PARTNER TECHNICAL DESCRIPTION

PARTNER K950 RING & CHAIN

The Partner K950 Ring and K950 Chain are power cutters with special properties developed partly from the rest of the Partner product range.

The engine in both machines is the same as that fitted to the Partner K950 Active, with modifications to suit drive for the ring and chain respectively.

PARTNER K950 RING

The Partner K950 Ring is the first power cutter with a combustion engine and eccentric drive of the ring blade. The design of the cutter traces its roots to the hydraulically driven K3600, which with minor modifications has been providing sterling service since 1987. The ring cutter is a Partner patent.

Many industries expressed a wish for a power cutter that could be put to work quickly and simply in small-scale operations, without requiring long preparation times for machine set-up. The result was the K950 Ring.

The Partner K950 Ring gives a cutting depth of 260 mm/10˝ with a blade diameter of 350 mm/14˝. In addition to this exceptional cutting depth, the eccentric drive means that overlapping of cuts that meet at an angle can be entirely deleted or minimised. This property makes the machine truly outstanding for cutting apertures for windows and doors and similar operations. In road-building, water & sewage and similar operations too, there is a need for making deep cuts quickly and simply.

The diamond-tipped blade cuts stone, concrete and similar materials with or without reinforcement, and even cast iron.

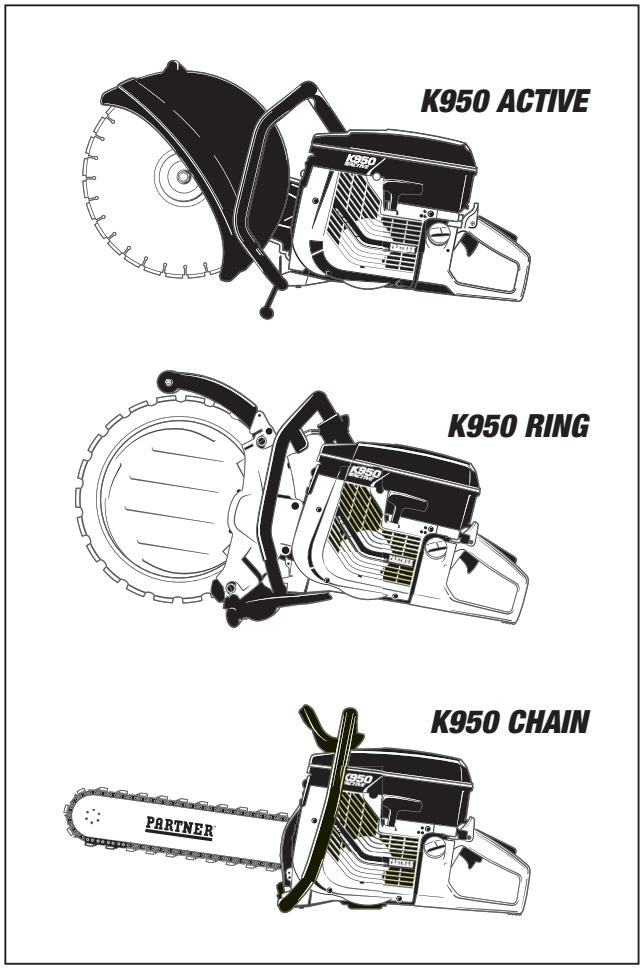
PARTNER K950 CHAIN

The Partner K950 Chain is an entirely new machine type in the Partner product range. The chain-saw is not intended to be used as an all-round machine but is instead primarily designed for special operations where deep and/or short cuts are essential.

The chain-saw is a perfect supplementary tool for the professional cutter who works with fixture-mounted wall saws. Cuts that the blade cannot make fully can be finished off with the chain-saw.

Cuts for insertion of load-bearing beams, ventilation ducts, cutting flush with the floor or roof, and deep cuts in tight spots are examples of work that the chain-saw can handle without compromising efficiency.

The chain-saw is also ideal for operations where it is quite simply impossible to gain access with a conventional cutter, for instance for cutting of already-installed pipes, rings, piles, foundations and so on in applications where concrete structures of different types are encountered every day.



The Partner K950 family

The three members of this family all share the same engine. It is the cutting principle that differentiates the machines from one other, with different machine properties as a result.

K950 ACTIVE

The centre-driven K950 Active is the **all-round cutter** in the family with a **cutting depth of 145 mm/5.7˝**. Its main application area is in cutting of stone and concrete blocks and kerbstones on the ground. Cutting of concrete pipes and rings is another common application. For all these operations, the K950 is the right choice.

Typical properties of the K950 Active are its classic design with a centre-driven blade that is truly **robust** and requires **minimal service**. It stands up to some pretty rough treatment both as regards operational technique and maintenance without protesting.

Unlike the other machines, the K950 Active can **dry-cut**. With an abrasive cutting blade, it is possible to **cut steel and other metals**.

The K950 Active has the highest operational speed and the lowest cutting cost in the family.

K950 RING

Two properties are decisive when considering an investment in a power cutter: the need for a **generous cutting depth, 260 mm/10˝, and/or the need for minimal overlapping**.

The 260 mm/10˝, cutting depth places the power cutter among the large range of wall-cutters. The K950 Ring is an **alternative to the fixture-mounted wall-cutting saw** used for less comprehensive operations.

In outdoor work, it is also an alternative to the hydraulically powered Partner K3600. The Partner K950 Ring has the same performance as regards cutting depth and speed, but it is not allowed to be used in non-ventilated areas (owing to carbon monoxide from the combustion engine), which somewhat limits its application area.

Wet-cutting must always be used with the ring cutter.

Since the K950 Ring does not require a hydraulic unit for drive, the investment is modest enough to be perceived as profitable even if the machine is not used every day.

The K950 Ring is the ideal machine for **cutting apertures** in walls and wherever there is a need for **deep cuts in concrete, stone and cast iron** with a **minimum of preparation**. A few examples from various operational areas:

– House-building; cutting apertures for doors and windows, and in cast floors and roof structures. Trimming of prefabricated concrete elements is another common task in modern building operations.

– Traffic; bridges, viaducts, traffic partitions, foundations, cable conduits, culverts and so on.

– Water and sewage; pipes, well rings, cast iron pipes with or without a ceramic coating, etc.

K950 CHAIN

This cutter should be seen as a **special machine**. With the K950 Chain, **precision work** can be performed including straight cuts that meet at an angle without overlapping.

The K950 Chain has two unique properties: a **cutting depth of 390 mm/15.4˝, 340 mm/13.4˝ without overlapping, and it cuts a minimum height of 110 mm/4.3˝**. With these properties, it is an excellent supplement to fixture-mounted wall-cutter for extending cuts that centre-driven cutters cannot complete owing to their operational method.

The chain-saw must always be used as a **wet-cutter**. It cuts without difficulty through normal reinforcement. Unlike the other K950 machines, it is more difficult to use when cutting very dense or strongly reinforced concrete, and cutting of cast iron is not permitted.

The shallow cutting height makes the K950 Chain an **ideal machine for making small cuts in concrete**. Typical examples are holes in buildings for **ventilation, cable ducts, pipes** and so on. The alternative to cutting for different types of opening is drilling with a fixture-mounted core drill, or hacking with a pneumatic chisel. In the latter case, supplementary masonry work will be necessary if there are any demands on cosmetic appearance. With the chain-saw, openings can be cut out with considerable precision and in most cases, there is no need whatsoever for any touching-up.

The chain-saw's operational principle offers so many benefits that it is easy to feel that this machine should replace the conventional cutter in many applications. However, power cutters work faster and the cost per cut area is far lower.

The chain-saw should be seen as a machine for operations where no other machine can do the job in a simple and cost-effective way – and such jobs are very common indeed.

Machine – materials

The table alongside is a simple presentation of the material types that can be cut with the machines in the Partner K950 family.

Note in particular that wet-cutting should always be used with the K950 Ring and Chain, while dry-cutting blades are available for the centre-driven machine for all material types.

Material Cutting method	K950 Active Wet/dry	K950 Ring Wet	K950 Chain Wet
Stone	●	●	●
Brick	●	●	●
Light concrete	●	●	●
Asphalt	●	●	●
Concrete	●	●	●
Concrete, light reinforcement	●	●	●
Concrete, strong reinforcement	●	●	
Cast iron	●	●	
Iron*	●		
Steel*	●		

*) Iron and steel are always dry-cut with an abrasive blade.

Economy

It is vital to take economy into account when choosing working methods and machines, since both these factors play a major role in determining profitability. However, it is not always easy to overview and calculate all the relevant factors. The following section offers a number of important pointers:

Investment cost
An investment of a given figure must always be based on the investment's utilisation rate, that is to say the number of hours the machine is utilised during a given period or throughout the machine's lifetime. Rental companies are playing an increasingly bigger role in the provision of special machines for short usage periods.

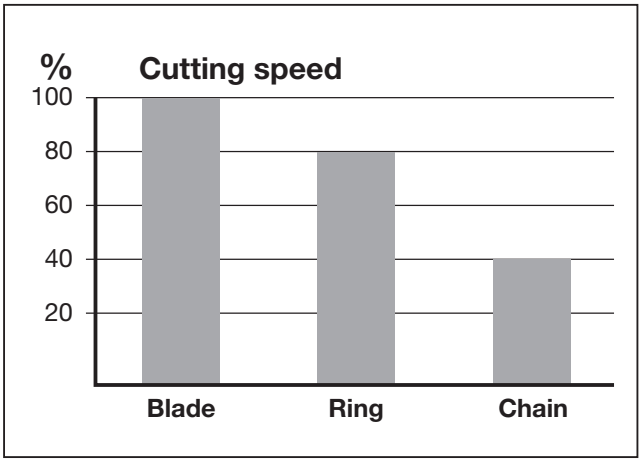
Tool costs
This is also part of the obvious cost structure that everyone must take into account. When it comes to cutters, which this booklet is about, the biggest cost for consumables relates to cutting blades and chains.

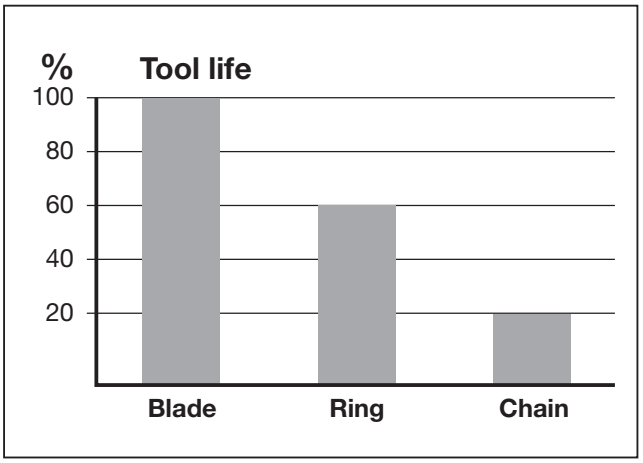
Cutting speed
A high cutting speed naturally means that the operator does the job faster, so the operator's wage per job is lower.

Set-up times
These costs, primarily time-related costs, encompass transportation and preparation before the work can begin, and the time needed to rig up the machine before starting the cutting operation. For example, it takes a long time to set up a wall-cutter, while a hand-held cutting machine is immediately ready for action. The choice of machine depends on the size of the job.

Availability/set-up time
The general rule is that the less predictable the immediate need for a machine, the greater the justification for keeping the machine available. If operational downtime disrupts production further down the line, there is added justification for including the machine in the tool stock.

Many jobs in the construction industry involve adjustments and modifications to structures that must be carried out on site. These needs are often unpredictable and usually immediate. The hand-held cutter therefore usually has an obvious place in the company's tool stock.





The above tables show the approximate difference in cutting speed and blade/ring/chain service life between the various machines in the K950 family. The nominal rating is set at 100% for the centre-driven K950 Active.

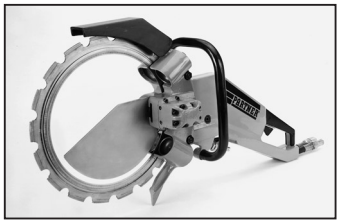
The ratings are based on cutting in fully hardened normal concrete. Wet-cutting has been applied throughout.

Accurate presentation of absolute ratings for cutting speed (surface/time unit) and service life (for example surface/blade) cannot be made in a meaningful way. Several varying factors come into play, such as the blade's hardness in relation to the cut material's hardness and composition. The operator's technique also has a major effect on cutting speed and the tool's lifetime.

Partner K950 Ring

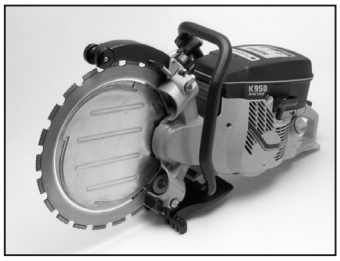
History

Partner K3500 – 1987
The K3500 hydraulically driven ring-cutter was launched in 1987. Its unique design has been patented.



A large number of detail improvements have been made since that original design. In particular, the drive and control systems for the blade have been developed so as to better withstand the machine's often tough operating conditions. Ongoing maintenance is far simpler on the latest model, and costs too are lower.

K950 RING – 2003
The K950 Ring is a successful combination of two tried and tested designs. The motor comes from the centre-driven K950 Active machine and the cutting unit is adapted from the K3600 hydraulically driven ring-cutter.



Target group
The hydraulic ring-cutter is aimed primarily at companies that work constantly with cutting in concrete structures both indoors and outdoors.

The petrol-driven ring-cutter has a broader target group. Various construction and building industry sectors need a hand-held cutter with considerable cutting depth that is suited for a wide range of outdoor operations. Since it is not dependent on a hydraulic unit, it is always immediately ready for use. All that is required is connection to a source of water for cooling the blade. The investment cost is lower than for the hydraulically driven cutter, which means that the investment is justified even if the machine is not used on a daily basis.

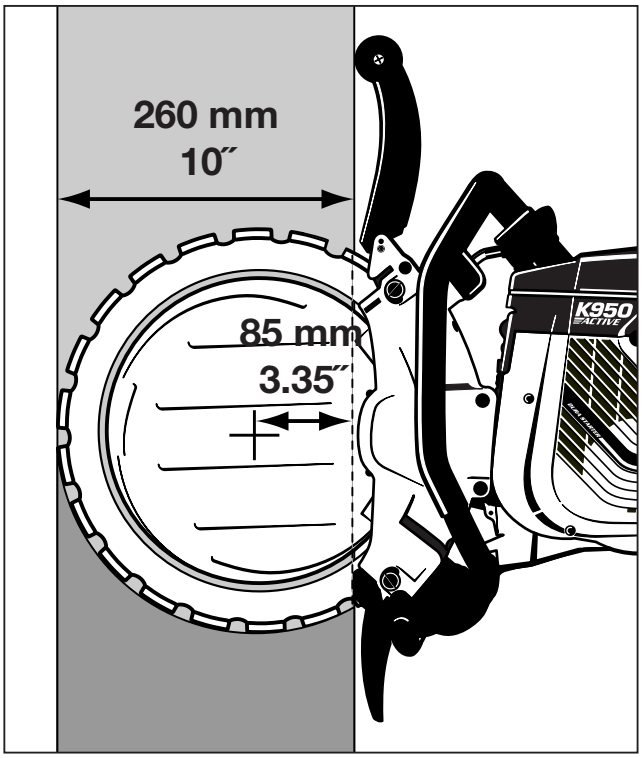
One natural operating environment for the K950 Ring is outdoors, for example in foundation and framework construction of large buildings, construction of bridges and traffic systems, pipe and culvert ducting for water, sewage, district heating, electricity, telecom and so on.

Rebuilding and extension projects often feature the need to cut out apertures for various purposes, such as windows, doors, ventilation ducts, holes in concrete girders and so on – while work on new constructions often includes the need to make modifications to prefabricated concrete elements.

In a first encounter with the K950 Ring, what is most remarkable is its extreme cutting depth for a hand-held machine. The fact that the machine differs significantly from the centre-driven cutter as regards overlapping of cuts that meet at an angle, is as valuable in many cutting operations as the generous cutting depth itself. This effect is described later on in greater detail.

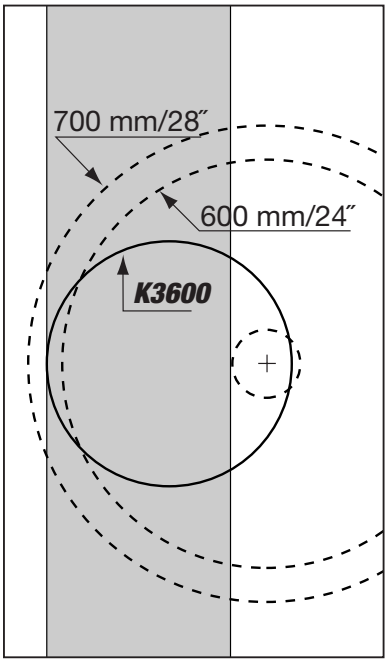
The smart idea

260 mm/10˝ cutting depth with a 350 mm/14˝ blade
Eccentric drive of the cutting blade is the revolutionary engineering solution that gives the Partner K950 Ring its remarkably generous cutting depth in relation to the blade's diameter. The centre of rotation lies roughly 85 mm/3.4˝ into the cut at maximum cutting depth (measured from the centre of the blade to the support roller's housing).



Comparison: blade diameter/cutting depth
Machines for concrete and stonecutting with a considerable cutting depth have long been available on the market and are usually called floor- or wall-cutters. Floor-cutters are mounted on wheels while wall-cutters feature a fixture that must be attached to the wall. The fixture is usually built in the form of a pair of rails along which the machine runs. Normally, these machines are hydraulically powered.

The flange washer, sometimes the transmission too, reduces the cutting depth by at least 50 mm/2˝.



With a traditional centre-driven wall-cutter, cutting depth of 260 mm/10˝ would require a blade diameter of at least 600 mm/24˝. The most common diameters of cutter blades in this range of size are 600/24˝ and 700 mm/28˝.

The Partner K950 Ring offers a 260 mm /10˝ cutting depth with a blade diameter of just 350 mm/14˝!

Partner K950 Ring – compact and universal
A cutting depth of 260mm/10″ is not particularly remarkable in itself. It is the combination of small blade diameter and deep cutting that is unique.

Without the eccentric drive principle, the weight penalty would make it impossible to build a hand-held power cutter that offers the ring-cutter's cutting depth.

The eccentric drive offers another extremely practical benefit, one that is often largely overlooked: there is less need for overcutting.

Overcutting
Overcutting refers to the extra distance that has to be cut in order for two cuts facing each other at a right angle to overlap each other with full cutting depth. Examples are openings for windows and doors. Two horizontal and two vertical cuts must be made, meeting in the corners and requiring overcutting. In the two upper figures, the darker line marks the horizontal cut and the lower line shows the essential overcut for total removal of the intended section.

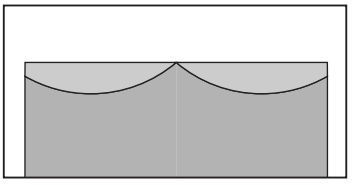
Less overcutting with the K950 Ring
As the figures here show, the need for overcutting is considerably less with the K950 Ring than with the centre-driven wall-cutter at modest cutting depths. In the example, the wall is 200mm/8″ thick, a common dimension for a brick or cast interior wall. The blade is 700 mm /28″ in diameter and the blade's flange washer is 100 mm /4″) in diameter.

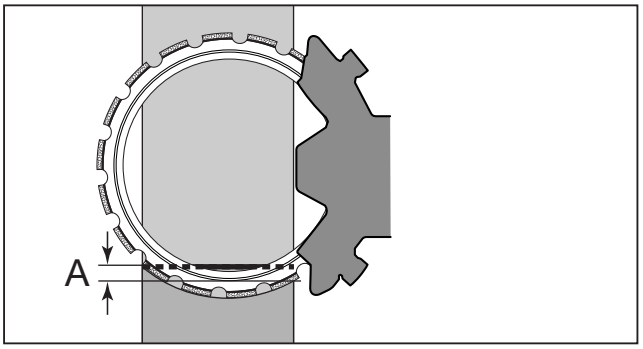
With the Partner K950 Ring, only 23 mm/.9″ (A) overcut is needed, while the centre-driven cutter requires an overcut of 85 mm/3.3″ (B). If we use a cutting blade that just manages the cutting depth, the overcut would approach the radius of the cutting blade (the radius minus the flange washer).

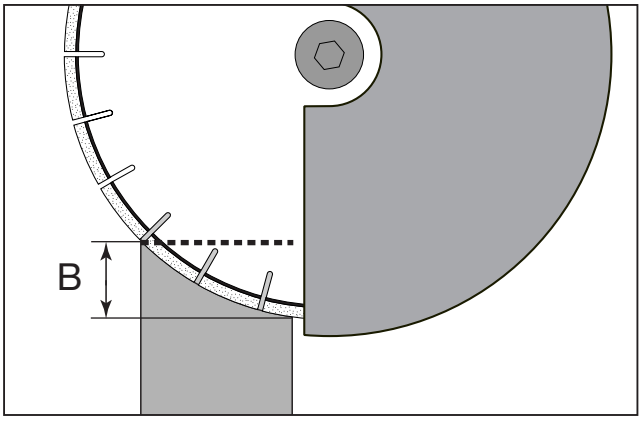
Since the Ringsaw's centre is 85 mm/3.3″ inside the cut, the result in a wall thickness of 170 mm/6.7″ is a cut that finishes as the same height on both sides of the wall – in other words, no overcut at all.

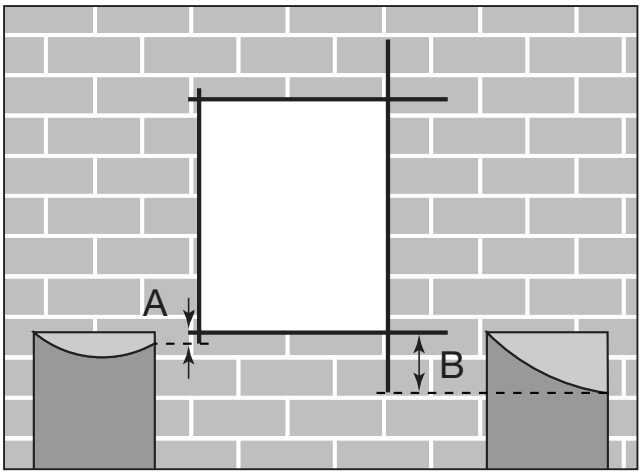
An operator with an eye for precision and order would quite rightly observe that the K950 Ring overcut is larger than that shown in the figure. However, this overcut is inside the wall, which only causes problems in exceptional cases, for instance if reinforcement rods in the load-bearing joists are found in the path of the cut.

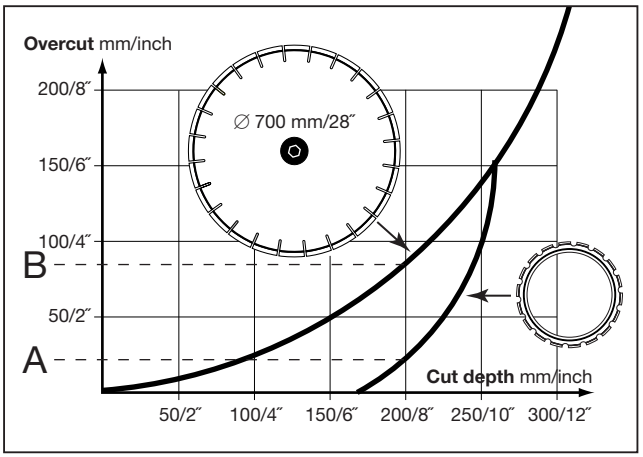
Cutting from two directions
If it is possible to cut from two directions, cutting depth is naturally doubled, while overcut remains unchanged. With the K950 Ring, it is thus possible to cut an object that is half a metre thick with minimal overcutting. The tricky part is to find the corresponding line on the other side of the wall, a problem that is normally solved by drilling along the cut's intersection.







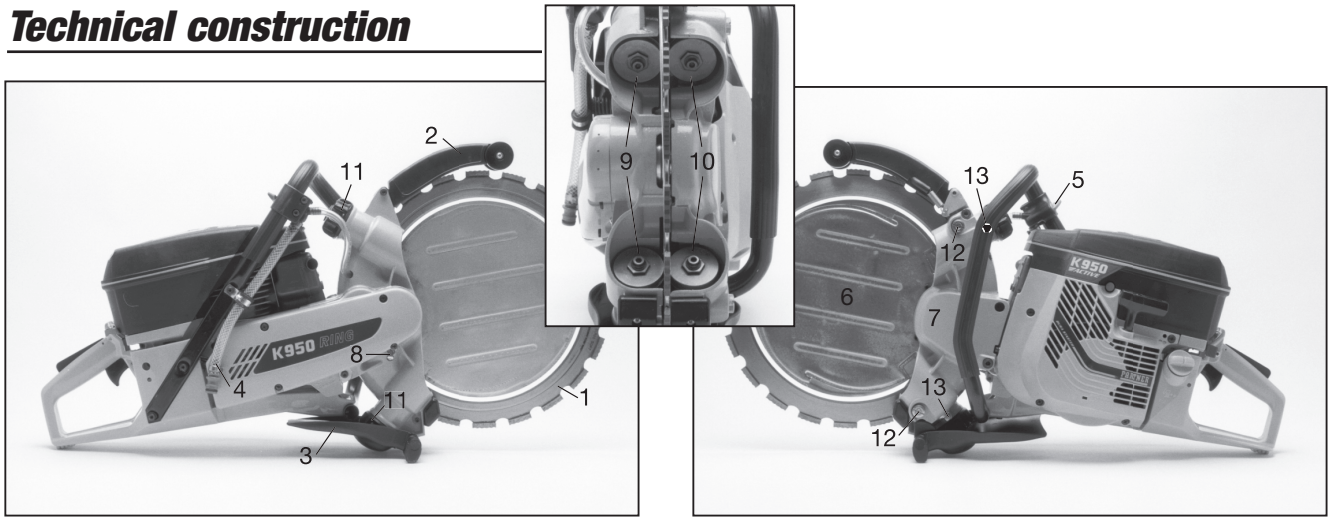




Wall thickness in the above examples is 200 mm/7.9″. The two upper figures show overcut with the Partner K950 Ring and a centre-driven cutter, diameter 700 mm /28″. The third figure shows the corresponding cuts as viewed by the operator and in cross-section.

The diagram shows the need for overcutting with the K950 Ring and a centre-driven cutter respectively, at various cutting depths.

Technical construction



Components, Partner K950 Ring
The Partner K950 Ring consists of the following main units:

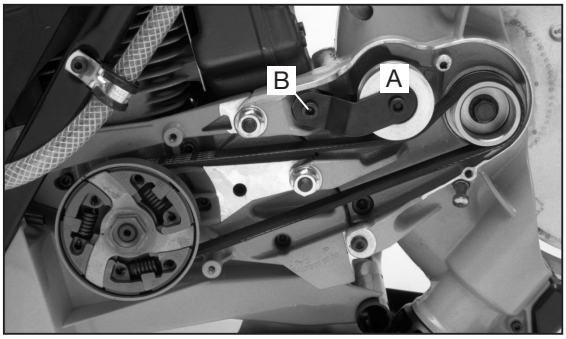
1. Cutter blade, ring-shaped steel blade with laser-welded diamond tips.
2. Blade guard
3. Splash guard
4. Hose for water supply
5. Control for adjustment of water flow
6. Water disc
7. Drive disc
8. Lock button for drive disc
9. Engagement rollers
10. Support rollers
11. Engagement roller knobs
12. Roller adjustment screws
13. Lock-nuts for roller adjustment

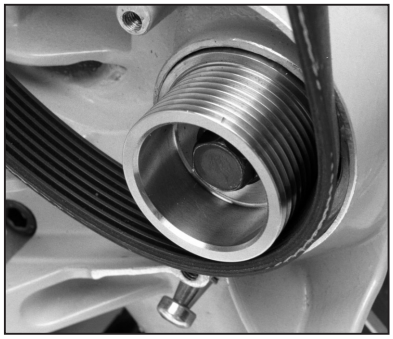
Transmission

The power transmitted between the motor's crankshaft and drive disc for the blade is far lower than that of the centre-driven cutting machine. The drive disc completes almost 6 turns for every revolution of the blade. This ratio means a corresponding cut in the power that the belt needs to transmit.

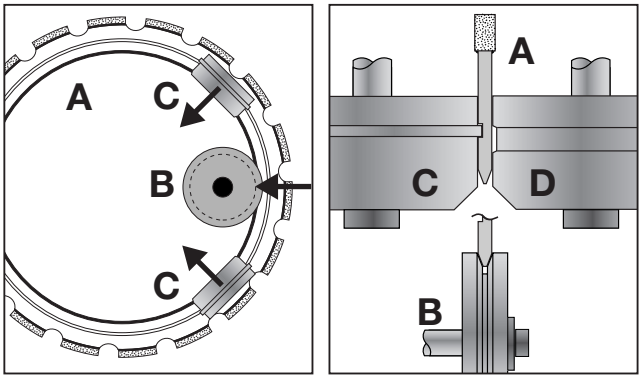
The K950 Ring uses a reinforced transmission drive belt with eight grooves. It can be likened to a number of slim grooved drive belts placed side by side and all doing the same job simultaneously. This design creates a broad contact surface, so power is transmitted with small heat losses and high efficiency. The belt's low height permits small pulley diameters. In comparison with the centre-driven machine, belt inspection and adjustment are needed far less frequently, and the belt is much more durable owing to the lower load to which it is subjected.

The tensioning disc (A) is locked with screw (B). The clutch is identical to that of the centre-driven cutter, with automatic lubrication of the clutch bearing – a renowned Partner speciality.





Excentric drive



The unique concept behind the K950 Ring is the eccentric drive of the cutter blade. If the drive system had not given the machine such unique properties, then it would scarcely have made it to the market today. Eccentric drive in practical implementation has imposed considerable demands on development resources and is continuing to place major demands on day-to-day production.

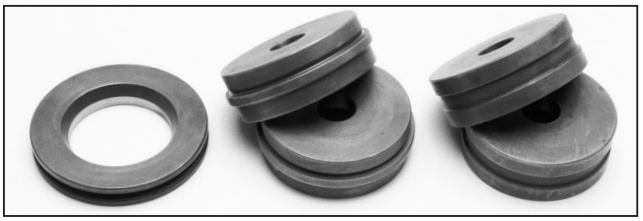
The blade (A) is driven and controlled as follows: the drive disc (B) has a groove in which the blade rests securely. The two engagement rollers (C) applies considerable tension to the centre of the blade, as a result of which the blade is pressed against the drive disc. The figure on the right shows how the engagement roller runs in the blade groove and provides tension against the drive disc. The only job of the support roller (D) is to provide counterpressure against the engagement roller.

With this design, the blade is located both radially and axially (rotating and lateral movement). Three points regulate the blade at the same time as the force against the drive disc creates sufficient friction to drive the blade.

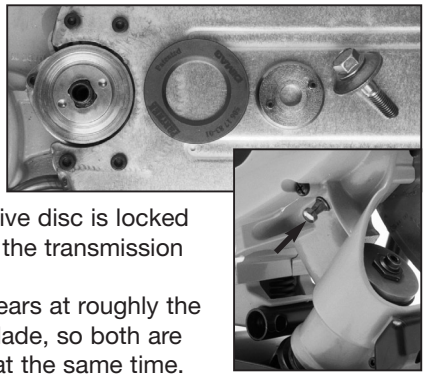
Drive disc and rollers

Parts subject to wear

The drive disc, engagement rollers and support rollers are the components that are subjected to wear. The working environment for these components are the worst imaginable, water combined with the finest grade of sand – creating what is probably the best sort of grinding paste known! That is why considerable importance has been attached to making service quick and easy. Since only parts that wear need to be replaced, costs are kept to a minimum.



Drive disc



The drive disc can be split and the disc itself can be easily replaced after removal of the centre bolt. For removal, the drive disc is locked with a catch under the transmission guard.

The drive disc wears at roughly the same rate as the blade, so both are normally replaced at the same time.

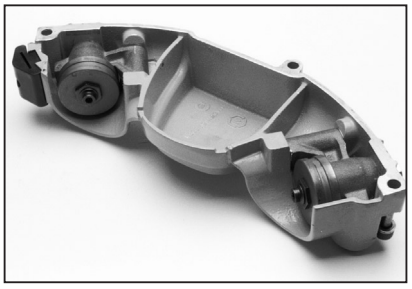
Every new Partner blade comes together with a new drive disc. If the blade is replaced before it is worn, for example when switching to a different blade type, the drive disc too must be replaced. The blade and drive disc should be regarded as a single paired-for-life entity.

Engagement rollers

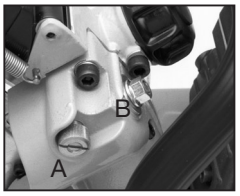
The engagement roller's bearing carrier can move inside the bearing housing. The correct pressure against the drive disc and cutting blade is provided by the spring that is compressed to the correct tension when the knob is screwed in. Note the nylon spacer in the centre of the spring. This serves as a damped extension limiter for the engagement roller.

The engagement roller's flange and the blade's groove are subject to wear. The drive disc's wedge-shaped groove and the blade's contact surface against it are also subject to wear. It is because of this that a fixed position for the engagement rollers would not be practicable. As the parts wear, the springs expand and press out the engagement rollers so that the blade always maintains the appropriate pressure against the drive disc.

Support rollers



The support rollers are located in the support roller housing, which is dismantled for blade replacement and maintenance of the drive and engagement systems. The purpose of the support rollers is only to provide counter-pressure against the engagement rollers. The support roller is attached to an articulated arm.



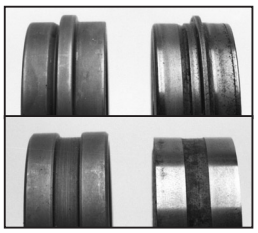
With the adjustment screw (A) the gap between the blade and roller is adjusted down to zero, after which it is locked in place with the lock-nut (B).

Roller adjustment

In order for blade engagement and drive to function perfectly, contact between the rollers and the blade sides must be correctly adjusted. To check this, thumb force should be sufficient to brake the support roller so that it slips against the blade when the blade is rotated by hand. Check and adjustment should be performed after fitting the blade and thereafter when the blade is half-worn. The drive should not be tensioned during this check, that is to say the knobs should be unscrewed.

Wear

Normally, when about 4-6 blades have been used up, the engagement and support rollers' wear-prone parts must be replaced. Each roller type should always be replaced in pairs. Roller wear should be checked in connection with blade replacement.



The engagement rollers' flange is 3 mm/.12″ wide when new, and the rollers should be replaced when 1.5 mm/.06″ of the flange remains.

The support rollers should be replaced when wear is down to the same level as the roller's waist.

Bearing housings

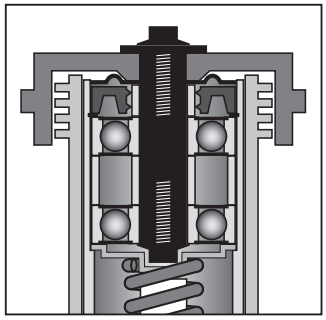
The engagement and support rollers are designed in the same basic way. A bearing housing encompasses two encapsulated roller bearings. Apart from the fact that the bearings themselves are sealed, there are sealing rings to prevent penetration of water and slurry at the shaft where the engagement or support roller is fitted.

The engagement and support rollers' bearing housings can be dismantled and the bearings, seals and other parts can be replaced. The roller's bearing housing can then be withdrawn once the blade has been removed.

The support roller's bearing housing is secured with a screw and lock nut for adjustment.

The roller itself can be replaced quickly and simply. One single hexagonal socket screw keeps it in place. A new genuine Partner screw with thread lock should always be used in connection with roller replacement.

In order to prevent water penetration to the roller shaft seal as much as possible, some highly interesting construction solutions have been implemented. The bearing housing has flanges where the engagement roller is fitted (the support roller only has one flange). The engagement and support rollers are designed like a cup that stretches across the flanges/flange with minimum gap between them. The gap between the flanges/flange breaks up the capillary force that would otherwise lead water towards the roller centre. Now instead, the water is caught by the roller and most of the water and slurry are slung out by centrifugal force.



Water-cooling

Wet-cutting must always be used together with the K950 Ring. The water cools the blade and the drive system. The water also rinses away most of the cutting slurry from the blade's drive and engagement system.

Water disc

In order for the cooling water to be effective at the cutting edge, while using as little water as possible for practical purposes, the K950 Ring is equipped with a water disc featuring three nozzles that distribute water to the blade. In addition to cooling the blade, the water binds the finely pulverised stone particles so that the liquid can be easily led out via the cutting groove. The U-shaped recess in the blade between the diamond segments serves as a transport channel for the water and the slurry.

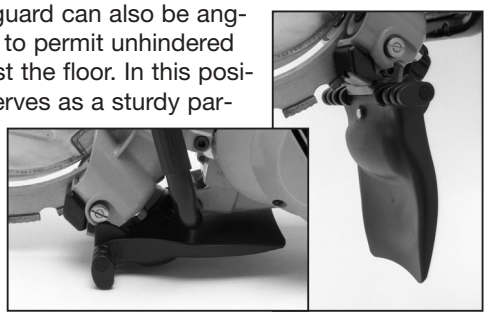
In addition to leading water to the cutting edge, the water disc also supports the blade to prevent twisting and thus helps ensure a straight cut.

Blade guard/splash guard

These guards serve two purposes: to protect the operator from unintentional contact with the blade, and to serve as a splash guard.

The upper blade guard can be angled rearwards so it is not in the way when cutting up against the roof. The rollers at the top ensure that the guard does not get stuck in joins or other surface irregularities.

The lower guard can also be angled fully back to permit unhindered cutting against the floor. In this position, it also serves as a sturdy parking support for the machine.



Handle system

Ergonomics have top priority in the design of every Partner cutter. In practical terms, this means the machine must be comfortable and safe to use. A well-built tool will not tire or burden its operator. More work gets done and the risk of injuries is minimised, both in the long and the short term.

The distance between the handles is important for overall ergonomics. A short gap means the operator must use greater force to advance and hold the machine on course. If the distance is too great, the machine is difficult to control.

The ideal distance, as on the K950 Ring and Chain, corresponds closely to the shoulder width of the user.

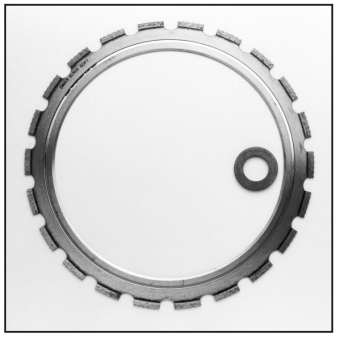
Handle grips in line with the cutter blade

A design in which the line of grip on the front and rear handles is aligned with the cutter blade, gives the best conditions for safe and efficient cutting. The cutter blade is automatically pressed straight down into the cutting groove, and the cut is straight. Crooked cutting grooves waste power and impose extra wear on the cutter's frame and segment.

Horizontal cutting is more difficult compared to the more common vertical cutting. In vertical cutting, most of the machine's weight is exerted on the object being cut and the feed pressure is applied on the front handle.

In horizontal cutting, however, the operator has to support the machine. The front handle's forward-positioned grip in the horizontal position shifts the weight to the rear handle, thus creating better balance. The operator can easily and comfortably provide feed pressure with his body against the air filter housing, with the support of the handle arch.

Cutting blades



Cutting blades for the Partner K950 Ring are available in a range of hardness ratings. The same blades are also used for the hydraulically driven K950 Ring.

The blades are patented special items that are manufactured according to stringent dimensional precision and body material so as to operate in perfect harmony with the drive and engagement systems.

Every new blade is supplied together with a drive disc, which normally wears at the same rate as the blade. If the blade is replaced, for instance when cutting in a new material, we recommend that the drive disc is also replaced. You should regard the blade and drive disc as a single paired-for-life unit.

Speed

A centre-driven Partner cutter with the corresponding blade diameter gives the blade an operational speed of about 5,000 rpm, while the speed of the ring cutter is about 3,000 rpm.

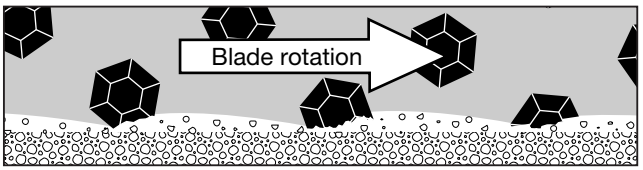
Laser-welded segments - TwinWeld

The diamond segments are laser-welded from two directions onto the blade body to stand up to the stresses that a hand-held power cutter can generate. The Partner K950 Ring is a machine intended for professional use and the diamond segments' quality is among the best that the market offers. Quality in this context means high content of pure (hard) industrial diamonds, which in practice means high cutting speed and long service life. The cutters should always be operated with water-cooling.

The blade's hardness rating

The segment, which is the working part of the blade, consists of small diamonds cast in a metal alloy. When we talk about the blade's hardness, it is the durability of the binding metal to which we refer, not the diamonds themselves. Severely wearing but soft materials, such as brick, require a hard blade while hard materials such as granite need a soft blade.

The diamond is the hardest material known to man. It shatters during the process of wear, thus generating new aggressive and sharp cutting edges. The binding metal, on the other hand, wears away in fine particles.
A correctly chosen blade offers a good balance between wear of the diamond and the binding metal.



Optimum hardness

The segment wears at a pre-determined rate so that the binding metal wears steadily, slightly more than the diamond cutting edge. On the diamond's "lee" side, the metal is protected by the diamond, thus producing a support lip.

Application areas

The methods available for cutting in concrete, stone and similar materials are in principle the following.

Small cuts are made using an angle-grinder and dry-cut blade. Hand-held centre-driven machines can manage cutting depths of up to 150 mm (16″ blade) and can be used with both dry- and wet-cutting, apart from electrically powered cutters which are only designed for dry-cutting.

Deep cuts, up to about 500 mm/20″, are made with a fixture-mounted wall-saw or wheeled floor-saw. Wet-cutting must virtually always be applied.

Extremely deep cuts are carried out with wire-cutting, that is to say a wire with diamond segments, a special method that we can leave out of the present discussion.

The alternative to cutting is hacking with a hammer and chisels, either pneumatically or hydraulically powered.

Application areas for the Partner K950 Ring

In terms of capacity (cutting depth) the K950 Ring is placed between the traditional cutting machine and the wall-mounted or floor-mounted saw.

Compared with the hand-held centre-driven cutter, the K950 Ring has almost twice the cutting depth and similar handling convenience (hand-held and lightweight).

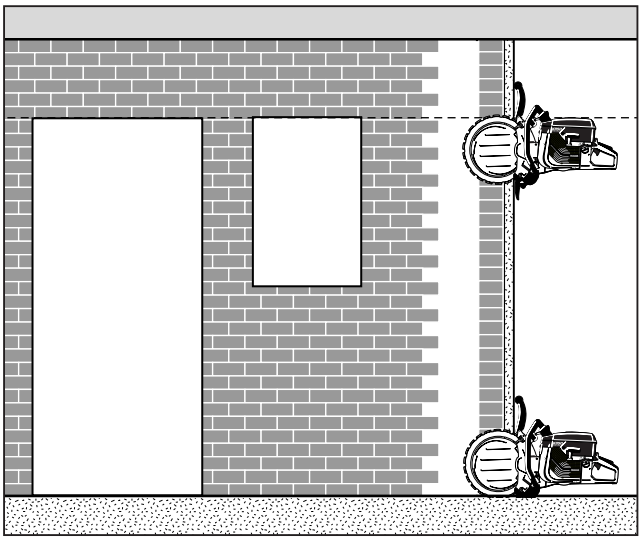
Compared with the wall-saw the K950 Ring offers the same cutting depth for normal operations, but the ring cutter does not need to be secured in a fixture. In this comparison, the Partner cutter is unique owing to its mobility.

To summarise, the foremost benefits of the K950 Ring are its considerable cutting depth combined with the convenience of hand-held operation.

The drive principle, where the centre of rotation lies within the cut itself, also offers unique benefits in practical application, which we will highlight.

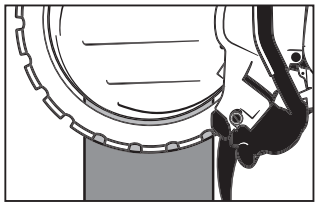
Cutting openings in concrete structures

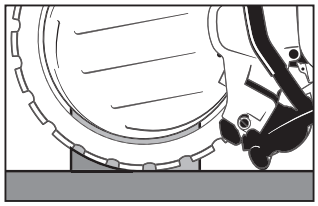
These very common operations in already-existing buildings demonstrate all the ring cutter's benefits in one and the same example. Assume that the wall is a total of 200 mm/8″ thick and that it surfaced with a material that cannot be repaired after overcutting in the corners.
– The small scope of the operation, with four short cuts, does not justify the time-consuming setting up of a fixture. What is more, the holes drilled for the fixture would have to be repaired afterwards.
– After the necessary overcutting, the cuts cannot be repaired invisibly.



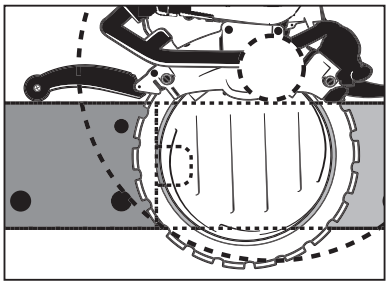
– If the wall (200 mm/8″) is cut from once side, the overcut is 23 mm/.9″. If the end cut is made from the opposite side, overcutting can be entirely eliminated at cutting depths down to 340 mm/13″!

170 mm cutting depth – no overcutting
There are many examples where, for a variety of reasons, it is not possible to make overcuts, for instance owing to reasons of material strength or cosmetic appearance. The ring cutter is far better at cutting in corners, for example where the wall meets the floor, than a centre-driven wall-saw.



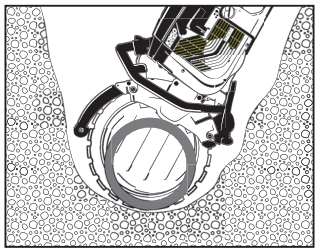


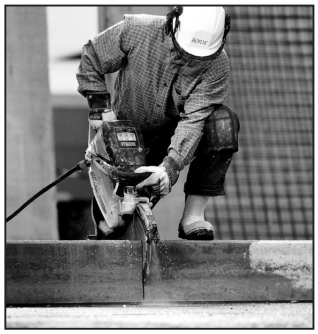
Reinforced concrete element
Concrete structures are being increasingly made as prefabricated elements and almost always with reinforcement which for reasons of strength sustainability is not to be cut. The ring cutter's considerable cutting depth and minimal overcutting need makes this an ideal machine in such operations. The illustration shows cuts in a reinforced girder cut using a ring cutter. The element on the left is to be retained. The girder is 200 mm/8″ thick. The dotted arch shows the cut if it had been made with a centre-driven floor cutter.

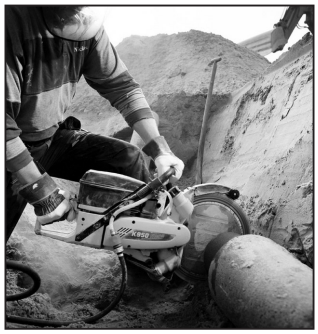


Construction operations
In this industry, there is a wide range of tasks for the ring cutter. Typical operations are the building of various roadworks such as bridges, viaducts, lane dividers and so on. Complex cast concrete constructions, usually in combination with prefabricated elements, often need to be trimmed or supplemented during the construction process.

Water, sewage, telecom, roads…
The ring cutter's compact dimensions give it a major advantage in congested spots. Typical examples are cutting in trenches, where it is often possible to minimise excavation around the object prior to cutting.







Partner K950 Chain

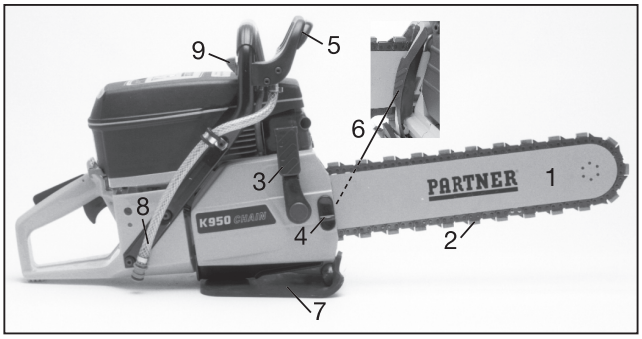
The Electrolux Group is the world's largest manufacturer of power saws for forestry applications. The step from the chain-saw's sharp teeth to the diamond segments of a power cutter is not far away. The basic structure encompassing the chain and drive system is the same as for the power saw, but that is where the similarities end.

The motor unit is a modified version of the centre-driven K950, and not a modified version of a chain-saw!

The diamond-tipped saw is designed to work in stone dust, water and concrete slurry, so it has all the equipment and all the design features that Partner has developed over a number of years for petrol-powered cutters.

The K950 Chain should under no circumstances be fitted with a cutting chain for wood – not least because this lacks essential safety features and lubrication for the cutting chain!

Technical design



Components, K950 Chain
The machine has the following special components:
1. Bar, 14 inches
2. Diamond-tipped chain
3. Chain tensioning handle
4. Counterhold screw
5. Hand guard with counterhold
6. Counterhold/wear protector
7. Splash guard
8. Water connection with quick-release coupling
9. Water valve

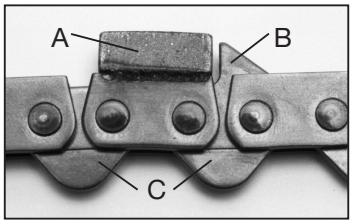
Chain/bar

The chain and blade are subjected to considerable wear from concrete dust and are therefore designed to resist wear as far as technically possible.

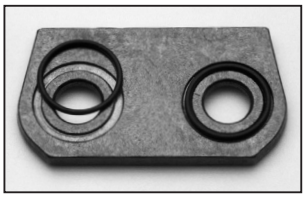
Chain design
The chain is made up of links where the cutting link has a diamond-tipped segment (A) that is laser-welded from two directions for best durability. The chain designed for a 14-inch bar has 32 diamond-tipped segments.

One link with guard (B) in front of the diamond segment serves as a depth limiter and thus protects the diamond segment from overloading and impacts. This function is most important when the saw is working with the tip of the bar, when only a few diamond segments are operating against the material at one time.

The chain has drive links (C) which fit in the drive sprocket, whose purpose is to power the saw and control the position of the chain on the bar.



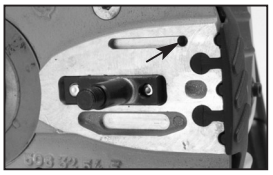
Greased links
Partner uses an exclusive type of chain where the links are lubricated with grease and sealed with O-rings. Not only does the chain last longer, the pressure from a regular water pipe is sufficient to cool and clean the chain during operation.

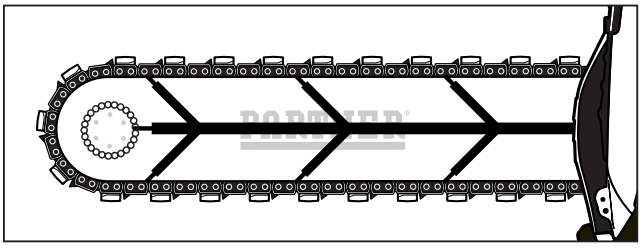


Chain types
Different materials require different types of diamond segment for efficient cutting. By varying the metal that binds the diamonds in place, the segments can be optimised for different types of material.

Water flow/lubrication
The water is fed from the motor block's water duct to the bar attachment and is then distributed via channels in the bar to six nozzles under the chain and to the bearing.

It is a good idea to operate the saw with as much water as possible so as to minimise chain and blade wear.



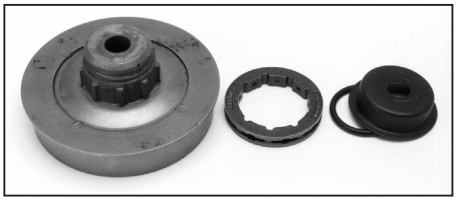


Clutch/drive sprocket

The drive sprocket is subjected to massive slurry and water exposure during cutting. In order to minimise water and dirt penetration into the clutch, the chain's drive sprocket is positioned at the tip of the motor's output shaft.

The clutch itself is of the same centrifugal type with three spring-loaded shoes that is found in all petrol-powered Partner cutters. What is special is that the clutch drum is turned, with the closed face outward. By equipping the clutch drum with a flange, it is easy to utilise the centrifugal force to create a runoff channel and thus minimise water penetration into the clutch.

Chain drive sprocket
The clutch drum has splines where the rim sprocket has a floating anchorage. In other words, the rim sprocket can move axially somewhat so that it is always exactly in line with the bar grove. The rim sprocket can be easily replaced after removing the tension ring.



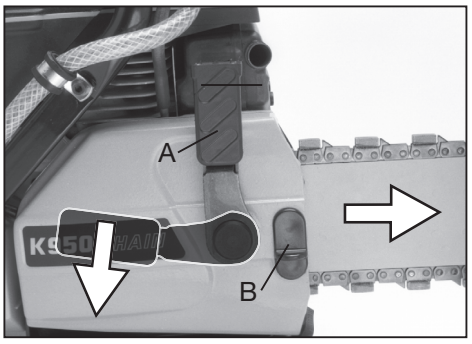
Chain tension

The Partner K950 Chain has a unique solution for adjusting chain tension quickly and without tools.

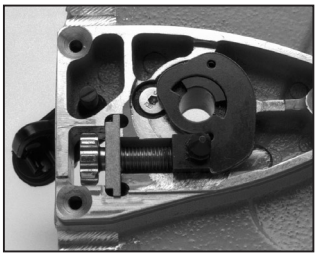
The adjustment mechanism consists of two parts, a lever (A) and a counterhold screw (B), and it functions as follows.

Chain tension lever
The lever's centre is threaded and when raised (tightened) the lever locks the cover against the bar (thus replacing lock-nuts).

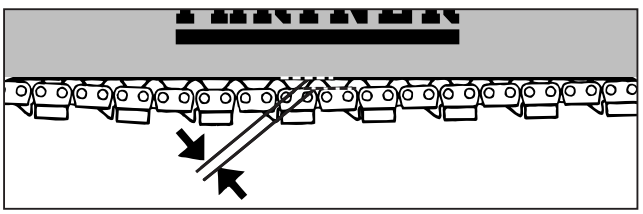
When chain tension needs to be adjusted, the lever is moved down/backwards. In this position, the bar can slide into its attachment. By pressing the lever down, the bar slides forwards and tensions the chain. The lever is then moved upwards and locks the bar and thus also secures the chain's tension.



Counterhold screw
This screw has no other function than to secure the bar so it does not move. It is tightened by finger pressure and is then covered by a rubber seal with protrusions to lock the counterhold screw in place.



Chain tension
Compared with a chain-saw for forestry applications, the diamond chainsaw has lower chain tension. Water has poorer lubricating properties than oil, and the lower chain tension reduces the friction between the bar and chain. The chain's slack measured in the middle of the bar should be between 5 and 12 mm/.2″ – .5″.

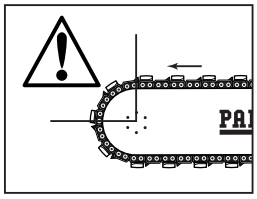


Operating technique

Application pressure
In order to ensure efficient cutting, the contact surface with the material being cut should be short. With cutting blades, the usual technique is to move the machine back and forth along the cut groove.

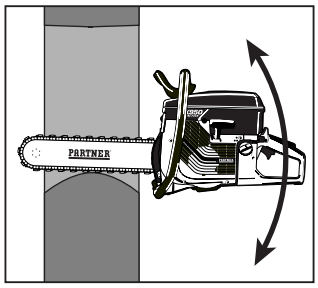
When using the chain-saw, which has a straight cut, other application methods must be employed when cutting deep so as to achieve a high partial application pressure and efficient cutting.

Incision



First make an incision to the full cutting depth. When applying the bar's tip to the object being cut, the chain nose's lower section should be used. If the upper part is used, there is a great risk of throwback, that is to say that the chain "climbs" up the object and the bar is thrown up and back towards the operator.

Swing
By allowing the machine to perform a slow pendulum motion while cutting, the chain's contact surface with the object can be kept short and the work proceeds more quickly.

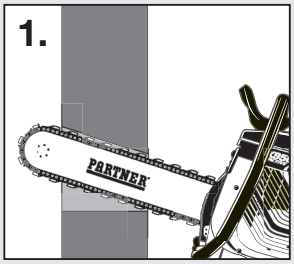


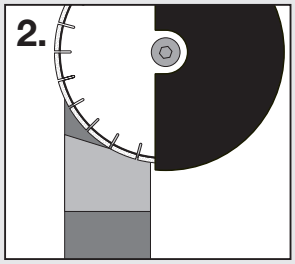
Counterhold
By pressing the rubber support against the object, the operator can create a lever effect which amplifies the feed pressure.

CORRECT SEQUENCE!
The chain-saw's diamond segments are 5.72 mm/.225″ wide while a conventional segment dimension for a cutter blade is 4.5 mm/.177″.

For operations where the chain-saw is used in combination with cutting tools that produces a narrower slit, the chain-saw's cut should be made first, followed only then by cutting with the narrower cutting blade.

An incision with a chain-saw in an already cut narrower groove leads to the chain getting stuck and a significant danger of throwback. The chain is overloaded and the result is broken diamond segments or chain breakage.

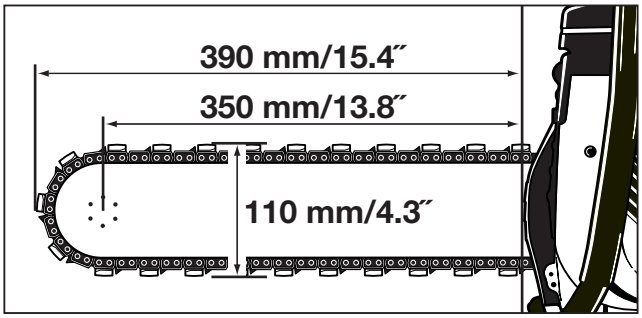




Properties

The diamond saw's exceptional properties determine its application areas. Cutting depth is maximum 390 mm / 15.4″ and it cuts 350 mm/13.8″ without overcutting, that is to say a cut in a straight line. Minimum cut height is 110 mm/4.3″.

The chain-saw does not in any way replace the traditional power cutters in normal operations – a conventional machine cuts both faster and more cheaply than the chain-saw. The K950 Chain is a special machine for work that requires an extreme cutting depth, or where it is necessary to cut small apertures, minimum 110 x 110 mm/4.3″ x 4.3″.



Target group
Compared with the rest of the Partner cutter range, it is difficult to specify volume operations that are typical for the K950 Chain.

The chain-saw is intended for a wide range of construction operations (building, roads, water/sewage), at the same time as it should be regarded as a special machine for a limited operational environment (deep and/or shallow cuts).

If we are to identify potential users of the chain-saw, we should look for operations in which it is necessary to **cut deep, where overcutting is either not allowed or not possible**, or where it is necessary to make **shallow cuts**. For other operations, accessibility is a vital benefit that argues in favour of the chain-saw. This should preferably also deal with less extensive operations.

Sample applications

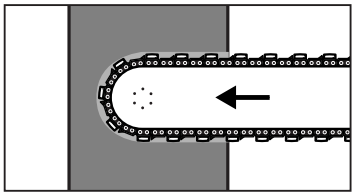
Under this heading we will offer a few examples of practical applications where the chain-saw's characteristics come into their own.

The machine for the entire job
As a single machine, it serves well for special jobs such as cutting apertures for ventilation, cable ducts (electricity, telecom), pipes (water, sewage) and so on.

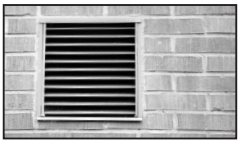
– Cutting of small apertures
There are many examples of this cutting requirement in the construction industry, e.g. holes for extractor valves, ventilation ducts, water and sewage pipes, cable ducts etc.

In particular when it comes to rebuilding and restructuring a building, the chain-saw has a variety of uses.

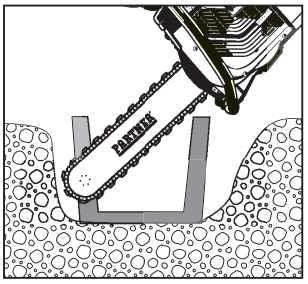
Incisions with the bar top is the best method for small openings, which promotes high cutting speed. The process of cutting out an extractor valve hole in a brick wall as shown in the illustration takes just a



few minutes. The aperture can be cut with immense precision, the result is neat, and no masonry work is necessary afterwards to tidy it up.



– Cutting in congested spaces
The diamond saw's extreme cutting depth of 390 mm /15.4″ solves many problems when cutting in congested spaces, for example in combination with groundwork where it is often difficult to expose the object sufficiently for access with a conventional power cutter. Examples here are cutting of sewage pipes, cable ducts (railway sidings) and foundations of various sorts.

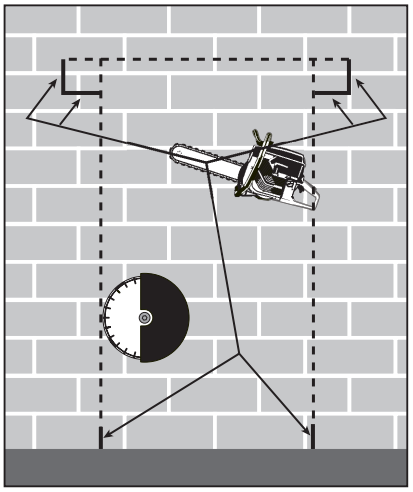


Supplementary machine
A typical example is the cutter which can be used as a supplementary cutter when the wall-saw cannot do the entire job, or when overcutting is not allowed or cannot be done, for instance when the cut has to be made all the way down to exact floor level.

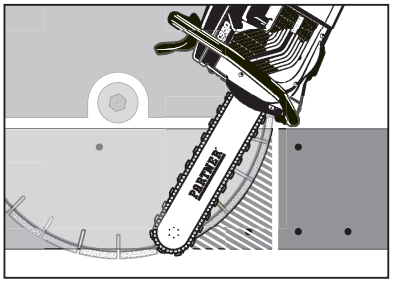
Cutting in corners when cutting in walls is another ideal job for the chain-saw. The chain-saw makes the corner cuts that the wall-saw cannot do without overcutting. No repair work is needed afterwards if the chain-saw does the work.

– Cutting in corners/phasing-in of load-bearing joists
Wall-saws leave an area that cannot be sawn without overcutting, see page 5. With a chain-saw as a supplementary cutter, overcutting can be entirely eliminated.

After being cut, walls made of breeze-block must usually be capped with a sturdy support, in the form of reinforced concrete or a steel beam. The K950 Chain makes the small cuts for the joist and cuts that last bit down to the floor, which the wall-saw cannot fully manage.



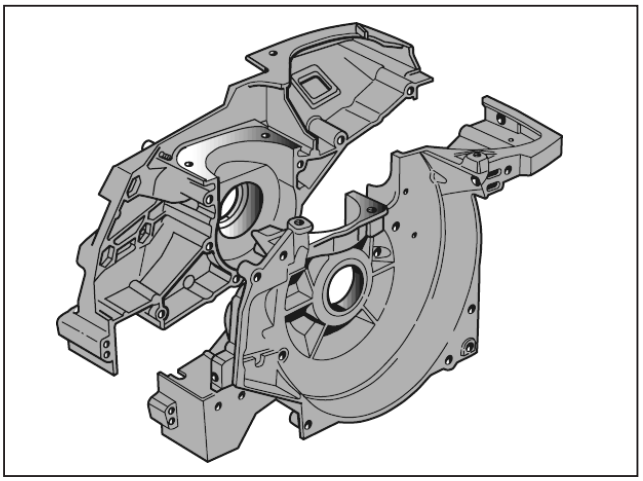
– Cutting in floor girders
In rebuilding work in particular, there is often a need to cut in cast reinforced floor girders. The ring cutter is ideal for the small jobs while the wheeled floor-saw is used for the larger cutting operations. By cutting the corners (shaded area) with the chain-saw, there is no need for overcutting with the floor-saw, and in fact overcutting is sometimes not even permitted in order not to compromise strength.



General K950 Ring/Chain

Machine body

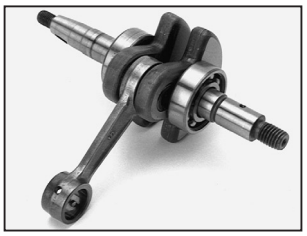
The machine body is cast in magnesium alloy for high strength and low weight. The block is conventionally split into two crankcase halves.



Surface treatment
The machine body is powder-painted, which means that no solvents are used. Powder paint is sprayed onto the machine body, which is electrostatically charged, to produce a uniform coating which penetrates everywhere. The parts are then baked in an oven and the powder paint melts to form a thick surface layer which is durable and resistant to mechanical wear.

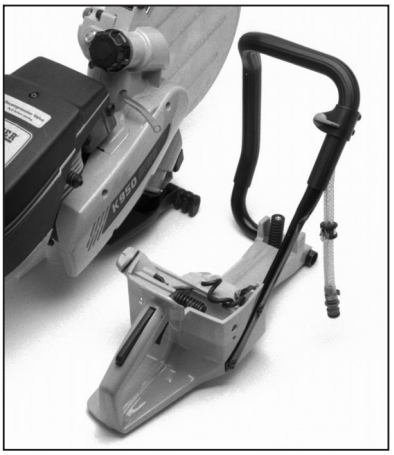
Crankcase bearing
The crankcase has sturdily dimensioned ball-bearings. These are lubricated by the two-stroke oil mixed in the fuel. The crankshaft's sealing rings can be replaced from outside the machine.

Crankshaft/connecting rod
The crankshaft and connecting rod are forged and case-hardened to ensure top strength and durability. The connecting rod has needle bearings on the crankshaft.



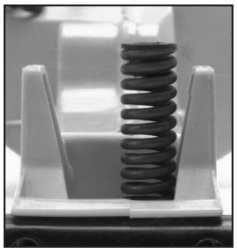
Machine/handle unit
The machines have a separate vibration-insulated unit that encompass the fuel tank, rear handle and machine bottom panel, at the front of which the handle arch is attached. The result is a sturdy handle with greater mass, which in turn helps cut vibration in the handle.

The separation of the fuel tank from the motor itself keeps the fuel cool, eliminating disruptions caused by vapour locks in the fuel system.



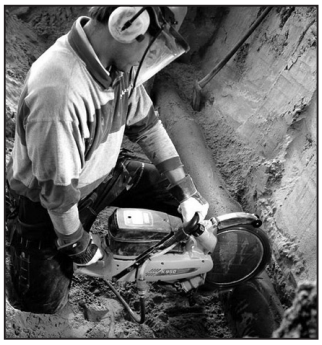
Vibration damping
In long-term use, vibrating handles cause damage to the blood vessels in the hand while short-term use can lead to loss of feeling and impaired muscle strength in the hands. In addition to the unpleasant sensation this causes, it is also a potential safety risk.

A good handle is always a balance between cancelling vibration and enhancing control.



Four vibration-damping springs link the motor to the tank. These springs are located at the greatest possible distance from each other to optimise vibration damping and operational properties.

Ergonomic design
Partner cutters have a machine body with minimum width, putting the centre of gravity as close to the operator as possible. This has a beneficial effect on operating comfort and ease of carrying when not in use. The motor itself has a clean design with smooth surfaces and no protruding parts. In normal cutting operations, the operator often has body contact with the machine, and protruding components would interfere with convenience and comfort.



Distance between handle sections
The handle arch is designed to provide good balance between the front and rear sections in both vertical and horizontal cutting.

In horizontal cutting, the operator has to carry the entire machine's weight, which is why the front handle has a forward-jutting grip for best balance.

Safe starting position
The rear handle on Partner cutters is designed to accommodate a large boot, ideal for locking the machine in a safe starting position.

Silencer

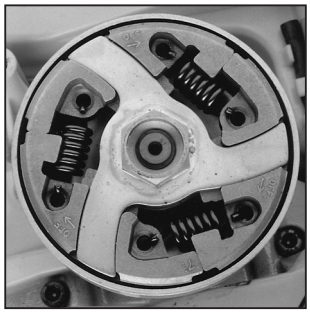
The silencer is of the two-chamber type and the exhaust gases are directed towards the side – away from the operator. The panel between the cylinder and silencer cools the exhaust port.

Most of the sound from the machine comes from the escaping exhaust gases.

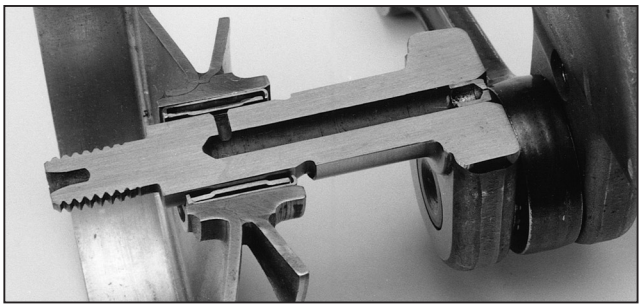
The air filter system acts as an effective intake damper and goes a long way to reducing sound pressure since the intake air is not drawn from above the engine. Sound levels are measured according to the CE norm in two ways:
– Sound pressure, measured at the operator's ear.
– Sound level, the mean value of the acoustic power which the machine generates, measured at twelve points around the machine on a reflective flooring material (concrete). These measurements are taken at idling speed and maximum speed.

Clutch

The clutch located between the engine and the cutter is of the centrifugal type. At idling speed, the clutch shoes are held against the centre by springs. Engagement speed is about 3400 rpm.



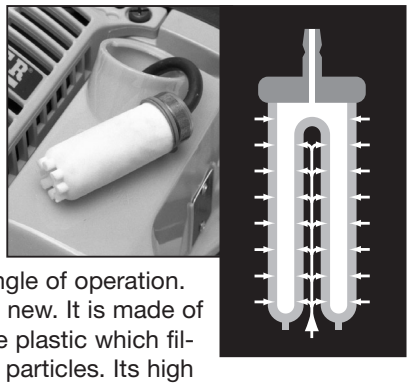
Self-lubricating clutch bearing
The clutch bearing is lubricated automatically – a tried and tested Partner speciality. A duct in the crankshaft opens out at the clutch bearing. The over-pressure which is created in the crankcase is transferred to the clutch bearing and keeps the bearing clear of incoming dust particles and at the same time lubricates it.



Fuel tank

The fuel tank is integrated with the vibration-damped handle unit, thus minimising heat transfer from the crankcase.Tank volume is sufficient for about 25 – 30 minutes of operation.

Fuel filter
The pick-up, which also has a fuel filter, always remains at the bottom of the tank so the cutting machine is always assured of its supply of fuel irrespective of the angle of operation.



The filter design is new. It is made of sintered polyethylene plastic which filters out the smallest particles. Its high filtration efficiency reduces wear on the carburettor's moving parts. The filter surface is smooth and repels dirt. The filter-replacement interval has thus been increased several times over.

Refuelling
The tank cover hangs securely from the machine during refuelling.

In order to avoid spillage for environmental and safety reasons while refuelling, we recommend the type of fuel-can which features an overfill valve.

Filter System

Cutting in stone and concrete generates tiny dust particles which must at all costs be prevented from entering the engine. The design of the air filter and its maintenance are the two most important factors governing the service life of the cutter. Designing a good air filter system is a matter of balancing effective filtering with long service intervals.

The development of more efficient filters has improved air-cleaning performance, but service intervals have by tradition still been inconveniently short in cutting machines. Machine rental firms inherit the problems caused by customers who do not carry out the necessary service during the rental period, or are faced with the cost of travelling frequently to various work-sites to carry out the necessary service.

Dust consists of extremely fine particles, generally so small that the individual particle cannot easily be distinguished by the naked eye but which in larger quantities can be seen as a cloud of dust. The stone or concrete dust which generally results from cutting operations generates the most damaging kind of particles for an engine's sliding or rotating components. Together with oil, this dust forms a perfect grinding paste which quickly wears down pistons, piston rings, cylinder walls and engine bearings once it penetrates an engine.

We generally measure dust particles in µm (1 µm = 0.001 mm), thousandths of a millimetre, and the particle sizes which are dealt with by the filter system generally measure between 50 µm and 5 µm. (It takes roughly 2 minutes for a stone particle measuring 10 µm to fall 1 m /3 feet in wind-still conditions.)

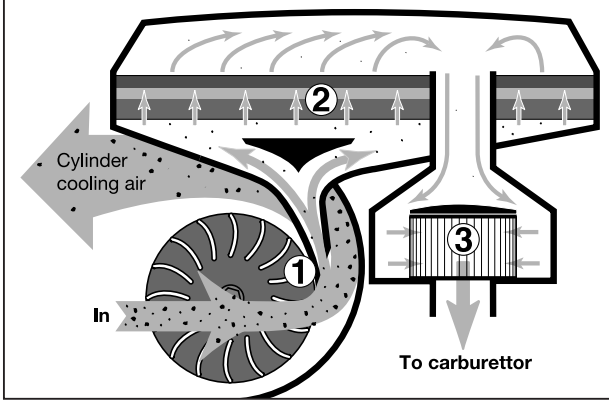
One physical characteristic which is vital to the function of the Partner Active Air Filtration system is the behaviour of dust particles in air currents depending on particle size:

A small particle is more easily affected by a current of air than a larger particle.

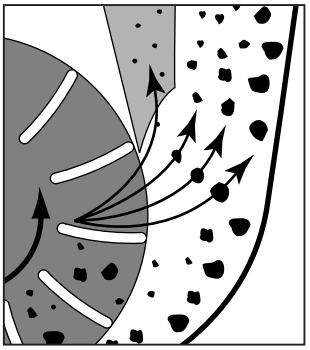
The reason for this is that small particles have a larger surface in relation to their mass. A small particle can therefore be steered and guided more easily by a current of air while a larger particle succumbs to centrifugal force or the force of gravity.

Partner Active Air Filtration is a filter system which effectively cleans the air entering the engine in three separate stages, utilising three different cleaning principles. The most immediate practical benefit of Active Air Filtration is that the service intervals are far longer compared to previous systems.

Air filtration principle

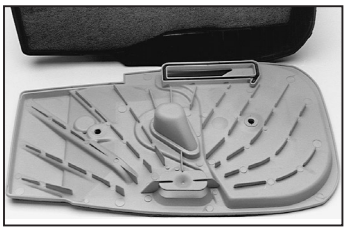


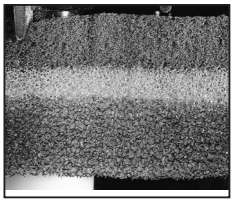
1. Centrifugal force is the first stage in cleaning the intake air of the K950 Ring and Chain. Centrifugal cleaning was previously only used on larger engines in dusty environments, for example for construction machines (cyclone air filter).



The fan vanes on the flywheel supply the cylinder with cool air at the same time as they act as the active part of the centrifugal filtering system for the engine's intake air. An intake nozzle is fitted just beside the fan vanes. Under centrifugal force, the larger particles do not follow the curved current of air to the nozzle but are instead thrown against the outside of the nozzle. Only very small dust particles will be able to follow the current of air leading into the intake. Tests show that up to 80% of all dust is removed by the centrifugal cleaning process.

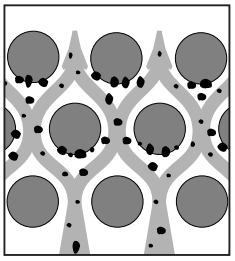
2. The foam filter is the next stage of separation in the filtration process. This filter covers the housing's entire surface, thus offering a filter surface of no less than 3.5 dm^2. The filter's base distributes air across the entire filter surface, so the filter performs uniformly.





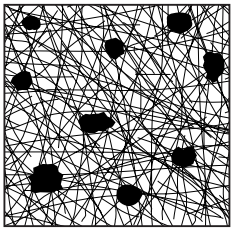
The filter is immersed in oil and is made up of three layers, each intended for a different pore size.

Inside the filter, the air flows through a structure pretty much like a labyrinth. Dust particles which strike against the filter sides do not bounce off but instead fasten to the sticky oily surface. A dry foam filter offers far less efficient cleaning performance than an oil-soaked filter.



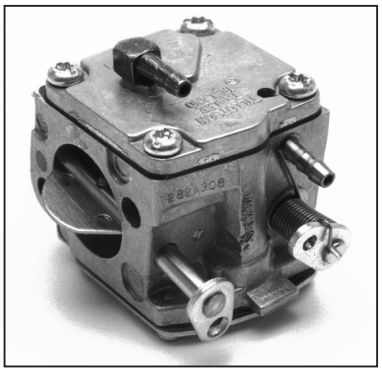
An oiled foam filter is by far the most effective filter for cleaning of stone dust, since the entire filter volume is used as a "dust trap", not just the surface. The total dust-absorbing filter area is accordingly enormous. The foam filter absorbs about 95% of the total dust volume remaining after centrifugal filtering. It can be washed clean and must be oiled at each service.

3. The paper filter deals with the small amount of dust particles which, more by chance than anything else, may manage to slip through the foam filter. Only a tiny amount of extremely small dust particles will ever get as far as the paper filter. The filter's dense network of cellulose fibres traps all incoming particles. The paper filter also serves as a protective barrier during filter services. The paper filter should be changed at every service.



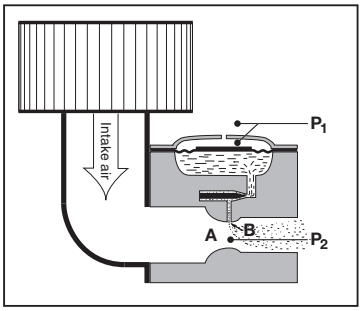
Carburettor

SmartCarb™ – carburettor with integrated filter compensation



With the SmartCarb™ carburettor, the machine always operates with the correct air/fuel mixture, virtually irrespective of how soiled the filters are.
This design results in:
- high and more uniform engine power
- better filter economy, longer service intervals
- lower fuel consumption
- lower emissions

Carburettor operating principle



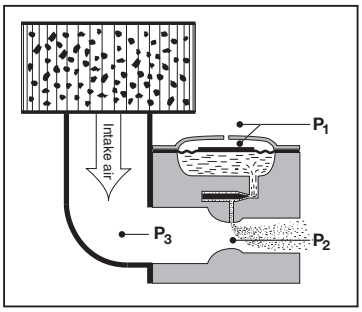
To understand the way in which the SmartCarb™ carburettor operates, we will first describe how a conventional carburettor works.

The carburettor's main job is to supply the right mixture of fuel and air to the engine. Every carburettor has a Venturi tube (A), in which the high speed jet (B) for petrol supply is fitted. When the engine sucks in air through the carburettor, the fuel is sucked down into the Venturi tube and mixed with the air.

A more detailed explanation is that *when the air flows through the Venturi tube, air velocity increases, thus causing pressure to drop in the Venturi* (the Bernoulli theorem). The pressure differential between the carburettor's fuel chamber (P_1) which operates under constant air pressure (atmospheric pressure), and the Venturi tube's negative pressure (P_2), causes the fuel to flow out through the jet.

Dirty filters

One problem with the conventional carburettor is that the air/fuel ratio gradually changes as the filters become increasingly blocked with dirt.

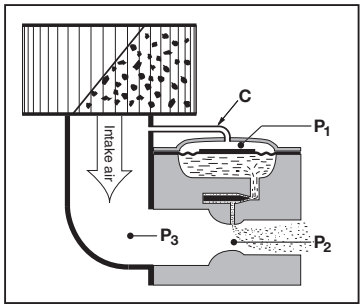


Dirty filters increase air resistance and promote a drop at (P_3) which is added to the pressure drop in the venturi (P_2), so that the pressure differential compared with the carburettor's fuel chamber (P_1) increases. As a result, the carburettor enriches the mixture, supplying more fuel in relation to air, which in turn impairs the engine's performance.

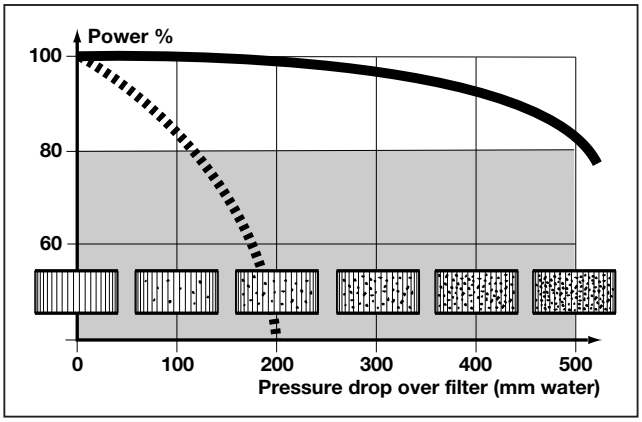
One way of compensating for dirty filters is naturally to reduce the amount of fuel being supplied by adjusting the high-speed needle in the carburettor.

SmartCarb™

The SmartCarb™ filter-compensating carburettor has an air duct (C) which links the carburettor's fuel chamber with the intake, which is directly connected to the filter chamber. (Note the fuel chamber's sealed lid and the fixed high-speed nozzle.)



The air duct (C) ensures that the air pressure in the fuel chamber (P1) and the filter chamber (P3) remains constant at all times. Only the pressure drop created by the venturi tube (P2) determines the amount of fuel which is to be mixed with the intake air. Therefore, irrespective of whether the filter system is clean or dirty, the relationship between air and fuel will remain constant at all times.



The above diagram (showing a laboratory test) demonstrates the considerable effect of SmartCarb™ on engine power. Air pressure is measured at the carburettor's inlet and the figure 0 is set for brand-new filters and with the engine running at normal speed. As the filters accumulate dirt, the pressure drops owing to the increased build-up of air resistance.

At a pressure drop of just 100 mm Vp, the standard carburettor provides such a rich fuel/air mixture that the filters must be replaced or the H-needle has to be adjusted. The SmartCarb™ carburettor offers excellent engine performance all the way to 500 mmVp.

With the standard carburettor, the engine loses power mainly because it is having to work with the wrong air/fuel ratio, while the power drop with the SmartCarb™ – which only becomes apparent once the filters are severely polluted – stems from the fact that the engine receives less air and fuel owing to the air resistance caused by the blocked filters.

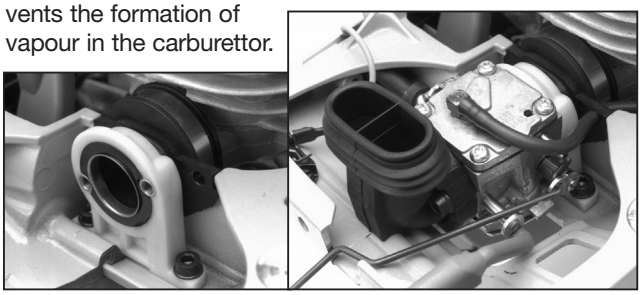
Long service intervals

In practical terms, the pressure drop in the diagram can be translated into corresponding operation times, where we can see that the SmartCarb™ engine offers many times the standard operating duration between filter service!

Vibration and heat-insulated carburettor
Every engine gives off a certain degree of vibration. The carburettor has a number of moving parts such as the control valve with its lever and diaphragm and the carburettor's throttle spindles. Their function is affected by vibration, with the effect growing in proportion to the mass (weight) of the parts. (Light parts have a greater ability to follow vibration-induced oscillation than do heavy parts.)

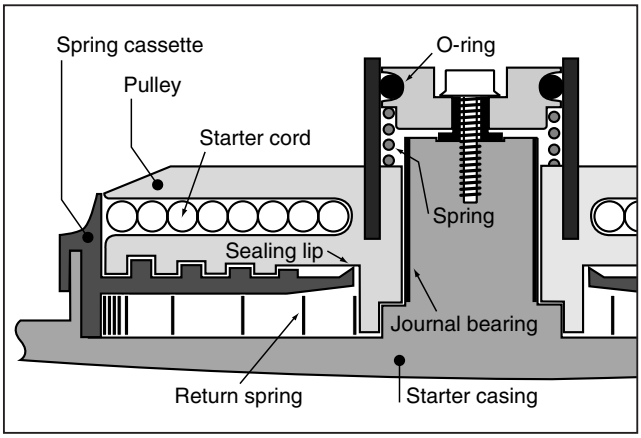
The carburettor and its moving parts are larger in large machines, so the K950 Ring and Chain feature a vibration-damping element between the cylinder and carburettor.

This element also serves as a heat insulator and prevents the formation of vapour in the carburettor.



Starter unit

Dura Starter is a new patented starting system that was designed to withstand the dust, water and slurry that make up the cutting machine's operating environment.



Dura Starter — new dust-excluding design
The principle of the new starter unit is that the pulley is protected from vibration-induced movement. This makes it possible to fit a series of seals and a grease-lubricated bearing.

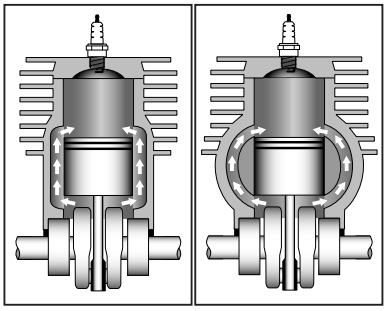
The spring above the pulley exerts a tensioning force against the centre screw and acts as a brake on vibration-induced movement. An O-ring above the spring prevents dust from penetrating into the pulley's bearing. The spacer sleeve around the centre screw is the pulley's upper bearing point and the entire pulley is journalled in a slider bearing against the starter casing's bearing pin.

The space between the pulley and the spring cassette is shaped like a circular labyrinth, which prevents dust from moving towards the centre. The spring cassette is sealed against the centre with a spring-loaded sealing lip lying against the pulley.

Cylinder/piston

The Partner K950 Ring and Chain have specially developed air-cooled two-stroke engines running on unleaded, minimum 90-octane petrol. They are lubricated with oil mixed in the petrol.

There are two types of flushing duct – open and closed. Large two-stroke engines work more efficiently with closed flushing ducts, which is why the K950 feature this system.



The cylinder bore is hard-chromed. The piston has two piston rings, and it has needle bearings at the coupling with the connecting rod.

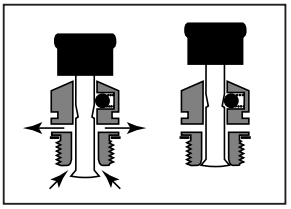
The cylinder and piston are made in a way which ensures ideal dimensions during operation. The piston is profile-turned and the cylinder is honed for the temperature — and the accompanying material thermal expansion — which each part of the cylinder and piston experience during operation. For example, the piston, when seen from the side, has a somewhat barrel-shaped profile, while the view from above reveals a slightly asymmetrical oval shape.

This design gives the engine maximum power through perfect sealing in the cylinder chamber allied to minimum frictional loss against the cylinder wall. However, this production method is both complex and expensive.

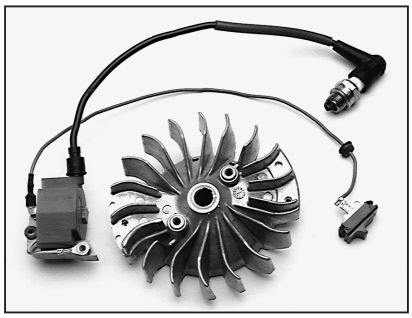
Decompression valve

Large engine offers relatively high resistance at the starter cord. The decompression valve solves this problem in a simple and efficient way.

When starting the machine, the valve is first opened by pressing the button. When the operator pulls the starter cord, most of the compression pressure exits through the valve and the starter cord's movement is both gentle and even. As soon as combustion takes place in the cylinder, the valve is shut automatically by the combustion pressure and the engine operates normally.

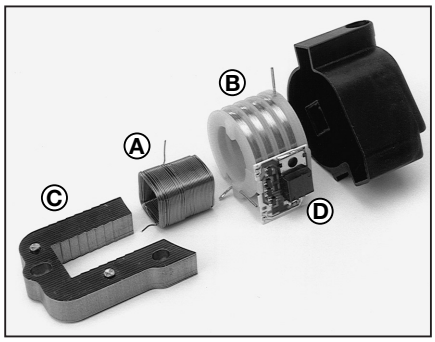


Ignition system



The ignition system is completely sealed and has no moving parts. It is insensitive to moisture and dirt. It is designed so that the ignition point never needs to be adjusted.

The Partner K950 Ring and Chain feature a built-in over-revving protector in the electronic module, limiting engine speed to 9,750 rpm.



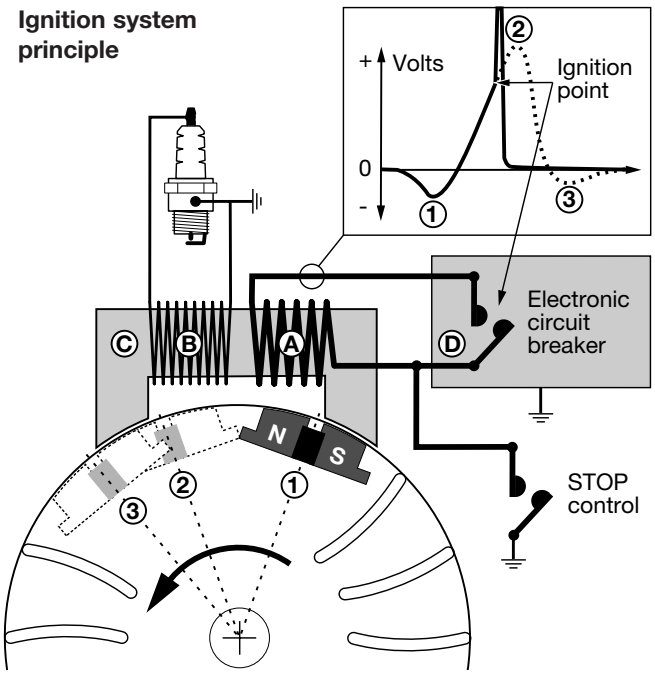
The ignition system consists of the primary coil (A) and the secondary coil (B), both of which surround the iron core (C). A transistorised electronic module (D) deals with the contact-breaking function.

Current is generated in the primary coil when the flywheel's permanent magnet passes the coil and produces the voltage sequence shown in the diagram below. (The dotted line shows the voltage which is generated if the current is not broken.)

The ignition point is determined by the electronic module which senses variations in voltage in the primary coil and cuts the current at the right level, at the same time as the piston is just below top dead centre. At the instant that the contact is broken, voltage in the primary coil rises from 5 V (volts) to about 200 V through a process of induction.

In the secondary coil, a high tension of about 20,000 volts is conveyed to the spark plug.

Ignition system principle



Controls

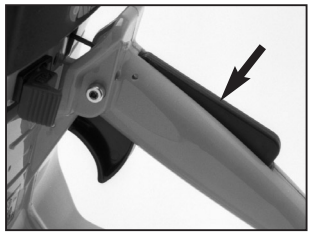
The basic principle behind the controls needed while the machine is running is that the operator should not need to release his grip on the handle. Therefore, all the controls are gathered together on the rear handle – for both safe and comfortable operation.

The size and the shape of the controls make them easy to operate with thick gloves on – gloves should always be used for cutting operations.

Throttle control

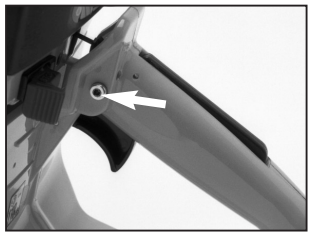
The throttle control has been thoroughly tested. The spring-loaded counterbalance, its stroke, design and precise positioning are all optimised for best "finger-tip comfort".

Throttle trigger lockout



The throttle control is blocked in the idling position – a safety device to prevent accidental acceleration. The inhibitor, on the upper face of the handle, is released when the driver grasps the handle.

Starting throttle catch



The throttle control can be locked in a partially open setting which ensures the correct throttle opening for starting, with either a cold or warm engine. As soon as the throttle control is pressed, the catch is released.

Choke

On the K950 Active, the choke control is pulled outwards, a more easily noticeable indication that the choke is engaged. The choke control does not act on the throttle shutter; instead, the partial-throttle setting is governed by the starting throttle catch during start-up.

Stop control

The stop control can be operated with the thumb without the operator having to release the handle. The control cuts the ignition.

Water valve

The flow of water is adjusted from the front handle with the thumb, without the operator having to release his grip on the machine's handle.

Technical specifications

Partner K950 Ring & Chain

Engine

Air-cooled, 2-stroke	94 cm^3/5.7 cu.in.
Power	4.5 kW (6.2 hk)
Bore/stroke	56 mm/38 mm, 2.2″/1.5″
Compression ratio	10.0:1
Max rpm	9,800 ± 300 rpm

Fuel

Petrol, min.90 octane unleaded (green pump)	
Oil mixture	4 % (1:25)
Oil mixture with Partner-oil	2 % (1:50)
Tankvolym	1.0 l
Full tank under normal operation lasts approx.	20–30 min.

Carburettor

Tillotson HS282A SmartCarb™ with built in filter compensation

Air filter

Three filtration principles:	
1. Active centrifugal filtration	
2. Oil-saturated 3-layer foam filter	
Filter area	3.5 dm^2/54 sq.in.
3. Dry filter, folded paper filter	16 dm^2/248 sq.in.

Ignition system

Transistorised ignition system, Electrolux type	
Spark plug	NGK, BPMR7A alt Champion, RCJ7Y
Electrode gap	0.5 mm/.02″

Clutch

Centrifugal clutch with 3 clutch shoes.	
Engagement speed, min.	3,200 rpm
Automatic lubrication of clutch bearing.	

Note 1: Noise emissions in the environment measured as soundpower (L_{WA}) in conformity with EC directive 2000/14/EC.

Note 2: Equivalent sound pressure level at the user's ear. Calculated as the time-weighted energy total for sound pressure levels under various working conditions with the following time distribution: 1/2 idling and 1/2 max speed. Measured according to EN 1454, dB(A) speed.

Note 3: Handle vibrations measured according to EN 1454.

CE The CE marking indicates that the manufacturer guarantees that the machine meets all the requirements of the EU directives, that is to say those safety standards which must be met in order for the machine to be sold within the EES block.

Partner K950 Ring

Cutting equipment

Cutting blade, diam	350 mm (14″)
Cutting depth, max	260 mm(10″)
Max pherical speed – rpm	55 m/s – 3,000 rpm

Weight

Without blade, emty tank	13.1 kg
Cutting blade	0.8 kg

Dimensions

Length with cutting blade	800 mm/31.5″
Max. width	210 mm/8.3″
Max height	420 mm/16.5″

Noise emissions (see note 1)

Sound power level, measured	117 dB(A)
Sound power level, guaranteed L_{WA}	118 dB(A)

Sound levels (see note 2)

Equivalent sound pressure level	103.5 dB(A)

Vibration levels (see note 3)

Idling, front/rear handles	7.7/11.8 m/s^2
Full throttle, front/rear handles	2.8/7.5 m/s^2

Partner K950 Chain

Cutting equipment

Bar with water channels	14 inch
Diamond saw chain, with O-ring sealed rivets	
Pitch, drive link	3/8″
Diamond segment, laser welded	32 pcs
Segment width (= kerf)	5.72 mm/.225″
Max. chain speed	28 m/s
Min. water requirement	1.5 bar, 15 l/min.
Cutting depth:	
Maximum	390 mm/15.4″
Without overcutting (straight cut)	350 mm/13.8″
Min. cutting hight	110 mm/4.3″

Weight

Without chain and bar, empty fuel tank	9.4 kg/20.7 lbs
Chain and bar	1.5 kg/3.3 lbs

Dimensions

Length	830 mm/32.7″
Max. width	285 mm/11.2″
Max height	370 mm/14.6″

Noise emissions (see note 1)

Sound power level, measured	115 dB(A)
Sound power level, guaranteed L_{WA}	116 dB(A)

Sound levels (see note 2)

Equivalent sound pressure level	103 dB(A)

Vibration levels (see note 3)

Idling, front/rear handles	10.8/12.1 m/s^2
Full throttle, front/rear handles	2.2/8.7 m/s^2

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