

DEMOLITION CRUSHER & SHEAR OPERATION MANUAL - FMC SERIES -

We appreciate your purchasing FMC series hydraulic crusher very much. Operation manual is to explain the safety regulations how to use, how to maintain and check-up, and how to the procedure necessary on the control so as to keep high quality of function in FMC hydraulic crusher.

Especially, we hope you must have thorough knowledge of the safety regulations and how to use on the operation manual to do the safe operation, the best function, and the most economy.

And inquiries related to operation will be forwarded to FEELENG through your dealer.

We, all of FEELENG promise that we do our best in our continuous service to the customer so as to make you very happy and satisfied.





⚠ WARNING

- Pay particular attention to all safety messages.
- Please give attention to the followings:
- The contamination of hydraulic oil can bring out the deadly defect in the hydraulic pump and motor of excavator as well as the crusher, please keep the oil change time for the smooth operation.
- Please keep the notice that our company don't take charge of the defect caused by making the crusher used improperly without following the way of operation on the manual.
- Do not operate this equipment before you have read fully understood this manual.

CAUTION

- Don't put the hand or the head into the unfolded crusher jaws.
- When hydraulic crusher is not used, the jaw of the crusher must be kept completely.



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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 is not included in this publication.

Whenever any question arises regarding your hydraulic crusher, or this publication, please consult your FEELENG 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 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-wires 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 drive. Hand signals must be agreed on before hand.
- 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 designed 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 $80\,\text{C}$ or below $20\,\text{C}$
- (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 onto 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.
- 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 mobbing bucket, make sure that there is no person in the vicinity of the arm or bucket.

W CAUTION

- Never mix oils from different manufactures.
- FEELENG does not endorse specific brands but does suggest that operators select quality oils whose suppliers provide assurance that required standards will always be met or exceeded.



CAUTION

■ Check if there is a person standing at 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.

W 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

- 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 0il.

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 FEELENG parts.



⚠ WARNING

- Improper operation or maintenance could result in injury or death.
- Read and understand the operation and maintenance manual.

 Additional manuals are available from FEELENG 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

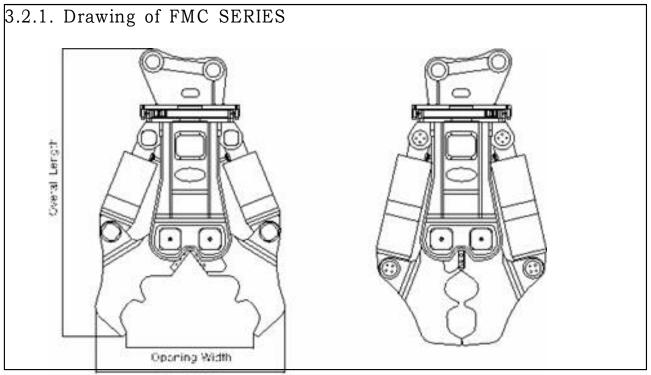
- Don't dissemble the crusher absolutely even though there is problem in the speed-up valve or on the maintenance and repair, please contact the A/S Department in our company.
- It takes the very risk against safety with the high pressure inside.

⚠ 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. DRAWING & PARTS LIST



Overall Width

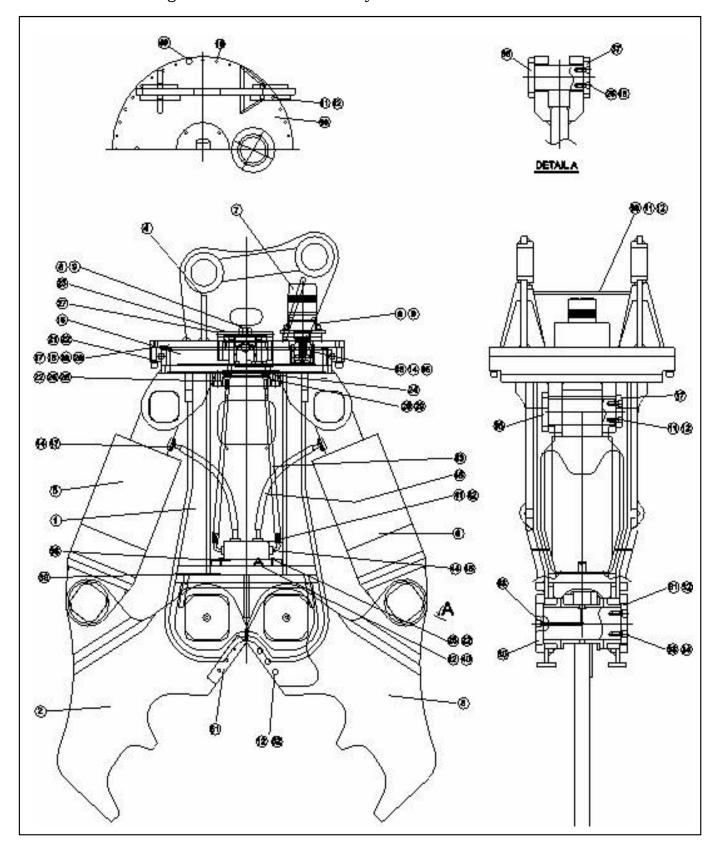
Descr	iption	Unit	FMC200	FMC300
Operation Weight		kg	1,870	2,930
Overall	Length	mm	2,100	2,650
Overall	Width	mm	1,281	1,650
Overall	Height	mm	700	830
Max. Open	ning Width	mm	800	1000
Cutter	Length	mm	353	585
Cutting	g Force	ton	225	330
Operating	Pressure	kg/cm ²	320	320
Required Oil Flow		LPM	200~250	250~300
Suitable	Excavator	ton	18~26	28~36
	Setting	kg/cm ²	160	160
Rotating	Pressure	psi	2,275	2,275
Hydraulic	Rotating	Lpm	15~60	15~60
Motor	Rate	Gpm	5.68~15.7	5.68~15.7
	RPM	Rpm	10~18	10~18

Cutting Ability	FM C200	FM C300
Round Bar	Ф35	Φ45
Channel	250×90×11	425×100×16
Angle	200×200×11	300×300×16
H-Beam	200×200×10	250×250×14
п-реаш	-	(300×300×12)

* Above specification are subject to change without prior notice.



3.2.2. Drawing of FMC300 Assembly





3.2.3. Parts List of FMC300

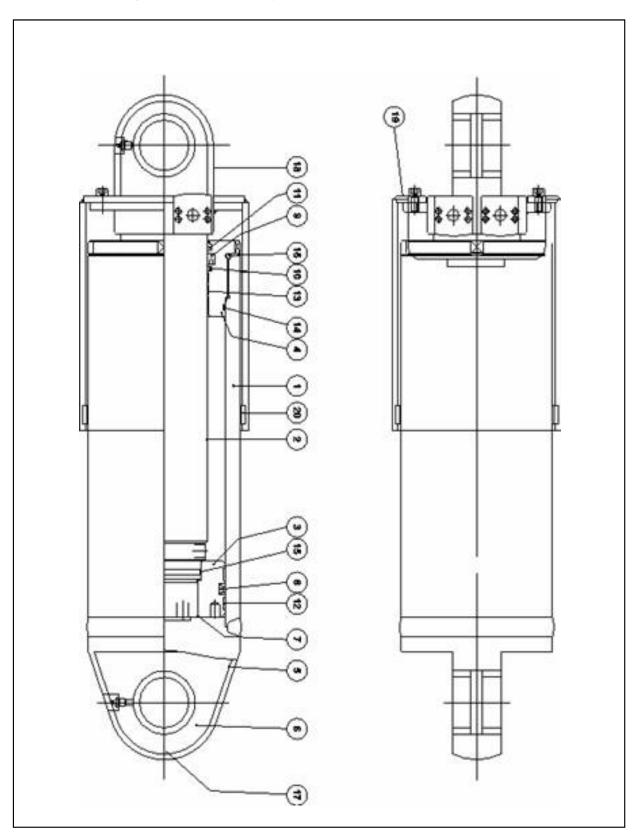
No	Part Name	Part No	Q' ty	Remark
1	BODY	SA25 1110	1	
2	ARM(A)	SA25 1210	1	
3	ARM(B)	SA25 1220	1	
4	BULK CAP	SA25 1310	1	
5	HYD' CYL ASS'Y	SA25 2110	1	
6	HYD' CYL ASS'Y	SA25 2120	1	
7	HYD. MOTOR	SA15 2310	1	WHITE
8	BOLT HEX(10.9)	N017-160450	8	M16×45
9	WASHER NORD LOCK	N511-160000	8	M16
10	MOTOR COVER	SA15 5310	1	
11	BOLT HEX(10.9)	N017-120300	12	M12×30
12	WASHER SPRING H/T	N411-121020	12	M12
13	PINION GEAR	SA15 5340	1	
14	STOP PLATE(P/GEAR)	SA15 5350	1	
15	Socket Flat Head Bolt(10.9)		1	1/2"×30
16	SLEWING GEAR	SA25 3110	1	SISI 616
17	BOLT HEX (10.9)	N017-161000	47	M16×100
18	WASHER RIBBED LOCK	N501-160000	93	M16
19	DOWEL PIN(TAPPED)	N511-134008	4	13×40(M8x1.25)
20	SOCKET BOLT(12.9)	N109-080100	4	M8×10
21	SOCKET BOLT(12.9)	N109-161100	45	M16×110
22	S/P WASHER	N411-161010	49	M16
23	CENTER JOINT	SA15 2320	1	
24	C/JOINT STOP PLATE(A)	SA15 5170	1	
25	SOCKET BOLT(12.9)	N109-160450	8	M16×45
26	SOCKET BOLT(12.9)	N109-160400	20	M16×40
27	C/JOINT STOP PLATE(B)	SA15 5180	1	
28	CONNECTOR(O-RING)	H010-110006	2	PF 1" x PF 1" 5#
29	O-RING(NOK)	N631-029004	2	1BP 29



No	Part Name	Part No	Q' ty	Remark
30	FRAME PIN	SA25 5110	2	¢ 140x348
31	END PLATE(F/PIN)-A	SA15 5130	1	¢ 176x30
32	END PLATE(F/PIN)-B	SA25 5130	1	¢ 200X30
33	SOCKET BOLT(12.9)	N109-200400	8	M20×40
34	WASHER RIBBED LOCK	N501-200000	8	M20
35	CYLINDER PIN	SA25 5120	2	¢ 110x296
36	ARM PIN	SA25 5100	2	¢ 110x188
37	END PLATE	SA24 5140	4	¢ 136x30
38	BLOCK	SA24 7110	1	
39	BLOCK BRACKET	SA24 7210	1	
40	SOCKET BOLT(12.9)	N109-120250	8	M12×25
41	PLUG	H270-110305	2	PF 3/4"
42	O-RING(NOK)	N631-024004	2	1BP 24
43	HOSE(5#×90F ¢ 41)	H660-167413	2	1"×4S×665
44	SPLIT FLANG	H174-160104	10	1" 고압
46	HOSE(F×F ¢41)	H680-167411	4	1"×4S×550
47	SOCKET BOLT(12.9)	N109-120400	40	M12x40
48	GREASE NIPPLE	N651-410002	3	PT 1/4"
49	GREASE NIPPLE	N651-810002	3	PT 1/8"
50	HAND HOLE COVER	CA25 5410	2	
51	CUTTER	CA25 5210	11	
52	Socket Flat Head Bolt(10.9)		22	M16×60
53	NUT PREVAILING LOCK		22	M16
54	GUIDE BLOCK	CA25 5200	1	
55	SOCKET BOLT(12.9)	N109-160600	4	M16x60



3.2.4. Drawing of FMC300 Cylinder



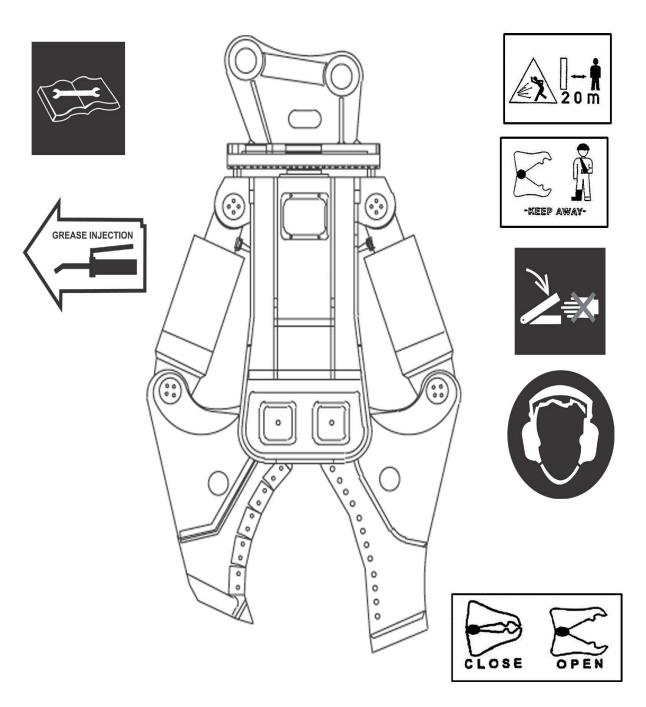


3.2.5. Parts List of FMC300 Cylinder

No	Part Name	Material	Q' ty	Remark
1	TUBE ASS'Y	SCM440-H	1	
2	ROD ASS'Y	SCM45C-H	1	
3	PISTON	SCM45C	1	
4	ROD COVER	SCM45C	1	
5	H-STEEL BUSH	SCM45C-H	2	
6	R-STEEL BUSH	SCM45C-H	2	
7	COVER ASS'Y	SS41	1	
A0	SEAL	LUYTEX	1	
A1	O-RING	NBR	1	1BG 160
A2	WEAR RING	PHENOL	1	
A3	SLIPPER SEAL	PTFE/NBR	2	SPGW 250
B1	DUST WIPER	URE	1	PU6 180
B2	U-PACKING	URE	1	T22 180
В3	O-RING	NBR	1	1BG 255
B4	STEP SEAL	PTFE/NBR	1	
В5	DU BUSH	DU METAL	1	MB 18050DU
В6	O-RING	NBR	1	1BG 240
В7	BACK UP RING	PTFE/MO	1	
C1	SET SCREW	SCM440	1	
C2	GREASE NIPPLE	SM20C	2	PT 1/4-A3
СЗ	DUST CAP	PLASTICK	2	PF 3/4
D1	SEAL KIT'S	ASS'Y	1	



4. Safety treatment







Do keep over anywhere within a 20 meter radius of the hydraulic crusher away from work site as flying debris can make person dangerous.



Keep out from between the crusher jaws. Risk of accident!



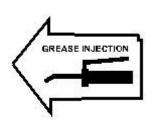
Use Hearing Protection



Read the manual before use



Don't touch the cutter



Apply grease to the crusher pins regularly.

Insufficient greasing may cause abnormal wear of pins and bush.



5. WARRANTY CONDITIONS

FMC hydraulic crusher will provide a warranty on all parts for a period of 12 months after take-over, however no longer than 18 months after delivery. However, the exchange of parts with wear and tear is available for 3 months separately from the warranty period of the products.

The following parts are available for 3 months warranty

- Kind of Pin and Bush, Cutter blade, Tooth, Hydraulic hose, Bolts & Nuts, and all the Sealing parts.

♦ Warranty conditions for spare parts

Spare parts have a warranty of 6 months, but at least until expire of the original warranty period for the object of supply.

♦ FEELENG doesn't take charge of the problem due to the followings

- ① In case of having not followed the regulations concerned
- 2 In case of the improper or abnormal handling
- 3 Improper maintenance and repair
- 4 When the way of operation is not correct
- (5) When the disorder is caused due to having no use of the parts designed by the manufacturer.
- **6** When the unskilled use of hydraulic crusher leads to the damage to the excavator



6. OPERATING CONDITIONS

The FEELENG hydraulic crusher is designed to be mounted on hydraulic excavators and is suitable for the following applications

Demolition of buildings such as tall concrete structures, industrial structures/buildings and bridges.

After mounting, the hydraulic crusher is provided with all necessary power by the carrier and is operated by the carrier driver from the cab.

⚠ WARNING

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

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.

7. LIFTING AND STORING

CAUTION

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

Ropes and lug must be in good condition.

Lift to use the center of the equipment with the lift loop or hole established at crusher. The hydraulic crusher should be deposited for storage on a wooden support of sufficient size and strength.

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

Collect any oil which runs out when the hydraulic hose are disconnected and dispose of it correctly. Seal off any open lines.



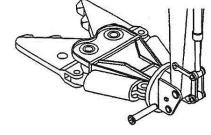
8. INSTALLATION

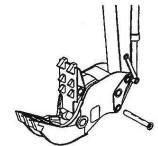
CAUTION

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

⚠ WARNING

- Personal injury can result from dropping pins during installation.
- Wear safety shoes to protect feet.
- How to mount the hydraulic crusher on the excavator
 - 1) Before mounting the hydraulic crusher, please put it on the flat place to take care of the direction of connection to the bracket pin as the drawing.
 - 2) Set engine speed to at low idle, and slowly move arm of carrier, and align the arm holes with the mounting bracket holes.





- 3) Insert carrier arm pin and assemble fasteners, and move bucket cylinder of carrier, align the bucket linkage holes with the mounting bracket holes. Assemble fasteners.
- 4) Remove end caps from the stop valve, and remove plugs from holes, and connect the holes to stop valves both sides of the arm.
- 5) Check the connection completely; open the stop valve to ON position.



9. OPERATING THE HYDRAULIC CRUSHER

9.1. Hydraulic oil

Normally any hydraulic oil originally intended for carriers can be used in hydraulic crusher.

Especially, when you use the crusher at first after mounting on the excavator, the crusher cylinder needs a lot of oil. So you must fill the oil by the proper

limit of oil after operating the crusher two or three times.

Since working with hydraulic crusher will heat the oil much more than in normal excavation works, oil viscosity must therefore be checked.

When hydraulic crushers are used continuously, the oil temperature normalizes at certain levels, depending on conditions and carrier.

At such temperatures, hydraulic oil viscosity should be 30-60 cST.

Lubricant Manufacturer	Hydraulic Oil	
TOTAL	Total Equivis ZS46	
SHELL	Tellus T46	
MOBIL	Mobil DTE 13M(All Temp) or DTE24(summer)	
YUKONG	Supervis HV146 N46 and ZIC Supervis X46	
CALTEX	Caltex HD Z46	

CAUTION

- Never mix oils from different manufactures.
- FEELENG does not endorse specific brands but does suggest that operators select quality oils whose suppliers provide assurance that required standards will always be met or exceeded.

The hydraulic crusher can not be started if hydraulic oil viscosity exceeds 1000 cST, not operated when hydraulic oil viscosity falls 15 cST.

9.2 Grease

Apply grease to each joint pins and slewing bearing of hydraulic crusher using recommended lubricant greases at FEELENG regularly.



Lubricant Manufacturer	Grease
SHELL	Alvania Ep#2
MOBIL	Mobil Faw#2 or Cold Temp Mobil Faw #1
CALTEX	Multipac EP2

9.3 Operating temperatures

The hydraulic oil operating temperature 1s -20 $^{\circ}$ C (-4 $^{\circ}$ F $^{\circ}$ +176 $^{\circ}$ F)

If the temperature is lower than $-20 \,^{\circ}\mathrm{C}$ (-4°F), the crusher have to be preheated before starting operation.

Oil preheat hydraulic oil, operate carrier (without running crusher), until oil temperature reaches specified temperature range.

During operation, oil will remain warm.

If hydraulic oil temperature exceeds specified limits, please stop equipment and don't restart operation until oil has cooled to specified operating temperature range.

9.4. Cooling

Maximum permitted hydraulic oil temperature range in continuous hydraulic crusher use is $50\,\text{C} \sim 80\,\text{C} (120\,\text{F} \sim 175\,\text{F})$, depending on viscosity of oil in the system. Therefore, a reliable hydraulic oil thermometer on the carrier, one must be installed. Hydraulic oil temperature depends on ambient conditions, carrier cooling system efficiency, and on crusher use.

When hydraulic crusher is used continuously, it is necessary to have a cooling system with extra cooling capacity, as compared with normal excavation work.

9.5 Safety details before operation

After mounting the crusher on excavator, check the following safety details before the operation of the crusher

CAUTION

■ Check if there is a person standing or 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.



If there are any risks the broken pieces or the metal broken pieces flying to the operator cabin by the crushing operation, please install the wire net for the protection against them at the cabin.

9.6 Check-up of function and operation

Check the connection and folding state of the hose while to adjust the bucket operation of excavator and to do operate the crusher up and down fully, and confirm the excavator and the connection parts between the excavator and the crusher.

• Check of open and close operation of jaw

Using the foot switch or button switch established at the operator cabin of the excavator, check jaw of the crusher open and close smoothly more than 5 times.

• Check the rotating operation (in case of rotating structure)

In case of the hydraulic revolving crusher, check the smoothness of rotating after rotate on the 360 degree counter clockwise or right using the switch in the operator cabin of the excavator.

In case that hydraulic rotating type of crusher has been converted into the free rotating one, block the input and output port by the plug after split the hose connected to the rotating driven hydraulic motor.

For the operation of the free rotating type of crusher, check the smoothness of rotation when the one-side jaw of crusher is met.

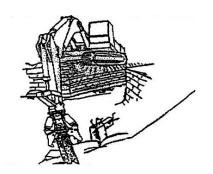


10. SAFETY OPERATION

⚠ WARNING

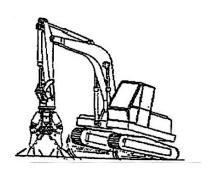
- Improper operation or maintenance could result in injury or death.
- Do not operate or work on this machine unless you are properly trained.
- Read and understand the operation and maintenance manual.
- Additional manuals are available from FEEL crusher dealers.

O ENSURE POSITIONING



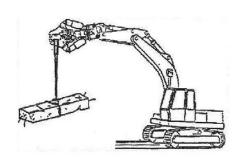
Place the excavator on the even flat Sound on the operation of crusher. If not, there is a risk that excavator seems to fall down and turn upside.

O NEVER SUPPORT EXCAVATOR



Don't have to move the crusher to the side of the main body in the excavator by the support of crusher.

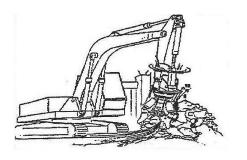
O NO LIFTING WITH CRUSHER



Don't use the lift operation using the crusher. It can bring out the risk of turning upside-down in the excavator and the cause of damage in the crusher.



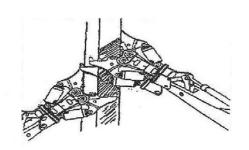
♦ NO SIDE STRENGTH



Don't collect the pile of broken pieces by the crusher.

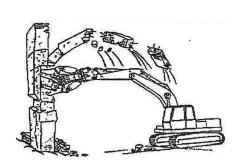
The crusher is not designed to perform this kind work.

CHANGE WORKING POSITION



Crusher many places of surroundings by turns, not only one place of the buildings. On the operation. Operate the crushing from the small place to the wider one, if possible.

O DO CRUSHING FROM THE TOP



On breaking down of column, chimney, brick buildings, the crushing operation has been done from the top to the bottom.

Incase of the pile of heavy-load concrete falling down on the excavator or crusher, it can make a big damage to the crusher

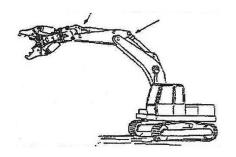
♦ NO DROP HITTING



Don't have to strike down by the crusher. It can lead to the heavy damage to the crusher.

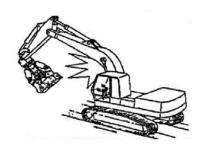


◆ NO FULL STROKE OPERATING



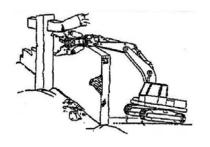
Don't operate the crusher with the attitude to carry the cylinder of the boom and arm in the excavator to the end of stroke.

♦ NO HIT BOOM



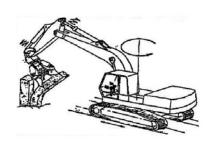
Be careful not to hit boom with crusher when main machine's arm is folding.

♦ NO USE AS A LEVER



Don't use the crusher as the support. This will cause serious damage to the crusher.

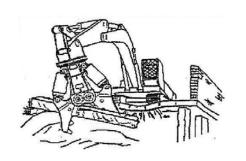
♦ NO ACTURE EXCAVATOR IN PROGRESS



Don't revolve the excavator or don't the boom during the operation. It can lead to the very bad damage to the crusher.



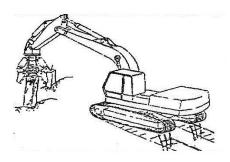
SAFETY TREATMENT BEFORE WORK



Install the wire net for the protection. On the driver's cabin to prevent possible injury from flying splinters of concrete or metal.

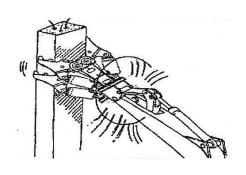
Confirm that the crusher can bear the load of the excavator when it works on the roof or over the ceiling of the buildings.

• NEVER PULL AT GIRDERS



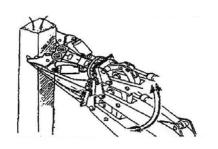
Don't operate to strike or pull out the pile by the crusher. This can both damage the crusher and cause the bolts on the adapter to break the excavator may become unstable and fall over remove projecting reinforcement rods this avoids damage to the hydraulic cylinder.

O NEVER ACTUATE THE ROTATING



Don't make revolution of the crusher in case of the hydraulic revolving type of the crusher during the operation. This crusher during the operation. This will cause damage to the hydraulic crusher and the boom.

• NEVER MOVE THE SHOVEL



Don't have to hold and swing the crusher with the broken pieces.

Bending movements of this nature will cause serious damage to the hydraulic crusher.



11. MAINTENANCE AND REPAIR

11.1. 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 valve 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 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.

11.2. Maintenance

- Check if there is a crack at the welding part of the crusher ever 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 dose not exceeds 2mm.
- Adjust the clearance of cutter blade according to the operation manual, if necessary.

11.3. Change of cutter blade

Change the cutter blade if there is 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 FEELENG 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 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 gloves.

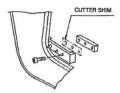
11.4. Checking and adjusting the cutter blade clearance

<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 has 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.

11.5 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 law.

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: 150~180℃

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

Protective gas: M11 DIN32526

Interpass temperature : max. 160 ℃

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℃

Welding filler: DIN8555 MSG 1-GZ-250

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

Protective gas: C02, M21 DIN32526

Interpass temperature: max. 200 ℃

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

Welding conditions for crusher teeth

Reheating temperature for welding: 150~180℃

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

11.6 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 FEELENG 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 parts.
- Every 100 hours, or 7 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 covers
- 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 dissemble 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.

11.7. 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 filter 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



parts 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 became 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.

12. Troubleshooting

Fault	Cause	Required Action
	The stop valve in the pipe line is locked	Open the stop valve
Hydraulic Crusher does not run.	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	Cutter blade is worn or broken	If necessary reset or replace cutter blade
cutted very well	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	Pressure relief valve is defective	Replace defective parts
is too high	Oil level in tank too low	Fill hydraulic oil
Oil leaks from the hydraulic connections	Connecting adapter is loose	Tighten adapter
Abnormal	Insufficient greasing	Apply grease
The jaw close by the gravity of itself	Defect of the speed-up valve	Call authorized service man

13. 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 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 the entire 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.