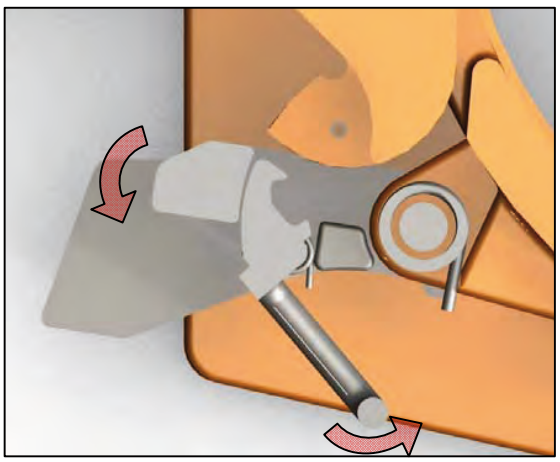
2.2 Remove the verification pin from “Position 1” and put it into “Position 2”. Pull the latch lock inside against the spring force with the left hand [1]. This opens the latch mechanism. Pull with the other hand the door handle to open the door [2].





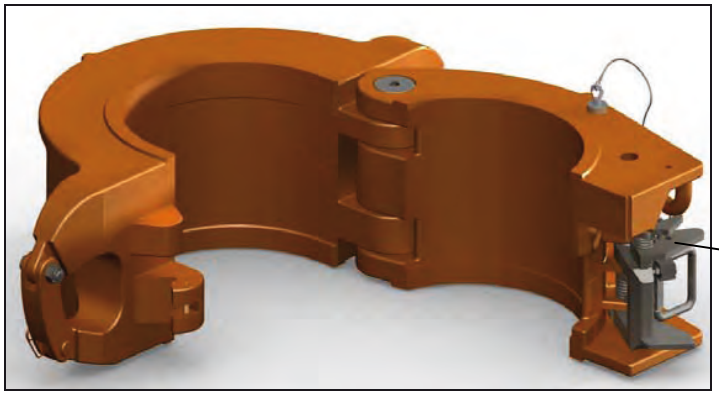


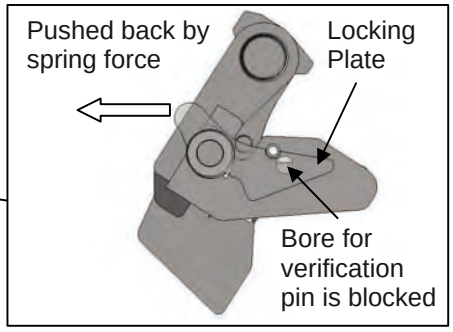
Pulling the latch lock against the spring force



Opening of the latch mechanism

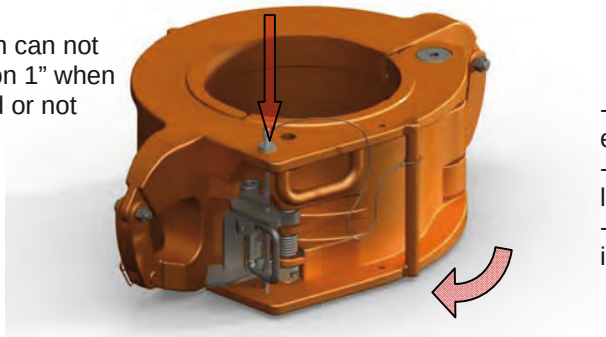
2.3 The SDS-Elevator door is opened and the Locking Plate blocks the bore for the verification pin. This avoids the setting of the verification pin into “Position 1” when the door is opened or not completely closed.





2.4 Close the elevator door by slam the door against the elevator body. Check that latch and latch lock snapped into place and put the verification pin back into “Position 1”.

Note:
The verification pin can not be set into “Position 1” when the door is opened or not completely closed



- Slam door to close the elevator
- Check that latch and latch lock has snapped into place
- Put verification pin back into “Position 1”

MAINTENANCE & INSPECTION

5. MAINTENANCE & INSPECTION

General

If cracks, excessive wear etc. is recognised, contact Blohm + Voss Repair GmbH or an authorised service company.
Weldings of the castings should be done only by Blohm + Voss Repair GmbH or an authorised service company in according to Blohm + Voss welding procedure.
A regular preventative maintenance program should be established for all elevators. These written maintenance procedures should be given to the crew or maintenance personnel.

Daily lubrication

Grease point 1: Hinge Pin
Grease point 2: Latch Pin
Grease point 3: Springs

Daily Inspection

Inspect visually:
Latch Opening Arrangement.
Including verification Pin
Presence of all bolts, nuts, safety elements, lock wire.
Check for wear and bending of verification pin

Daily Test

Function the elevator daily. If any damage or malfunction were found, take the elevator out of service for repair.

Locking of screws

All Screws are normally secured by a mechanical bolt lock or with a safety wire. All other screws are secured by metal adhesive (Locktite). Ensure the correct retention method is applied.

Latch and latch lock

Ensure that the latch and latch lock mechanism are functioning properly. Hinge pins, latch lug surface and link contact surface should be lubricated.

Grease quality

In order to achieve efficient greasing even at different environmental temperatures, we recommend the following grease types should be used (obtainable from Blohm + Voss Repair GmbH):

- Low-Viscosity grease Type AVIATICON Grease XRF.

Alternatively; use EP gear lubricating grease for greasing ”non-oil tight gear trains”
Temperature range:

- EP1 when temperature < 0°C/32°F
- EP2 when temperature > 0°C/32°F.

Picture 5: Grease barrel

Inspection categories acc. to API RP 8B

Category I
This category involves observing the equipment during operation for indications of inadequate performance. When in use, equipment shall be visually inspected on a daily basis for cracks, loose fits or connections, elongation of part, and other signs of wear, corrosion or overloading. Any parts found to show cracks, excessive wear, etc., shall be removed from service for further examination.
The equipment shall be visually inspected by a person knowledgeable in that equipment and its function.

Category II
This is Category I inspection plus further inspection for corrosion, deformation, loose or missing components, deterioration, proper lubrication, visible external cracks, and adjustment.
Category II may involve some disassembly to access specific components and to identify wear that exceeds the allowable tolerances.

Category III
This is Category II inspection plus further inspection, which should include NDT of critical areas and may involve some disassembly to access specific components and to identify wear that exceeds the allowable tolerances.
Prior to inspection, all foreign material such as dirt, paint, grease, oil, scale, etc. shall be removed from the concerned parts by a suitable method (e.g. paint-stripping, steam-cleaning, grit-blasting).

Category IV
This is Category III inspection plus further inspection for which the equipment is disassembled to the extent necessary to conduct NDT of all primary-load-carrying components.

Equipment shall be:
- disassembled in a suitable-equipped facility to the extent necessary to permit full inspection of all primary-load-carrying components and other components that are critical to the equipment.
- inspected for excessive wear, cracks, flaws and deformation.

Procedure:
- Corrections shall be made in accordance with the manufacturer's recommendations.
- Prior to inspection, all foreign material such as dirt, paint, grease, oil, scale, etc. shall be removed from the concerned parts by a suitable method (e.g. paint-stripping, steam-cleaning, grit-blasting)

Frequency

Periodic inspection

The recommended schedule for inspection:

Daily:	I+II
6 Monthly:	III
1 Year:	IV

The recommended frequencies apply for equipment in use during the specified period.
The inspection frequencies are only recommendations. The schedule of inspection heavily depends on the following factors:
- environment
- load cycles
- regulatory requirements
- operating time
- testing
- repairs
- re manufacture

Non-periodic inspection

A complete, on-job, shut-down inspection equivalent to the periodical Category III or Category IV should be made before (if anticipated) and after critical jobs (e.g., running heavy casing / drill strings, jarring, pulling on stuck pipes and/or operating at extreme low temperatures) <-20° C (<-4° F).

Inspection

A thorough inspection should be carried out periodically (every 3 months) or as special circumstances may require. Before starting an inspection disconnect any hydraulic/pneumatic system and remove all foreign materials (dirt, paint, grease Oil, scale, etc.) from surface by a suitable method. After a field inspection, it is advisable to record the extent of testing and testing results. Conduct the periodic or critical load inspection in the field by the crew with the supervisor. If cracks, excessive wear etc. is recognized, contact Blohm + Voss Repair GmbH or an authorized service company.

Inspection of Hydraulic/ Pneumatic System

Check for leakage every day. Should internal or external leakage reach an unacceptable high level, contact Blohm + Voss Repair GmbH or an authorized service company.

Critical Load Inspection

Critical loads may occur. For example: impact loads such as jarring, pulling on stuck pipe, etc. If critical loads occurred unexpectedly, conduct the inspection immediately.

Dismantling Inspection

Generally, when the equipment returns to base, warehouse, etc. Carry out the Tool inspection, immediately. Furthermore, control it prior to its being sent on the next job.

- The Tool should be dismantled and inspected in a suitably equipped facility for excessive wear, cracks, flaws or deformations.
- Corrections should be made in accordance with recommendations which can be obtained from Blohm + Voss Repair GmbH.
- Weldings at the castings should be done only by Blohm + Voss Repair GmbH or an authorized service company in according to Blohm + Voss welding procedure.
- When need is shown in a field inspection, dismantle the Tool and arrange an inspection in a suitably equipped facility.
- Springs should be carefully visually inspected for excessive wear and obvious weakness.

Inspection check lists

CHECK LIST FRONT PAGE _____

TYPE OF EQUIPMENT _____

SERIAL NUMBER _____

PART NUMBER _____

SUPERVISOR _____

DATE OF INSPECTION _____

INSPECTION CATEGORY _____

PLACE OF INSPECTION _____

ELEVATOR TYPE :	SDS-65	SDS-100/1	SDS-100/2	SDS-100/3	SDS-150/1	SDS-150/2	SDS-150/3	SDS-150/4	SDS-150/5
ELEVATOR PN:	**640600**	**641020**	**641000**	**641040**	**641500**	**641520**	**641540**	**641560**	**641580**
HINGE PIN PN:	640610	641030	641010	641010	641510	641510	641550	641570	641590
HINGE PIN DIA. NEW:	15,85	15,85	21,85	21,85	24,85	24,85	27,85	34,85	49,85
NOMINAL BORE DIA.:	16,00	16,00	22,00	22,00	25,00	25,00	28,00	35,00	50,00
BORE DIA. NEW MAX:	16,043	16,043	22,052	22,052	25,052	25,052	28,052	35,062	50,062
BORE DIA. WORN MAX:	16,603	16,603	22,612	22,612	25,612	25,612	28,612	35,622	50,622
LATCH PIN PN:	640604	640604	641504	641504	641504	641504	641504	641504	641504
LATCH PIN DIA. NEW:	15,85	15,85	19,85	19,85	19,85	19,85	19,85	19,85	19,85
NOMINAL BORE DIA.:	16,00	16,00	20,00	20,00	20,00	20,00	20,00	20,00	20,00
BORE DIA. NEW MAX:	16,043	16,043	20,052	20,052	20,052	20,052	20,052	20,052	20,052
L.BORE DIA. WORN MAX:	16,623	16,623	20,632	20,632	20,632	20,632	20,632	20,632	20,632

ELEVATOR TYPE :	SDS-150/7	SDS-250/0	SDS-250/1	SDS-250/2	SDS-250/3	SDS-250/5	SDS-250/6	SDS-350/1	SDS-350/2	SDS-350/4	SDS-350/5	SDS- 500
ELEVATOR PN:	**641620**	**642600**	**642500**	**642520**	**642540**	**642580**	**642620**	**643500**	**643520**	**643560**	**643580**	**645500**
HINGE PIN PN:	641630	642610	642610	642510	642510	642590	642622	643510	643526	643510	643526	645504
HINGE PIN DIA. NEW:	44,85	49,85	49,85	49,85	49,85	69,85	70,00	69,85	70,220	69,85	70,220	69,80
NOMINAL BORE DIA.:	45,00	50,00	50,00	50,00	50,00	70,00	70,00	70,00	70,00	70,00	70,00	70,00
BORE DIA. NEW MAX:	45,062	50,062	50,062	50,062	50,062	70,074	70,076	70,030	70,074	70,07	70,074	70,08
BORE DIA. WORN MAX:	45,622	50,622	50,622	50,622	50,622	70,634	70,634	70,634	70,634	70,63	70,634	70,70
LATCH PIN PN:	641504	642604	642604	642604	641504	641504	611504	643504	643522	643504	643522	645505
LATCH PIN DIA. NEW:	19,85	19,85	19,85	19,85	19,85	19,85	37,85	24,85	25,149	24,85	25,149	37,85
NOMINAL BORE DIA.:	20,00	20,00	20,00	20,00	20,00	20,00	38,00	25,00	25,00	25,00	25,00	38,00
BORE DIA. NEW MAX:	20,052	20,052	20,052	20,052	20,330	20,330	38,062	25,052	25,052	25,052	25,052	38,07
L.BORE DIA. WORN MAX:	20,632	20,632	20,632	20,632	20,910	20,910	38,642	25,632	25,632	25,632	25,632	38,70

All dimensions in mm.

Check Category I (Ongoing observation)

Observe during operation for inadequate performance.

Check List Category II (Daily)

CHECK FOR THE FOLLOWING GENERAL ISSUES (but not limited to):			
DESCRIPTION		CHECKED	SIGNATURE
1	Complete front page of check list for the records	OK	
2	Check for correct size of elevator	OK	
3	Check state of lubrication	OK	
4	Check functioning of elevator as a whole	OK	
	Remarks		

CHECK FOR LOOSE ITEMS, ESPECIALLY FOR (but not limited to):			
DESCRIPTION		CHECKED	SIGNATURE
1	Hinge pins, bolts and retainers	OK	
2	Screws, bolts, nuts, washers, retainers, springs and lock wire	OK	
3	Link blocks	OK	
4	Check completeness and condition of warning plates and labels	OK	
5	Check for presence of verification pin and wire and check if properly secured to elevator	OK	
	Remarks		

CHECK FOR CRACKS, ELONGATION, DAMAGE AND CORROSION, ESPECIALLY FOR (but not limited to):			
DESCRIPTION		CHECKED	SIGNATURE
1	Elevator Body and Door	OK	
2	Hinge pins, bolts, nuts	OK	
3	Latch and lug	OK	
4	Closing arrangement	OK	
5	Verification pin	OK	
5	Check if verification pin is bent, worn and/or damaged	OK	
	Remarks		

_____ _____

SUPERVISOR DATE

Check List Category III (every 6 months)

GENERAL			
DESCRIPTION		CHECKED	SIGNATURE
1	Carry out an Category II inspection	OK	
2	NDT (MPI) critical areas. Some disassembly may be needed to do so	OK	
3	Check parts for wear according to allowable tolerances.	OK	
	Remarks		

Check List Category IV (every year)

GENERAL			
DESCRIPTION		CHECKED	SIGNATURE
1	Carry out an Category III inspection	OK	
2	NDT (MPI) critical areas and load bearing components. Strip elevator to do so	OK	
	Remarks		

_____ _____

SUPERVISOR DATE

Measuring of wear

To measure link ears it is necessary to use calipers and a ruler.
Significant wear is restricted to the top link ear, it is here that the measurement is taken.
Hinge Pins, Latch Pins and socket holes are not normally measured for wear in the field. When it becomes apparent that the Hinge or Latch Pins show significant wear, the elevator should be dismantled for general maintenance check up.

Remanufacturing

Remanufacturing and repair of critical areas or load bearing parts must be done only by B + V or a B + V authorized service company.
Also minor cracks or defects, which may be removed by grinding without reducing safety or operation of the elevator, must be done only by B+V or a B + V authorized service company.
Following the repair, the parts should again be inspected by an appropriate method to insure that the defect has been completely removed.
If the elevator is defective beyond repair, destroy it directly.

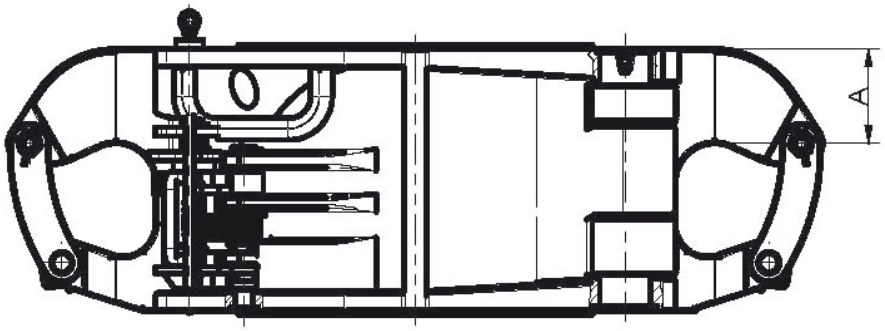
Square shoulder elevators

Square shoulder elevators in heavy use will wear under the repeated loads of the tool joints or collars. During drilling operation, the square shoulders gradually become rounded and offer less supporting area. This has to be checked regularly, in order to prevent the bore to reduce by the gradual flow of metal. This will result in the elevator not closing and locking around the pipe. At the same time the worn surface of both tool joint and elevator may contact on a slight taper, which could cause extreme opening forces within the elevator. This can result in an extremely dangerous situation. Worn or damaged square shoulder surfaces of the elevator are easily corrected by properly machining these surfaces by an B + V authorized service company.

Inspection Square shoulder elevators

Inspect the collars for squareness, uniformity and depth of wear. Uneven wear or worn recesses of 1/16 inch or more requires refacing the surface.
Carefully inspect hinge pins and springs visually for excessive wear and obvious weakness.
To do so, use a rule marked in sixteenth of an inch. The straight edge of the rule is used to check the squareness of the top bore and the rule is inserted into the worn pockets and ridges.

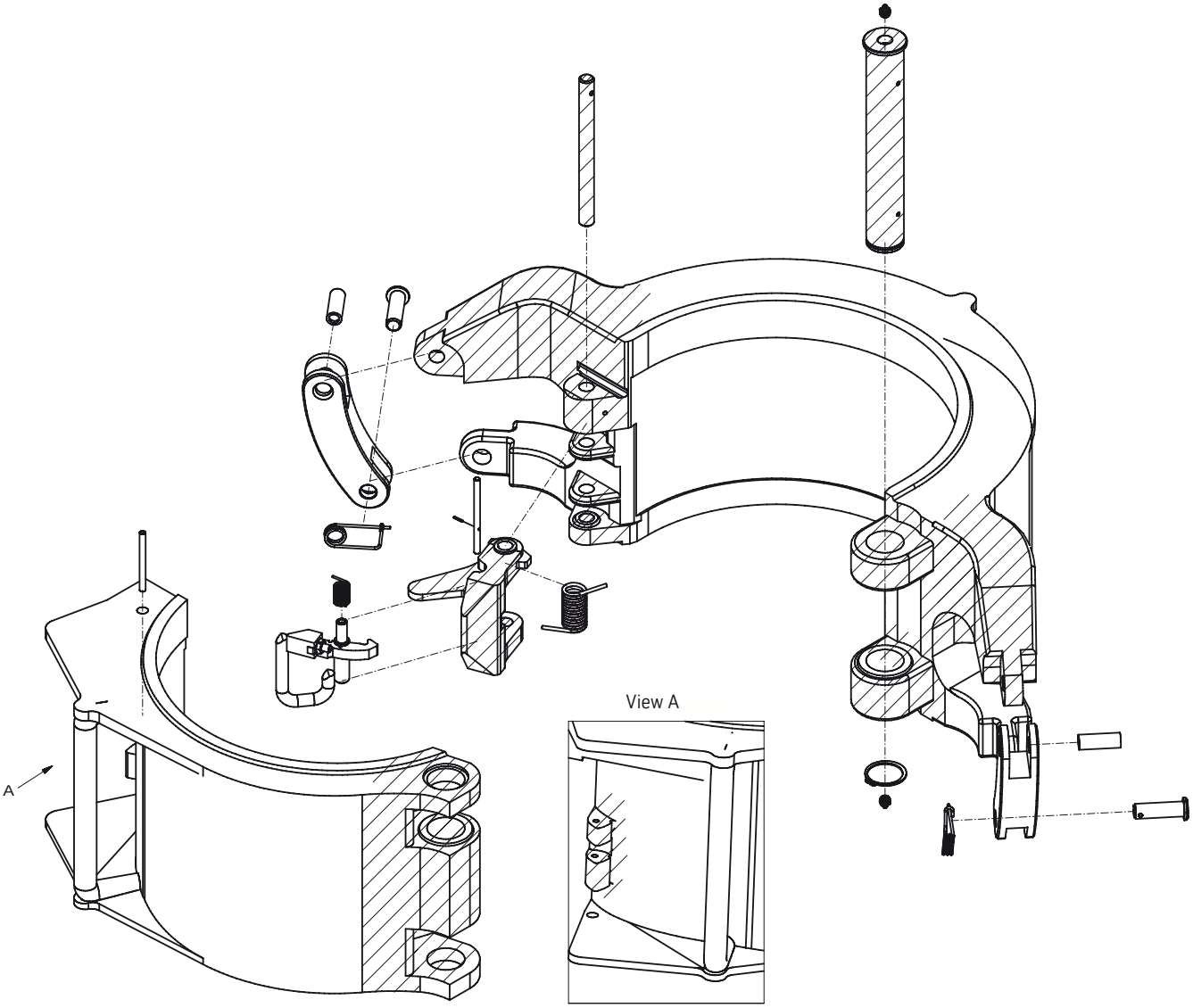
Minimum ear dimensions



Elevator type	Partnumber	Minimum dimension A (mm)
SDS-65	640600	64
SDS-100/1	641020	79
SDS-100/2	641000	79
SDS-100/3	641040	79
SDS-150/1	641500	89
SDS-150/2	641520	89
SDS-150/3	641540	89
SDS-150/4	641560	89
SDS-150/5	641580	89
SDS-150/7	641620	89
SDS-250/0	642600	112
SDS-250/1	642500	112
SDS-250/2	642520	112
SDS-250/6	642620	112
SDS-250/3	642540	108
SDS-250/5	642580	108
SDS-350/1	643500	121
SDS-350/2	643520	121
SDS-350/4	643560	121
SDS-350/5	643580	121

WARNING: Minimum ear dimensions are only valid when the elevator is in otherwise good condition, does not have excessive wear, cracks or other defects, or previous weld repair and has not been misused. This inspection criteria can not on their own determine the overall condition of the elevator and its suitability for continued use.

Critical Areas



BORE CODES

6. BORE CODES

Plain drill collars with lift plug

Drill collar OD Inch	Bore Code	Top bore A Inches	Bottom Bore B Inches
3.1/4	271	3.13/32	3.13/32
3.1/2	272	3.21/32	3.21/32
4	273	4.5/32	4.5/32
4.1/8	274	4.9/32	4.9/32
4.1/2	275	4.21/32	4.21/32
4.3/4	276	4.15/16	4.5/32
5	277	5.3/16	5.3/16
5.1/4	279	5.7/16	5.7/16
5.1/2	280	5.11/16	5.11/16
5.3/4	281	5.31/32	5.31/32
6	282	6.7/32	6.7/32
6.1/4	284	6.15/32	6.15/32
6.3/8	285	6.19/32	6.19/32
6.1/2	286	6.23/32	6.23/32
6.3/4	287	7	7
7	288	7.1/4	7.1/4
7.1/4	289	7.1/2	7.1/2
7.1/2	291	7.3/4	7.3/4
8	293	8.1/4	8.1/4
8.1/4	295	8.1/2	8.1/2
8.1/2	296	8.25/32	8.25/32
9	297	9.9/32	9.9/32
9.1/2	298	9.25/32	9.25/32
10	301	10.11/32	10.11/32
11	304	11.11/32	11.11/32

Drill collars with ZIP groove

Drill collar OD Inch	ZIP OD	Bore Code	Top bore A Inches	Bottom Bore B Inches
4.1/8	3.11/18	181	3.13/16	4.1/4
4.3/4	4.1/4	182	4.3/8	4.7/8
5.1/4	4.3/4	183	4.7/8	5.3/8
5.1/2	5	184	5.1/8	5.5/8
5.3/4	5.1/8	185	5.1/4	5.7/8
6	5.3/8	186	5.1/2	6.1/8
6.1/4	5.5/8	187	5.3/4	6.3/8
6.1/2	5.7/8	188	6	6.5/8
6.3/4	6	189	6.3/16	6.7/8
7	6.1/4	190	6.7/16	7.1/8
7.1/4	6.1/2	191	6.11/16	7.3/8
7.1/2	6.3/4	192	6.15/16	7.5/8
7.3/4	7	193	7.3/16	7.7/8
8	7.1/4	194	7.7/16	8.1/8
8.1/4	7.1/2	195	7.11/16	8.3/8
8.1/2	7.3/4	196	7.15/16	8.5/8
9	8.1/8	198	8.3/8	9.1/8
9.1/2	8.5/8	199	8.7/8	9.5/8
9.3/4	8.7/8	203	9.1/8	9.5/8
10	9.1/8	202	9.3/8	10.1/8

Casing bore chart

Casing size Inch	Bore Code	Top bore A Inches	Bottom Bore B Inches
4.3/4	222	4.27/32	4.27/32
5	223	5.3/32	5.3/32
5.1/2	224	5.5/8	5.5/8
5.3/4	225	5.7/8	5.7/8
6	226	6.1/8	6.1/8
6.5/8	228	6.3/4	6.3/4
7	229	7.1/8	7.1/8
7.5/8	231	7.3/4	7.3/4
8.5/8	234	8.25/32	8.25/32
9	235	9.5/32	9.5/32
9.5/8	236	9.25/32	9.25/32
9.7/8	265	10.1/32	10.1/32
10.3/4	238	10.29/32	10.29/32
11.3/4	239	11.15/16	11.15/16
13.3/8	243	13.9/16	13.9/16
13.5/8	259	13.13/16	13.13/16
14	255	14.13/64	14.13/64
16	245	16.7/32	16.7/32
18	247	18.1/4	18.1/4
18.5/8	248	18.7/8	18.7/8
20	249	20.1/4	20.1/4
21.1/2	250	21.25/32	21.25/32
22	261	22.9/32	22.9/32
24	254	24.5/16	24.5/16
24.1/2	251	24.13/16	24.13/16
26	252	26.11/32	26.11/32
28	256	28.23/64	28.23/64
30	253	30.3/8	30.3/8
32	258	32.25/64	32.25/64
36	257	36.7/16	36.7/16

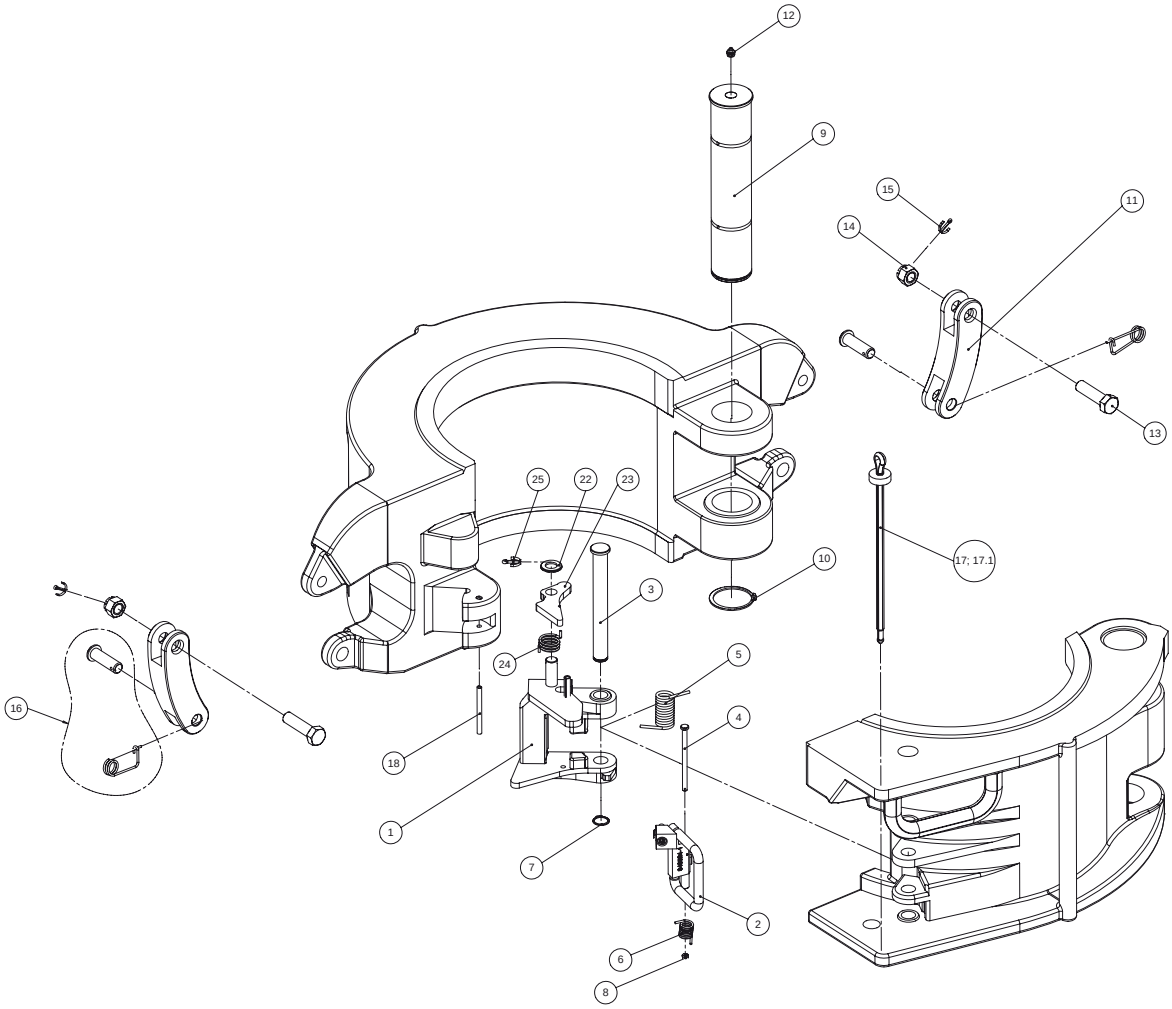
Tubing bore chart

Tubing size Inch	Style	Bore Code	Top bore A Inches	Bottom Bore B Inches
1.050	Plain	121	1.5/32	1.5/32
	Upset	122	1.13/32	1.13/32
1.315	Plain	123	1.13/32	1.13/32
	Upset	124	1.19/32	1.19/32
1.660	Plain	125	1.3/4	1.3/4
	Upset	126	1.29/32	1.29/32
1.900	Plain	127	2	2
	Upset	128	2.3/16	2.3/16
2.3/8	Plain	129	2.15/32	2.15/32
	Upset	130	2.23/32	2.23/32
2.7/8	Plain	1310	2.31/32	2.31/32
	Upset	132	3.7/32	3.7/32
3.1/2	Plain	133	3.19/32	3.19/32
	Upset	134	3.27/32	3.27/32
4	Plain	135	4.3/32	4.3/32
	Upset	136	4.11/32	4.11/32
4.1/2	Plain	137	4.19/32	4.19/32
	Upset	138	4.27/32	4.27/32

DRAWINGS & SPARE PARTS

7. DRAWINGS AND SPARE PARTS

SDS type 250/6, 350/2, 350/5 “One hand operation“

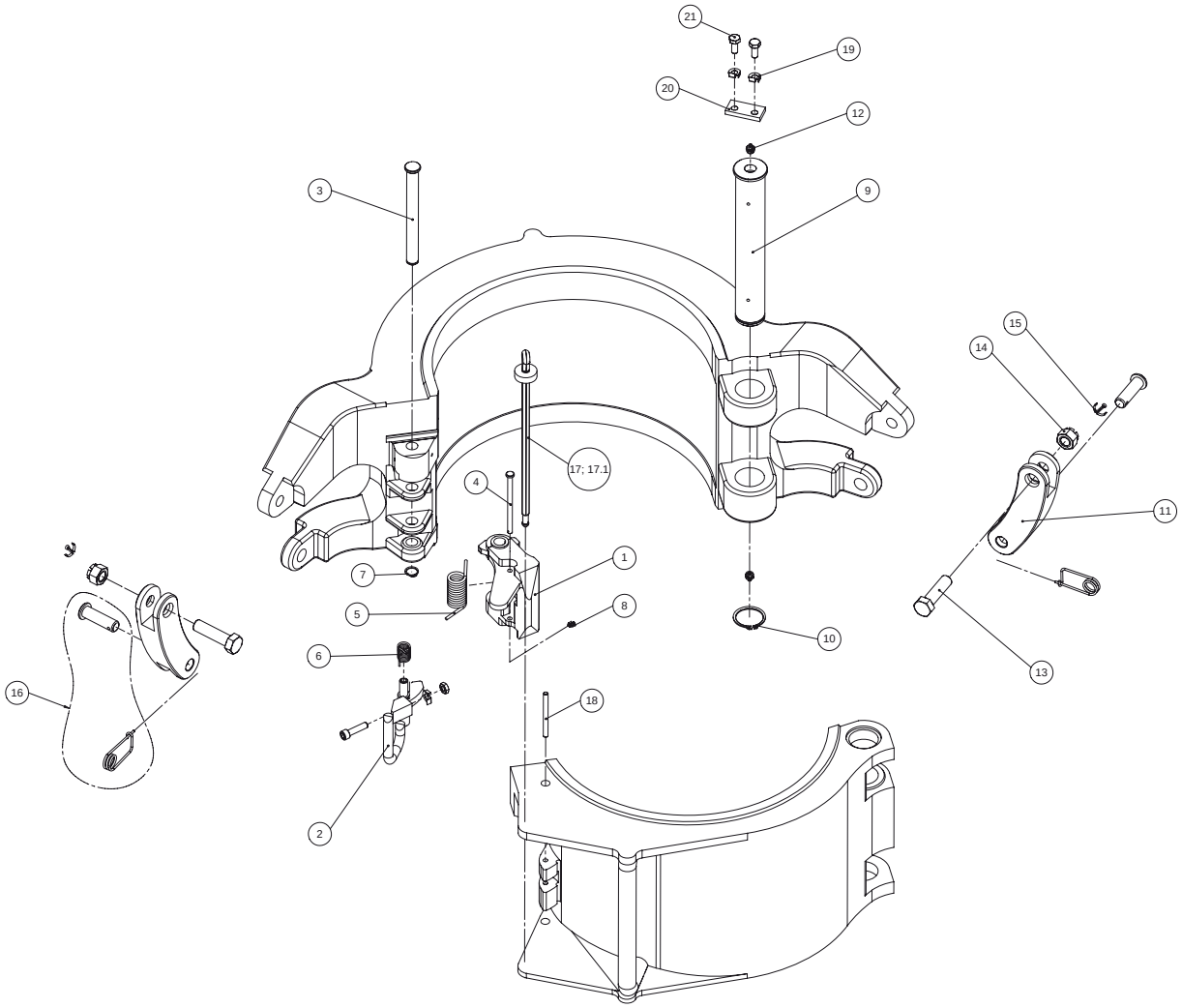


Parts list for SDS type 250/6, 350/2, 350/5 “One hand operation“

Index No.	Qty	Description	Recommended Spare Parts (one year operation)	SDS-250/6 P/N 642620-Y-BC	SDS-350/2 P/N 643520-Y-BC	SDS-350/5 P/N 643580-Y-BC
		Frame part no.		642621	643521	643581
1	1	Latch		611503-1	643502-1	643502-4
2	1	Latch Lock Assembly		642624	643524-1	643524-1
3	1	Latch Pin		611504	643522	643522
4	1	Latch Lock Pin		641005	641505	641505
5	1	Latch Spring	*	611506	643506	643506
6	1	Latch Lock Spring	*	611007	643507	643507
7	1	Latch Pin Sec.Ring	*	611508	641058	641058
8	1	Cotter Pin	*	620609	620609	620609
9	1	Hinge Pin	*	643511	643526	643526
10	1	Hinge Pin Sec. Ring	*		643528	643528
11	2	Link Block		612512	612512	612512
12	1	Grease Nipple	*	(2x) 612515	612515	612515
13	2	Screw	*	613623-1	613623-1	613623-1
14	2	Nut	*	752338	752338	752338
15	2	Cotter Pin	*	752339	752339	752339
16	2	Link Block Bolt Assy.	*	612514	612514	612514
17	1	Verification pin Assy.	*	642620-1	643520-1	643580-1
17--	1	Rope clamp	*	643801-1	643801-1	643801-1
18	1	Rivet Pin	*	642695	641575	641575
19	2	Washer	*	735854		
20	1	Safety plate	*	641590-2		
21	2	Screw	*	89126		
22	1	Washer	*	612679	612679	612679
23	1	Locking plate		642620-4	643520-4	643580-4
24	1	Spring	*	643520-5	643520-5	643520-5
25	1	Cotter Pin	*	752322	752322	752322
26	1	Screw	*			
27	4	Screw	*			
28	1	Plunger				
29	1	Additional Block				
		Rec. spare parts Assembly		642620-RSP	643520--RSP	643580-RSP

All parts marked with * are recommended Spare Parts (one year operation)

SDS-type 65, 100, 150, 250/0 up to 250/5, 350/1, 350/4 “Two hand operation“



Parts list SDS-type 65, 100, 150, 250/0 up to 250/5, 350/1, 350/4 “Two hand operation“ part 1.

Index No.	Qty	Description	Recommended Spare Parts (one year operation)	SDS-65 P/N 640600-Y-BC	SDS-100-1 P/N 641020-Y-BC	SDS-100/2 P/N 641000-Y-BC	SDS-100/3 P/N 641040-Y-BC	SDS-150/1 P/N 641500-Y-BC	SDS-150/2 P/N 641520-Y-BC	SDS-150/3 P/N 641540-Y-BC	SDS-150/4 P/N 641560-Y-BC	SDS-150/5 P/N 641580-Y-BC	SDS-150/7 P/N 641620-Y-BC
		Frame part no.		640601	641021	641001	641041	641501	641521	641541	641561	641581	641621
1	1	Latch		640602	640602	641572	641572	641572	641572	641572	641572	641572	641602
2	1	Latch Lock Assembly		641015	641015	641573	641573	641573	641573	641573	641573	641573	641603
3	1	Latch Pin		640604	640604	641504	641504	641504	641504	641504	641504	641504	641504
4	1	Latch Lock Pin		641505	641505	641505	641505	641505	641505	641505	641505	641505	641505
5	1	Latch Spring	*	640606	640606	641506	641506	641506	641506	641506	641506	641506	641506
6	1	Latch Lock Spring	*	641507	641507	641507	641507	641507	641507	641507	641507	641507	641507
7	1	Latch Pin Sec. Ring	*	612509	612509	620608	620608	620608	620608	620608	620608	620608	620608
8	1	Cotter Pin	*	620609	620609	620609	620609	620609	620609	620609	620609	620609	620609
9	1	Hinge Pin	*	640610	641030	641010	641010	641510	641510	641550	641570	641590	641630
10	1	Hinge Pin Sec. Ring	*	612509	612509	641011	641011	641511	641511		620611		612508
11	2	Link Block		611512	611512	611512	611512	611512	611512	611512	611512	611512	611512
12	1	Grease Nipple	*	612515	612515			612515	612515	612515 / (2x) 70064	612515 / 70064	2x 612515	612515
13	2	Screw	*	621430-11	621430-11	621430-11	621430-11	621430-11	621430-11	621430-11	621430-11	621430-11	621430-11
14	2	Nut	*	621430	621430	621430	621430	621430	621430	621430	621430	621430	621430
15	2	Cotter Pin	*	752339	752339	752339	752339	752339	752339	752339	752339	752339	752339
16	2	Link Block Bolt Assy.	*	611514	611514	611514	611514	611514	611514	611514	611514	611514	611514
17	1	Verification pin Assy.	*	640600-1	641020-1	641000-1	641040-1	641500-1	641520-1	641540-1	641560-1	641580-1	641620-1
17--	1	Rope clamp	*	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1
18	1	Rivet Pin	*	641575	641575	641575	641575	641575	641575	641575	641575	641575	641615
19	2	Washer	*							735854		735854	
20	1	Safety plate	*							641550-1		641590-2	
21	2	Screw	*							645198		89126	
22	1	Washer	*										
23	1	Locking plate											
24	1	Spring	*										
25	1	Cotter Pin	*										
26	1	Screw	*										
27	4	Screw	*										
28	1	Plunger											
29	1	Additional Block											
		Rec. spare parts Assembly		640600-RSP	641020-RSP	641000-RSP	641040-RSP	641500-RSP	641520-RSP	641540-RSP	641560-RSP	641580-RSP	641620-RSP

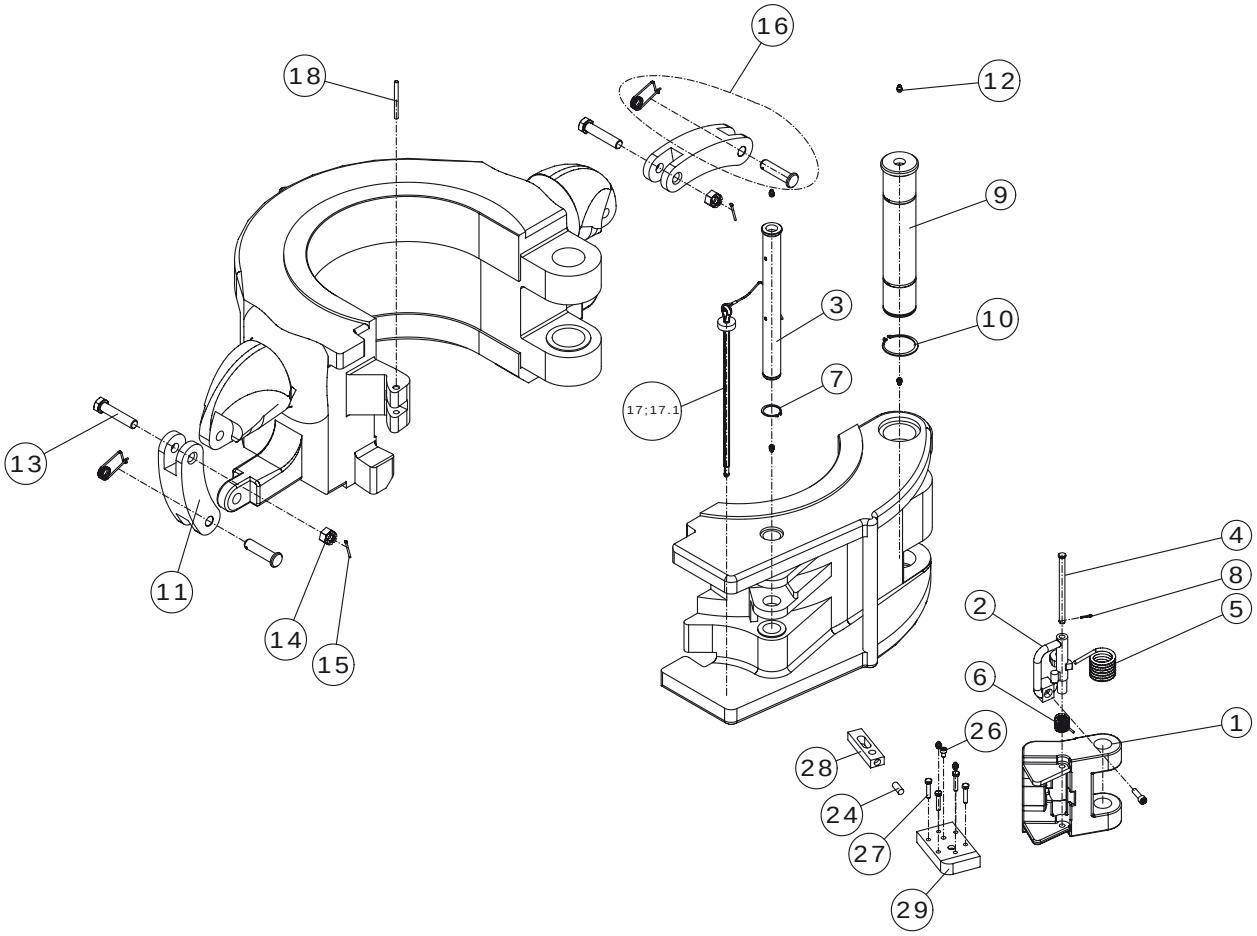
All parts marked with * are recommended Spare Parts (one year operation)

Parts list SDS-type 65, 100, 150, 250/0 up to 250/5, 350/1, 350/4 “Two hand operation“ part 2.

Index No.	Qty	Description	Recommended Spare Parts (one year operation)	SDS-250/0 P/N 642600-Y-BC	SDS-250/1 P/N 642500-Y-BC	SDS-250/2 P/N 642520-Y-BC	SDS-250/3 P/N 642540-Y-BC	SDS-250/5 P/N 642580-Y-BC	SDS-350/1 P/N 643500-Y-BC	SDS-350/4 P/N 643560-Y-BC
		Frame part no.		642601	642501	642521	642541	642581	643501	643561
1	1	Latch		641572	641572	641572	641572	641572-2	643502	643502
2	1	Latch Lock Assembly		642603	642603	642603	642603	641573-A	643503-1	643503-1
3	1	Latch Pin		641504	641504	641504	641504	641504	643504	643504
4	1	Latch Lock Pin		641505	641505	641505	641505	641505	641505	641505
5	1	Latch Spring	*	641506	641506	641506	641506	641506	643506	643506
6	1	Latch Lock Spring	*	641507	641507	641507	641507	641507	643507	643507
7	1	Latch Pin Sec.Ring	*	620608	620608	620608	620608	620608	725314	725314
8	1	Cotter Pin	*	620609	620609	620609	620609	620609	620609	620609
9	1	Hinge Pin	*	642610	642510	642510	642510	642590	643511	643511
10	1	Hinge Pin Sec. Ring								
11	2	Link Block		612512	612512	612512	612512	612512	612512	612512
12	1	Grease Nipple	*	2x 612515	2x 612515	2x 612515	2x 612515	2x 612515	612515	612515
13	2	Screw	*	613623-1	613623-1	613623-1	613623-1	613623-1	613623-1	613623-1
14	2	Nut	*	752338	752338	752338	752338	752338	752338	752338
15	2	Cotter Pin	*	752339	752339	752339	752339	752339	752339	752339
16	2	Link Block Bolt Assy.	*	612514	612514	612514	612514	612514	612514	612514
17	1	Verification pin Assy.	*	642600-1	642500-1	642520-1	642540-1	642580-1	643500-1	643560-1
17--	1	Rope clamp	*	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1	643801-1
18	1	Rivet Pin	*	641575	641575	641575	641575	641577	641575	641575
19	2	Washer	*	735854	735854	735854	735854	735854	735854	735854
20	1	Safety plate	*	641590-2	642506	641512	641512	641590-2	641590-2	641590-2
21	2	Screw	*	89126	89126	89126	89126	89126	89126	89126
22	1	Washer	*							
23	1	Locking plate								
24	1	Spring	*							
25	1	Cotter Pin	*							
26	1	Screw	*							
27	4	Screw	*							
28	1	Plunger								
29	1	Additional Block								
		Rec. spare parts Assembly		642600-RSP	642500-RSP	642520-RSP	642540-RSP	642580-RSP	643500-RSP	643560-RSP

All parts marked with * are recommended Spare Parts (one year operation)

SDS-type 500 “One hand operation“



Parts list SDS-type 500 “One hand operation“

Index No.	Qty	Description	Recommended Spare Parts (one year operation)	SDS-500 P/N 645500-Y-BC
		Frame part no.		645501
1	1	Latch		611503
2	1	Latch Lock Assembly		642624
3	1	Latch Pin		645505
4	1	Latch Lock Pin		611005
5	1	Latch Spring	*	611506
6	1	Latch Lock Spring	*	611007
7	1	Latch Pin Sec.Ring	*	611508
8	1	Cotter Pin	*	620609
9	1	Hinge Pin	*	645504
10	1	Hinge Pin Sec. Ring		
11	2	Link Block		615012
12	1	Grease Nipple	*	642623 / 70064
13	2	Screw	*	613623-11
14	2	Nut	*	752338
15	2	Cotter Pin	*	752339
16	2	Link Block Bolt Assy.	*	615014 / 622515
17	1	Verification pin Assy.	*	645500-1
17--	1	Rope clamp	*	643801-1
18	1	Rivet Pin	*	641575
19	2	Washer	*	
20	1	Safety plate	*	
21	2	Screw	*	
22	1	Washer	*	
23	1	Locking plate		
24	1	Spring	*	650216
25	1	Cotter Pin	*	
26	1	Screw	*	775081-1
27	4	Screw	*	645138
28	1	Plunger		645500-4
29	1	Additional Block		645500-3
		Rec. spare parts Assembly		645500-RSP

All parts marked with * are recommended Spare Parts (one year operation)