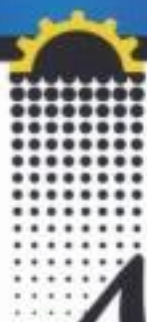


Arman Industrial & Manufacturing Group  
Hydro Cone Crusher 36"



**Arman crusher**  
Aggregate manufacturer company



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Dezign Production Cone Crusher Plant

### Hydro Cone Crusher:

is one of different kinds of cone shaped crushers which are used as initial or secondary in mines.

Tight structure, high power and capacity in crushing stones easy adjusting , low cost for maintaining and repairing are unique specifications of this machine.

Crushing operation in this machine will be done by closing the distance between Mantles (which are located on shafts) and Concave (Which is inside the main body, i.e. Topshell).

All abrasive parts of this machine are made up Molybdenum Manganese Steel which is highly resistant against abrasion.

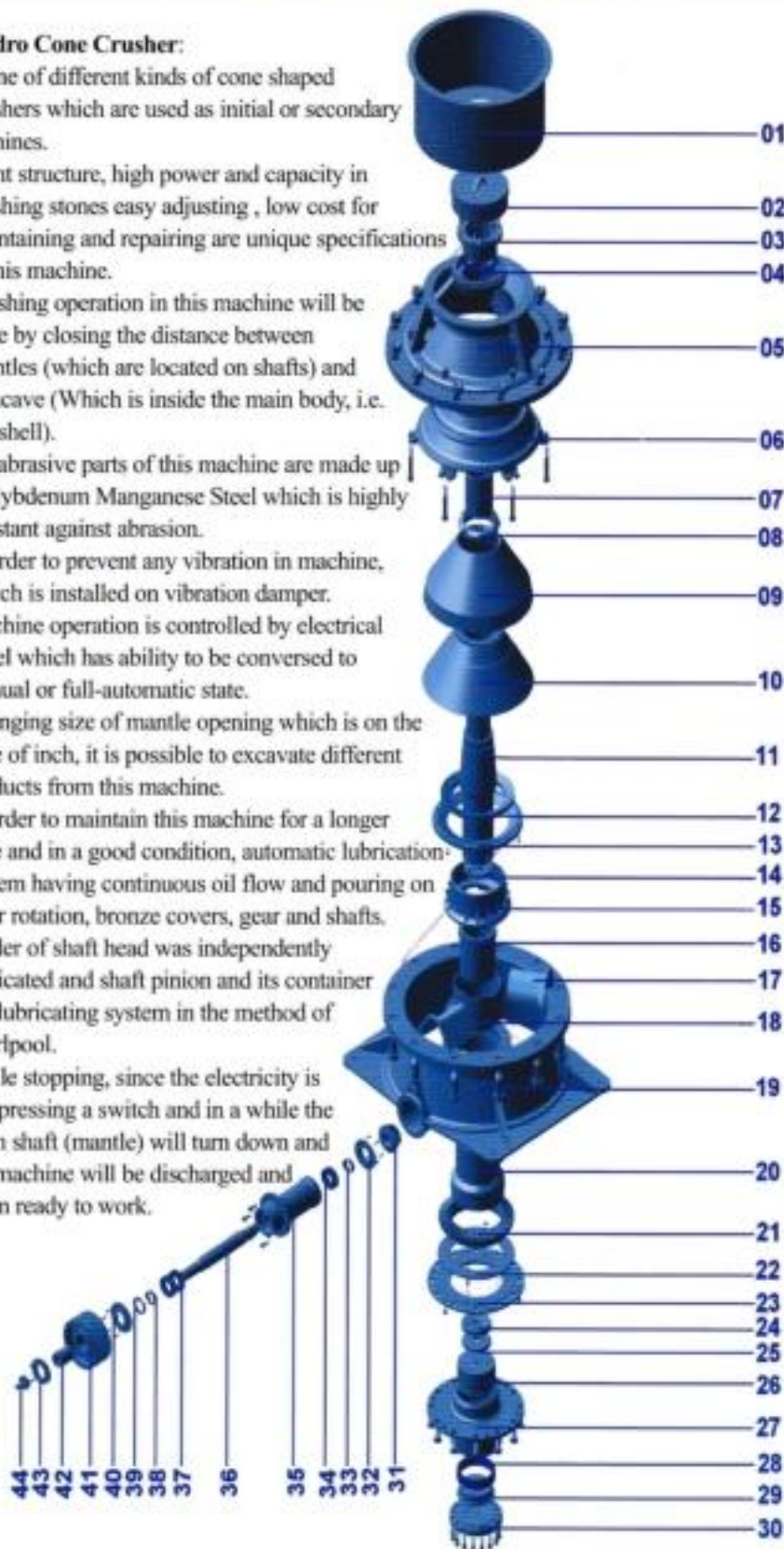
In order to prevent any vibration in machine, switch is installed on vibration damper.

Machine operation is controlled by electrical panel which has ability to be converted to manual or full-automatic state.

Changing size of mantle opening which is on the base of inch, it is possible to excavate different products from this machine.

In order to maintain this machine for a longer time and in a good condition, automatic lubrication-system having continuous oil flow and pouring on floor rotation, bronze covers, gear and shafts. Spider of shaft head was independently lubricated and shaft pinion and its container has lubricating system in the method of whirlpool.

While stopping, since the electricity is off, pressing a switch and in a while the main shaft (mantle) will turn down and the machine will be discharged and again ready to work.



Hopper	1
Cap	2
Spider	3
Seal	4
Top Shell	5
Concave	6
Sleeve	7
Main Shaft Nut	8
Mantle	9
Head Center	10
Main Shaft	11
Dust Seal Ring	12
Retaining Ring	13
Shaft Step	14
Dust Collar	15
Eccentric Bush	16
Bottom Shel Cover	17
Bottom Shell Bushing	18
Bottom Shell	19
Eccentric Bush(Steel)	20
Crown Wheel	21
Plate Of Bronze	22
Plate Of Steel	23
Step Washer (Steel)	24
Piston Wearing Plate	25
Piston	26
Hydroset Cylinder	27
Packing	28
Packing Plate	29
Hydroset Plate	30
Pinion	31
Bearing Cover	32
Spacer	33
Bearing	34
Housing	35
Pinion Shaft	36
Bearing	37
Spacer	38
Seal	39
Bearing Cover	40
Pulley	41
Pulley Bushing	42
Ring Of Pulley	43
Blank Ring	44



	<b>Title</b>
Definitions and terminology .....	2
1-1 Hydro Cone crusher: .....	2
1-2 Crusher size.....	2
1-3 Intel opening: (B).....	2
1-4 Closed side setting (A): (CSS).....	2
2-1 Crusher application.....	3
2-2- Machine description.....	4
2-2-1- Mechanical section.....	4
2-2-2- hydraulics and lubrication: .....	4
Machine lubrication: .....	5
Hydraulic section and CSS control: .....	5
Technical requirements .....	6
3-1 Machine dimensions .....	6
Machine installation .....	10
4-1 chassis .....	10
4-2 Rotation direction of machine main pulley .....	10
4-3 Location of the electromotor: .....	10
4-4 Discharging crushed material: .....	10
4-5 Feeding the Machine: .....	11
Machine operation .....	12
Electric system .....	12
A: Hydraulics activation: .....	12
B: Crusher activation: .....	12
A: Stopping the crusher: .....	13
5-2 How to load the material:.....	13
5-3 Lubrication system: .....	14
5-4 Automatic setting of the CSS: .....	15
Machine maintenance.....	18
6-1 Daily checks: .....	18
A: Before you turn the crusher on: .....	18
B: After running the lubrication system pump.....	18
A: After operating the machine: .....	18
D: When working with the machine and crushing action.....	18
After stopping the device: .....	19
6-2- weekly checks: .....	19
6-3 yearly checks: .....	19
6-4- Oil used for lubricating the machine: .....	20
6-5- Oil used in the hydraulic jack system: .....	20
6-6- Starting the machine: .....	20
Describing some machine failures, their cause, and fixing them.....	21



**Definitions and terminology**

**1-1 Hydro Cone crusher**

The feature of this machine is a cone-shaped space limited by a crushing hard shell (concave) and an off-axis movable cone (mantle); the crushing of input material is done in this space. The closed side setting (CSS) and pushing of the material is adjustable through a hydraulic system.

**1-2 Crusher size:**

The size of crusher is determined according to largest diameter of the main cone (Figure 1).

In this text, the 36" model (900mm) is intended.

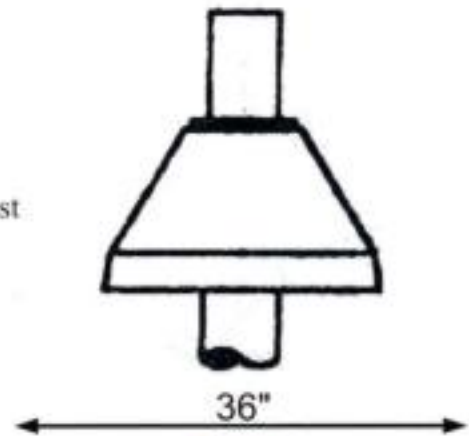


Figure 1

**1-3 Intel opening: (B)**

Intel opening is defined as the distance between the movable cone and fixed crushing shell on top of the crushing conical space and on its open side (Figure 2).

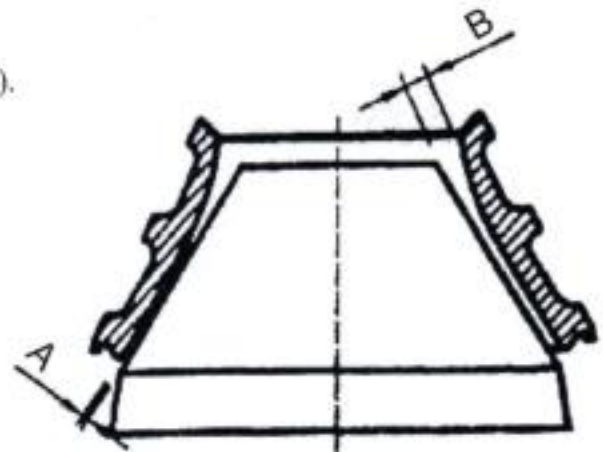


Figure 2

**1-4 Closed side setting (CSS):**

Closed side setting is defined as the distance between the movable cone and fixed crushing shell on bottom of crushing conical chamber and on its closed side (Figure 2).



## 2-1 Crusher Application:

Hydro Cone crusher is used for crushing hard, non-sticky and dry materials to the strength of 400 mpa such as limestone, granite, basalt, quartz and other minerals in weather conditions of 60 c. There are two kinds of this crusher:

1): fine crusher for crushing the materials to the size of 100 mm, which contains three types:

2" -36" (for crushing materials up to 50 mm),

3" -36" (for crushing the material to the size of 75mm)

and 4"-36" (for crushing materials up to 75 mm).Figure (3)

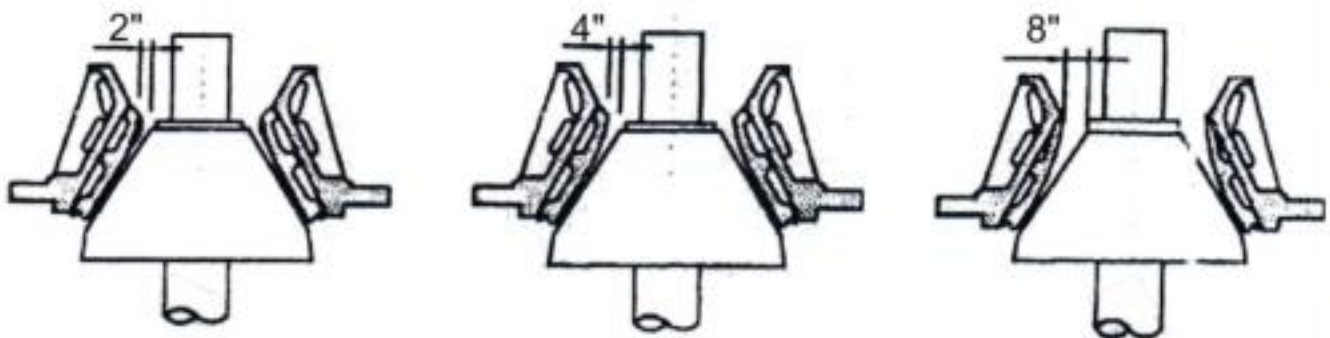


Figure 3

2): Coarse crusher is used for crushing materials up to 220 mm, which includes five types:

5"-36", 5.5"-36" (for crushing materials up to 135 mm) and 6.5 "-36", 7 "-36" (for crushing materials up to 175 mm) and 8"36", 9"-36" (for crushing materials up to 220 mm). The difference between crushers of fine crushing group is just in mantle and concave type and other parts are similar.

Crushers of the coarse crushing group are different in mantle, concave and top shell (upper shell) type , and the other parts are similar.

Hydro Cone Crusher is used as a secondary crusher in the ore dressing operation after a jaw crusher; but if a large volume of raw materials have the appropriate dimensions for being crushed in this machine, it can also be used as a primary crusher.



**2-2- Brief description of machine:**

Hydro Cone crusher has 3 main parts:

1. Mechanical section
2. Hydraulics and lubrication
3. Electricity and Electronic Control parts

**2-2-1 Mechanical section**

The mechanical section has 5 main components including:

1. Bottom shell and the appurtenant
2. Top shell and the appurtenant
3. Hydroset and the appurtenant
4. Hosing and the appurtenant
5. Main shaft and the appurtenant

Driving force for starting the crusher is provided by an electric motor which is transmitted by the belt and pulley to the machine.

Electric motor movement is first transferred to the pinion shaft and the gears, resulting in rotation of the machine eccentric section and movement of the main shaft, whose end is placed in the bronze eccentric bush.

There is a little space between the main shaft and the bronze eccentric bush, and this gap is filled with a thin layer of oil.

By moving of the main shaft and then applying high pressure and strike on the materials entered into the crushing chamber, material crushing operation is performed.

There is a dust seal ring at the back of the main cone, which is used to prevent dust from entering into the lubrication system and oil contamination.

**2-2-2- The hydraulic system and lubrication:**

The device hydraulic system consists of two main components:

- A. Lubrication system
- B. The hydraulic system and the CSS control

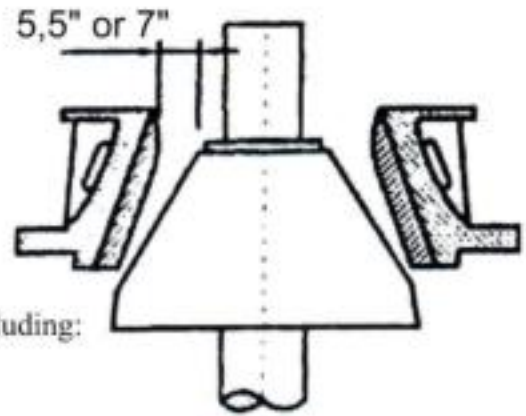


Figure 4



**Machine lubrication:**

For lubricating the interior parts of the crusher, there exist two pathways for entering oil into the machine (Figure 5) through which the Bronze Bushes, crown wheel and pinions, bronze step washers and the bearings of housing or pinion shaft sections are lubricated. An output path also returns the oil into the reservoir.

The machine lubrication system has a hydro heat exchanger, whose mission is to reduce the temperature of the hot oil. For the cold season, a heating system (heater) is considered for warming the oil in the reservoir.

A filter is mounted to prevent the pleats creation.

**The hydraulics and CSS control:**

Setting the closed side setting (CSS) is done by a system of hydraulic jack.

The oil in the hydraulic jack flows into the hydrosset by the pump and moves the piston in the hydrosset cylinder, which results in the vertical movement of the main shaft.

Thus, the CSS is variable and adjustable(Figure 5).

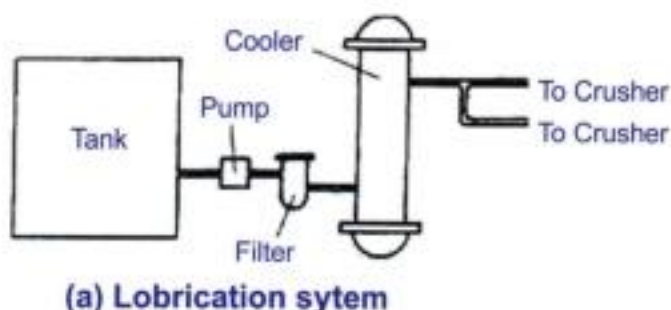
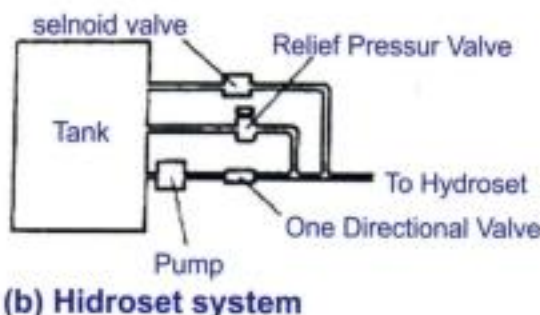


Figure 5



**Technical requirements**

**3.1 Machine dimensions:**

The overall dimensions of the machine are shown in figure 6.

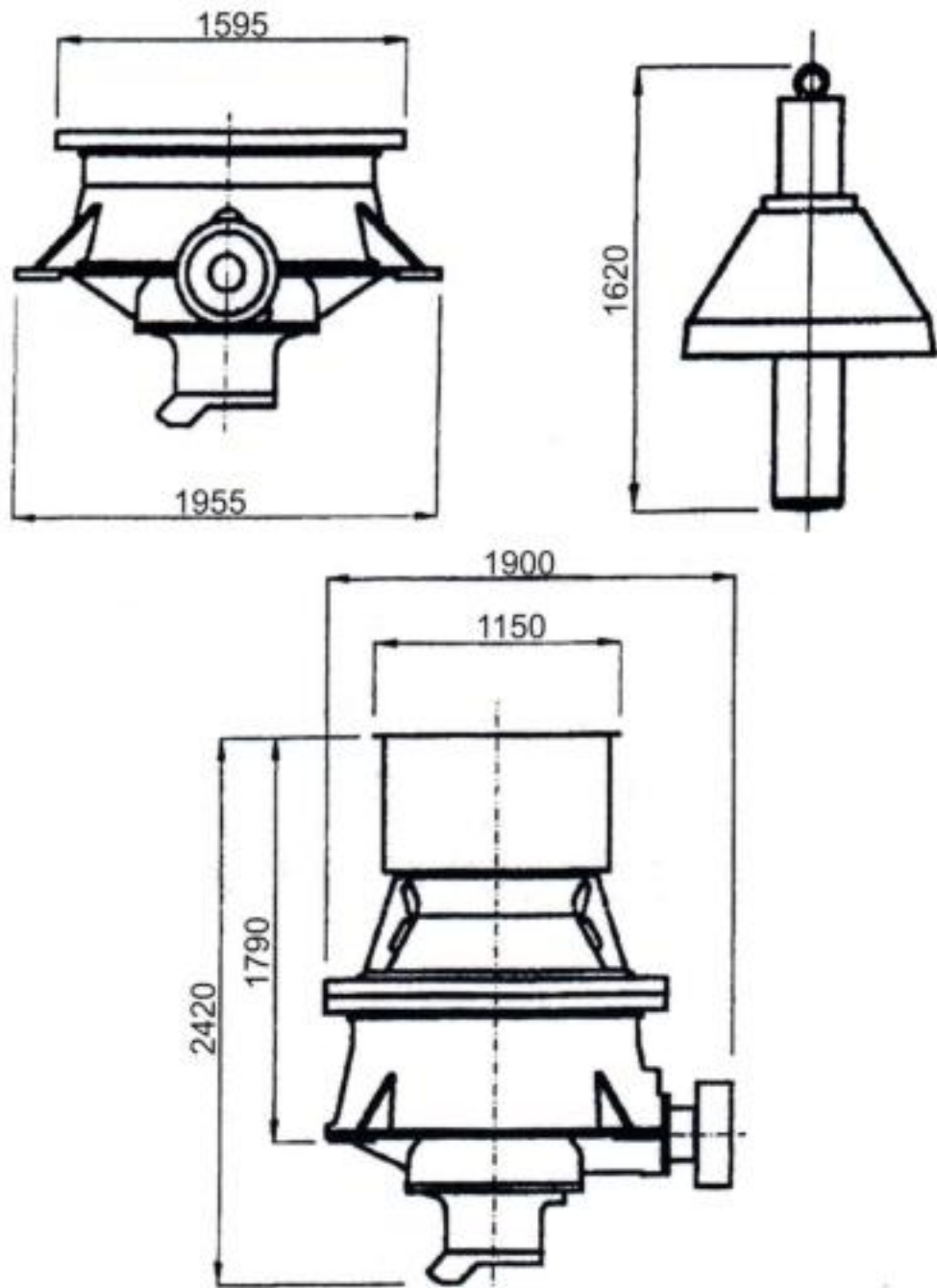
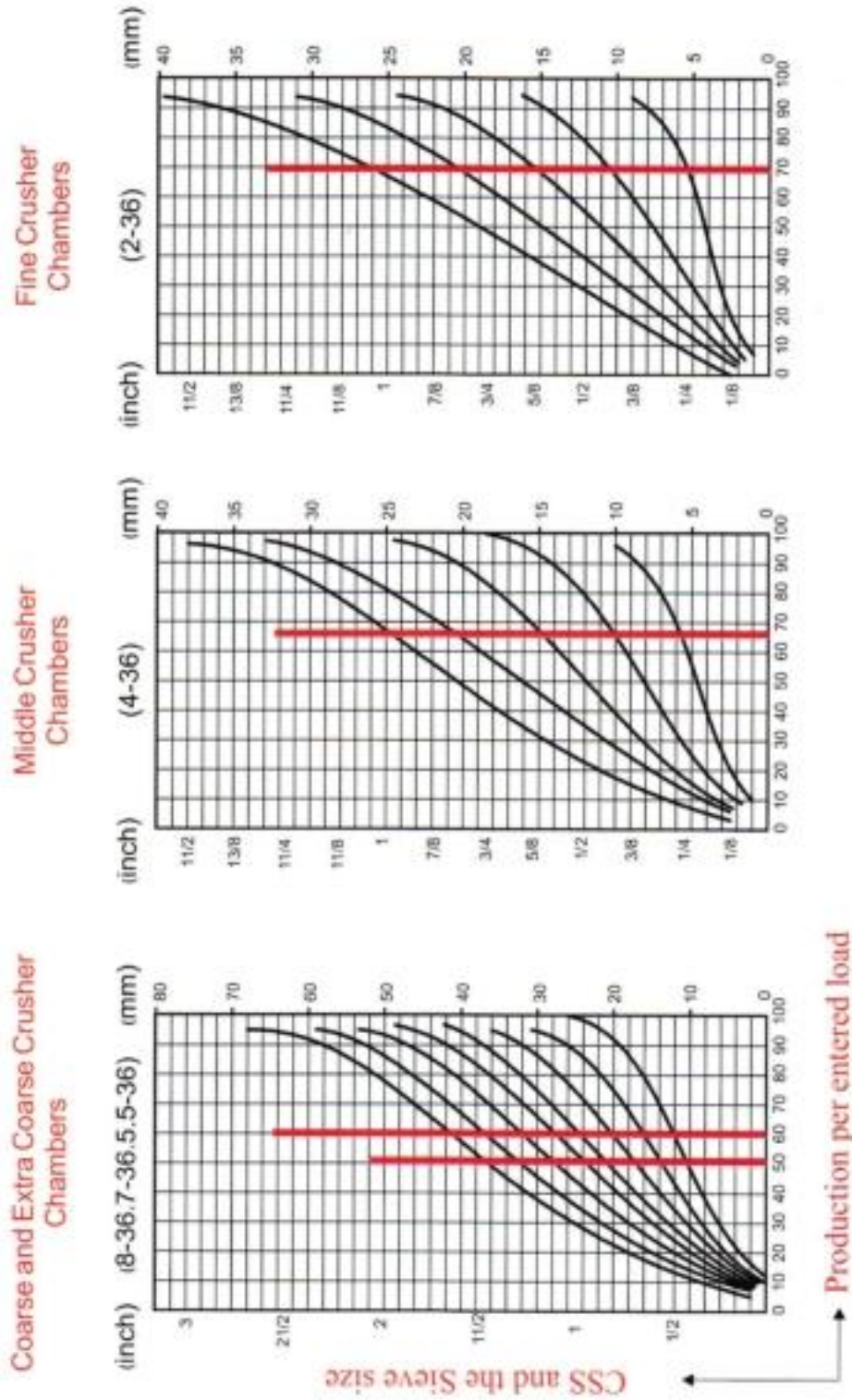


Figure 6





## Grain size distribution curve of the product (Dry Granites), Hydro cone crusher



Select the machine CSS; the horizontal line passes that point. The curve passing the junction point of the mentioned horizontal line and the bold vertical line defines the product grain size.



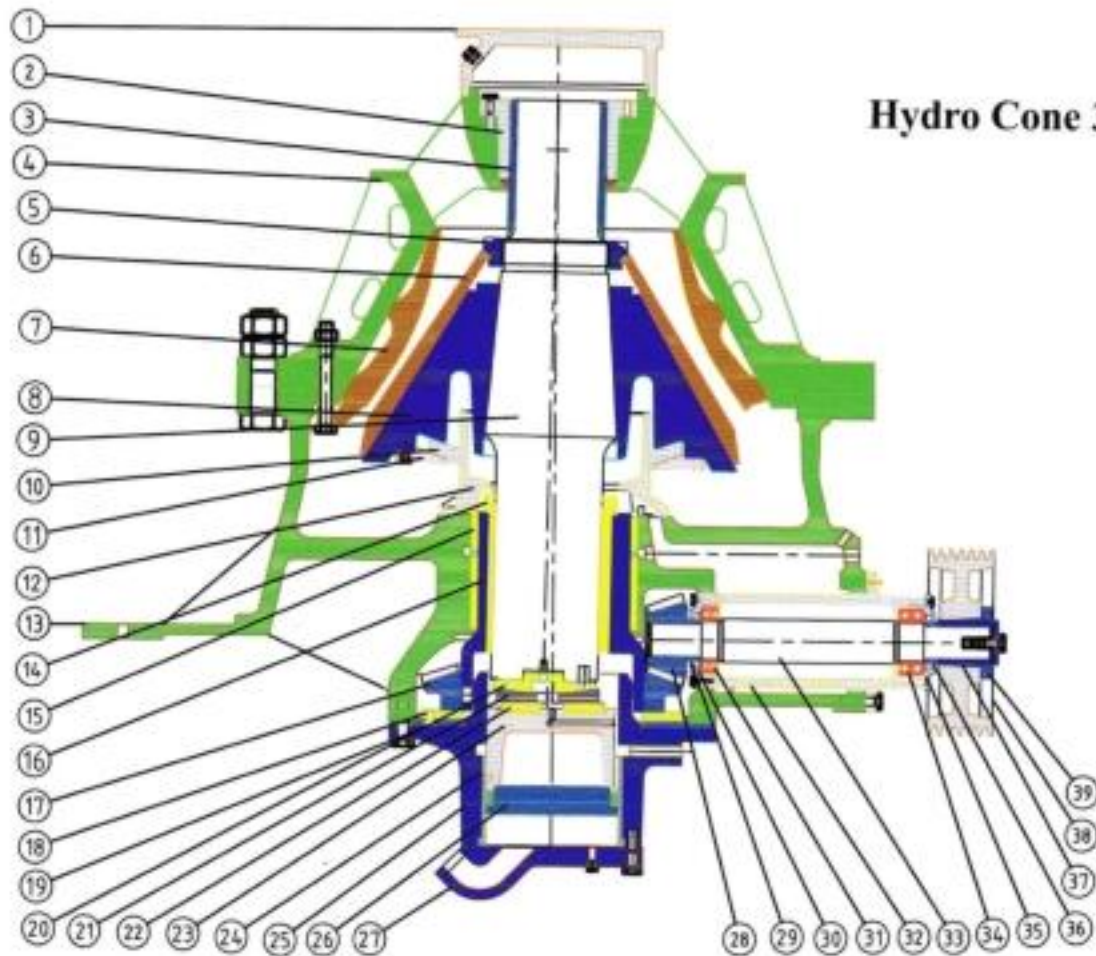
Approximate capacity of Hydro Cone 36" (tons per hour)

Crusher Size	Maximum Entry Size (inch/mm)	Max Permitted Motor power		Eccentric throw		C.S.S. (Closed Size Setting ) mm/ins											
		kw	hp	ins.	mm	5	6	8	10	13	16	19	22	25	29	32	
						3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1	11/8	32	
Extra Coarse Crusher Chamber 8-36	5x5x7 125x125x175	55	75	5/8	16												
		75	100	3/4	19							85	90	95	100	105	
		75	100	7/8	22									115	120	125	
		90	125	1	25											140	145
Coarse Crushing Chamber 7-36	4x4x6 100x100x150	55	75	5/8	16							80	85	90	95	100	
		75	100	3/4	19							100	105	110	115	120	
		75	100	7/8	22								125	130	135	140	
		90	125	1	25									145	150	160	
Coarse Crushing Chamber 51/2-36	3x3x5 75x75x125	55	75	5/8	16					60	70	80	90				
		75	100	3/4	19					70	80	90	100				
		75	100	7/8	22						90	100	110				
		90	125	1	25							105	115				
Middle Crushing Chamber 4-36	2x2x3 50x50x75	55	75	5/8	16			42	45	48	52	55					
		75	100	3/4	19				52	55	60	65					
		75	100	7/8	22					65	70	75					
		90	125	1	25					75	80	85					
Fine Crushing Chamber 2-36	11/2x11/2x2 40x40x50	90	125	11/8	28					80	90	100					
		75	100	3/4	19	32	35	38	40	45							
		75	100	7/8	22		38	38	45	50	55						
		90	125	1	25		45	45	55	60	65						
		90	125	11/8	28				65	70	80						

Figure 4

The above values are in ton per hour regarding the dry materials of about 1.6 ton per cubic meters specific weight required that the sizes finer than its CSS be previously sieved.





**Hydro Cone 36 Inch**

No	Part Name	Material
1	Spider cap	Cast iron
2	Spider Bushing	Cast iron
3	Main Shaft Sleeve	Carbon Steel
4	Top Shell	Cast steel
5	Main Shaft Nut	Cast steel
6	Mantle	High Manganese cast steel
7	Concave Ring	High Manganese cast steel
8	HeadCenter	Cast steel
9	Main Shaft	Carbon Steel
10	Dust Seal Ring	Cast iron
11	Retaining Ring	Cast iron
12	Dust Collar	Cast iron
13	Bottom Shell	Cast steel
14	Eccentric Bushing	Bronze
15	Bottom Shell Bushing	Bronze
16	Eccentric	Alloy steel
17	Gear	Alloy steel
18	Gear Wearing Plate	Bronze
19	Retaining Ring	Carbon Steel

No	Part Name	Material
20	Main Shaft Step	Bronze
21	Step Washer	Alloy steel
22	Piston Wearing Plate	Bronze
23	piston	Cast iron
24	Hydroset Cylinder Bushing	Cast iron
25	Hydroset Cylinder	Cast steel
26	Packing Plate	Alloy steel
27	Hydroset Cylinder Cover	Cast steel
28	Pinion	Alloy steel
29	Bearing Cover	Cast iron
30	Spacer	Carbon Steel
31	Bearing	-
32	Pinion Shaft Housing	Cast iron
33	Pinion Shaft	Alloy steel
34	Bearing	-
35	Bearing Cover	Cast iron
36	Spacer	Carbon Steel
37	Tapered Bushing	Alloy steel
38	Pulley	Cast iron
39	Retaining Ring	Carbon Steel

### Device installation and start-up

#### 4.1. Chassis

Hydro Cone crusher is placed on a metal chassis while installing (Figure 7).

The chassis is consisted of two fixed and movable parts.

The movable part is placed on six flexible rubber plates, which leads to least amount of vibration and long life of the machine while operating.

The fix part of the chassis is installed on a reinforced concrete foundation, such that its four legs are welded in their location on the base plates located on the foundation.

#### 4-2 Circulation direction of the machine main pulley:

The pulley circulation direction should be clockwise when looking directly at the machine main pulley (Figure 8).

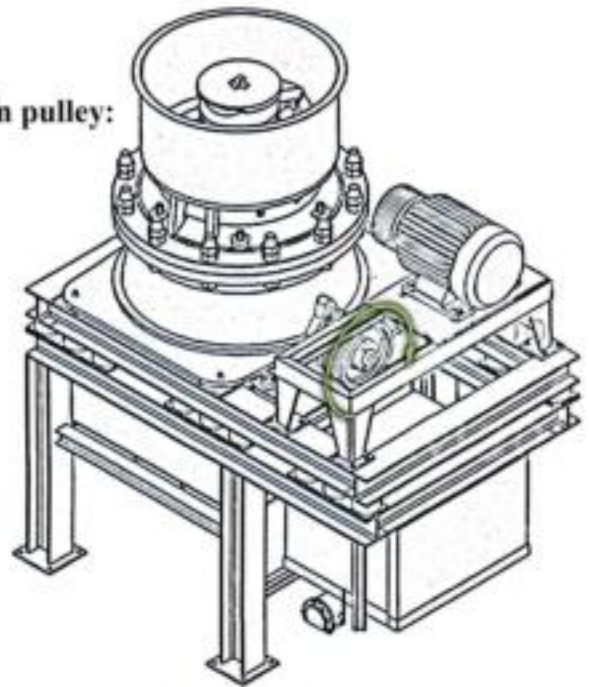


Figure 8

#### 4-3- Location of the electric motor:

Before adjusting the belts, the electric motor should be placed such that the electromotor main shaft and the pinion shaft be completely parallel and the belts rotation direction be perpendicular to the shafts.

#### 4.4 Discharge of the crushed material:

Discharge of the products should be such that the crushed materials do not get assembled under the crusher; otherwise, the dust seal ring will be damaged and as a result, the oil will be polluted to dust.

The oil passages shall not be to the discharged material.



For ease in opening and removing the hydroset, the foundation must be designed such that sufficient height exists between the device and the strip carrying the discharged material.

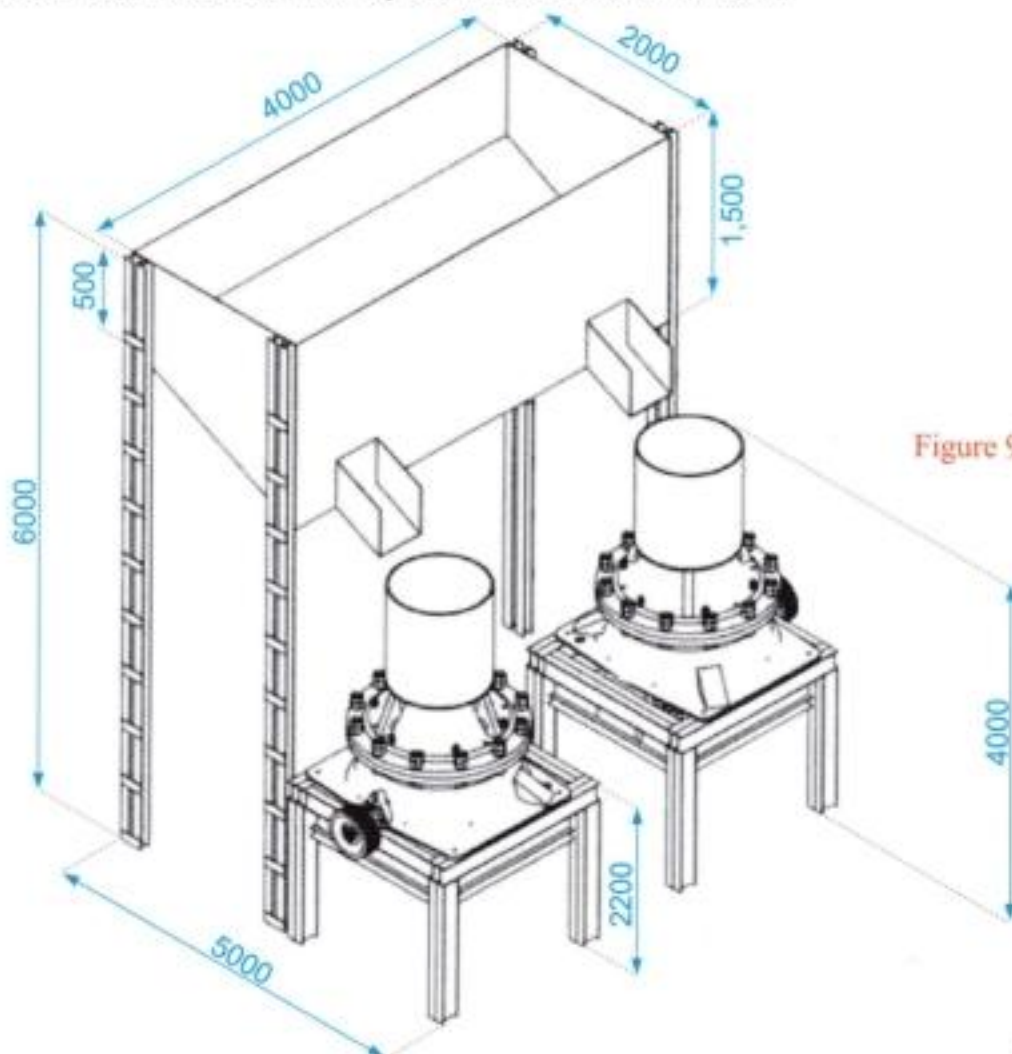
There should also be enough free space around the crusher for opening other parts of the crusher, replacement of the parts and machine repair and maintenance.

#### 4.5. Feeding the machine:

An air silo is placed next to the machine in order to feed the crusher.

The size and location of the silo is defined in figure 9.

The main task of the air silo is to uniformly feed the load into the crusher.



Air silo feeding the Hydro Cone crusher with a capacity of about 4 cubic meters



### How to operate the machine

#### 5.1 Electrical system:

There are two stages at the start of the crusher operation:

#### **A: Activation of the hydraulic system:**

The oil pump, hydraulic jack pumps and solenoid valve are activated in this stage.

By activating the oil pump, the bronze bushes and gears are lubricated and with activating the jack pump, the closed side setting (C.S.S) is controlled and regulated.

The task of solenoid valve includes controlling the oil entry and exit from the hydroset into the hydraulic jack reservoir.

In the hydraulic system, the above operation can be done manually or by an automatic control unit.

The crusher control unit is a PLC responsible for the machine regulation. For example, the PLC unit can be set as follows:

Minimum amperes of machine operation: 100Amp

Maximum amperes of machine operation: 120Amp

Average amperes: 110 Amp

As a result, when the ampere reaches more than 120 Amp, the PLC unit commands and the CSS opens up a little to decrease the amperage.

Also, if the ampere is less than 100 Amp, the pump jack operates, the CSS is tightened and the ampere increases. Thus, the crusher always works in a range of 110 Amps and the C.S.S remains constant

in a certain amount.

#### **B. Activation of the crusher**

After activating the hydraulic system, the electric motor can be turned on; in this case, the crusher gets ready to receive the load.



**Note: At this stage, there are three modes for the system safety:**

1. If the oil temperature is not enough for the proper fluidity in the pipes, the electric motor will not switch on.
2. If the oil temperature is too dangerous for the bronze bushes, the electric motor will not turn on.
3. If the input oil flow rate is not enough, the electric motor again will not switch on.

In Hydro Cone crushers of model 36", the 90 kw electromotor is used for operating the machine. Equipment such as metal lined steel, fuse, etc. are used for safety of the electromotor. Diagrams of control circuit and crusher power are depicted in the attachments.

**C: Stopping the crusher:**

The following steps must be taken to stop the crusher:

1. Stopping the feeding operation,
2. Turning off the motor after 0 to 15 seconds,
3. Stopping lubrication operation 3 to 15 min after complete electric motor shutdown.

**5-2- How to load the material:**

The crusher productivity depends on the physical properties of the loaded materials, loading amount and conformity of the amount of loaded material with the crushing chamber. So, it is important that the size of loaded material be in accordance with the type of crusher.

For instance, in machines of fine crusher group, the input load should be proper with the type 2"-36" or 4"-36".

Materials entry and exit chutes must be properly designed before making the foundation. The load entry chutes must be large enough to feed enough load to the crusher and the hopper be completely full while loading.

Besides, the elevator feeding the machine should be equipped with an iron detector to prevent them from entering into the crusher.

A system should also be installed on the feeder to stop the feeding when the materials are increased too much.



Feeding practice should be done only after the complete start of the crusher and conveyor belts. It should be noted that if there is no assurance of complete crusher feeding, the crusher should not start working. If the material feeding is not done uniformly, i.e.

the entered load is not distributed evenly in the hopper or the small-sized materials are gathered on one side and larger-sized materials are accumulated on the other side, extra pressure will be imposed on the crusher resulting in waste of the thin oil layer around the bronze bushes and hence destroying them. Uneven distribution of the load can also lead to steady wear of the mantle and concave (figure 10).

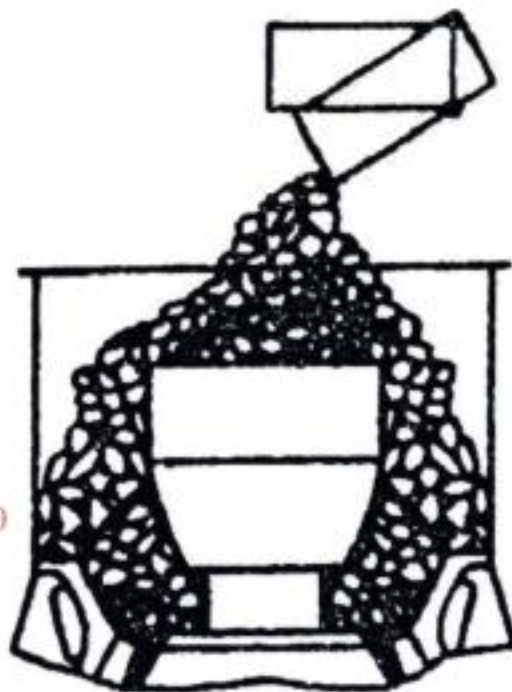


Figure 10

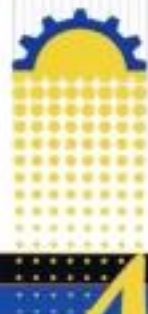
### 5.3 lubrication system:

For lubrication of the crusher, an electric motor-operated pump sends the filtered oil (to catch dirt and tiny pieces of metal) into the crusher.

The oil filter has a simple design, is easily replaceable and can be cleaned from contamination. The filter has a magnetic collector which removes the iron particles from the oil.

There are two oil entrances into the crusher that enter a volume of about 40 lit / min oil to the machine.

The pump and electric motor specifications are as follows:





## **Oil Pump:**

1. Output speed: 1500 r.p.m
2. Pressure: 175 bar
3. Capacity: 40 lit / min

## **Electric motor:**

1. Power: 2.2 kw
2. Speed: 1400 r.p.m

The pumped oil passes through a heat exchanger before entering the machine to reach a desirable temperature for entering the machine. Some features of the heat exchanger include:

1. The main body of iron tube with a length of 90 cm
2. 88 copper water pipes with an inner diameter of 10 mm
3. The number of water passes is equal to 4
4. The total contact area of 3 square meters

A water reservoir with a capacity of at least 20,000 liters is required for the heat exchanger system, and the water pump should circulate the water with a rate of about 15 cubic meters per hour.

Inlet oil temperature should be within the range of 30 to 60 and for this purpose, two thermostats maintain the oil temperature at this range.

One of the thermostats is used to control the heating system and when the oil temperature exceeds 60, the thermostat alarms and the machine operation is stopped through a micro-switch.

The lubrication system performance is indicated by a signaling LED on the power control panel.

A thermometer is used to determine the reservoir inner temperature and an oil level indicator is used to determine the oil level in the reservoir.



### 5.4 C.S.S automatic regulation

Regulating the C.S.S is done by a hydraulic jack system; furthermore, this system can be easily become automatic.

There is an ammeter in this system which has been programmed to operate the machine with the desired amperage. Thus, the system always remains fixed in a certain amount of CSS.

In cases that excess pressure is imposed on the machine and the ampere increases, the main shaft moves down with decrease in hydraulic jack oil pressure; and by increase in amount of CSS, this additional pressure is neutralized and the shaft automatically returns to its previous location again.

**Hydraulic jack system includes an electric motor, oil pump, solenoid valve, etc.**

Some characteristics of the pump and electric motor are as follows:

#### Oil Pump

1. Output speed: 1500 r.p.m
2. Pressure: 175 bar
3. Capacity: 20 lit / min

#### Electric motor:

1. power: 1.1 kw
2. Speed: 1400 r.p.m

In this one-way system, the oil passes by the one-way pump and valve through the hydro-set and lifts the main shaft as a result of which, the CSS decreases or increases (Figure 11).

A relief valve is placed on the oil path in case problems such as not opening of the outlet opening occur; this valve acts automatically and leads the oil into the reservoir and thus relieves the pressure on the system.

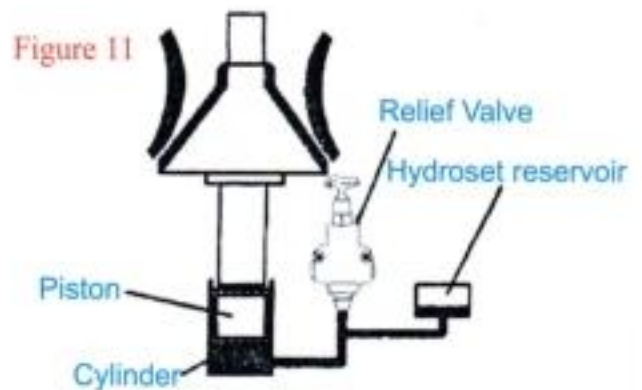
One of the features of hydro cone crusher is having a digital control system. In cases of excessive stress due to the entered load or extra pressure caused by the entry of non-crushable metal parts in crusher, the digital system gets into action. By operating of the digital control system, the oil pressure in the hydraulic jack drops and therefore, the main shaft moves down; the CSS opens and the non-crushable materials are discharged.

Therefore, the machine has complete safety versus such materials (figure 11).

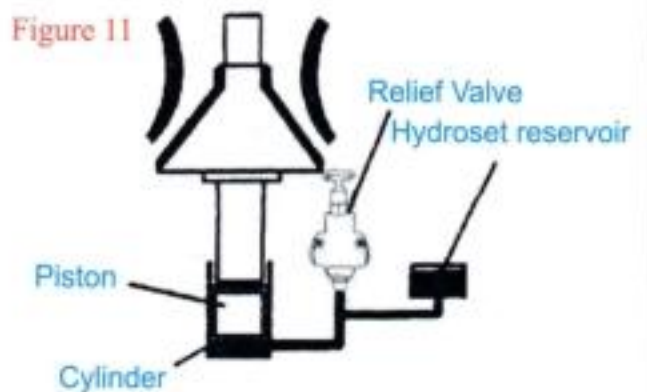


Another feature of Hydro Cone crushers is easy discharge of the machine in the event of fault in the system, *i.e.* it is possible to stop the crusher along with the material in the crushing chamber and this is also possible to lower the main shaft and deplete the crushing chamber before machine restart.

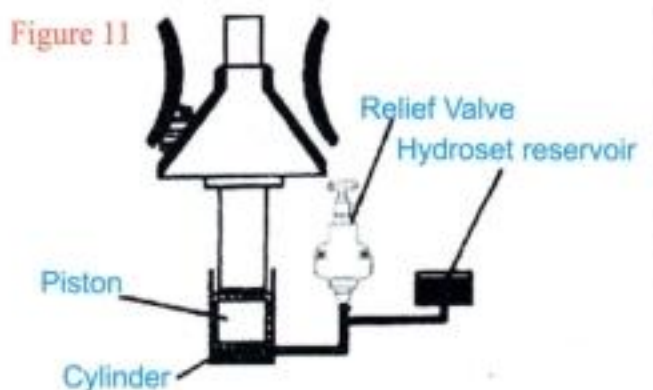
The oil is pumped from the reservoir into the hydroset cylinder and raises the mantle to the required position.



The oil is returned from the hydroset cylinder into the reservoir and lowers the mantle to the required position.



Due to excessive pressure on the hydraulic system, the oil in the hydroset cylinder is driven by the relief valve into the reservoir, and thus the mantle moves down and the non-crushable material is discharged by opening of the CSS.



### **Machine Maintenance:**

Careful maintenance is of special importance in all crushers, but considering that crushers operate under different working conditions, giving the same program for all of them is not possible.

It's necessary to check the new crusher status on a momentary basis.

But it is possible to increase the checking duration gradually until obtaining a reasonable period of time.

Checking each crusher parameters can be done as follows:

#### **6.1 Daily checks:**

##### **A: Before starting the crusher:**

- 1 Check the oil level in the lubrication tank,
- 2 Check the oil level in the hydraulic jack oil tank,
- 3 Make sure of the oil existence within the pinion shaft housing

##### **B: After running the lubrication system pump:**

1. Check the oil return into the reservoir,
2. Ensure absence of oil leakage in the oil entrance and exit paths.

##### **C: After machine operation:**

1. Control the C.S.S. amount.

##### **D: When working with the machine and crushing operation:**

1. Check if there are any unusual sounds,
2. Check unusual sounds in the oil pump.
3. Control the returning oil temperature.
4. Control the electric motor current.
5. Make sure of no oil leakage.
6. Inspect tightness of the machine screws.



### **E: After stopping the machine:**

1. Check the presence of metal particles in the oil,
2. Control the oil level in the pinion shaft housing,

### **6-2- weekly checks:**

In addition to the points stated in the daily checks, the following points should also be controlled on a weekly basis:

1. Inspecting the oil filter and tank and cleaning them if needed,
2. Inspecting the mantle and concave to see the wearing amount or other defects,
3. Checking the CSS in four locations around the crushing chamber and comparing them with each other,
4. Inspecting the dust seal ring for the amount of wear or other defects,
5. Checking the oil pump for unusual noises or wear,
6. Controlling tightness of the bolts and tightening them if needed,
7. Checking the belts for wear or resilience,
8. Checking the clearance between the main shaft and the spider bush,
9. Checking the clearance between the crown wheel gear and the pinion,
10. Inspecting the grease level in the spider bush.

### **6-3- Yearly checks**

In addition to the items mentioned in daily and weekly checks, the following points should also be controlled yearly after opening the machine:

1. Inspecting bottom-shell for amount of wear,
2. Inspecting the bottom-shell bush for wear or scratches on the surface,
3. Inspecting the bronze step washer for wear or scratches on the surface,
4. Inspecting the top-shell for amount of wear,
5. Control of the contact between the top-shell and bottom-shell
6. Inspecting the inside and outside of eccentric bushes for wear or scratches on the surface
7. Inspecting the amount of wear on the gears
8. Replacement of defective or depreciated parts such as protective coatings of bottom-shell, top-shell, etc.

### **6-4- Oil used for machine lubrication:**

Machine oil for lubrication of the machine internal parts should have the following characteristics:

1. Resistant to oxidation.
2. bubble-free
3. Harmless for copper alloys.
4. Surface tension of at least 45 lb.

**In the Hydro Cone machine of model 35", Nissan 200 or Behran 150 oils are used.**

### **6-5- Oil used in the hydraulic jack system**

Oil used for the hydraulic system shall comply with the oil used for system lubrication.

In other words, they should both own the features described in the previous section; but they are a bit different considering viscosity (fluidity).

In fact, the hydraulic jack system is slightly more fluid.

For this purpose, the Nissan Oil 100 is used in Hydro Cone machine models of 36".

### **6-6- Starting the machine:**

Before starting the crusher, the following items should be checked:

1. Oil pipes should be properly closed and the return pipe shall have the appropriate slope;
2. The electric motor voltage should be appropriate;
3. There should be enough oil in the oil tank
4. The oil heating system should be connected;
5. The oil return thermostats and the heating system be connected;
6. There should be enough grease inside the spider bush;
7. There should be enough oil in the pinion shaft housing;
8. Make sure of the proper circulation of electric motor;
9. Control the proper performance of the oil flow micro-switches and oil return.



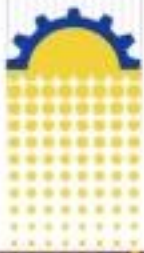
**Some of the machine faults, their cause, and how to fix them:**

Below are some cases leading to the crusher dysfunction, their cause and fixing them:

Fault	Reason	How to fix
<b>The crusher stop</b>	<ul style="list-style-type: none"> <li>-Excessive pressure to the device</li> <li>-Load accumulation in the crushing chamber</li> </ul>	<ul style="list-style-type: none"> <li>-Deplete the crusher chamber by lowering the shaft;</li> <li>-Reset the CSS;</li> <li>-There might be much fine load in the loaded material;</li> <li>-The concave or mantle should not have bulge</li> </ul>
	<p>Entering a piece of iron metal into the crusher</p>	<ul style="list-style-type: none"> <li>-Deplete the crusher chamber by lowering the shaft;</li> <li>-Reset the CSS;</li> <li>- If the shaft is stuck and cannot be lowered, you can pick up the lid of spider chamber and press the shaft top with a hand jack restrained by the top-shell arms.</li> </ul>
	<ul style="list-style-type: none"> <li>-Insufficient or no oil flow</li> <li>-Activation of the protective devices</li> </ul>	<ul style="list-style-type: none"> <li>- Clean the oil filter and clean if necessary;</li> <li>- Check the oil distribution.</li> <li>- Check the oil flow rate</li> <li>- Replace the pump if necessary,</li> <li>- Control the protection devices.</li> </ul>
	<p>High oil temperature</p>	<p>Refer to the oil temperature rise column</p>



Fault	Reason	How to fix
<p>Machine instability in a specific CSS</p>	<p>Oil leakage</p>	<p>Inspect the hydro-set section and fix it in case it leaks.</p>
	<p>Electrical panel digital is faulty. The hydro-set system is aired</p>	<ul style="list-style-type: none"> <li>- Fix the digital system;</li> <li>- Exhaust the air inside the hydro-set system.</li> </ul>
	<ul style="list-style-type: none"> <li>-The relief valve is faulty</li> <li>- The oil returns to the tank</li> </ul>	<ul style="list-style-type: none"> <li>-Hydro-set packing is spoiled;</li> <li>- Jack oil enters the lubrication system.</li> </ul>
	<ul style="list-style-type: none"> <li>-Hydro-set packing is spoiled;</li> <li>- Jack oil enters the lubrication system.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the hydro-set packing;</li> <li>- Inspect the inner surface of hydro-set cylinder for damage and replace the hydro-set cylinder bush if necessary.</li> </ul>





Fault	Reason	How to fix
<b>Unusual noises</b>	- Inadequate clearance between the gears	- Check the clearance between the gears.
	Wearing of the bronze step washer at the bottom of the main shaft	Check the oil for metal particles; if the particles have increased during the subsequent visits, the crusher must be repaired
	The concave is released (in the crushers having concave holder ring)	Check the rotation direction of the crusher.
	The mantel and concave collide with each other.	<ul style="list-style-type: none"> <li>- Check the C.S.S.</li> <li>-Inspect the concave for non-uniform wear.</li> <li>-If this is the case, change its place by rotating the top-shell.</li> <li>-Refer to the CSS instability column</li> </ul>
	Movement between the top-shell and bottom-shell (Loose screws)	<ul style="list-style-type: none"> <li>-Replace damaged or broken screws.</li> <li>- Check if the top-shell angled surface is in complete contact with its front surface in the bottom-shell; otherwise this section must be repaired with welding and lathing.</li> </ul>

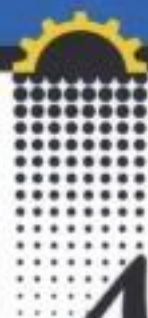


Fault	Reason	How to fix
Crusher shaking	Unbalance in the crusher pulley or loosening of the pulley on the shaft	-Fix the cause and replace the pulley if necessary.
Oil temperature rise	Thermostat non-operation	Inspect the thermostat.
	Excessive load accumulation in the crushing chamber	Check the crusher stop column
	The bronze bushes are getting damaged.	- Check for metal particles in the oil. - Inspect the bronze bushes.
Excessive oil pollution	The dust seal ring does not fully do the dusting action	-Possibly, accumulation of too much load in the crusher has damaged the dust seal ring. -Replace the dust seal ring if necessary. Set the material discharge rate to prevent their accumulation under the crusher.
	The oil filter is blocked	Clean the filter
The machine does not switch on	The oil pump is not turned on.	Find the cause and fix it.
	The flow rate is not sufficient and the protection machines may not work.	- Check the oil flow rate. - Inspect the oil filter and clean it if necessary. - Check the oil distribution. - Replace the oil pump if necessary. - Check the protection devices.





Arman Industrial & Manufacturing Group  
Hydro Cone Crusher 36"



**Arman crusher**  
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