

HILTI

DS-WS 10

Operating instructions

en

CE

ORIGINAL OPERATING INSTRUCTIONS

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1. General information

1.1 Information on how to use these operating instructions

The operating instructions must be read carefully before the equipment is put into operation. Always keep these operating instructions with the equipment. The wire saw system should be handed over to other persons only complete with the operating instructions.



Indication of danger

CAUTION

This word is used to draw attention to a potentially dangerous situation which could lead to minor personal injury or damage to the equipment or other property.

1.2 Pictograms



Warning



Caution: High voltage



Warning: Avoid hand injuries



Wear protective gloves



Wear protective goggles



Wear a safety helmet



Wear protective footwear



Wear respiratory protection



Read the operating instructions before use

1.3 The wire saw system



- 1 Compact wire saw
- 2 Air compressor with control panel
- 3 Compressed air hoses (2×7 m, 1×1 m)
- 4 Positioning template
- 5 Water hoses (2×10 m)
- 6 Water nozzle, flexible
- 7 Water nozzle, long
- 8 Water hose connector with regulating valve
- 9 1/2" square drive wrench
- 10 Toolbox for tools and accessories

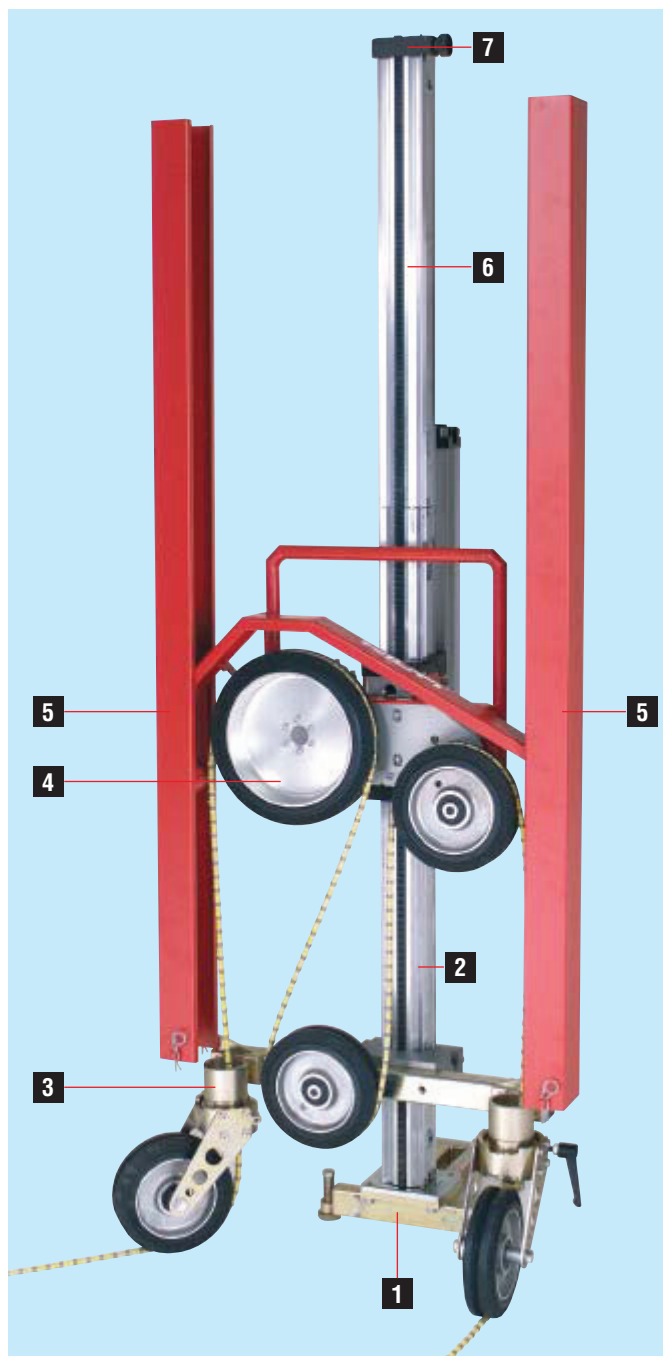
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2. Description

2.1 Use as directed

- The DS-WS10 wire saw has been developed for the technical demolition of steel, concrete, stone or brickwork structures in construction and civil engineering applications. Use of the saw for other applications is considered to be “not as directed” and requires prior approval by the manufacturer.
- The operator in charge must be aware of the possible dangers and of his responsibility for safety, both with regard to himself and to others.
- The wire saw is designed for a maximum cutting length of 2 meters. The maximum distance between the pivoting pulleys at the machine and the wire entry or exit point must not exceed 3 meters.
- The wire saw may be operated only by specialists trained in concrete cutting techniques, referred to in the following as “operators”. These persons must be familiar with the content of these operating instructions and must have been trained in their safe application by a Hilti specialist.
- National regulations and legislation as well as the information in the operating instructions and safety precautions concerning the saw and its accessories (sawing wire, fastening accessories, lifting equipment, compressor, hydraulic power unit etc.) must be observed.
- Do not use the saw to cut objects not secured in place or held against the wire by hand.
- Use of the wire saw or its components for purposes other than wire sawing is prohibited, i.e. use as a transport or conveyance device is not permissible.

2.2 Components

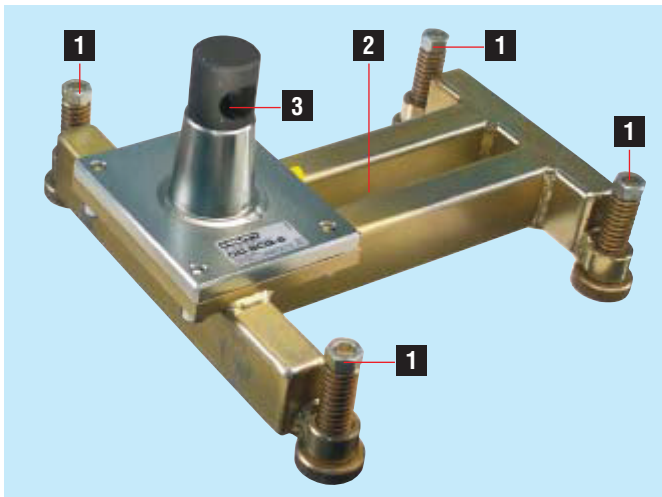


- 1 Base plate
- 2 Guide rail and advance unit
- 3 Pivoting pulley crossbar
- 4 Drive unit
- 5 Guard
- 6 Wire storage extension
- 7 End stop

2.3 Operating controls and parts

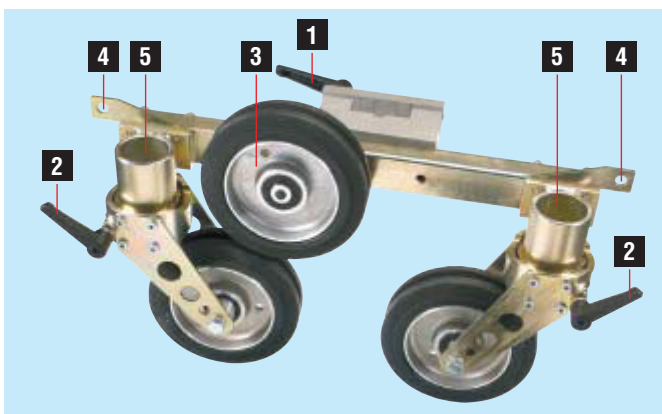
Base plate

- 1 Leveling screws
- 2 Anchor slot
- 3 Connecting taper



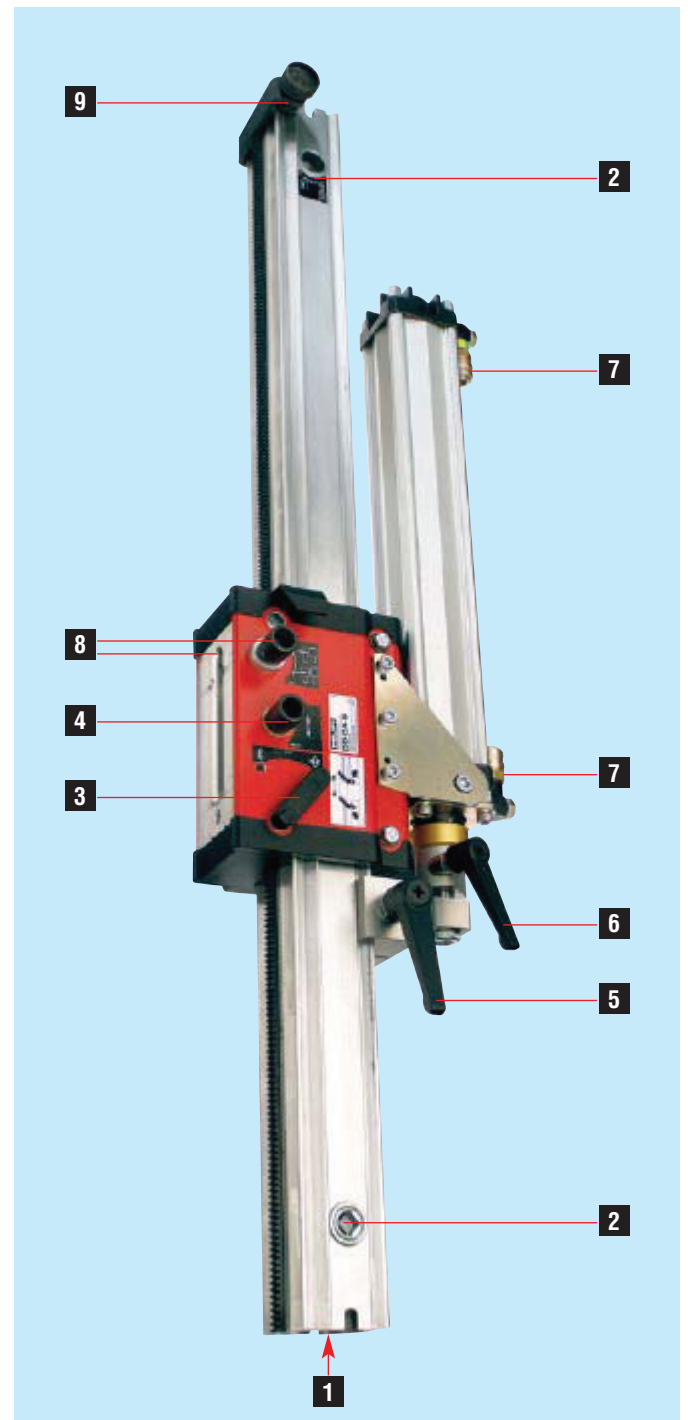
Pivoting pulley crossbar

- 1 Attachment point and clamp
- 2 Pivoting pulley locking lever
- 3 Wire storage pulley
- 4 Guard mounting hole
- 5 Hollow axles



Guide rail and advance unit

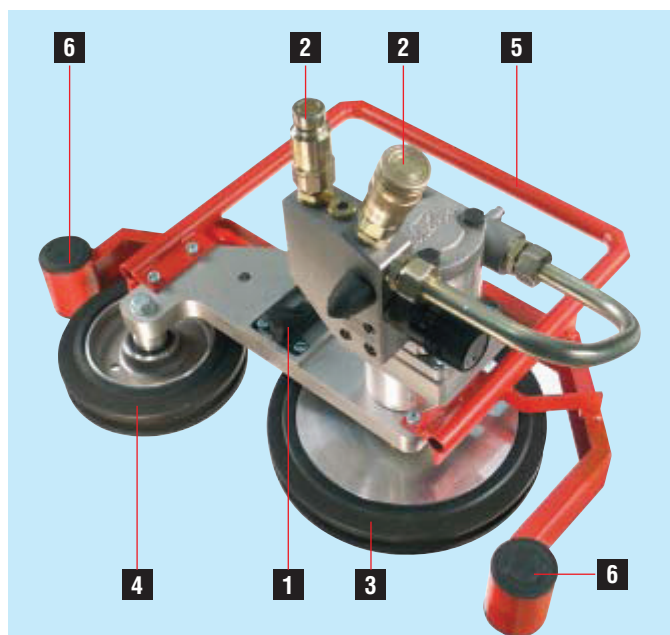
- 1 Internal taper
- 2 Eccentric pin
- 3 Carriage locking mechanism
- 4 Manual advance mechanism
- 5 Piston rod securing clamp
- 6 Return lock
- 7 Compressed air connection
- 8 Drive unit interface and locking mechanism
- 9 End stop



2. Description

Drive unit

- 1 Mounting interface
- 2 Hydraulic connection
- 3 Drive pulley
- 4 Return pulley
- 5 Carrying / holding bar
- 6 Guard guides



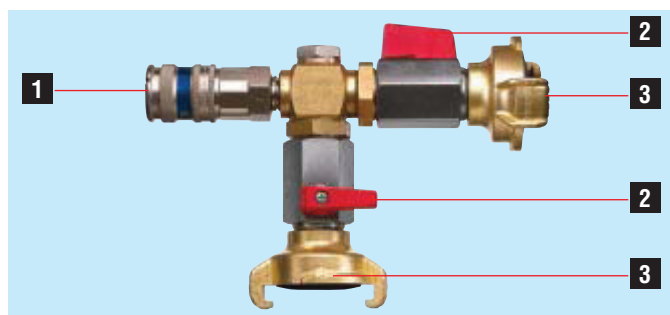
Guard

- 1 Guard mounting pin
- 2 Spring pin



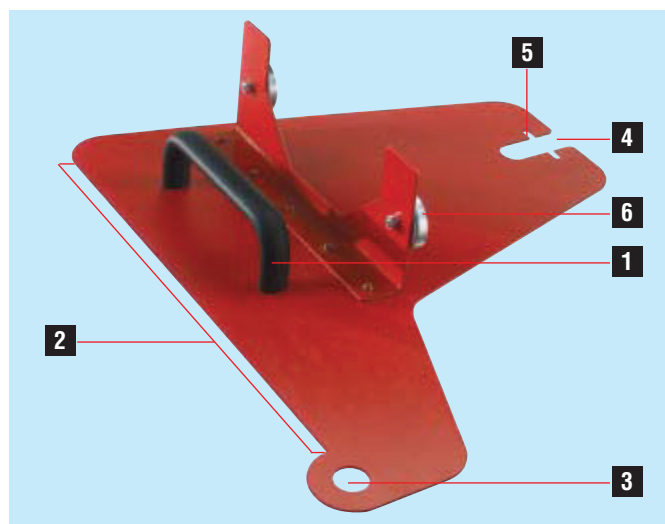
Water connection and regulating valve

- 1 Coupling (water outlet from hydraulic unit)
- 2 Flow regulation and shut-off valve
- 3 Water hose connection (cooling water nozzles)



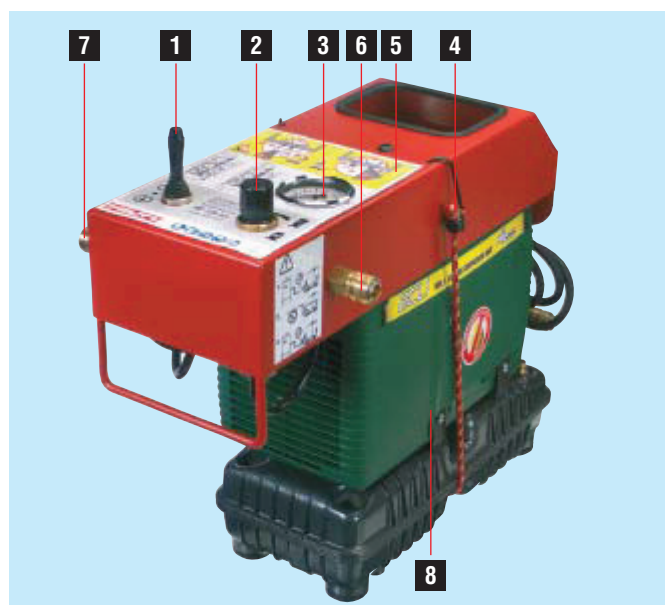
Positioning template

- 1 Grip
- 2 Edge indicating line of cut
- 3 Wire entry point
- 4 Possible anchor positioning range
- 5 Optimum anchor position
- 6 Retaining magnet for attachment to base plate



Pneumatic system control panel

- 1 Advance direction control valve
- 2 Regulator for advance pressure adjustment
- 3 Advance pressure indicator
- 4 Securing band
- 5 Safety and operating instructions
- 6 Compressed air supply connection
- 7 Advance cylinder connection
- 8 Air compressor



2.4 Drive principle

The sawing wire is passed around the object to be cut, over guide pulleys and the drive pulley before the ends of the wire are joined to form an endless loop. The wire loop is set in motion by rotation of the drive pulley and pulled through the object to be cut by way of the linear advance movement of the drive unit.

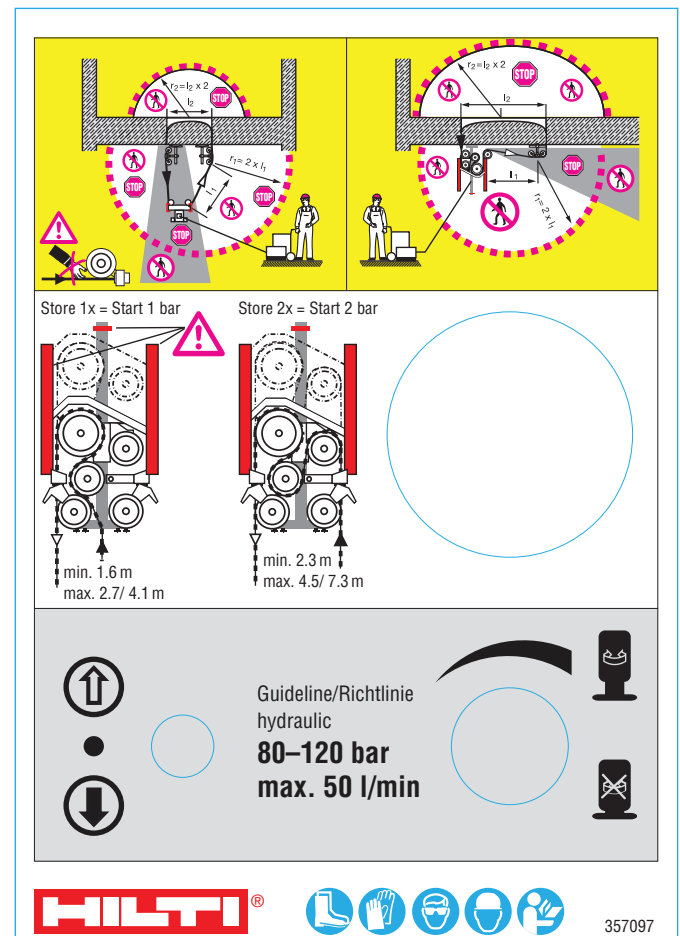
2.5 Saw advance and wire storage

Wire advance is by way of the “block and tackle” principle. The advance movement, i.e. causing the wire to be drawn in, is effected by the pulleys being pushed apart by a compressed air cylinder. In addition, the drive pulley is mounted on a moving carriage. The length of wire that can be stored on the pulleys depends whether a single or double return system is used, i.e. with or without the optional wire storage pulley. Please refer to the “Technical data” section for further details.

2.6 Wire guidance

Alignment of the sawing wire between the pivoting pulley on the machine and the pivoting pulley mounted on the object being cut can be set precisely by adjusting the pulleys. In flush cutting applications, the pivoting pulleys adjust automatically to the decreasing distance between the wire entry and exit points by pivoting freely as the cut progresses.

2.7 Safety concept for the working area





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3. Tools and accessories

3.1 Sawing wire

Safety precautions and instructions



Use only rubber- or plastic-coated sawing wires of a type approved for use at a speed of at least 30 m/sec.



Connecting wires of different diameters together, the use of worn, out-of-round wires or wires with loose beads or damaged cores (individual strands broken) is not permissible.



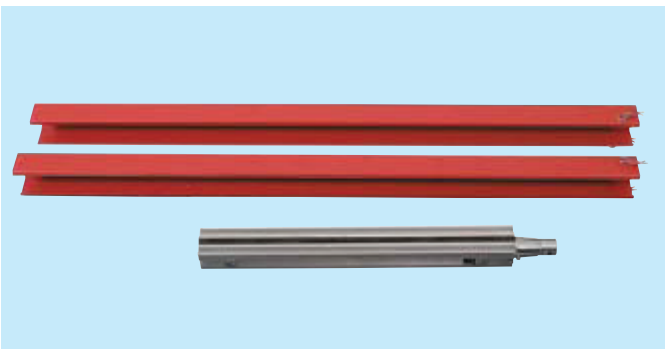
Observe the wire and wire connector manufacturer's instructions when connecting sawing wires.



Use only diamond wires with beads of a diameter within the 8 – 12 mm range. Other diameters may cause the wire to jump off the pulleys or result in damage to the running surface of the pulleys.

3.2 Wire storage extension

The wire storage extension can be used to increase wire storage capacity from 250 cm to 500 cm.



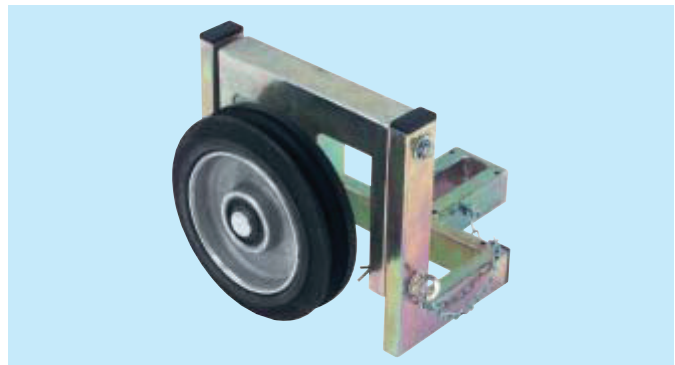
3.3 Pulley stand

In applications where, due to restricted access, it is impossible to mount the compact wire saw directly on the object to be cut or where longer cuts of up to a maximum of 2 meters are to be made, the sawing wire is guided to the cutting face by the pulley stand.



3.4 Release pulley

The release pulley is used to decrease the length of wire in contact or to increase the radius of the arc followed by the wire (avoiding a tight radius) at the rear of the object to be cut.



3.5 Hilti sawing wires and accessories

Recommendations: Which specification for which material?

	Standard diamond wires (sintered beads)		Special wires (electroplated beads)	
	BC	LC	Steel 20%	Steel 100%
Material	Reinforced concrete	Reinforced concrete	Heavily reinforced concrete	Solid steel
Desired characteristics	Fast cutting	Long life	–	–

Technical data

	Standard diamond wires (sintered beads)		Special wires (electroplated beads)	
	BC	LC	Steel 20%	Steel 100%
Hilti wire saw type	WSS30, WS15, WS10			
Bead diameter (mm)	10.5		10.2	10.8
Diamond matrix thickness (mm)	1.5		–	–
No. of beads per meter	44	40	40	48

DS-W 10.5 diamond wires

Hilti DS-W 10.5 diamond wires for DS-W15, DS-WS 30 and DS-WS 10 wire saw systems

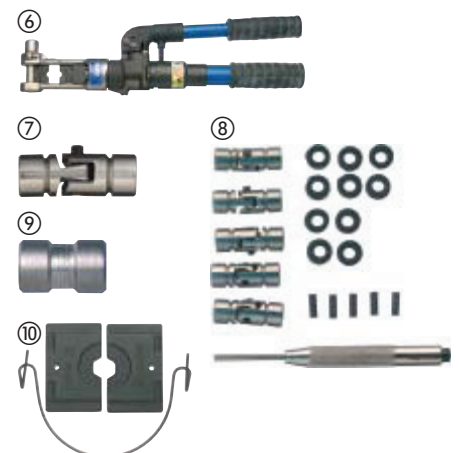
Wire length (m)	Designation DS-W 10.5 BC ①	DS-W 10.5 LC ②	DS-W 10.2 steel 20% ③	DS-W 10.8 steel 100% ④
10 m	235835/6 *	235834/9 *	–	–
14 m	235836/4 *	235838/0 *	376982/0	371987/9
18 m	315019/0 *	315020/8 *	371983/8	371988/7
22 m	315022/4 *	315023/2 *	371984/6	371989/5
26 m	315025/7 *	315026/5 *	–	–
30 m	315028/1 *	315029/9 *	–	–
50 m	370500/1	376630/0	371985/3	371990/3
100 m	370426/9	376631/8	371986/1	371991/1
150 m	376633/4	376632/6	373130/4	–
per/m	376635/9	376634/2	377830/5	377781/0

* with factory-fitted flexible connectors



Accessories for Hilti diamond wires

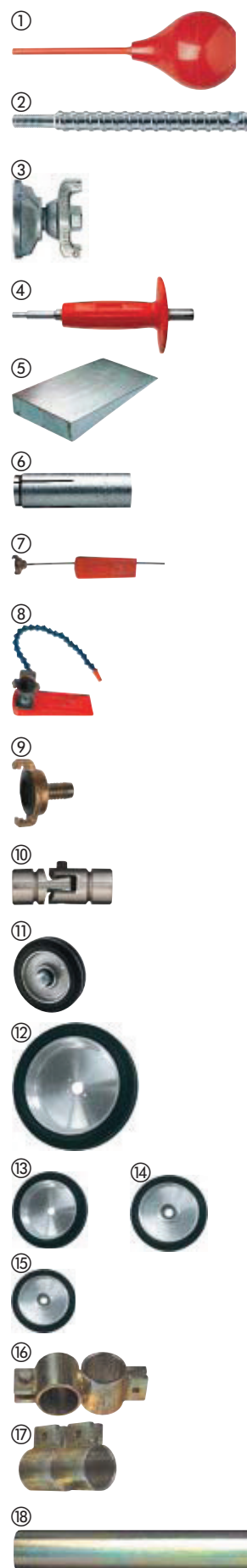
Designation	Package contents	Ordering designation	Item no.
Crimping pliers For crimping connectors / repair sleeves	1	DS-WSTHY	⑥ 235845/5
Flexible connectors Quick-release type	1	DS-WCMV	⑦ 340427/4
Set of flexible connectors Quick-release type with pin and O-ring	5	DS-WCSet	⑧ 371383/1
Pin Replacement pin for quick-release connectors	10	DS-WP	235842/2
Sleeve Repair sleeve	5	DS-WS	⑨ 235841/4
O-ring Fitted between connector and bead	10	O-Ring 10/4,7×2,5	235844/8
Crimping jaws Replacement jaws for crimping pliers	2	DS-WJ	⑩ 340426/6
Angle grinder For cutting diamond wire	1	AG 125-S	000000/0



3. Tools and accessories

3.6 Accessories for securing the drive unit and wire guides

Ordering designation	Quantity	Use
DS-WS tool set		Wire saws
comprising:		
Hilti plastic toolbox	1	Operator
Accessories, list of contents and uses	1	Operator
Open-end / ring wrench, 19 mm	1	Fastening pulley stand
Hammer, 1½ kg	1	Setting anchors, assembly
Screwdriver, 6 mm	1	Clamping spindle
BB blow-out pump	① 1	Blowing out anchor holes
Folding rule, 2-metre	1	Operator
Spirit level	1	Operator
Wooden pencil	2	Operator
Cleaning cloth	1	Operator
Hilti spray	1	Operator
Hilti grease dispenser	1	Operator
Flat brush	1	Operator
Protective goggles	1	Operator
Clamping spindle, short, M12S	② 3	Pulley stand, drive unit
DD-CN-SML clamping nut	③ 3	Pulley stand, drive unit
HSD-G M12 setting tool	④ 1	Fastening anchors
Water connection nipple	⑨ 1	Water supply
GK seal	5	Water seal for 356700/5
Steel wedge	⑤ 6	Securing concrete blocks



Accessories and wearing parts for Hilti wire saw systems

Ordering designation	Quantity	Use
M12L clamping spindle, long	② 1	Fastening pulley stand, drive unit
HKD-D M12×50 flush anchor	⑥ 50	Hole diameter 16 mm
Water supply, long	⑦ 1	Water supply line
Water supply, flexible	⑧ 1	Water supply line
DS-WSW 200 guide pulley	⑪ 1	Pulley stands, WS 15/WSS 30 drive
DS-WSW 140 guide pulley	1	Plunge saw return pulley
DS-WSW 500 drive wheel	⑫ 1	DS-WSS 30 drive unit
DS-WSWD 280 drive wheel	⑬ 1	DS-WS 15 drive unit
DS-WSWS 280 storage pulley	⑭ 1	DS-WS 15 drive unit
DS-WSWS 200 storage pulley	⑮ 1	DS-WS 15 drive unit
Cross-type tube clamp	⑯ 1	Mounting guide pulleys
Double tube clamp	⑰ 1	Tube extension
Tube, 2"×1 m (60.3 mm outside dia.)	⑱ 1	Tube extension
CEE 32A coupling (female)	1	For extension cable
Round fuse, 3.15 A, 250 V, fast-acting	10	DS-WS 15 control unit
Round fuse, 0.63 A, slow-acting	10	DS-WS 15 control unit
Fuse, 250 V, 40 A	5	DS-WS 15 control unit
DS-WSTHY crimping pliers	1	Crimping connectors and sleeves
DS-WCMV connector	⑩ 1	Quick-release type
WS-WP pin	10	Spare pin for quick-release connector
DS-WS sleeve	5	Repair sleeve
O-ring, 10/4,7×2,5	10	Fitted between connector / bead
DS-WJ clamping jaws	2	Spare jaws for crimping pliers

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4. Technical data

4.1 Hydraulic drive

The DS-WS 10 compact wire saw is designed for operation with the Hilti D-LP 15 and D-LP 32 or D-LP 30 hydraulic power units. Use of other hydraulic units for powering the saw is permissible only when such units are of a suitable specification and type approved for use as a power source for hydraulic drilling or sawing equipment.

Flow rate: max. 50 l/min.

Optimum working range: 36 to 50 l/min.

Pressure: max. 210 bar

Optimum working range: 80 to 120 bar

A built-in safety device limits the oil flow rate to the hydraulic motor to a maximum of 50 l/min., thus limiting the wire speed to a maximum of 27 m/sec.

The operator will notice when the flow rate limiting device has become active as the drive unit then no longer runs smoothly (audible and visual indication).



Do not, under any circumstances, operate the saw at a flow rate in excess of 50 l/min.

4.2 Compressed air supply

The compressor for the air supply is included as part of the wire saw system.

Pressure: 6 to 8 bar

Flow rate: 205 l/min

If a different compressor is used, ensure that its specification is suitable and that it is of a type approved for use on construction sites.

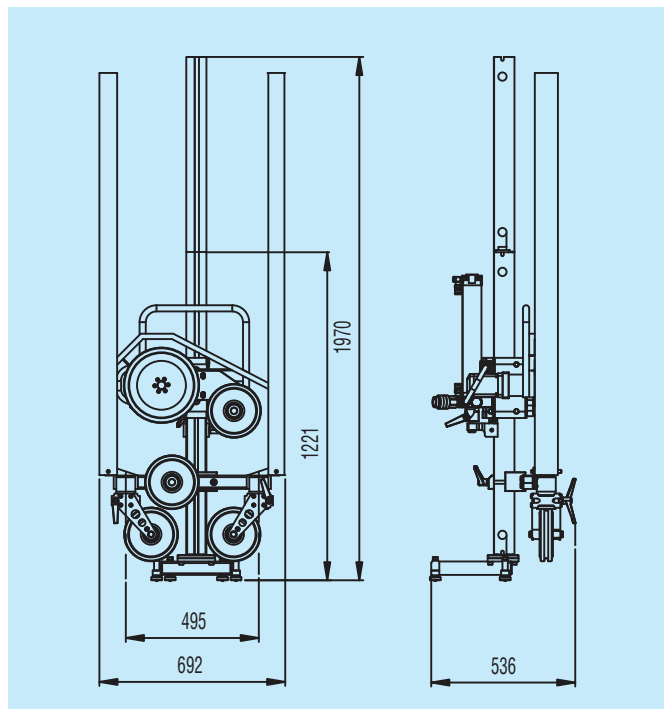
4.3 Cooling and flushing water supply

Please follow the instructions for your hydraulic power unit.

4.4 Dimensions and weights

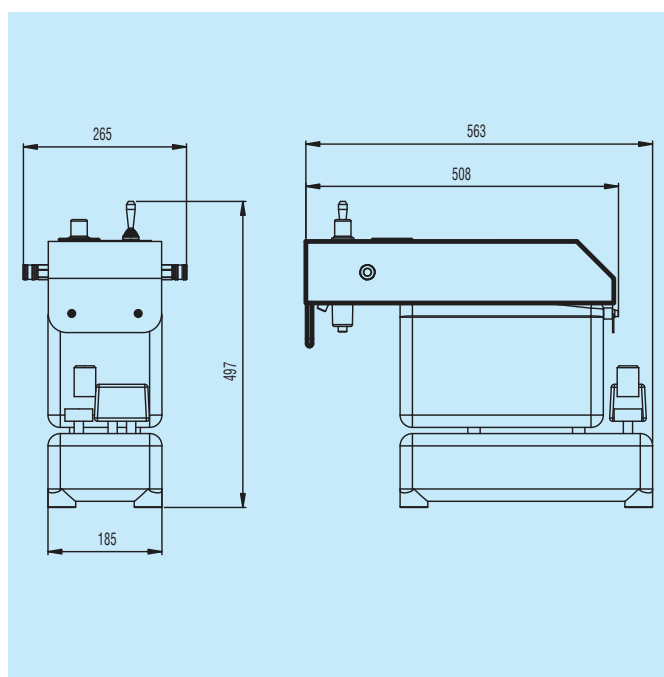
Dimensions of the compact wire saw

Weight: 69.5 kg



Dimensions of the compressor with control panel

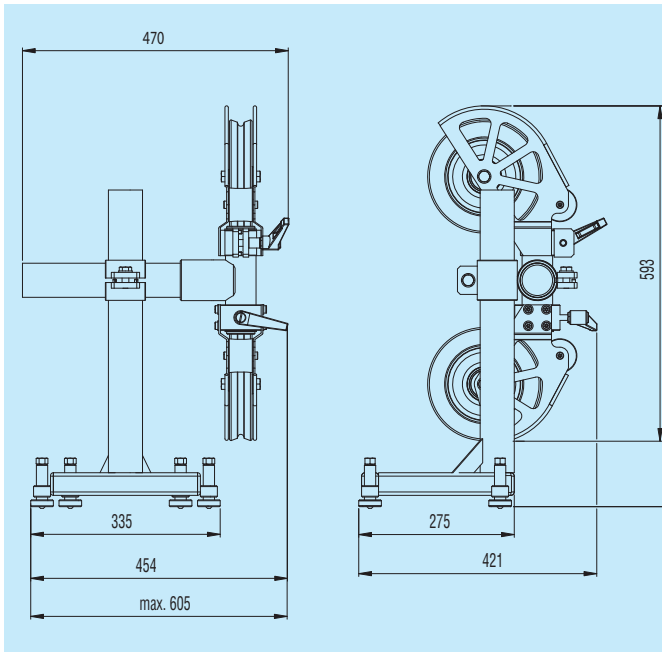
Weight: 20.1 kg



4. Technical data

Dimensions of single-pair pulley stand

Weight: 21.3 kg



Length of system compressed air line:

Length of system compressed air line: 7 m

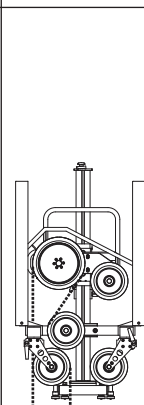
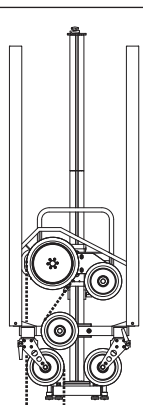
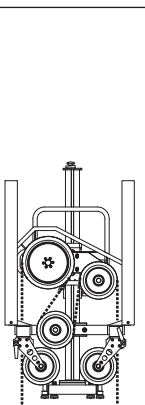
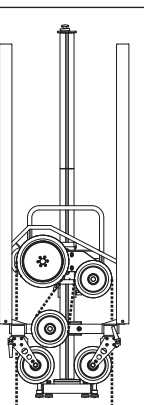
Length of system water supply line: 10 m

4.5 Performance data

Nominal power at 120 bar and 50 l/min.: 10 kW

Wire speed at max. 50 l/min.: 27 m/sec

4.6 Wire storage capacity and length requirements

Rigging method	A	B	C	D
Storage rigging	single	single	double	double
Storage extension	without	with	without	with
Wire on drive, min.	160 cm	160 cm	230 cm	230 cm
Storage capacity	110 cm	250 cm	220 cm	500 cm
Wall thickness, max.	55 cm	125 cm	110 cm	250 cm
				

4. Technical data

4.7 Type plate

HILTI®		DS-WS10		
Made in Austria Registered trademark of Hilti Corp. Schaan, Liechtenstein				
Nominal power rating:	max. 17.5 kW			
Oil flow rate:	max. 50 l/min			
Oil pressure:	max. 210 bar			
Drive pulley dia.:	280 mm			
Speed:	max. 1900 r.p.m.			
Diamond wire dia.:	8–12 mm			
357072	xxxxxx	xxxxxx	xx xxxxxx 03	CE

4.8 Noise levels

Typical A-weighted
sound power level as per ISO 3744:

DS-WS10 with D-LP 15	102.0 dB(A)
DS-WS10 with D-L P32	103.5 dB(A)

Typical A-weighted
sound pressure level
at the workplace
at a distance of 3 m
as per ISO 11202:

DS-WS10 with D-LP 15	83.5 dB(A)
DS-WS10 with D-L P32	84.5 dB(A)

The use of ear protection is recommended!

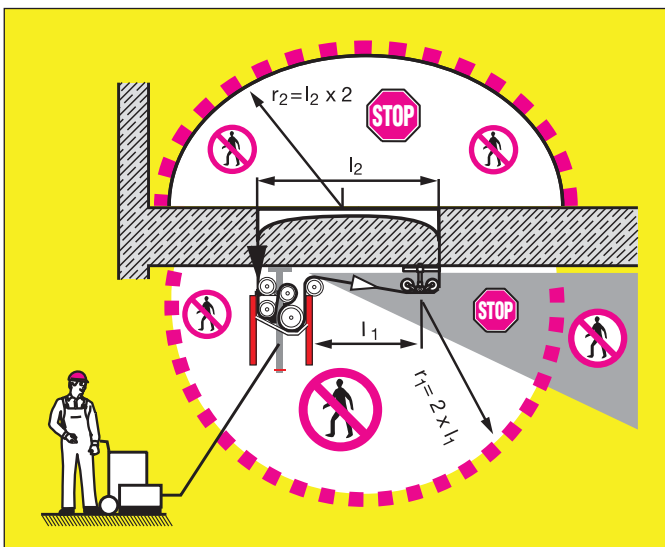
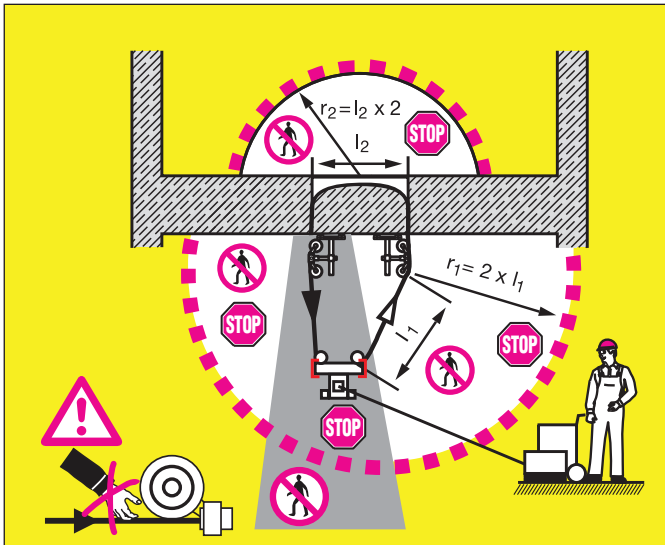
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5. Safety precautions

5.1 Safety measures at the working area

■ Safety measures must be implemented in the area where sawing is taking place so that operators and third parties cannot be injured or property damaged by debris or objects which may fly off during the sawing operation (small stones, pieces of wire, sawing slurry, etc.). Safety measures must also be implemented in the area not directly visible to the operator, behind where sawing is taking place.

■ Persons must NEVER enter the danger area while sawing is in progress. The danger area extends to at least twice the radius of the length of wire that would be unleashed in the event of the wire breaking and also includes the area of the extended axis at the wire tension side. The operator is responsible for cordoning off the area and restricting access to it.



■ Always keep the free wire lengths between the drive unit and object being cut as short as possible. NEVER operate the equipment without mounting wire guides on the construction component to be sawn. In the event of wire breakage, the wire is thus automatically retained within the hollow axles of the guide pulleys, thus greatly reducing the free length of wire released. Long, free wire lengths can lead to dangerous wire whiplash in the event of wire breakage.

■ When setting up and operating the saw system, always ensure that no persons are below the area in which you are working. Falling items of equipment or tools could lead to serious injury.

5.2 Preparations

■ Sawing work influences the statics of the structure. Approval must be obtained from the site engineer or architect prior to carrying out drilling and sawing work.

■ In cooperation with the site engineer or architect, ensure that no gas, water, electricity or other supply lines are located in the cutting area. Supply pipes or cables, for instance, located close to the cutting area and which could be damaged by falling objects, must be specially protected and, if necessary, switched off or temporarily taken out of service.

■ Ensure that the cooling water used is drained or extracted in a suitably controlled manner. Water that is allowed to drain away or spray around in an uncontrolled manner can lead to damage or accidents. The fact that water could drain away into internal, hidden cavities, e.g. in brickwork or masonry, must also be taken into account.

■ Make a careful note of any influence the immediate surroundings may have on operations. Do not use the wire saw in areas where there is a risk of explosion or in close proximity to combustible materials, fluids or gases. Flying sparks or electrostatic discharge can lead to fires or explosions.

■ Do not cut materials which, as a result of the cutting process, may produce toxic or explosive dust or vapors.

■ Do not cut easily combustible aluminum or magnesium alloys.

5.3 Securing the objects being cut and disposal of sawing slurry

■ In order to avoid injury and to prevent the diamond wire becoming trapped or jammed, steel wedges and/or supports must be used to prevent uncontrolled movement of parts of the structure being cut.

■ Make sure that sections of the structure that are cut free (concrete blocks etc.) do not present a risk of injury to persons or a risk of damage to equipment or property. Take suitable precautions (use supports etc.) to ensure that parts of the structure cut free remain in their original position even after making the final cut.

■ Parts that have been cut free, often with a weight of several tons, may be removed and transported away only by trained specialists using approved means of lifting and transportation.

■ Never loiter in the vicinity of loads suspended by cranes.

■ The area of the cut or the opening created by the cutting process must be safely and visibly cordoned off in order to avoid the possibility of persons falling.

■ Introducing sawing slurry into the drains or sewage system without suitable pre-treatment is problematic from an environmental point of view. Ask the local authority responsible about existing regulations. We recommend the following pre-treatment:

- Collect the waste water in a suitable container (e.g. using an industrial vacuum cleaner)
- Let the waste water stand until the slurry settles and then dispose of the solid portion of the waste material at a building waste disposal location (the separation process can be accelerated by adding a flocculent).
- Neutralize the residual water by adding a neutralizing agent or dilute it by adding a large quantity of water before allowing it to enter the drainage system.

5.4 Operating safety

■ Check that the wire saw and its components, the sawing wire and wire connectors and all accessories are in good condition and perfect working order before use. Any damage or malfunctions must be rectified in a professional manner before operation commences.

■ Position the control panel as far as possible outside the danger zone and remain in the vicinity of the control panel during cutting operations.

■ Sawing may begin only once the wire saw and pulley stands have been securely fastened to a solid base material. A falling component of the system may result in serious damage or personal injury.

■ Connect the equipment to the electric power supply only after the wire saw has been fully set up.

■ Begin saw operation only when the wire guards have been fitted correctly and when the sawing wire has been rigged through the hollow axles of pulleys positioned directly at the wire entry and exit points.

■ Persons may enter the danger zone (e.g. to adjust pulleys or water supply nozzles) only after the hydraulic power unit has been switched off and when the drive pulley has come to a standstill (oil flow switched off).

■ Observe the permissible drive parameters (hydraulic pressure and oil flow rate) and the recommended guide values for cutting speed and advance pressure when sawing.

■ Use only sawing wires with a rubber or plastic coating on the sections between the beads and of a type approved for cutting at a speed of at least 30 m/sec.

■ Wire breakages can be reduced considerably by using high-quality diamond wires and wire connectors and the appropriate tool for crimping the connectors.

■ The wire may become hot – do not touch it without gloves!

■ Use adequately dimensioned fastening materials (anchors, screws etc.) to secure the pulley stands, the wire saw and the parts of the structure that are to be cut free.

5. Safety precautions

■ Use only the accessories recommended in these operating instructions. See Section 3. The use of other accessories may result in damage or injury.

■ When using ladders, e.g. when mounting the single-pair pulley stands on walls, ensure that the ladder complies with regulations, is undamaged and stands securely on the floor.

■ The operator must ensure that no person is present in the danger zone at any time during operation of the saw. This also applies to areas not directly visible, e.g. to the rear of the section of the structure being sawn. If necessary, a sufficiently large area must be cordoned off or security personnel posted accordingly.

■ Stay alert and carefully monitor the sawing operation, the cooling water system and the area surrounding the workplace. Do not operate the wire saw if your full concentration is not on the job!

■ No modifications may be made to the wire saw equipment.

5.5 Electrical safety

■ Always check that the electric cables, plugs, lighting, compressor and hydraulic power unit are in good condition before use. Do not operate the equipment if it is damaged in any way, if the equipment is not complete or if the operating controls or components do not function as they should. In case of faults or malfunctions, the wire saw should be repaired by an authorized Hilti repair mechanic or qualified electrical specialist.

■ Connect the hydraulic power unit and compressor only to a power source equipped with an earth conductor and ground fault circuit breaker (PRCD). Check that these items are in perfect working order before operating the equipment.

■ Make sure that the mains voltage corresponds to the specification given on the type plate.

■ Protect yourself against electric shock, i.e. avoid contact with earthed objects such as pipes and radiators etc.

■ Keep all electric cables, especially their plug connec-

tions, in a dry condition. Close the electric sockets by means of the covers provided when not in use.

■ Always pull the plug itself, never the cable, when disconnecting from the electric supply. Do not permit electric cables to become trapped or squashed and protect them from sharp edges, heat and oil.

■ Use of extension cables : Use only extension cables with adequate conductor cross-section which are approved for the intended field of use. Do not work with extension cables when they are rolled up. This can result in a drop in output at the equipment and may cause the cable to overheat. Replace damaged extension cables.

■ Disconnect the power cable before beginning cleaning and maintenance work or in the event of a lengthy interruption between periods of operation.

5.6 Safety precautions during transport

■ Make sure that the wire saw and its components cannot move about during transportation.

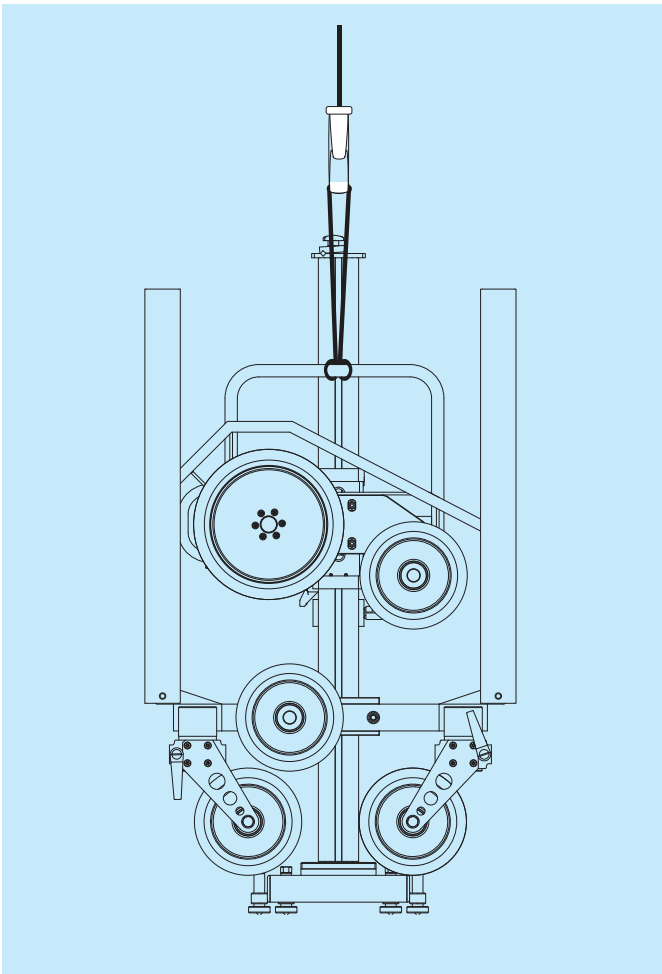
■ Always avoid adopting a bent-over body position when carrying heavy items, i.e. keep your back straight when lifting and carrying.

■ Take care to ensure that the wire saw cannot fall over after it has been assembled and stood up, but not yet secured. Accordingly, stand the saw only on a solid level surface, with the pulleys turned out toward the front.

■ Use the handles provided for transportation. Ensure that the handles are always kept clean and free of grease.

■ Use only approved lifting equipment attached to the lifting point provided when transporting the saw by crane. Before transporting the saw, check that all removable parts are securely fastened, that the drive unit is locked in position and that the end stop is fitted. Never loiter under loads suspended by crane.

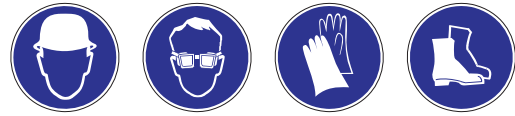
5. Safety precautions



5.7 General safety information

- Use the wire saw only when you have read the operating instructions, when you are familiar with the information contained therein and when you have been trained to use the equipment safely by a Hilti specialist. All warnings and safety information must be observed.
- Always keep the operating instructions with the equipment and pass them on to any subsequent user who has been trained in its use.
- When not in use, store the wire saw in a locked, dry place out of reach of children.
- Careful cleaning and observation of the specified care and maintenance procedures are prerequisites for safe, trouble-free operation of the equipment.
- Do not leave tools (e.g. the 1/4" square drive wrench) in place on the equipment. Check to ensure that all tools have been removed before switching on.

- Keep the working area tidy and well lit. An untidy workplace and inadequate lighting increase the risk of accident.



- Wear suitable, close-fitting working clothes, protective gloves, safety footwear, goggles and a hard-hat. Do not wear loose clothing or jewelry. Wear a hair net if you have long hair. It is recommended that ear protection is worn.



- Respiratory protection should be worn when working in enclosed or poorly ventilated areas.
- Keep children and other persons well away from the workplace and allow no-one to touch the wire saw, power cable or diamond wire.



- Failure to comply with the warnings and safety information may lead to severe or fatal injury and serious damage to the equipment or other property.



6. Preparing the saw system for use

Preparing the saw system for use	6.1 Planning wire guidance and the cutting sequence	26
	6.2 Examples of applications	26
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	6.5 Pulling the wire through by hand, rigging and connecting the wire	30
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6. Preparing the saw system for use

6.1 Planning wire guidance and the cutting sequence

Thorough training and experience are essential for optimum planning of the cutting sequence and wire guidance system. The following basic principles apply:

- The tighter the cutting arc, the higher the wire contact pressure and thus the higher the cutting performance.
- The maximum distance between two guide pulleys determines the extent of the working area to be cordoned off (danger zone).

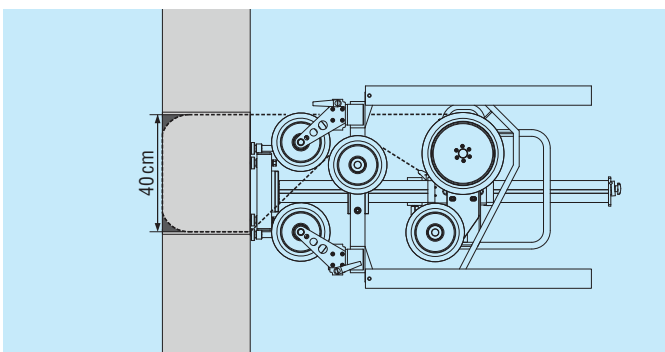
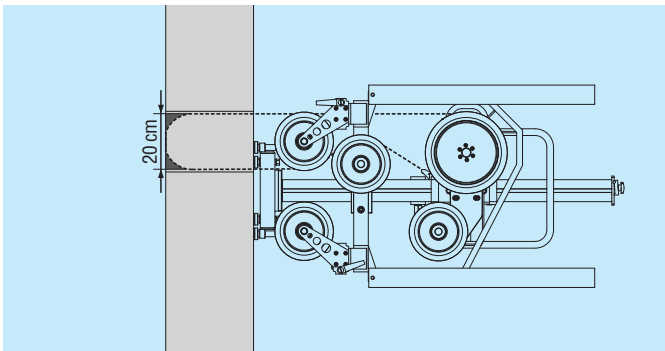
Below you will find a few recommendations for the most common applications:



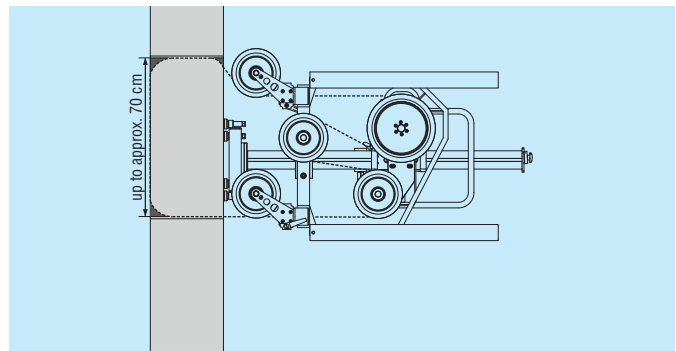
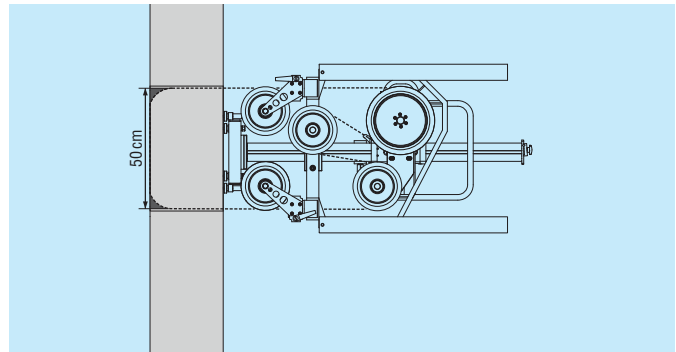
The recommendations for positioning the guide pulleys and pulley stands shown in the examples in these operating instructions should be observed. Please consult a Hilti wire sawing specialist before using other wire guidance configurations.

6.2 Examples of applications

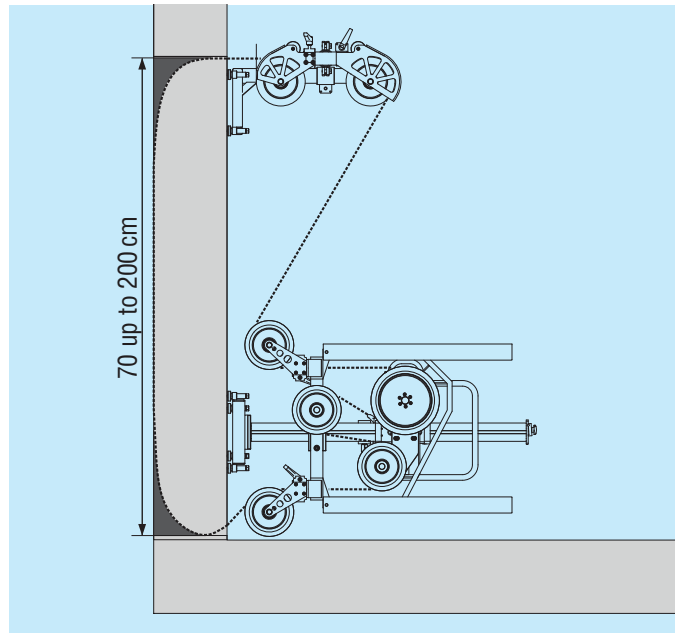
Horizontal or vertical, 20–40 cm cutting length



Horizontal or vertical, 40–70 cm cutting length

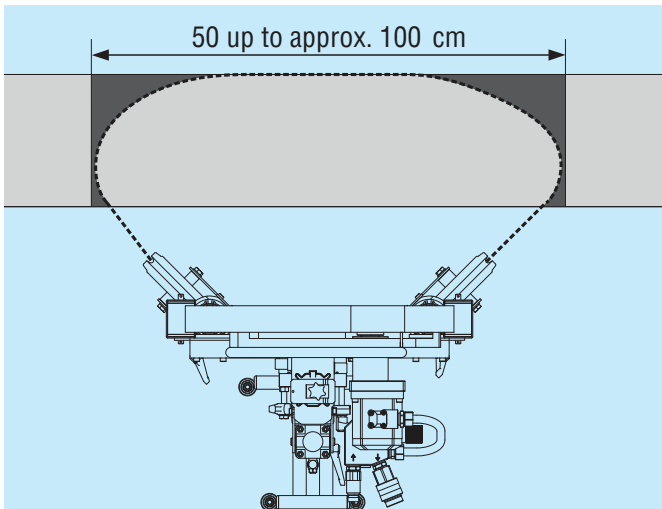


Horizontal or vertical, 70–200 cm cutting length

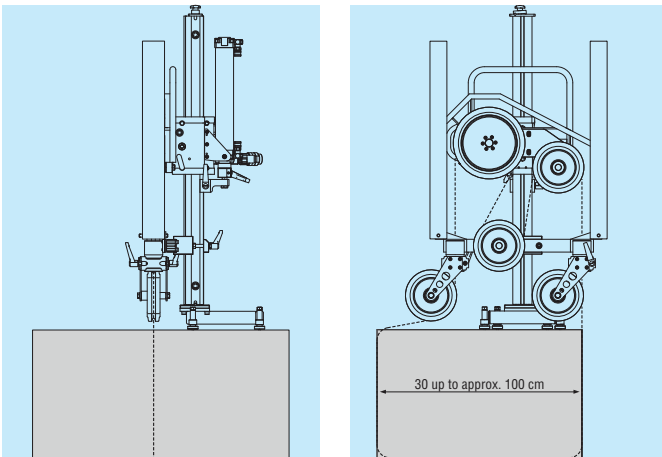


6. Preparing the saw system for use

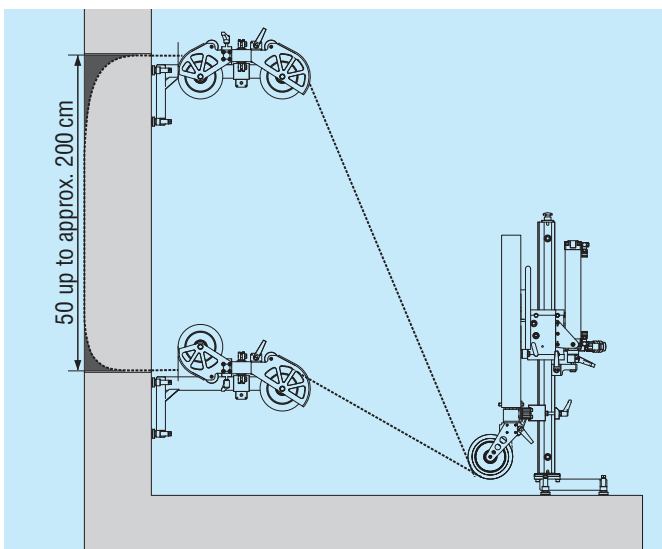
Flush cutting, 50 to approx. 100 cm length



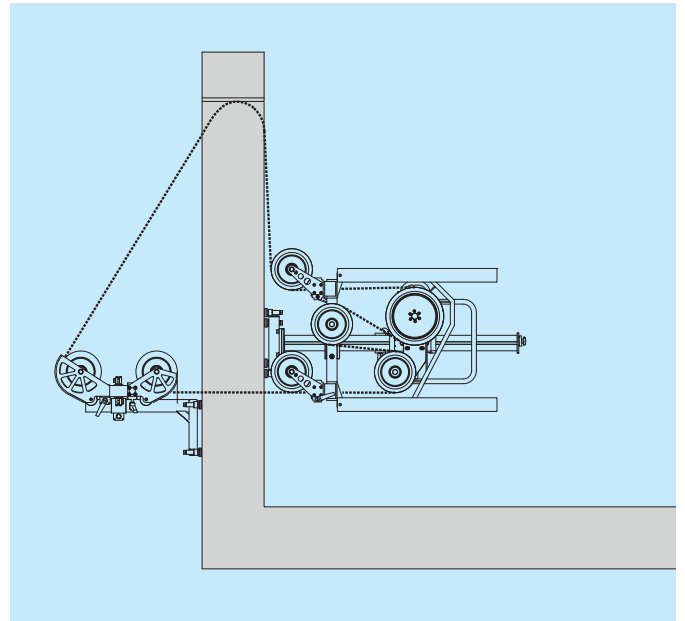
Beam or column, 30 to approx. 100 cm cutting length



Horizontal or vertical, 50–200 cm cutting length



Horizontal or vertical, transverse cutting technique



6.3 Determining the necessary wire capacity and wire length

Wire storage capacity (approximation)

Thickness of object to be cut $\times 2$

Wire length required (approximation)

Girth of object to be cut ($2 \times$ length of cut + $2 \times$ thickness of object) + minimum length required for rigging the saw – 40 cm

The present minimum lengths for rigging the saw can be found in the “Technical data” section.

6. Preparing the saw system for use

6.4 Assembling the components

Drilling through holes



The position of the through holes has a direct influence on the accuracy of the cut. We therefore recommend use of a diamond core drilling rig for drilling through thick walls or components or where only low tolerances are permissible. Hammer drills may be used on thinner walls or components or where the permissible tolerances are greater.

We recommend drilling holes of 16 mm diameter. Hole diameter, however, must be at least approx. 4% of the wall thickness.

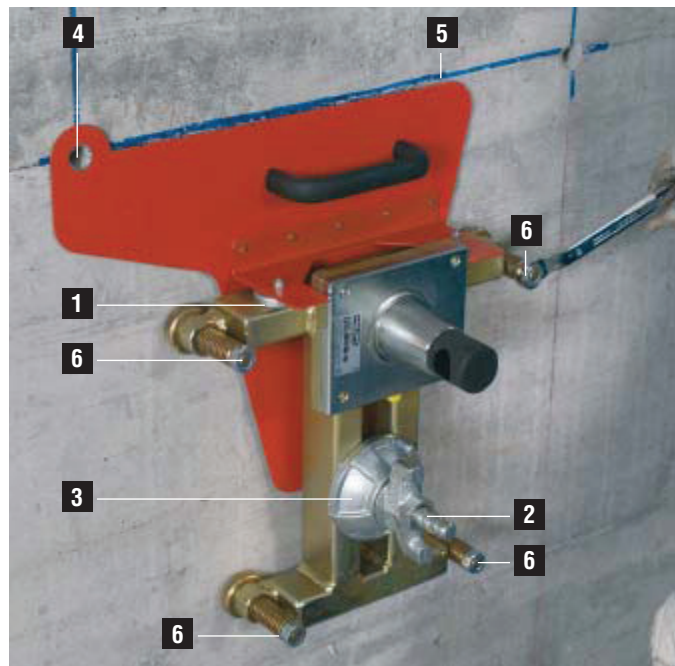
Securing the base plate



To ensure efficient and safe operation it is essential that the saw and, if applicable, the pulley stands are fastened correctly and securely using adequately dimensioned fasteners. In applications where the compact wire saw is mounted directly on the object where the cut is to be made, the exact position of the anchor hole and alignment of the base plate for an accurate cut can be determined with the aid of the positioning template



- 1 Edge indicating line of cut
- 2 Through hole
- 3 Optimum position for anchor fastening



- 1 Retaining magnet for attachment to base plate
- 2 Clamping spindle
- 3 Clamping nut
- 4 Through hole for diamond wire
- 5 Edge indicating line of cut
- 6 Leveling screws

For fastening on concrete, use of the Hilti HKD-D M12 metal expansion anchor or a fastener providing at least equivalent holding power is mandatory.

6. Preparing the saw system for use

Your Hilti representative will be pleased to provide advice in case of questions concerning fastening security on base materials such as brittle or cracked concrete, masonry and synthetic or natural stone.

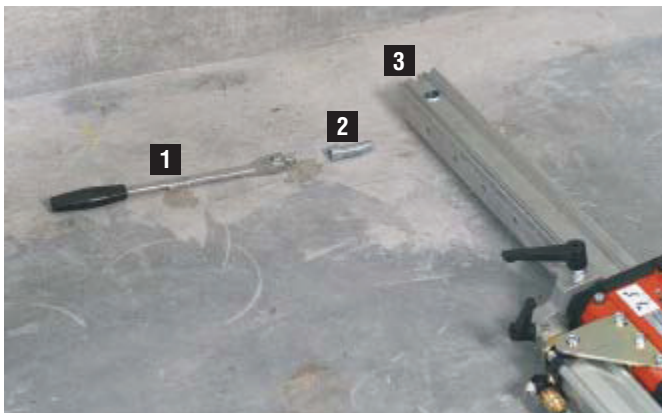


The use of vacuum baseplates for fastening is not permissible under any circumstances.

Procedure

- Use the template to mark the position of the anchor hole.
- Drill the hole, clean the hole, insert the Hilti HKD-D anchor and expand it.
- Screw in the clamping spindle as far as it will go.
- Attach the positioning template to the base plate.
- Bring the base plate into position and secure it initially with the clamping nut.
- Align the base plate and then tighten the clamping nut and leveling screws.

Attaching the guide rail unit



- 1/2" square wrench
- Eccentric pin
- Guide rail unit



Push the guide rail onto the connecting taper and insert the eccentric pin fully.



Tighten the eccentric pin in a clockwise direction.

Fitting the pulley crossbar



Bring the pulley crossbar into position.



Close the locking bar and tighten the clamping lever.

6. Preparing the saw system for use

Mounting the drive unit

Procedure



Pull out the carriage clamping pins.



Guide the clamping piece into the slot in the carriage.



Push in the clamping pins and tighten them in a clockwise direction. Fit the end stop.



Do not, under any circumstances, operate the saw without a correctly and securely fitted end stop.

6.5 Pulling the wire through by hand, rigging and connecting the wire

When feeding the wire through by hand, ensure that the running direction indicator on the wire corresponds to the direction of rotation arrow on the drive unit. Seen from the front, the drive wheel rotates in a clockwise direction.

Should the running direction indicator mark on the wire no longer be visible, the direction of travel can be determined from the diamond beads which take on a conical form when worn (narrow end ahead).

First feed the wire through the object to be cut and then round off the corners at the rear of the object by pulling the wire back and forward manually, in a sawing motion, until the wire can be moved freely by hand.

6. Preparing the saw system for use



Feed the wire through the hollow axles of the pulley stands (if used) and subsequently through the hollow axles on the pulley crossbar on the compact wire saw. To ensure that the sawing wire wears evenly and stays round, we recommend that the wire is twisted in a counterclockwise direction (approx. half a turn per meter length) before the ends are connected together.



Lay the sawing wire over the return pulleys and drive pulley and then tension it slightly by moving the drive unit along the guide rail.



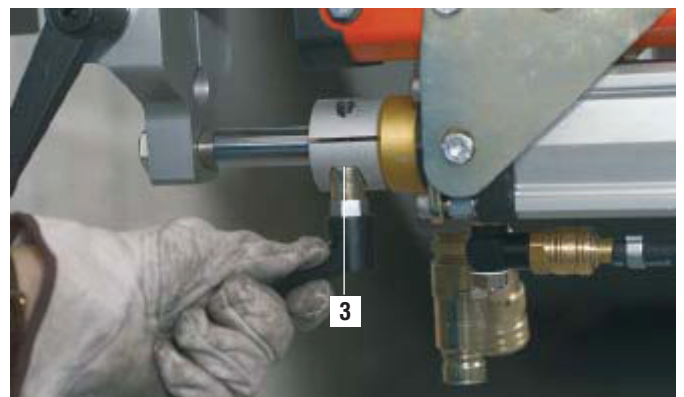
1 Advance movement locking lever

Lock the drive unit in position.



2 Piston rod securing clamp

Subsequently release the return lock and the piston rod securing clamp. Slide the piston rod all the way in and then lock it in position.



3 Return lock

The return lock prevents slackness of the sawing wire due to resilience of the piston rod when starting the saw. The advance movement locking lever can be released after tightening the return lock.

6. Preparing the saw system for use



Release the advance movement locking lever and the piston rod clamp only after ensuring that the advance cylinder is not under pressure.

6.6 Fitting the guards



Bring the guard into position.



Secure the guard with the spring pin



Do not, under any circumstances, operate the saw without correctly and securely fitted guards and end stop.

6.7 Fitting the optional storage extension

The wire storage capacity of the saw can be increased by fitting the optionally available wire storage extension.



Fit the connecting taper and secure it with the eccentric pin.



Push the storage extension onto the connecting taper and secure it with the eccentric pin.



Fit the end stop.

6. Preparing the saw system for use



Do not, under any circumstances, operate the saw without the correctly and securely fitted LONG guards (supplied as part of the storage extension set).



Do not, under any circumstances, operate the saw without a correctly and securely fitted end stop.

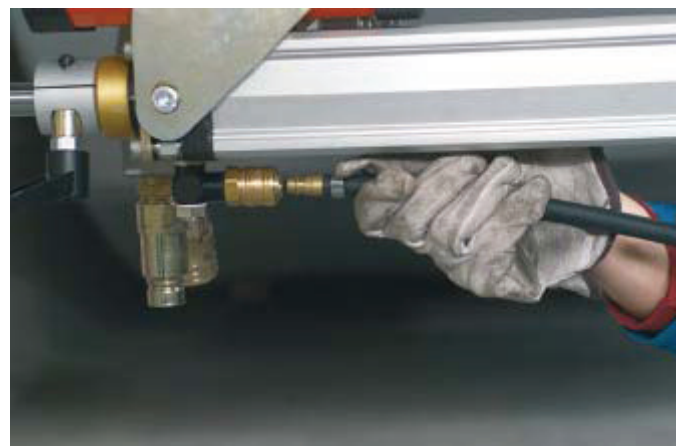


Use only the components supplied with the DS-WS 10 for extending storage capacity and never extend storage capacity beyond the maximum permissible length of 2 meters.



6.8 Connecting the hydraulic, compressed air and water hoses

Connecting the compressed air hoses



Connect the compressed air hoses to the cylinder



Connect the compressed air hoses to the control panel.

6. Preparing the saw system for use

Fitting the water supply



Fit the 3-way water connector.



Connect the water hoses.



Mount the cooling water nozzles.

Connecting the hydraulic hoses



Connect the hydraulic hoses to the drive unit.



The hydraulic hoses used must be of a length sufficient to allow the hydraulic power unit to be positioned outside the immediate danger zone.

7. Operating the equipment

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	7.2 Switching on the cooling water and checking the direction of the jets	36
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	7.5 Steps before and after the end of the sawing operation	37
	7.6 Readjusting saw advance on reaching end of stroke	38

7. Operating the equipment

7.1 Setting the starting cutting pressure

Set the advance pressure to the recommended value shown on the control panel and tension the wire by operating the advance control valve.



Set the advance pressure.



Operate the advance control valve.

7.2 Switching on the cooling water and checking the direction of the jets



7.3 Starting sawing



Before switching on the hydraulic power unit, check that all hydraulic hoses are connected correctly and their couplings secured. Failure to connect the return hose may lead to damage to the hydraulic motor.



Before switching on the wire saw, check to ensure that no one is within the danger zone and that no one can enter this zone without the consent of the operator.



Switch on the main drive and allow the sawing wire to start running.

Switch the main drive off immediately if the wire does not begin to run right away. Switch the hydraulic power unit off at the main switch and set the advance control valve to the neutral (middle) position.

7. Operating the equipment

Subsequently check whether the sawing wire can be pulled through the kerf easily by hand. If not:

- Round off corners where the cut is to be made by chiseling or by pulling the wire through by hand.
- Remove small stones or fragments etc. that may be stuck in the kerf.
- Optimize the wire guidance system.

Restart the sawing procedure as previously described. The advance pressure can be increased as soon as the wire begins to run. The optimum hydraulic pressure is within the 80 to 120 bar range.

7.4 Checks while sawing



Do not enter the danger zone, for example, to adjust the water nozzles, guide pulleys or advance pressure cylinder or to drive wedges etc. before ensuring that the saw drive has come to a standstill, the hydraulic power unit has been switched off and the pneumatic advance valve has been set to the neutral (middle) position.



Stay out of the danger zone while the saw is in operation and stay close to the emergency off switch on the hydraulic unit so that the drive can be switched off immediately in a dangerous situation.

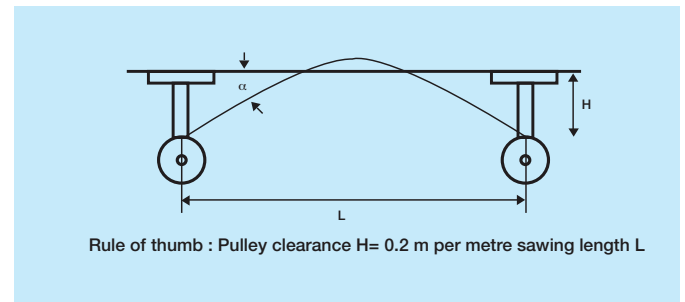
■ Take care to ensure that the sawing wire is adequately cooled and adjust the direction of the jets to ensure that sufficient water reaches the cutting face.

■ Take care to ensure that the wire runs smoothly, without vibration. If the wire begins to vibrate, the guide pulleys must be realigned or the advance pressure adjusted.

■ Take care to ensure that the hydraulic pressure remains within the 80 to 120 bar range. If the pressure drops, it can be raised again by increasing the pneumatic advance pressure.

■ Note that the pressure exerted by the wire generally decreases toward the end of the cut as the cutting arc becomes flatter, thus reducing the effectively transfer-

able hydraulic pressure. The cutting arc of the wire and, correspondingly, the effectively transferable hydraulic pressure, can be increased by positioning the guide pulleys at the wire entry and exit points at a greater distance from the wall.



Take care to ensure that the part cut out or cut through is adequately supported and that wedges are used to prevent trapping and pinching of the wire and to avoid the risk of personal injury or damage to equipment or property..

7.5 Steps before and after the end of the sawing operation

■ Before cutting right through, take care to ensure that the wire, when released from the kerf, can be caught by the guide pulleys mounted at the cutting line.

■ If possible (depending on the hydraulic unit used), reduce wire speed before cutting right through and switch off the drive as soon as the object is cut through.

■ Switch off the hydraulic power unit and retract the piston (reverse advance movement). Bring the pneumatic advance lever to the neutral (middle) position and engage the carriage locking lever.

■ Disconnect the hydraulic hoses and compressed air hoses from the drive and guide rail unit before rearranging and setting up the saw for the next cut.

■ Clean the saw and the pulley stands thoroughly after each cut using a medium-hard brush and plenty of water.

7. Operating the equipment

7.6 Readjusting saw advance on reaching end of stroke (with optional storage extension)

Switch off the hydraulic power unit (motor and oil flow), engage the advance movement (carriage) locking lever and subsequently set the pneumatic advance to the neutral (middle) position. The return lock and piston rod clamp can then be released and the piston rod pushed in by hand.



1 Advance movement locking lever



2 Advance direction control valve



Always ensure that the advance cylinder is not under pressure before releasing the advance movement locking lever.



3 Piston rod securing clamp

4 Return lock



Subsequently tighten the piston rod securing clamp, set and tighten the return lock and then disengage the advance movement locking lever.

8. Care, maintenance and repair

- Regular, thorough cleaning and maintenance of the system is necessary to ensure that all moving parts and operating controls continue to work smoothly and to prevent excessive wear or damage to parts of the system.
- We recommend that the saw system and pulley stands are cleaned quickly after each cut. Pay special attention to the toothed rack and other surfaces of the guide rail and all other moving parts and controls.
- Clean all parts of the system, except the electrically powered units (compressor and hydraulic unit), with a medium-hard brush and plenty of water right away at the end of each working day. Cleaning of the system should be planned as part of the daily working schedule.
- After cleaning, check that all moving parts operate smoothly, that they function correctly and are not damaged. Check that the drive unit, under no load, moves smoothly over the complete piston stroke when an air pressure of max. 1 bar is applied. Damaged or malfunctioning parts must be replaced before further use of the system in order to avoid accidents or costly consequential damage.
- Spraying the system, when clean, with a concrete parting agent reduces the tendency for dirt and concrete residues to adhere to it and makes subsequent cleaning easier.
- Drain the service unit at the control panel and the compressor pressure container at least once a month.

8. Care, maintenance and repair

Troubleshooting

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9.13	Little or no sawing progress	44

9. Troubleshooting

9.1 The drive pulley / sawing wire doesn't begin to rotate

Possible cause	Solution / measures
The wire passes over sharp corners.	<ul style="list-style-type: none">– Pull the wire through by hand until corners are rounded off.– Round off corners by chiseling.
The wire tension is too high.	<ul style="list-style-type: none">– Reduce tension by reducing pressure.
The wire is pressed into the kerf in an excessively tight arc.	<ul style="list-style-type: none">– Mount guide pulleys directly at the wire entry and exit points.
Wire contact / cutting length is too long.	<ul style="list-style-type: none">– Divide the cut up into several shorter lengths.– Reduce contact length by using additional guide pulleys.
The wire has been fitted the wrong way round (not running in specified direction).	<ul style="list-style-type: none">– Check running direction and change it if necessary (narrow end of beads ahead).
A new wire sticks in an existing kerf.	<ul style="list-style-type: none">– Use a thinner wire.

9.2 The drive pulley slips / wire is not driven

Possible cause	Solution / measures
The diamond wire is too loose, i.e. tension is too low.	<ul style="list-style-type: none">– Increase tension by increasing pressure.– Set the advance valve to “tension” position.– Check whether the cylinder or carriage have reached the end of their travel.
The drive pulley is too badly worn.	<ul style="list-style-type: none">– Replace the drive pulley.

9.3 The wire jumps off the drive or guide pulleys when starting

Possible cause	Solution / measures
The return lock was not set and tightened.	<ul style="list-style-type: none">– Slide the return lock all the way toward the cylinder and secure it in position.
Guide pulleys not aligned correctly.	<ul style="list-style-type: none">– Adjust the guide pulleys to bring them exactly into alignment with each other.

9.4 Uneven / one-sided wear of the sawing wire

Possible cause	Solution / measures
The wire was not twisted before joining the ends together.	<ul style="list-style-type: none">– Twist the wire approx. 0.5 turn per meter length in a counterclockwise direction (as seen from the wire end) before joining the ends.

9.5 The wire breaks immediately before or after the connector

Possible cause	Solution / measures
Alternate bending stress on wire is too high.	<ul style="list-style-type: none">– Reduce bending stress on the wire by using flexible connectors.– Fit new connectors.

9.6 The diamond wire is pulled out of the crimped connector

Possible cause	Solution / measures
Use of unsuitable crimping pliers.	– Use the crimping pliers recommended by the manufacturer of the connectors.
The crimping jaws of the pliers are worn.	– Replace the crimping jaws.
The crimping pliers are set incorrectly.	– Set the pliers according to the manufacturer's instructions.
The sawing wire was not pushed far enough into the connector.	– Push the wire into the connector as far as it will go.

9.7 The diamond wire begins to vibrate strongly during sawing

Possible cause	Solution / measures
Tension on the wire is too low.	– Increase the tension by increasing the pressure.
The guide pulleys are not exactly in alignment with each other.	– Adjust the guide pulleys to bring them into alignment.
The guide pulleys are too far apart (unguided wire length too long).	– Reduce the unguided wire length by mounting additional pulley stands. – Set up the saw closer to the point where the cut is being made.

9.8 The diamond wire wears too quickly

Possible cause	Solution / measures
Cutting speed is too low, i.e. drive speed (r.p.m.) is too low	– Increase the drive speed, i.e. the cutting speed (D-LP 30/D-LP 32)
Too little cooling / flushing water.	– Direct the flow of water exactly toward the wire and the cutting face. – Increase the flow of water.
Cutting through very abrasive material.	– Use a diamond wire of a different specification.

9.9 The diamond wire collapses / beads are pushed together

Possible cause	Solution / measures
Inadequate cooling of the diamond wire.	– Ensure that sufficient water reaches the cutting face. – Stop cutting at regular intervals to allow the wire to cool.
The diamond wire suddenly sticks in the kerf while sawing.	– Secure the object being cut to prevent movement. – Reconsider the sequence in which the cuts are made. – Remove loose material from the kerf. – Check that the connectors are fitted the right way round.

9. Troubleshooting

9.10 The air compressor doesn't start

Possible cause	Solution / measures
The compressor is not connected to the electric supply.	– Connect the compressor to the electric supply.
The compressor is not switched on.	– Switch on the compressor.

9.11 The air compressor can't build up pressure

Possible cause	Solution / measures
The compressor's air tank was empty when connected to the control panel.	– Disconnect the air hose from the compressor and allow the compressor to run until it switches itself off by way of the pressure valve and then reconnect the air hose.

9.12 Drive pulley speed begins to fluctuate rapidly (audible)

Possible cause	Solution / measures
Excessively high oil flow rate (> 50 l/min.) causes activation of the flow rate limiter.	– Reduce the oil flow rate to below 50 l/min.

9.13 Little or no sawing progress

Possible cause	Solution / measures
The cutting arc is too flat, resulting in low wire contact pressure.	– Cut in a tighter arc.
Advance pressure is too low, resulting in low wire contact pressure.	– Increase the advance pressure.
The carriage does not move freely on the guide rail.	– Check that the carriage can move freely (smooth movement at 1 bar pressure). Clean the guide surfaces, rack and rollers if necessary.
The beads on the sawing wire have become polished or were not sharpened properly in advance.	– Sharpen the beads on the sawing wire.
The advance cylinder has reached the end of its stroke or the carriage is at the end stop.	– Readjust the cylinder. – Reposition the end stop.
The cut or length of wire in contact is too long.	– Reduce the length of wire in contact by way of a release pulley. – Reduce the length of the cut / divide the cut into several shorter lengths.

10. Disposal of the DS-WS10 wire saw

Most of the materials from which Hilti appliances are manufactured can be recycled.

The materials must be correctly separated before they can be recycled.

Hilti has already made arrangements in many countries for taking back your old appliance for recycling. Please ask your Hilti customer service department or a Hilti sales representative for further information.

Should you wish to return the appliance yourself to a disposal facility for recycling, proceed as follows: Dismantle the appliance as far as possible without the need for special tools and dispose of the individual parts.

No.	Part / assembly	Main material	Recycling
1	Template	Steel, aluminum	Scrap metal
2	Base plate	Steel	Scrap metal
3	Guide rail unit	Steel, aluminum Plastics	Scrap metal Plastics recycling
4	Pivoting pulley crossbar	Steel	Scrap metal
5	Drive unit	Steel, aluminum	Scrap metal
6	Pulleys	Steel, aluminum Rubber	Scrap metal Waste material
7	Air compressor and control panel	Plastic	Plastics recycling Scrap metal
8	Case for accessories	Plastic	Plastics recycling
9	Guards	Aluminum	Scrap metal



11. Manufacturer's warranty – tools

Hilti warrants that the tool supplied is free of defects in material and workmanship. This warranty is valid so long as the tool is operated and handled correctly, cleaned and serviced properly and in accordance with the Hilti Operating Instructions, and the technical system is maintained. This means that only original Hilti consumables, components and spare parts may be used in the tool.

This warranty provides the free-of-charge repair or replacement of defective parts only over the entire lifespan of the tool. Parts requiring repair or replacement as a result of normal wear and tear are not covered by this warranty.

Additional claims are excluded, unless stringent national rules prohibit such exclusion. In particular, Hilti is not obligated for direct, indirect, incidental or consequential damages, losses or expenses in connection with, or by reason of, the use of, or inability to use the tool for any purpose. Implied warranties of merchantability or fitness for a particular purpose are specifically excluded.

For repair or replacement, send tool or related parts immediately upon discovery of the defect to the address of the local Hilti marketing organization provided.

This constitutes Hilti's entire obligation with regard to warranty and supersedes all prior or contemporaneous comments and oral or written agreements concerning warranties.

12 EC declaration of conformity

Description	Compact wire saw
Serial no.	up to 9999
Designation	DS-WS10
Year of design	2003

We declare under our sole responsibility that this product complies with directive 98/37/EG.

Hilti Corporation



Dr. Ivo Celi
Senior Vice President
Business Unit Diamond
07 / 2004



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