

OPERATING MANUAL

HYDRAULIC CRUSHER

- ▶ *FC 500*
- ▶ *FC 700*
- ▶ *FC 1000*
- ▶ *DS 100*
- ▶ *DS 800R(S)*
- ▶ *DS 1200R*
- ▶ *FR 500R(S)*
- ▶ *FR 700R(S)*
- ▶ *FR 1000R(S)*



D&A HEAVY INDUSTRIES

1.INTRODUCTION

This manual contains safety, operation, lubrication, and maintenance information.

This manual is a reference document for new operators, and a refresher document for experienced personnel.

Read, understand, and store it close to hydraulic crusher.

Continuing improvement and upgrading of product designs may have caused changes to your crusher which are not included in this publication.

Whenever any question arises regarding your hydraulic crusher, or this publication, please consult your D&A dealer.

◆Safety

The safety section list contains basic safety and operating precautions.

Read and fully understand the basic precautions listed in the safety section before operating, or performing lubrication, maintenance, and repairs on, this product.

◆Operation

This section includes discussion of work preparations and operating techniques.

The operating techniques outlined in this publication are basic. Skill and techniques develop as operators gain knowledge of the crusher and its capabilities.

◆Maintenance

Maintenance section is a guide to proper of the equipment.

Illustrated, step-by-step instructions are grouped by service interval. Items without specific service intervals are listed.

Items in "Maintenance Intervals" chart refer to detailed instructions below.

◆Maintenance Interval

Use the service hour meter of main machine to determine servicing intervals.

Periodical intervals shown(daily, weekly, etc) may be used instead of service hour meter intervals, if they provide more convenient servicing schedules, and approximate to the indicated service hour meter reading.

Recommended services should always be performed at the intervals that occur first.

Under extremely severe operating conditions, more frequent lubrication than specified in the "Maintenance Interval" instruction may be necessary.

Performing service on items at multiples of the original requirement.

2.SAFETY REGULATIONS

For the safe operation of crusher, please give the attention to the followings :

◆ Matter that demand special attention before the operation

Before the operation of hydraulic crusher, you should have thorough knowledge of the work regulations and how to use on the manual.

▶ Special attention to mount the hydraulic crusher

- ① If the excavator has a suitable hydraulic system, check the normal width of the hydraulic lines. All supply/return lines for the oil must have an inner diameter of least 25mm for the hydraulic crushers

Check the connections on the hydraulic crusher and the crusher hoses.

The connecting threads must be undamaged and free of sand or similar foreign bodies.

The hoses/pipes used for these lines must satisfy the following quality criteria :

Crusher connection hoses : hydraulic hoses with 4-wire spiral inlays as per DIN standard 20023.

Hydraulic pipes : steel tubing, seamless, cold drawn, as per DIN standard 2391, sheet 2, grade C.

- ② When mounting the hydraulic crusher, an assistant is required who must be instructed by the excavator driver. Hand signals must be agreed on beforehand.
- ③ When lifting the crusher, use only the lugs provided and sufficiently powerful lifting equipment.
- ④ The hydraulic crusher should only be mounted on an excavator to meet the capacity properly.
- ⑤ If an appropriate hydraulic system is fitted, check the inside diameter of the hydraulic lines.
All supply/return lines for the hydraulic oil must have an adequate inside diameter.
- ⑥ Please use the crusher after the pressure of relief valve has been set exactly in the hydraulic circuit for the crusher.

◆ Special attention to operate the hydraulic crusher

- ① It must be used only for the usage designated by manufacturer
- ② The protection equipments like wire net must be placed into the operator cabin of the excavator so as to protect the operator from the broken pieces by crushing under operation

- ③ You must use only the hydraulic oil designated by the excavator and crusher manufacturers.
Only use hydraulic oils with sufficient viscosity.
- ④ Stop to use the crusher when the hydraulic oil temperature reaches over 80°C or below 20°C
- ⑤ There is a risk of accident by the broken pieces by crushing under operation, the safe zone must be made more than the operation capacity of the excavator. If the person comes into the zone, stop to do operate the crushing immediately

◆ **Special attention to maintain and repair work**

- ① Put the grease into the pin part of the crusher regularly.
- ② Check the cutter blade clearance regularly. if necessary, correct the cutter blade clearance.
- ③ You must follow the regular maintenance, the way and time according to the manual, and especially take on intensive care of the part to take a risk of damage, wear and tear

◆ **Special attention to dismount the hydraulic crusher**

- ① When dismounting the hydraulic crusher from the excavator, please put the crusher on the flat area after check if there is no obstacle within the revolution radius of the excavator.

Also the jaw of the crusher must be kept completely close.

- ② Take care of the safety against the crusher after dismounting so that it cannot fall over.
- ③ After turn stop valves to "OFF" position, disconnect hydraulic hoses from stop valves.
Apply end caps and plugs to hose ends and fittings to prevent contamination.



CAUTION

Give a very special attention to the risk of burn by the very hot oil, piping, and crusher body after the hydraulic crusher has been in use.



CAUTION

When removing the cutter blades, always wear protective glasses.



CAUTION

To exclude the possibility of injury to employee, the safety regulations valid in the country of use must be observed when operating the excavator.



CAUTION

When lifting the hydraulic crusher, use only the lug provided and sufficiently powerful lifting equipment.



CAUTION

When aligning linkages, never insert fingers into pin holes. Unexpected machine movement may occur in this situation and cause a severe injury.
Match holes by visually lining up.
While aligning arm holes, or moving bucket, make sure that there are no person in the vicinity of the arm or bucket.



CAUTION

Never mix oils from different manufactures.

D&A does not endorse specific brands but does suggest that operators selet quality oils whose suppliers provide assurance that required standards will always be met or exceeded.



CAUTION

Check if there is a person standing ar working within the radius of about 20M of the crusher operation, do take action to make him go out of the radius immediately if there is.



CAUTION

Be sure to keep all safety regulations concerned with the operation of maintenance and repair.



CAUTION

Don't put the hand or the head into the unfolded crusher jaws.



CAUTION

When adjusting the cutter blade clearance, make sure there is no-one between the open crusher jaws.



CAUTION

Tighten loose bolts without exceeding the prescribed tightening torque.

Broken bolts must be replaced immediately.

Risk of serious damage.

The bolts and disk lock washers for the ball-bearing slewing gear must only be replaced by genuine D&A parts.



CAUTION

Oil bearing lines and components become very hot after the crusher has been in use.

Especially, when disconnect hydraulic hoses from stop valve, give a very special attention to the risk of burn by the very hot hydraulic oil.

 **WARNING**

Improper operation or maintenance could result in injury or death.
Do not operate or work on this machine unless you are properly trained.
Read and understand the operation and maintenance manual
Additional manuals are available from D&A Crusher dealers.

 **WARNING**

The abnormal operation can make the very bad influence on the crusher and bring out the defect.

 **WARNING**

Personal injury can result from dropping pins during installation.
Wear safety shoes to protect feet.

 **WARNING**

Don't disassemble the crusher absolutely even though there is problem in the speed-up valve or on the maintenance and repair, please contact the A/S Department in our company,
It takes the very risk against safety with the high pressure inside.

 **WARNING**

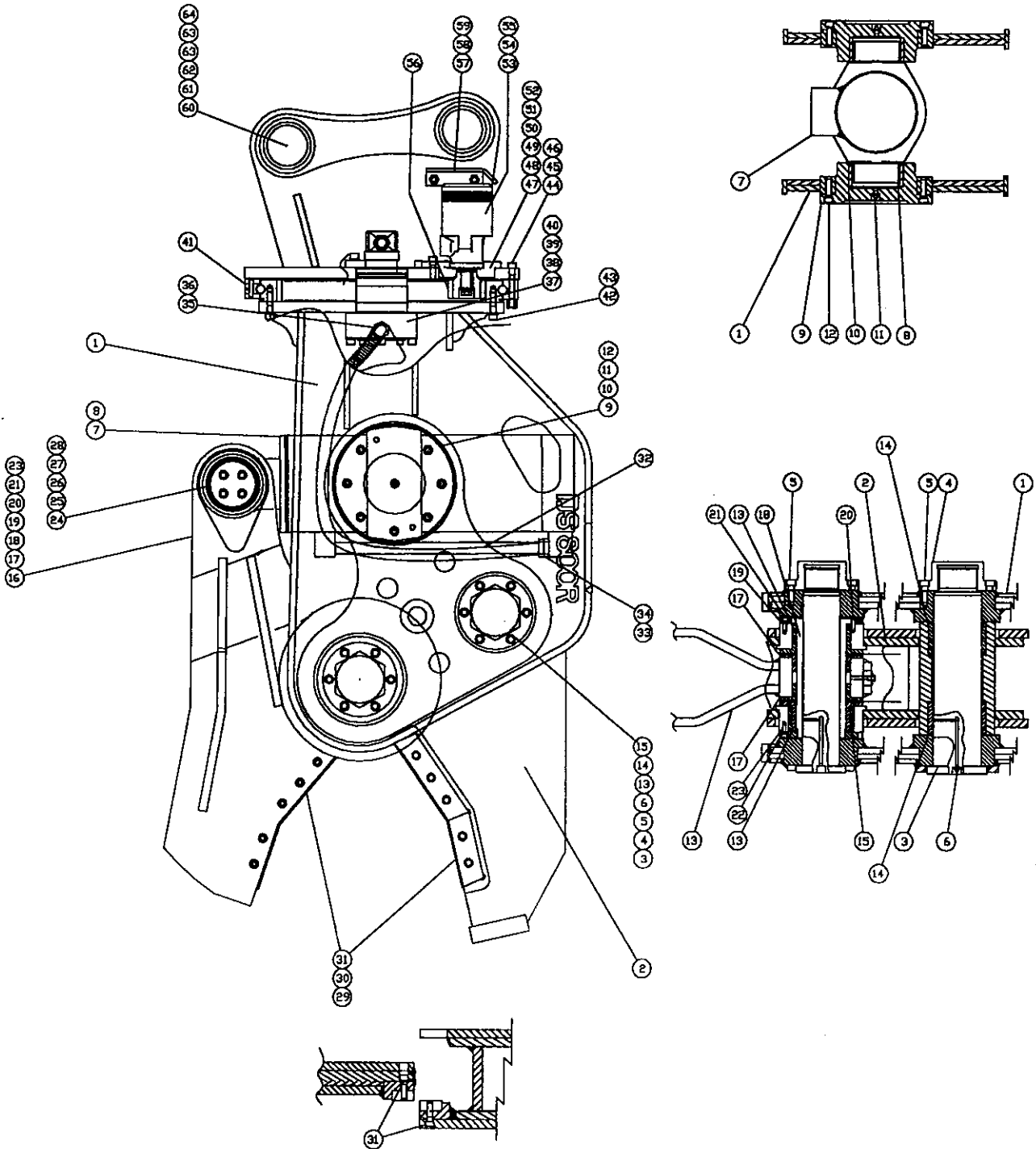
The flow quantity has already been set at the throttle valve of the motor control valve block in the factory to meet the proper revolution speed before sending out the crusher, so you don't have to adjust the flow quantity absolutely.

If the adjustment is necessary, please contact our A/S department.

3-3. DS SERIES

Item \ Model	unit	DS100	DS800R(S)	DS1200R
Operating weight	kg (lb)	325(715)	2,700(5,940)	3,118(6,860)
operating pressure	kg/cm2 (psi)	210(300)	320(4,580)	380(5,428)
Max. opening width	mm (inch)	400(16)	668(26)	800(32)
Crushing force	ton	15	80	110
Cutting force	ton	31	270	300
Cutter length	mm (inch)	100(4.0)	480(19)	600(24)
Overall length	mm (inch)	1,335(53)	2,500(98)	3,118(123)
Overall height	mm (inch)	630(25)	1,264(50)	1,511(60)
Overall width	mm (inch)	427(17)	810(32)	972(38)
Suitable excavator	ton	3-8	26-36	36-45

4.8.1. Drawing of DS800

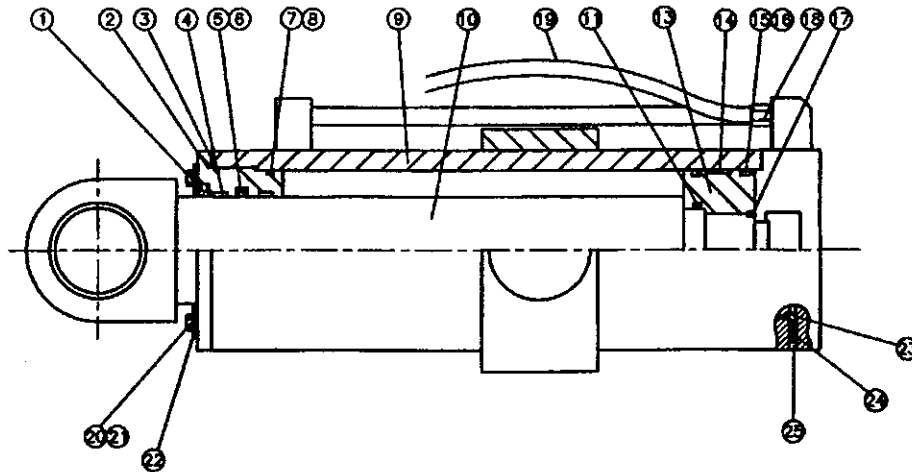


4.8.2. Parts list of DS800

No.	PART NAME	PARTS No.	Q'TY	REMARK
1	BODY ASS'Y	S082-211A0	1	
2	BODY-JAW ASS'Y	S082-31000	1	
3	FRAME PIN	S082-552A1	1	
4	PRAME PIN NUT	S082-552B1	1	
5	HEX HEAD BOLT	013002-16050	2	M16*40
6	GREASE NIPPLE	004013-06000	4	1/4"
7	HYD.CYLINDER ASS'Y	C100-110A0	1	PROCESSED
8	TRUNNION-BUSH	C102-545A4	2	
9	FRAME COVER	C102-542A1	2	
10	FRAME COVER BUSH	C102-542A3	2	
11	GREASE NIPPLE	004013-06000	4	1/4'
12	SOKET BOLT (12.9)	013002-16050	16	M16*50
13	BODY JAW 'T'TYPE BUSH	S082-311B3	2	
14	BODY RING BUSH	S082-911M5	2	
15	CONTROL RING BUSH	S082-911M8	1	
16	ARM-JAW ASS'Y	S082-41000	1	
17	ARM-JAW 'T'TYPE BUSH	S082-411B7	2	
18	MAIN PIN BUSH	S082-911M7	1	
19	CONTROL RING	S082-911M6	1	
20	BALANCE PIN	011002-10035	2	10 35
21	SOKET BOLT (12.9)	013002-10030	7	M10*30
22	LOCK-RING NUT	S082-911M9	1	
23	SOKET BOLT (12.9)	013002-10030	1	M10*30
24	MAIN- PIN	S082-551A1	1	
25	MAIN-PIN NUT	S082-551B1	1	
26	ARM PIN	C102-562A1	1	
27	ARM PIN PLATE	C102-552A3	1	
28	SOKET BOLT (12.9)	013002-16040	4	M16*40
29	CUTTER 200	C082-311D3	2	
30	CUTTER 280	C082-311D4	2	
31	SOKET BOLT (12.9)	013002-16055	10	M16*55
32	HYD. HOSE	002431-19080	2	
33	O-RING	007001-02400	2	
34	HOSE FLANGE	006001-19400	2	
35	O-RING	007001-02400	2	
36	WASHER BASED ADAPTER(90	004002-19000	2	
37	CENTER JOINT ASS'Y	COCJ-109A1	1	PROCESSED
38	O-RING	077001-1400P	1	P140
39	HEX HEAD BOLT	013002-12120	4	M12*120
40	HEX NUT	014001-12000	8	USE FOR M12
41	SLEWING RING BEARING	C072-BR0A1	1	SISI TYPE
42	SOKET BOLT (12.9)	013002-16065	22	M16*65

43	SPRING WASHER	015001-16000	22	USE FOR M16
44	SOKET BOLT (12.9)	013002-16120	26	M16*120
45	HEX NUT	014001-16000	52	USE FOR M16
46	SPRING WASHER	015001-16000	26	USE FOR M16
47	MOTER STOPPER	C102-527B6	1	t16*243*187
48	SOKET BOLT (12.9)	013002-16035	4	M16*35
49	SPRING WASHER	015001-16000	4	USE FOR M16
50	MOTER BASE	C072-412C1	1	
51	SOKET BOLT (12.9)	013002-16050	4	M16*65
52	SPRING WASHER	015001-16000	4	USE FOR M16
53	HYD. MOTER(PARKER)	COMT-110PA	1	TGO625AT 080AAAA
54	SOKET BOLT (12.9)	013002-12040	4	M12*40
55	SPRING WASHER	015001-12000	4	USE FOR M12
56	SPUR GEAR	C102-412C3	1	t9*560*228
57	MOTER COVER	C102-412B8	1	M16*30
58	HEX HEAD BOLT(12.9)	013002-16030	4	USE FOR M16
59	SPRING WASHER	015001-16000	4	USE FOR M16
60	HEX NUT	014001-16000	4	
61	BRACKET PIN	B3602-40310	2	
62	BRACKET PIN BUSH	B3602-40400	4	
63	BRACKET PIN RING	B3602-40510	4	
64	BOLT	013001-16140	4	
65	NUT	014001-16000	8	
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4.8.3. Drawing & parts list of DS800 Cylinder



NO.	DESCRIPTION	PARTS No.	Q'TY	REMARK
1	DUST SEAL	007003-15000	1	
2	CYLINDER HEAD	C10R-11500	2	
3	O-RING	007001-2250G	1	G225
4	WERE RING	007005-22500	2	
5	U-PACKING	007002-15000	1	
6	BACK UP RING	007004-15000	1	
7	O-RING	007001-2250G	1	G225
8	BACK UP RING	007004-2250	1	
9	TUBE WELD ASS'Y	C10R-11800	1	
10	ROD WELD ASS'Y	C10R-11110	1	
11	O-RING	007001-1350P	1	P135
12	BACK UP RING	007004-13500	1	
13	PISTON	C10R-11100	1	
14	WERE RING	007005-15000	1	
15	U-PACKING	007002-22500	2	
16	BACK UP RING	007004-22500	2	
17	SET SCREW	013005-10010	1	
18	ADAPTER	004008-25A25	2	
19	HOSE	002041-25120	2	
20	HEX BOLT	013001-10020	2	M10 X 20
21	SPRING WASHER	015001-10000	2	
22	DUST SEAL COVER	C10R-11240	2	
23	BALL	025001-06000	1	
24	SPRING	027020-07045	1	
25	HOLLOW PLUG	004012-12000	1	

12. MAINTENANCE AND REPAIR

12.1. General information

The regular check-up of the maintenance and repair concerned with the crusher must be done for the crusher so as to have always kept the best function of the crusher



CAUTION

Be sure to keep all safety regulations concerned with the operation of maintenance and repair.

Before the maintenance and repair of the crusher, it is imperative that the pressure on the hydraulic system be relieved.

Procedure as follow :

- ① Turn off the starting engine of the excavator.
- ② Repeatedly actuate switches for opening/closing laws and for rotating crusher
- ③ After turn stop valves to "OFF" position, separate the connection hose from the crusher.



CAUTION

Don't put the hand or the head into the unfolded crusher jaws.



WARNING

The flow quantity has already been set at the trottle valve of the motor control valve block in the factory to meet the proper revolution speed before sending out the crusher, so you don't have to adjust the flow quantity absolutely.

If the adjustment is necessary, please contact our A/S department.

12.2. Maintenance

- ◆ Check if there is a crack at the welding part of the crusher every day after the operation.
(visual check of supporting elements and weld seams)
- ◆ Check the wear and tear of the part of jaw, cutter blade, and tooth of crusher regularly
Change the wear and tear of blade and tooth at the proper time.
- ◆ Check regularly if the bolt, nut, and fix cover at the pin, stop pin, etc. are loose, and
adjust them very tight by the prescribed tightening torque, if necessary.
- ◆ Check that the blade clearance does not exceed 2 mm.
Adjust the clearance of cutter blade according to the operation manual, if necessary.

12.3. Change of cutter blade

Change the cutter blade if there are the wear and tear or any damage at the edge of cutter blade during the operation.

Always use new fastening bolts when fitting new cutter blade.

Use only genuine D&A fastening bolts and ensure that they are fitted correctly.

When removing the cutter blades, be sure to use the device made by ductile material like the copper because the cutter blade is made by a very hard material.

So it can lead to the fatal damage to the human body, please wear the protection eye during the operation at all the times.



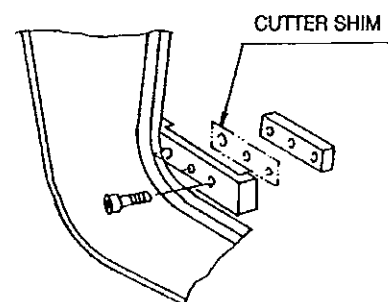
CAUTION

When removing the cutter blades, always wear protective glasses.

12.4. Checking and adjusting the cutter blade clearance

< Checking the cutter blade clearance >

- ◆ Close the jaws of the crusher.
- ◆ Measure cutter blade clearance using a feeler gauge(or 2mm thick of bar)
- ◆ If clearance is greater than 2mm, you must adjust the clearance.
- ◆ Adjusting the cutter blades
 - Loosen the cutter blade mounting bolts and remove the cutter blade.
 - Repair the worn cutting side by grinding so that the cutter blade can be securely installed on the cutter base.



- Turn and install the cutter blade onto the cutter base. Tighten the cutter blade mounting bolts hand-tight. firmly tighten the bolts while pounding the cutter blade closely contacts the cutter base.
- The clearance between the two mating cutter blades have set to about 1mm. If the clearance becomes larger due to wear, adjust the clearance by additionally installing a cutter shim(optionally available) between the cutter blade and the cutter base.

12.5. Welding for crusher jaws and teeth

If there are wear and tear at the lower end of jaw in the hydraulic crusher very much, rewelding work can be performed by the way of welding designated as following. When rewelding the face of jaw, it is important to ensure that there is still a buffer layer on the face metal. If this is not the case, this buffer layer must first be welded in place before renewing the face of jaw.

Before welding, the crusher jaw in question must be removed from the crusher and fitted components such as cutter blades and teeth detached.

In order to achieve the best possible results, be sure to follow the welding way designated.

The tooth treated the heat with the cast steel can take the risk of crack during the welding.

- Welding conditions for buffer layer on crusher jaws

Reheating temperature for welding : 150°C-180°C

Welding filler : D1N8556(AWS A5.4 E312-16)

Protective gas : M11 DIN32526

Interpass temperature : max. 160°C

How to operate : Electrode operation, Welding after installation of windscreen

- Welding conditions for hard-facing layer on crusher jaws

Reheating temperature for welding : 150-180°C

Welding filler : DIN8555 MSG 1-GZ-250

(For the welding rod of the high Mn steel electrode)

Protective gas : CO₂, M21 DIN32526

Interpass temperature : max. 200°C

How to operate : Same as the above mentioned buffer layer.

– Welding conditions for crusher teeth

Reheating temperature for welding : 150–180 °C

Welding filler : DIN8556(AWS A5.4 E312–16).

12.6. Maintenance interval

– Daily

◆ Check if the bolt and nuts is loose or taken away

- ▶ Bolts in the slewing part
- ▶ Bolts in the cylinder rod cover
- ▶ Bolts in the cutter blade
- ▶ Bolts for the joint pin cover



CAUTION

Tighten loose bolts without exceeding the prescribed tightening torque.

Broken bolts must be replaced immediately.

Risk of serious damage.

The bolts and disk lock washers for the ball-bearing slewing gear must only be replaced by genuine D&A parts.

◆ Check the wear and break of the cutter blade.

◆ Check if connection part of the hydraulic hose is loose or not.

– Weekly

◆ Check the wear of crusher jaws and teeth, and cutter blade clearance

◆ Check if there is a crack in the welding part.

(Visual check of supporting elements and weld seams)

◆ Check if the grease is filled into the joint pin part.

◆ Check abnormal noise at slewing part.

– Every 100 hours, or 6 Months

Contact the A/S Department in our company regarding the following items of regular check-up and get the check-up service from them.

- ◆ Conditions of the grease quantity and sealing at the slewing bearing and hydraulic motor part.
- ◆ The mixture with the alien substance in the cylinder rod cover
- ◆ The hydraulic hose and pipe
- ◆ Check the wear and break in joint pins of crusher
- ◆ Check the wear and tear in all welding structure



WARNING

Don't disassemble the crusher absolutely even though there is problem in the speed-up valve or on the maintenance and repair, please contact the A/S department in our company.

It takes the very risk against safety with the high pressure inside.

12.7. Changing hydraulic oil

The contamination of hydraulic oil can bring out the damage to the hydraulic part in the excavator as well as to the crusher, it is the cause of having no operation and the damage to the parts.

We recommend hydraulic oil and oil filters replacement as shown in the following Table, which is based on 100% hydraulic crusher operation.

Hydraulic oil	Every 600 hours
Oil filters	Every 100 hours

Even if there is any hydraulic oil contamination before the above mentioned time, change the hydraulic oil immediately.

On the exchange of hydraulic oil, you must change the hydraulic oil in the inner part of cylinder and piping, and that of cylinder in the crusher as well as the hydraulic oil tank completely.



CAUTION

Oil bearing lines and components become very hot after the crusher has been in use.

Especially, when disconnect hydraulic hoses from stop valve, give a very special attention to the risk of burn by the very hot hydraulic oil.

13. TROUBLESHOOTING

Fault	Cause	Required action
Hydraulic crusher does not run.	The stop valve in the pipe line is locked.	Open the stop valve
	The hydraulic oil has too small	After check the oil level of tank and need the oil, fill the oil properly
	Switch defective.	Connect wire of switch
The operation of jaw is not smooth or doesn't run suddenly.	Speed-up valve defective	Call authorized service man
The crushing power is weak.	Operating pressure too low	Correct operating pressure or call authorized service man
The steels doesn't be cutted very well.	Cutter blade is worn or broken	If necessary reset or replace cutter blade
	Cutter blade clearance is sized over	Adjust cutter blade clearance
Hydraulic crusher can not rotated or abnormal noise	Hydraulic motor, gear, slewing bearing are defective	Replace defective parts
Operating temperature is too high.	Pressure relief valve is defective	Replace the pressure relief valve
	Oil level in tank too low	Fill hydraulic oil
Oil leaks from the hydraulic connections	Connecting adapter is loose	Tighten adapter
Abnormal noise at joint pin	Insufficient greasing	Apply grease
The jaw close by the gravity of itself	Defect of the speed-up valve	Call authorized service man

14. STORAGE

If it's not used for the long-term, close the jaw completely and take it away from the excavator, and keep it.'

Put the crusher on the flat square beam or the pallet for the safe-keeping.

Close the cap of connection hose against the alien matters coming into, put it upward at the hydraulic crusher.

Especially the body of the pulverizing crusher(FR700, FR1000) can go forward and backward, so the wooden bar must put down on the body of crusher as the support, not to move the body.

After the rust preventing of all the pin and the jaw with wear and tear, keep the crusher with the cover not to get any influence from the environment.



CAUTION

Oil bearing lines and components become very hot after the crusher has been in use.