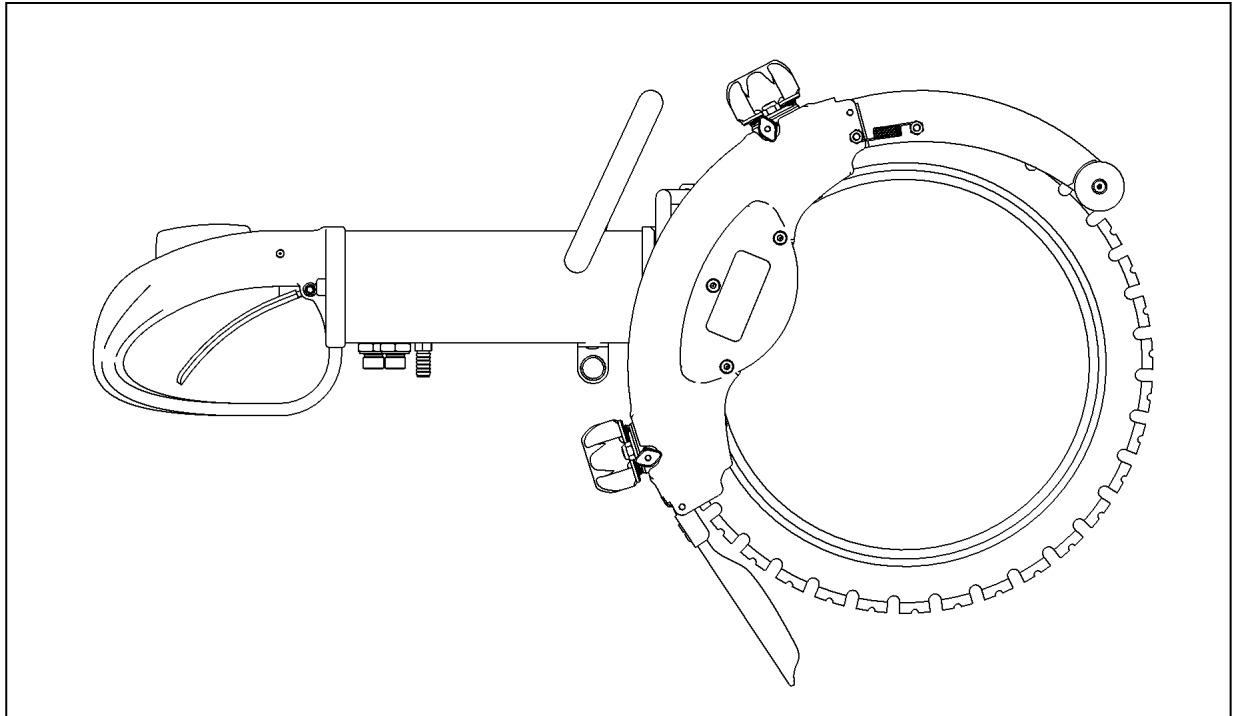


# Operating Manual



## **HRS400 PREMIUM Hydraulic Ring Saw**

From serial No. 9786

Revised july 2017



**HYCON A/S**  
Juelstrupparken 11  
DK-9530 Støvring  
Denmark

Tel: +45 9647 5200  
Fax: +45 9647 5201  
Mail [hycon@hycon.dk](mailto:hycon@hycon.dk)  
[www.hycon.dk](http://www.hycon.dk)

## Prior to Operation

We thank you for choosing a HYCON HRS400 ring saw.

To ensure smooth operation and long-lasting performance of your new ring saw, we recommend you to study this operating manual carefully and pay special attention to the chapters about

### Safety and Service Precautions

We hope you will be satisfied with your new HYCON ring saw.

Best regards  
HYCON A/S

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## Technical Details

HRS400 Ring Saw	
Weight w/o hoses and blade	10.2 kg
Oil flow	20-40 l.p.m.
Recommended minimum water supply	4 l.p.m. / 2 bar
Working pressure nominal	160 bar
Pressure relief valve in power source	Max. 172 bar
Max. return pressure	40 bar
Max. oil temperature	80°C
Blade diameter	ø400 mm
Max. cutting depth	300 mm
Circumferential speed	37–49 m/s
Rotation	1750 – 2350 rpm
Vibration level	<2.5m/s <sup>2</sup>
Sound pressure level 1 m L <sub>PA</sub>	109 dB(A)
Sound power level L <sub>WA</sub>	98 dB(A)
Necessary cooling capacity on power source	1 kW
Power	6 kW

## Useful Information regarding the Use of HRS400 Ring Saw

The HRS400 ring saw is a compact tool with great performance. There are no other ring saws on the market with higher performance in relation to size.

It is the perfect tool for cutting in all types of concrete, brick wall, asphalt etc.

The HRS400 ring saw cannot be mounted in a HYCON cart, but only used for handheld cutting jobs.

The HRS400 ring saw has two handles for optimum operator comfort.

The HRS400 ring saw is unaffected by water and can be operated in all working environments, even for cutting under water.

The HRS400 ring saw can also be connected to excavators and other machines. We recommend the use of a HYCON powerpack and/or an oil flow divider, which protects against too high oil flow, too high pressure and backwards rotations. See section about Use of Hydraulic Power Sources.

The saw is designed for wet cutting. If you use the HRS400 ring saw for dry cutting you will destroy the blade and have an excessive wear on spare parts. ONLY do wet cutting, as this cools the blade and removes the slurry. This results in as little wear on the blade as possible. Therefore always use sufficient water flow and pressure for cleaning slurry from rollers and blade.

The utility values of your HYCON HRS400 ring saw are numerous, and you will be pleased with your investment.

## Safety Precautions

- Read the HRS400 ring saw and power source operating manuals prior to use.
- Only use the HRS400 ring saw in accordance with the local working regulations on allowed working time
- Check the oil flow to the HRS400 ring saw. The oil flow may not exceed 40 l.p.m. A too high oil supply can result in the speed of the diamond blade being too high, causing the blade to break.
- Make sure that the diamond blade is mounted correctly and firmly fastened.
- Always use diamond blades approved for handheld cutting and for the material to be cut.
- Always use blades that are in good condition.
- From the factory, the HRS400 ring saw is mounted with a safety trigger, which may never be disturbed or dismantled.
- The HRS400 ring saw has an automatic integrated safety function that makes the saw stop if the diamond blade jams. However, in case of jamming, always loosen the blade from the material, before you start cutting again.
- Start the HRS400 ring saw just before you start cutting, and stop it again once the cutting is done. Do not let the HRS400 ring saw run freely in the air without water supply.
- In case of horizontal cutting or cutting above the head, always be aware of material falling down.
- A fine jet of oil at pressure can penetrate the skin. It is therefore important never to use your fingers to check for oil leaks and never to hold your face close to suspected leaks – use a piece of cardboard instead. If oil has penetrated the skin, you should get medical treatment immediately.
- The operator must always use protective goggles, earplugs, hard hat and shoes when operating the HRS400 ring saw.
- Never use the HRS400 ring saw close to electric cables. Prior to operation, check whether there are hidden or buried cables.
- Never wear loose clothing as it may get entangled in the moving parts of the saw.
- Always connect hoses to the HRS400 ring saw before starting the powerpack. Be sure that all couplings are tight.
- The HRS400 ring saw may not be operated if the oil temperature is above 80 C°. Operation at higher temperatures may result in the HRS400 ring saw getting warmer than normal and the operator risks getting burnt on it.
- To avoid all personal injury and damage to material, all repair, maintenance and service work must be carried out by authorized or properly trained persons only.

### IMPORTANT

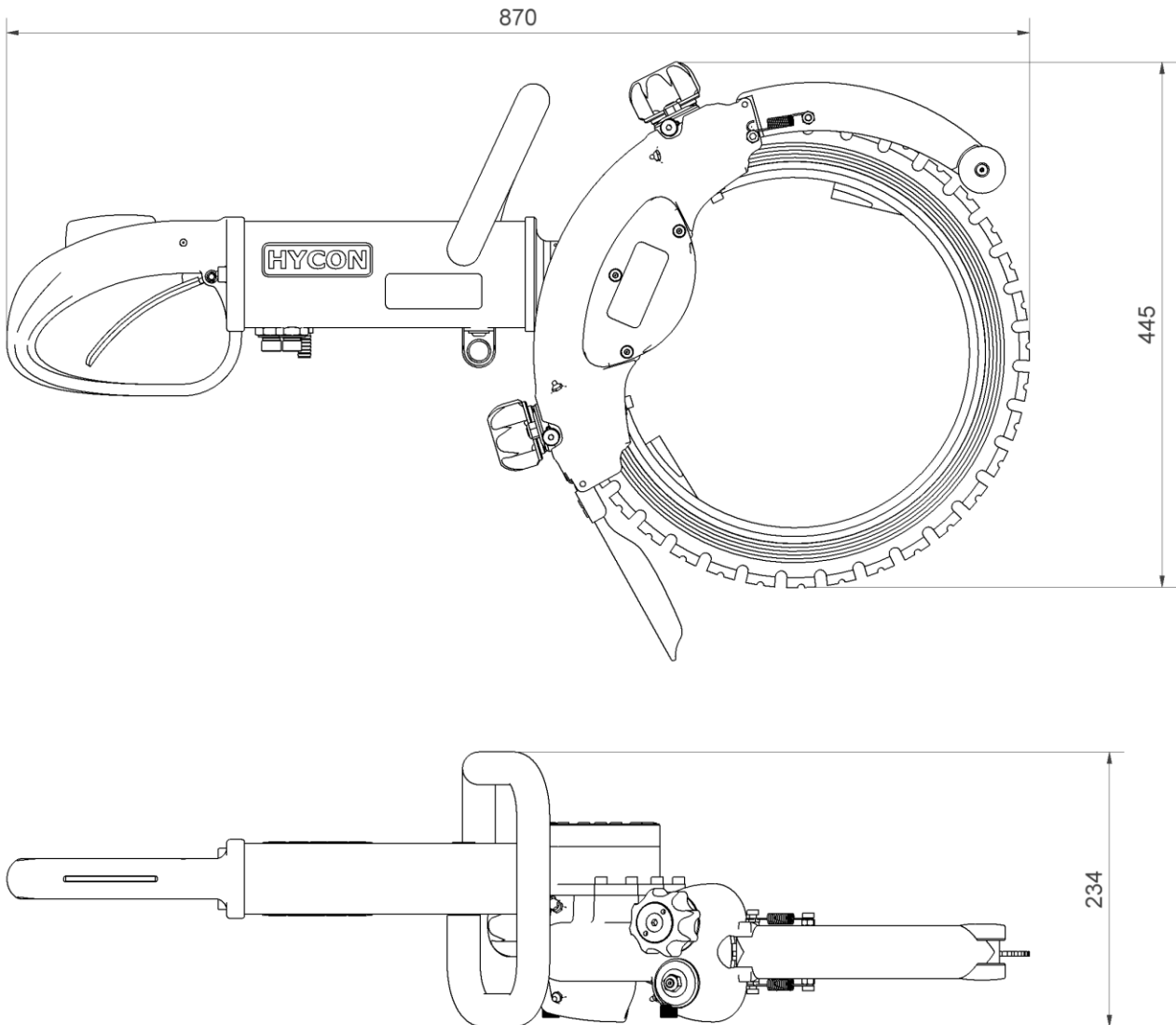
- Never leave the HRS400 ring saw when connected to the powerpack.
- Always use approved hoses. Contact your dealer, if necessary. Mount the hoses correctly so that the HRS400 ring saw rotates in the right direction. The hydraulic motor will be destroyed if pressure is set to the wrong connection. (T)
- The operator must pay extra attention and show caution when working in difficult working areas, such as slopes and other dangerous nature of the ground. Do not reach too far with the HRS400 ring saw, but always maintain a good footing and keep your balance.
- The operator must be properly trained in using the HRS400 ring saw or under supervision of a qualified instructor.
- An HRS400 ring saw not in use should always be kept in a safe and dry place.
- Always make sure that the HRS400 ring saw labels and warning signs are legible.
- Always use hoses, couplings and spares as such recommend by HYCON A/S.
- Repairs may only be carried out by experienced personnel.
- Make sure that all couplings are cleaned before connection.
- Do not throw or drop the ring saw! It is a highly specialized tool and it needs to be handled with care, or failure to the ring saw may occur.
- Do not block or damage the safety trigger for any reason. If the safety trigger is non functional, replace it immediately.
- Always disconnect the hydraulic circuit before connecting or disconnecting the HRS400 ring saw. If this is not done, there is a risk of damage to the quick release couplings or the hydraulic system getting superheated
- Never let the saw run dry – always cut only with water.



## WARNING

You must use approved personal protective equipment whenever you use the machine. Personal protective equipment cannot eliminate the risk of injury but it will reduce the degree of injury if an accident does happen. Ask your dealer for help in choosing the right equipment.

## HRS400 Hydraulic Ring Saw Overall Dimensions



	Length mm	Height mm	Width mm
HRS400 Ring Saw	870	445	234

## Operation

### CONNECTION TO HYDRAULIC POWER SOURCES - CHECK HYDRAULIC POWER SOURCE

- Using a calibrated flow meter and pressure gauge, make sure the hydraulic power source develops flow and pressure that is appropriate for the ring saw.
- Make certain that the power source is equipped with a relief valve set to open at 250 bar maximum.
- Make sure the ring saw is connected correctly to the powerpack and that hoses are not leaking from rubber or couplings.

### CONNECTING HYDRAULIC HOSES

- Wipe all hose couplers with a clean lint free cloth before making connections. Do not connect pressure to the return port.
- Connect the hoses from the hydraulic power source to the couplers on the ring saw hoses. It is a good practice to connect return hose first and disconnect it last to minimize or avoid trapped pressure within the hydraulic motor.
- Make sure the hydraulic hoses are connected properly and fully seated to ensure that the flow is in the proper direction.

**Note: If uncoupled hoses are left in the sun, pressure increase inside the hoses might make them difficult to connect. Whenever possible, connect the free ends of the hoses together when not in use.**

## General working Instructions



### WARNING

**This section describes basic instructions on how to use the HRS400 ring saw. If you feel unsafe while operating the HRS400 ring saw, STOP and seek expert advice. Do not attempt to use the HRS400 ring saw any further until instructions on how to proceed is given. Ask a specialist or your local HRS400 ring saw dealer.**

- **Observe all safety precautions.**
- Never use the machine if you are tired, if you have drunk alcohol, or if you are taking medication that could affect your vision, your judgment or your coordination.
- Look around to ensure that no obstacles can affect your control of the ring saw.
- Do not use the machine in bad weather, such as dense fog, rain, strong wind, intense cold, etc. Working in bad weather is tiring and can lead to dangerous conditions, e.g. slippery surfaces.
- Never start to work before the working area is clear and you have a firm foothold. Look out for any obstacles with unexpected movement. Ensure when cutting that no material can become loose and fall, causing operating injury. Take great care when working on sloping ground.
- Be aware that your clothes or limbs may not have contact to the moving parts on the ring saw or power.

- Always keep a safe distance to the moving parts.
- The guard protection of the spinning blade must ALWAYS be in good condition and ALWAYS mounted correctly.
- Always have enough illumination for a secure working environment.
- Always ensure you are in balance and having a good foothold when operating the ring saw.
- ALWAYS check for hidden gas pipes or electrical cables in the material you cut!

## Cold Weather Operation

If the ring saw is to be used during cold weather, preheat the hydraulic fluid at low power source speed. When using the normally recommended fluids, fluid should be at or above freezing level 32°F/0° C before use. Damage to the hydraulic system or hydraulic motor seals can result from use with fluids that is too viscous or thick. See page 8.

**Note: Remember to empty the saw from water after cutting in freezing conditions to avoid damage.**

## Water Supply

Only use with water. Make sure water supply is sufficient. Abrasive material and too little water when cutting increases wear on the drive wheel and the inner edge of the blade and may cause the blade to slip.

**Note: The recommended minimum water supply is 4 l.p.m./2 bar.**

## Equipment Protection and Care

- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the "OFF" position when coupling or uncoupling the ring saw. Failure to do so may result in damage to the quick couplers and cause overheating of the hydraulic system.
- Make sure the circuit PRESSURE hose (with male quick disconnect) is connected to the "P" port. The circuit RETURN hose (with female quick disconnect) is connected to the opposite port. Do not reverse circuit flow. This can cause damage to internal seals.
- Always replace hoses, couplings and other parts with replacement parts recommended by HYCON. Hoses must have a minimum working pressure rating of 250 bar.
- Do not exceed the rated flow or pressure (refer to Technical Details in this manual for correct flow rate and pressure). If specifications are exceeded, rapid failure of the internal seals may result.
- Always keep critical labels and markings, such as warning stickers and tags legible.
- Ring saw repair should be performed by experienced personnel only.
- Make certain that the recommended relief valves are installed in the pressure side of the system

## Starting Instructions

- Mount a diamond blade. See settings and adjustment page 10.
- Connect hoses – clean couplings before connection. Connect water supply.
- Set the power source on "ON".
- Open for water supply.
- Find a good footing for the cutting. See safety instructions!
- Activate the safety trigger, press the trigger lever towards the handle and start the saw.
- Start by holding the blade towards the material. When gradually a groove is cut, press the blade towards the material and cut in lines of 5-7 cm until you have cut through the material. This is the quickest way of cutting instead of cutting through in one attempt.
- It is important to keep the water supply steady and sufficient as it cools the blade, removes the slurry and guarantees you the best result with as little wear on the blade and rollers as possible.

### Stop

- Remove the blade from the material and let go of the trigger lever
- Set the power source on "OFF"
- Disconnect water supply



Note: For easier cleaning let the blade spin in the air with full water running for 30 seconds. It will help removing slurry from blade and rollers. HYCON recommends cleaning each roller for slurry after usage for longer lifetime and better adjustment of blade. See separate instruction.

## Use of HRS400 Ring Saw Blades

### Sharpening diamond blades

Diamond blades can become dull if you use the wrong feeding pressure on the blade, wrong blade or cut the wrong material. If the diamond blade becomes dull it will only produce heat and can cause overheating to the material or the blade can be out of round. Sharpen the blade by butting in soft material i.e. sandstone or bricks.

### Vibrations on diamond blades

The blade can become out of round if a too high pressure is used. A lower feed pressure can stop the vibration. Otherwise replace the blade. The blade shall be intended for the material to be cut.



Note: USE only HYCON blades, rollers and drive wheel or no warranty will be granted in case of failure to ring saw.

HYCON provides 2 different kinds of blades:

- Standard blade, diamonds are not positioned
- Premium blade, diamonds are positioned
- Both types of blade come in a soft (20), medium (45) and hard (70) version.

See page 16 for more info regarding HRS ring saw blades.

**Note: Drive wheel must be replaced with every new blade. Guide rollers should be replaced after 10 blades**

## Service and Maintenance

Note: the chart is based on daily use

Service/Maintenance	Daily	Weekly	Yearly
Check couplings and clean carefully	X		
Check hydraulic hoses	X		
Clean rollers	X		
Lubricate rollers (grease nipples)		X	
Adjust drive wheel	X		
Adjust rollers and check for wear	X		
Check drive wheel	X		
Check blade guard condition	X		
Check the water disc		X	
Clean with water and spray	X		
Gear oil change	Change gear oil after first 5 hours of operation. After that, change it every 200 hours of operation, but at least once a year. Use gear oil GL-5 75W90. See page 12.		

## Oil Types

The HYCON HRS400 Ring Saw uses standard hydraulic oil, i.e. all types of mineral oil and biodegradable oil, which comply with the following values:





Under normal working conditions in a temperature range of -10° to +40°, a viscosity 46 oil is usually suitable. At temperatures beyond this range use oil with another viscosity.

Note: If using biodegradable oil, we recommend the use of oil based on rape. Other types of oil can be aggressive towards parts of the pump

## Length of Hydraulic Hoses

Hose extension	Inside diameter of hydraulic hose (inch)
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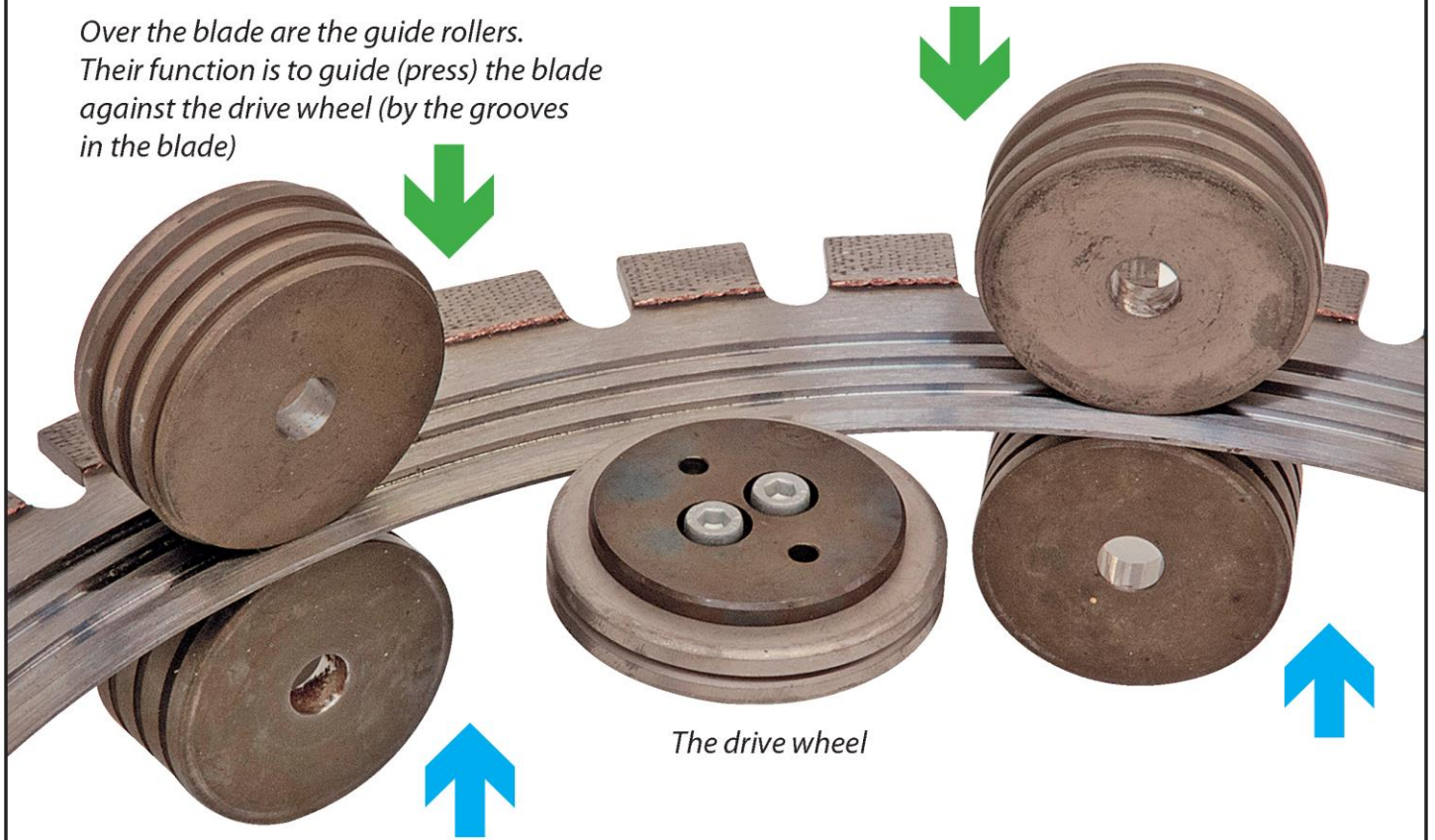
Recommended viscosity	20-40 cSt
Permitted viscosity	15-1000 cSt
Viscosity index	Min. 100
Temperature area	-20° to +70° C

Up to 30 m	1/2
30 – 45 m	5/8
45 – 100 m	3/4

**Note:**  
Hoses over 30 m will create a very high loss of pressure resulting in poor performance.

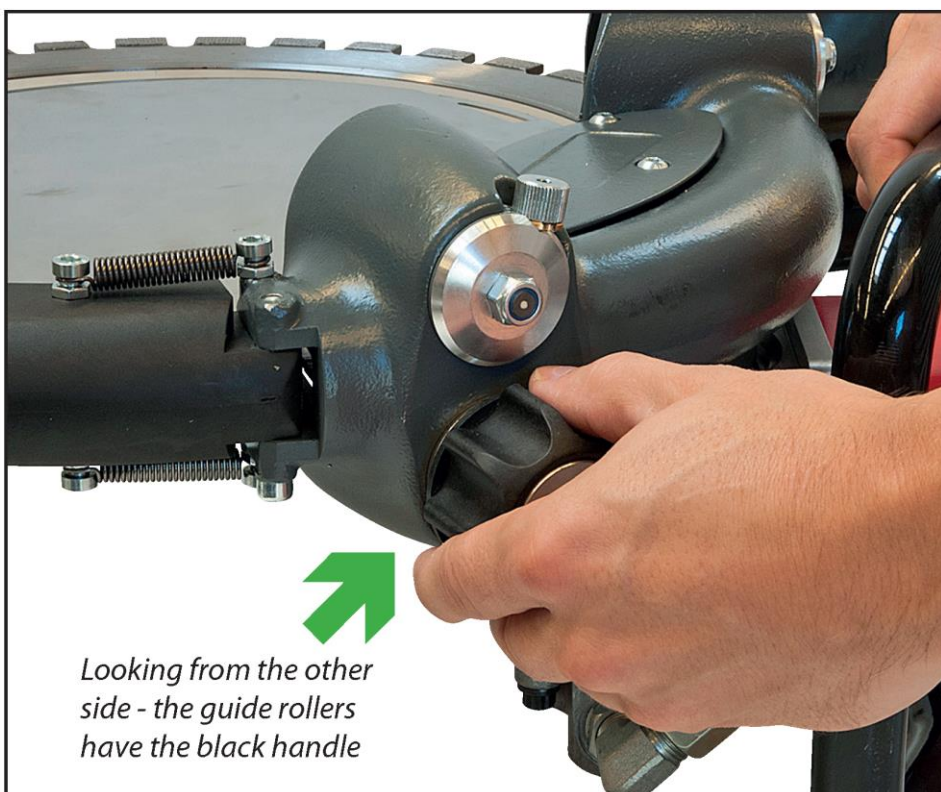
# How does your HYCON ring saw work?

Over the blade are the guide rollers.  
Their function is to guide (press) the blade  
against the drive wheel (by the grooves  
in the blade)



The drive wheel

Under the blade are the support rollers.  
Their function is to support the blade.



Looking from the other  
side - the guide rollers  
have the black handle

## Service Accessories



From left to right :  
Two pin wrench, open  
spanner, hex key and  
feeler gauge supplied  
with every saw (except  
for the feeler gauge  
that comes with every  
blade). WD40 lubricant  
can be purchased at  
HYCON distributor or  
your local dealer.



# Mounting and adjusting the blade



Place the saw on firm ground.



Place the blade between the rollers.  
Make sure the guide roller is placed correctly into the grooves of the blade.



Gently (NOT tightly) adjust the support roller against the blade using the hex key.  
NB: The roller adjustment is eccentric - if you tighten too far to the right it will become loose again.



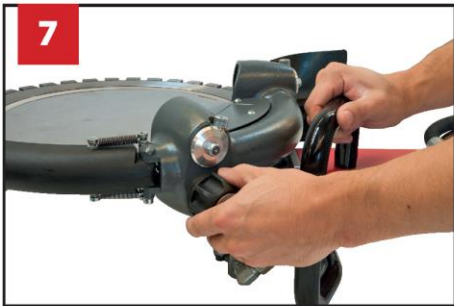
Mount the drive wheel.



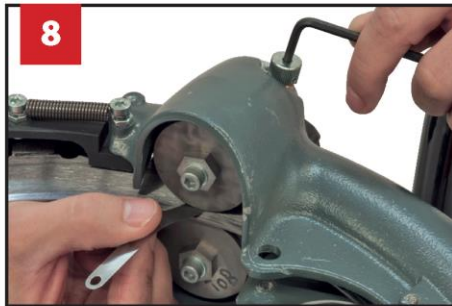
Tighten the drive wheel.



Mount the water blade and the cover.



Adjust the guide roller against the drive wheel - turn the black knob clockwise until it stops.  
Both guide rollers should be equally tightened!  
NB: It cannot be overtightened



Re-adjust the support rollers > loosen the screw counterclockwise with the hex key, use the feeler gauge to adjust the gap between the support roller and the blade > turn the screw clockwise until the gap matches the feeler gauge.



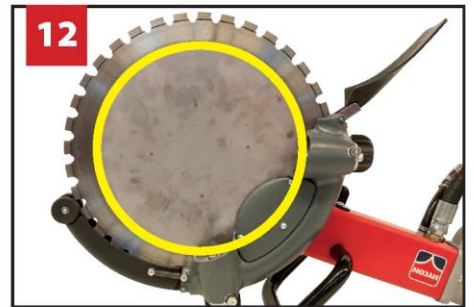
If the support roller is correctly adjusted you can turn the roller by the finger. If it cannot turn it is too tight.



Tighten the nut at the end of the support roller.



You must be able to turn the blade by the hand.



Check that the distance between water blade and blade is the same full circle.

**NB: Re-tighten after 10 min. operation**

# Daily cleaning makes your HYCON ring saw work perfectly..!

During operation water and slurry can get into the housing where the rollers are. Therefore - to ensure that your HYCON HRS will perform perfectly - **it is VITAL that you follow our 5 very simple instructions for daily cleaning:**



Let the ring blade spin free for minimum 30 seconds after EACH JOB. Clean water will flush the rollers.



Clean the rollers and housing very carefully with the water hose EVERY DAY after use...



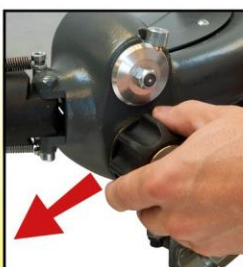
- ON BOTH SIDES..!



Spray all parts with WD-40.



Apply grease to all four grease fittings.



### **Our advice:**

The guide roller adjustment should every day after use be turned COUNTER-CLOCKWISE to protect the function.

## Use of Hydraulic Power Sources

The HRS400 ring saw can be connected to various hydraulic power sources, such as excavators, trucks, loaders, tractors etc., and of course HYCON powerpacks, the design of which ensures your new HRS400 ring saw a perfect match and the absolute best working conditions.

It is important that the HRS400 ring saw is not subjected to an oil flow and a working pressure beyond its design capability. In case of doubt, please refer to the ID-tag on the saw and the technical details on page 3.

Check the oil supply and the working pressure by means of test equipment. The test equipment should comprise a pressure gauge, a flow meter and a valve for adjustment of pressure.

Make sure that:

- the oil supply is not too high
- the working pressure is not too high
- the return pressure is not too high
- the pressure relief valve is not set higher than 172 bar
- the internal diameter of the hoses is sufficient (min. ½")
- all couplings are in order
- the power source is equipped with an oil filter of min. 25 Micron

Hoses with too small internal diameter and/or defect couplings cause the HRS400 ring saw to work with incorrect working pressure.

Your dealer can help you check this.

If the output of the power source is too high:

- the power source must be adjusted to correct output
- or you can choose to mount a HYCON oil flow divider to protect the HRS400 ring saw against overload
- or you can choose one of our HYCON powerpacks. Your dealer can guide you in choosing the right powerpack.

In case of doubt, please contact your dealer or HYCON A/S.

## Warranty Terms

We grant 12 months warranty from the first date of operation. The warranty applies to faults that can be related to design and production errors.

Faults caused by incorrect operation, incorrect handling, lack of maintenance or the like, will not be accepted as warranty.

The warranty covers the parts necessary for repair and the suggested average time needed for repair.

Normal wear and tear is excluded.

Special terms apply for use under water.

For further warranty details, please contact your local dealer.

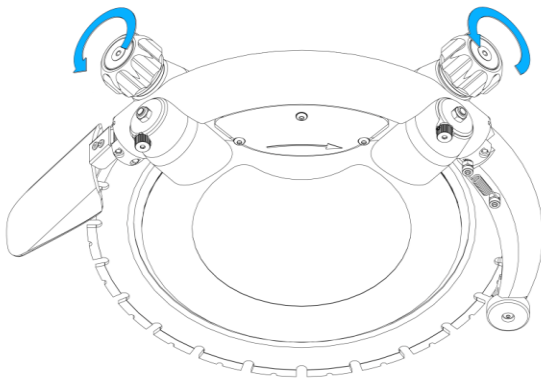
## Replacement/Adjustment of Blade

### Loosening:

Loosen the tightening knob completely by turning it counter clockwise, thereby loosening the blade from the drive wheel.

### Tightening:

To adjust the blade firmly against the drive wheel, turn both tightening knobs clockwise alternately so that the built-in compression springs are pressed together. Make sure that the distance between blade and water blade is the same both at the left and the right side.



If the guide rollers cannot be turned completely back into bottom position, the cause could be deposit of concrete dust/slurry on the back side. Dismount the rollers and clean thoroughly.

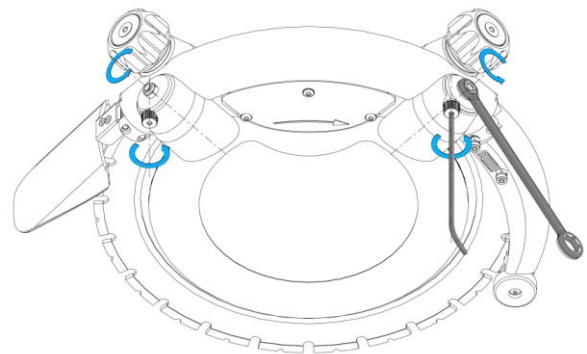
## Adjustment of Support Rollers

### Loosening:

Use a ring spanner size 13 mm to loosen the hexagon nuts and then retighten them slightly. Turn the adjustment screw approx. 8-9 turns counter clockwise. This will lift the support roller approx. 2 mm from the blade.

### Tightening:

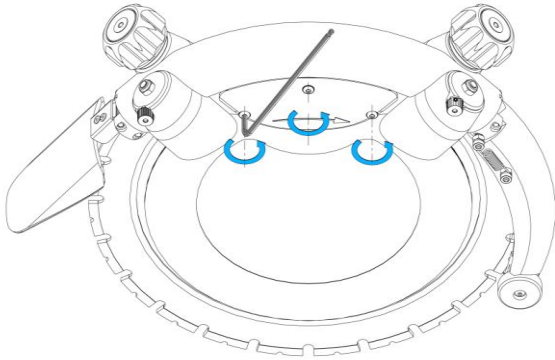
Adjust the support roller down against the blade by loosening the hexagon nuts just slightly and then turning the adjustment screw clockwise. Do under no circumstances press the support roller too hard against the blade. You must be able to turn the blade by hand. Now tighten the hexagon nuts completely.



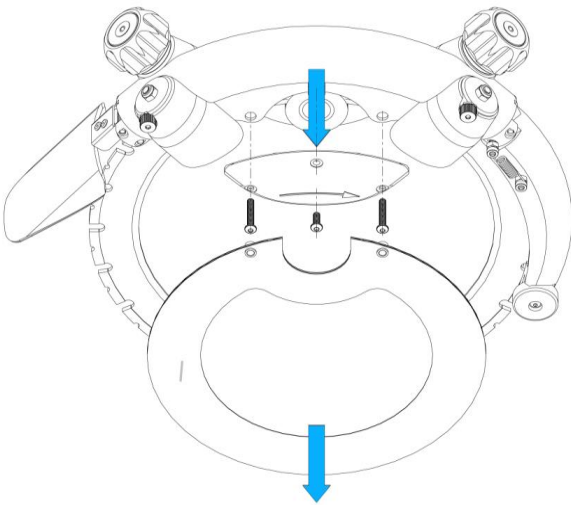
If the support rollers cannot be turned completely back into bottom position, the cause could be deposit of concrete dust/slurry on the back side. Dismount the rollers and clean thoroughly.

## Dismounting of Front Cover and Water Blade

Use a hex key size 4 mm to loosen the 3 screws. Remove the front cover.

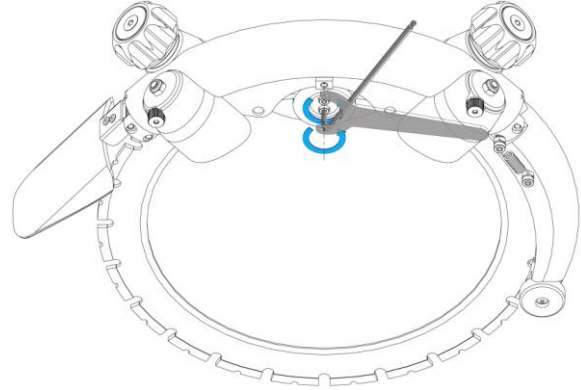


Remove the entire water blade.



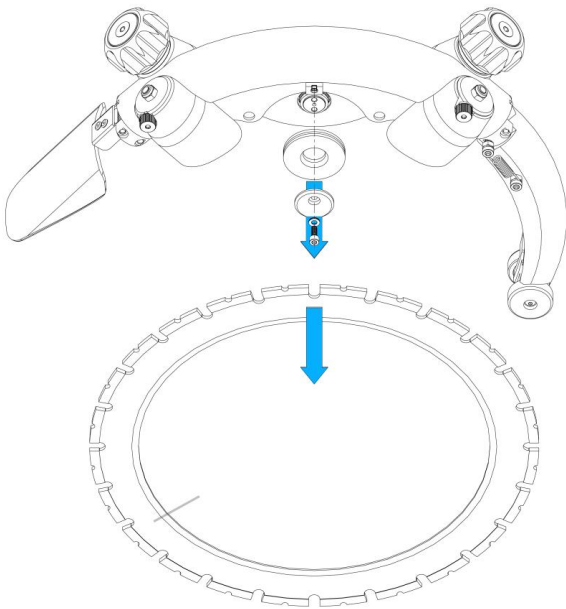
## Replacement of Drive Wheel

Use a hex key size 4 mm to loosen the 2 hexagon screws. You can use a two pin wrench to prevent the drive wheel from turning round.



**If the drive wheel is worn out replace immediately. Use only original spare parts. Contact your local dealer for further support and information.**

## Replacement of Blade



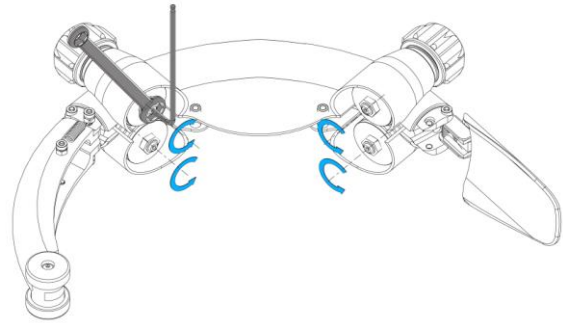
Do not retip the diamond blade. Use only original blades. Contact your local dealer for further information.



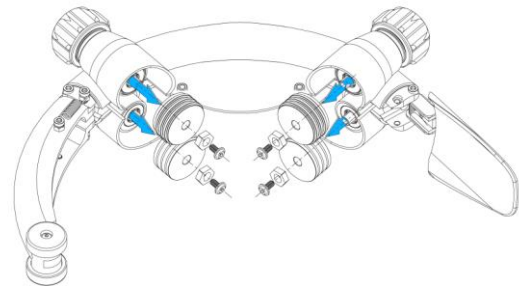
When mounting the blade make sure that the three raised edges on the guide roller and the three grooves on the blade interlock.

## Replacement of Support and Guide Rollers

Use a ring spanner size 17 mm to hold on to the hexagon washer, and use a hex key size 4 mm to loosen the screws.



The support rollers and the guide rollers can now be removed.



Lock the screws with Loctite 275 when mounting them again



The roller edge interlocking with the blade must be sharp. Replace the roller if the edge is not sharp.



## HYCON HRS400 Blade Information

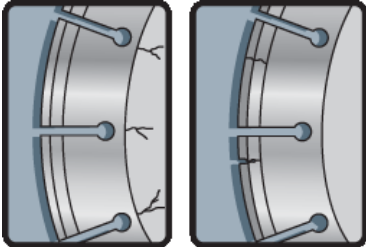
The following chart can be used to determine what kind of blade is needed for different kinds of material to cut.

Blades	Type of Bond	Granite	Heavy Reinforced concrete	Reinforced concrete	Semi-hard concrete	Soft concrete	Soft bricks	Abrasive building blocks
Premium 20 YELLOW	<i>soft</i>	(X)	X	X	(X)			
Premium 45 BLUE	<i>medium</i>		(X)	X	X	(X)	(X)	
Premium 70 RED	<i>hard</i>			(X)	X	X	X	(X)
Standard 20 YELLOW	<i>soft</i>	(X)	X	X	(X)			
Standard 45 BLUE	<i>medium</i>		(X)	X	X	(X)	(X)	
Standard 70 RED	<i>hard</i>			(X)	X	X	X	(X)

## HYCON HRS400 Blade Information

If you do not use the right blade, you might see the following problems occur:

### Core or Segment Cracks



**Cause** Blade is too hard for material being cut  
**Solution** Use a softer bonded blade

**Cause** Blade mounted improperly or saw needs repair  
**Solution** Check rollers and drive wheel. Check all bearings, shaft and flanges.

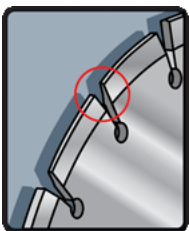
### Undercutting



**Cause** Steel core wears faster than diamond segments caused by highly abrasive fines grinding against blade during cutting.

**Solution** Use a softer bonded blade and/or increase water flow to flush out cut.

### Uneven Segment Wear



**Cause** Insufficient water flow on one side of blade.  
**Solution** Flush water system and check for adequate and equal water flow/distribution.

**Cause** Blade mounted improperly or saw needs repair.  
**Solution** Check rollers and drive wheel. Check all bearings, shaft and flanges.

### Short Blade Life

**Cause** Blade is too soft for material or water flow is too low.

**Solution** Choose blade with a harder bond and/or increase the water flow.

### Slow Cutting Speed

**Cause** Material being cut is too hard for the blade. The hard material wears the exposed diamonds but not the metal portion of the segment. The segment wears too slowly, no new diamonds are exposed.

**Solution** Cut a soft abrasive material until diamonds are well exposed. Try asphalt block, sandstone or dried mortar. Choose a blade with softer bond.

### Overheating

**Cause** Inadequate cooling.

**Solution** Follow guidelines for proper blade operation and cooling procedures. Check water flow.

### Segment Loss

**Cause** Blade is too hard for material being cut.

**Solution** Use a softer bonded blade.

**Cause** Steel core is worn due to undercutting.

**Solution** Use a softer bonded blade and/or increase water flow to flush out cut.

## Trouble Shooting

Problem	Probable Cause
Blade does not rotate	Incorrect roller adjustment
	Blade not fitted correctly on guide rollers
	Support rollers tensioned too much
	Possible faulty hose connection to the hydraulic system
	Possible faulty hose connection to the drive source or other hydraulic problem
Blade rotates too slowly	Incorrect roller adjustment
	Worn drive wheel
	Saw is pushed too hard
	V-shaped inner diameter of the blade is worn
	The springs on the guide rollers are weakened
	Dirty pressure relief valve in the hydraulic system and in the saw
	Dirty filter
	Defective roller bearings
	Too high back pressure
	Inadequate oil flow, check the hydraulic oil flow
Blade jumps out of its position	Roller setting too loose
	Worn guide rollers
	Blade not fitted correctly on guide rollers
	Blade damaged
Blade wobbles	Support rollers tensioned too much
	Blade overheating
Segments break	Bent, twisted or badly maintained blade
Blade cuts too slowly	Wrong blade for the material
	Saw pushed too hard
	Check that the right amount of water reaches the blade
Blade slips	Guide rollers do not move in and out freely. A seized roller cannot press the blade hard enough against the drive wheel
	Worn drive wheel. Abrasive material and too little water when cutting increases the wear on the wheel.
	Worn guide roller flange. When more than half of the width of the flange is worn the blade slips.
	The blade's groove and inner edge are worn. Caused by inferior flushing of abrasive material and/or a worn drive wheel causing the blade to slip.

## EC-Declaration of Conformity

We hereby confirm that the

**HRS400 Ring Saw – from serial No. 9786**

is manufactured in conformity with EC-directives 2006/42/EC and 2000/14/EC.

The following standards have been applied:

EN ISO 12100:2011, EN ISO 11148-7:2012, EN ISO 4413:2010

HYCON A/S  
Juelstrupparken 11  
DK-9530 Støvring  
Denmark



Lars Melgaard  
Production Manager

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