

HILTI

DS WS10 / DS WS10-E

Operating instructions

en



ORIGINAL OPERATING INSTRUCTIONS

DS WS 10 / DS WS 10-E diamond wire saw system

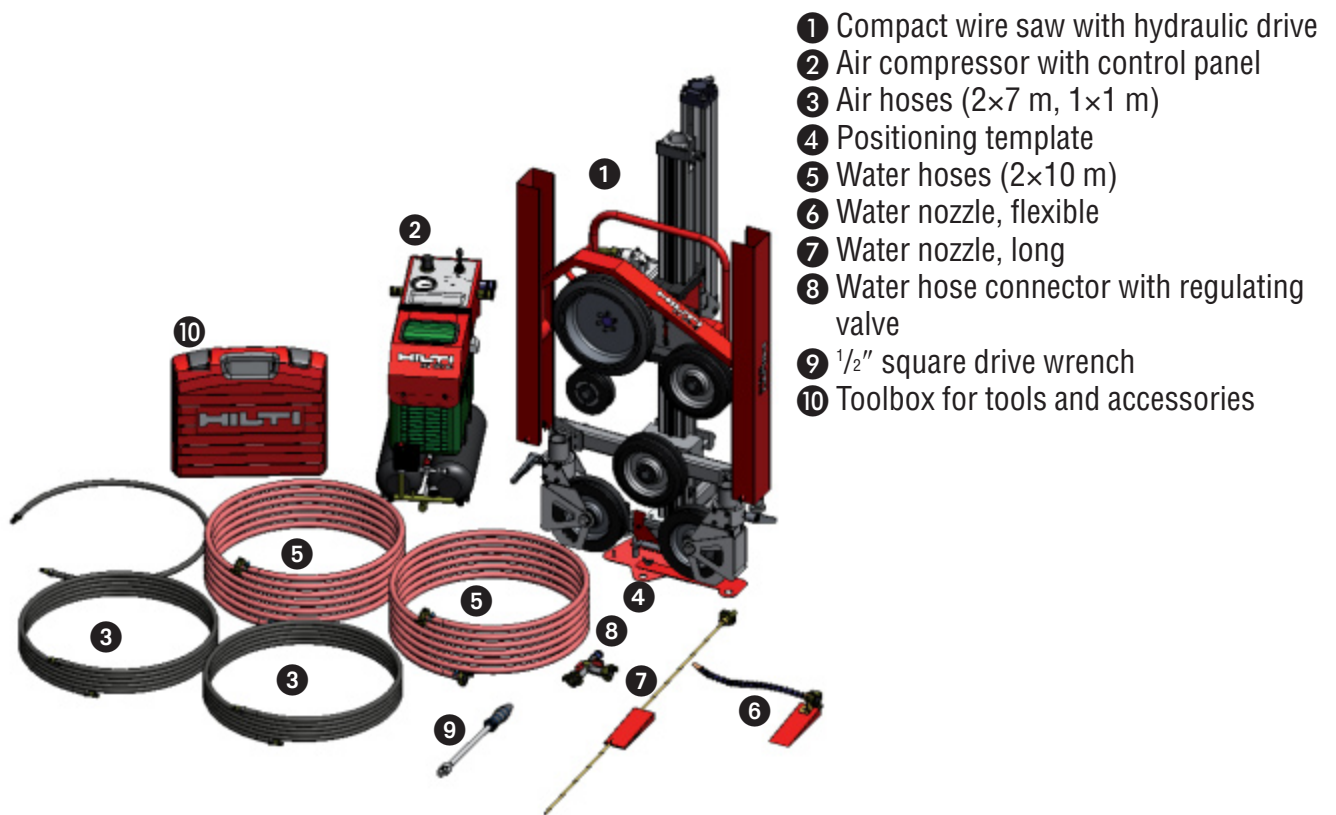
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It is essential that the operating instructions are read before the machine is operated for the first time. Always keep these operating instructions together with the machine.

Ensure that the operating instructions are with the machine when it is given to other persons.

DS WS10 hydraulic wire saw



- 1 Compact wire saw with hydraulic drive
- 2 Air compressor with control panel
- 3 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

DS WS10-E electric wire saw



- 1 Compact wire saw with electric drive
- 2 Control unit with air compressor
- 3 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

1. General information

1.1 Safety notices and their meaning

DANGER

Draws attention to imminent danger that could lead to serious bodily injury or fatality.

WARNING

Draws attention to a potentially dangerous situation that could lead to serious personal injury or fatality.

CAUTION

Draws attention to a potentially dangerous situation that could lead to slight personal injury or damage to the equipment or other property.

NOTE

Draws attention to an instruction or other useful information.

Symbols



Read the operating instructions before use.



Return waste material for recycling.

A

Amps

V

Volts

Hz

Hertz

kW

Kilowatts

mm

Millimeters

/min

Revolutions per minute

rpm

Revolutions per minute

l/min

Liters per minute

On the machine



To avoid damage, do not exceed a water pressure of 6 bar.



To avoid damage when there is a risk of freezing, the cooling circuit of the system must be blown out with compressed air after use.

1.2 Explanation of the pictograms and other information

Warning signs



General warning



Warning: electricity



Warning: avoid hand injuries

Obligation signs



Wear eye protection.



Wear a hard hat.



Wear protective gloves.



Wear safety footwear.

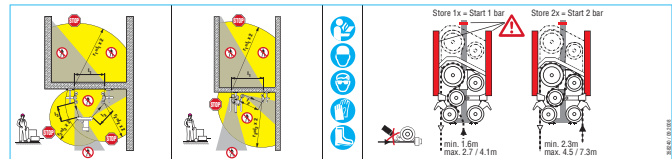


Wear respiratory protection.



Wear ear protection.

On the control unit



No persons may enter or remain within the danger area indicated while the equipment is in operation.

Location of identification data on the machine

The type designation and serial number can be found on the type identification plate on the machine. Make a note of this data in your operating instructions and always refer to it when making an enquiry to your Hilti representative or service department.

Type: _____

Serial number: _____

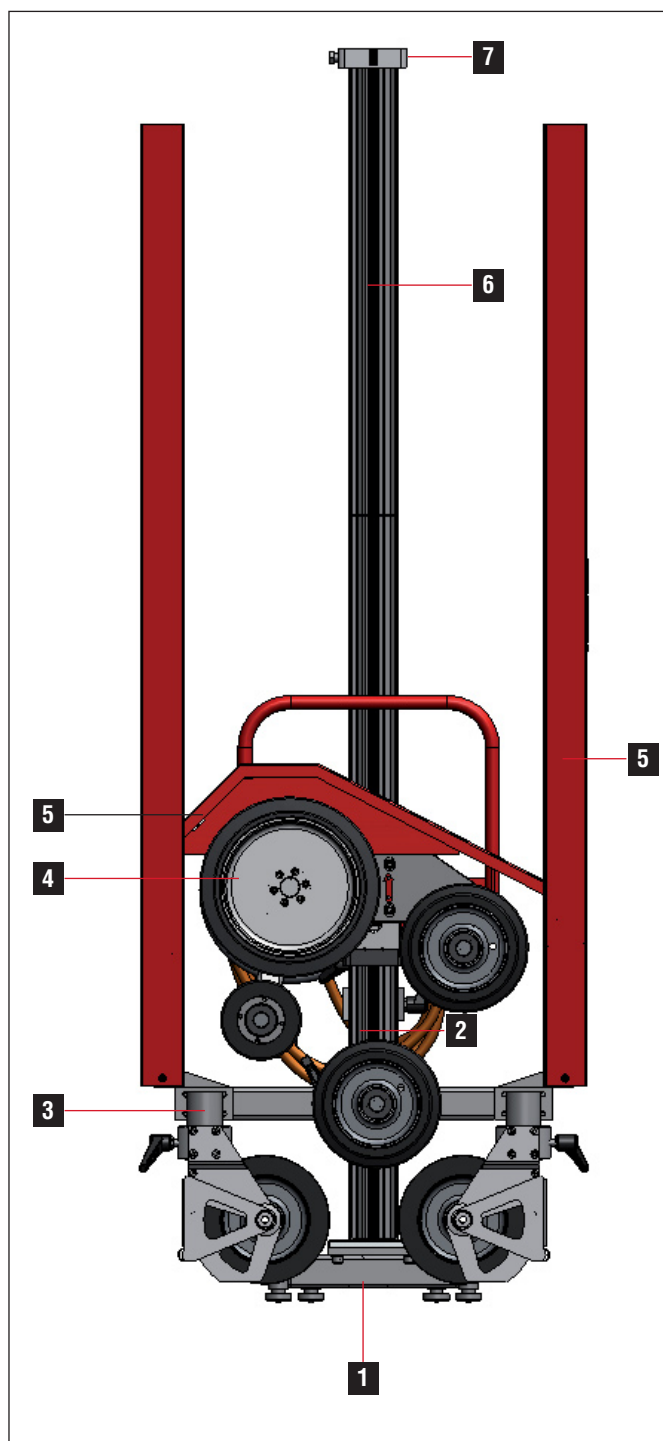
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2. Description

2.1 Use of the equipment as directed

- The DS-WS10(-E) wire saw has been designed 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 operator is responsible for securing the danger area by cordoning the area off and installing the appropriate protective equipment.
- 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 3.5 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 loose objects or objects 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.
- The machine is suitable for wet and dry cutting. A vacuum dust removal system must be used when dry wire sawing. Special dust removal hoods are available on request.
- The equipment may be lifted by crane only at the lifting points provided.
- Do not cut materials which, as a result of the cutting process, may produce toxic, hazardous or explosive dust or vapors.
- Do not cut easily combustible aluminum or magnesium alloys.

2.2 Components

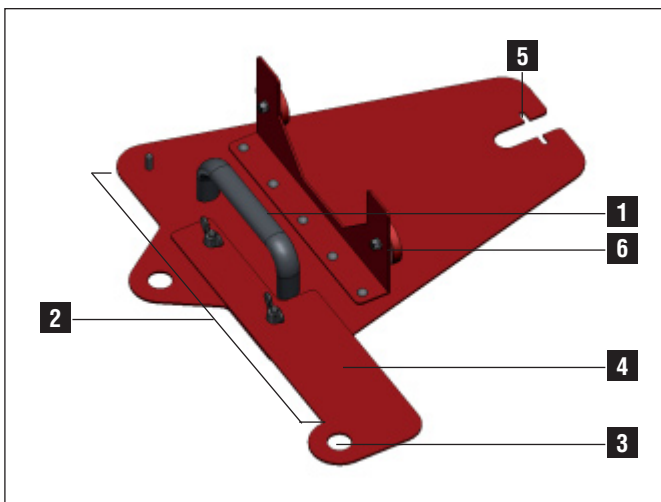


- 1 Base plate
- 2 Guide rail and advance unit
- 3 Pivoting pulley crossbar
- 4 Hydraulic drive unit (DS WS10) or electric drive unit (DS WS10-E)
- 5 Guard
- 6 Wire storage extension
- 7 End stop

2.3 Operating controls and parts

Positioning template

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

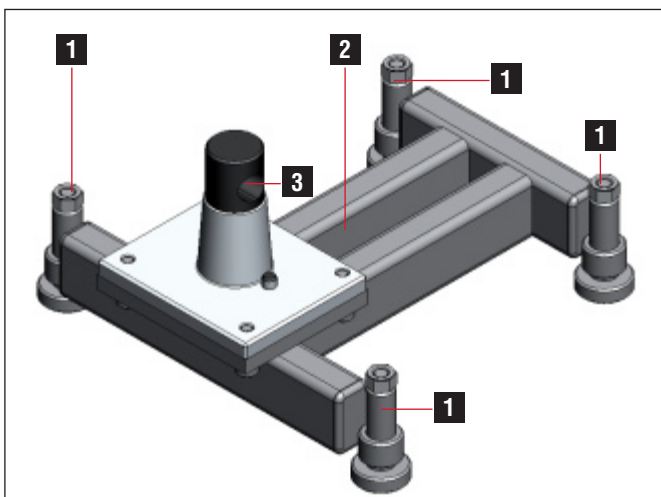


NOTE

The drilling point indicator can be pivoted between the positions of the through holes for the tension and slack sides of the wire.

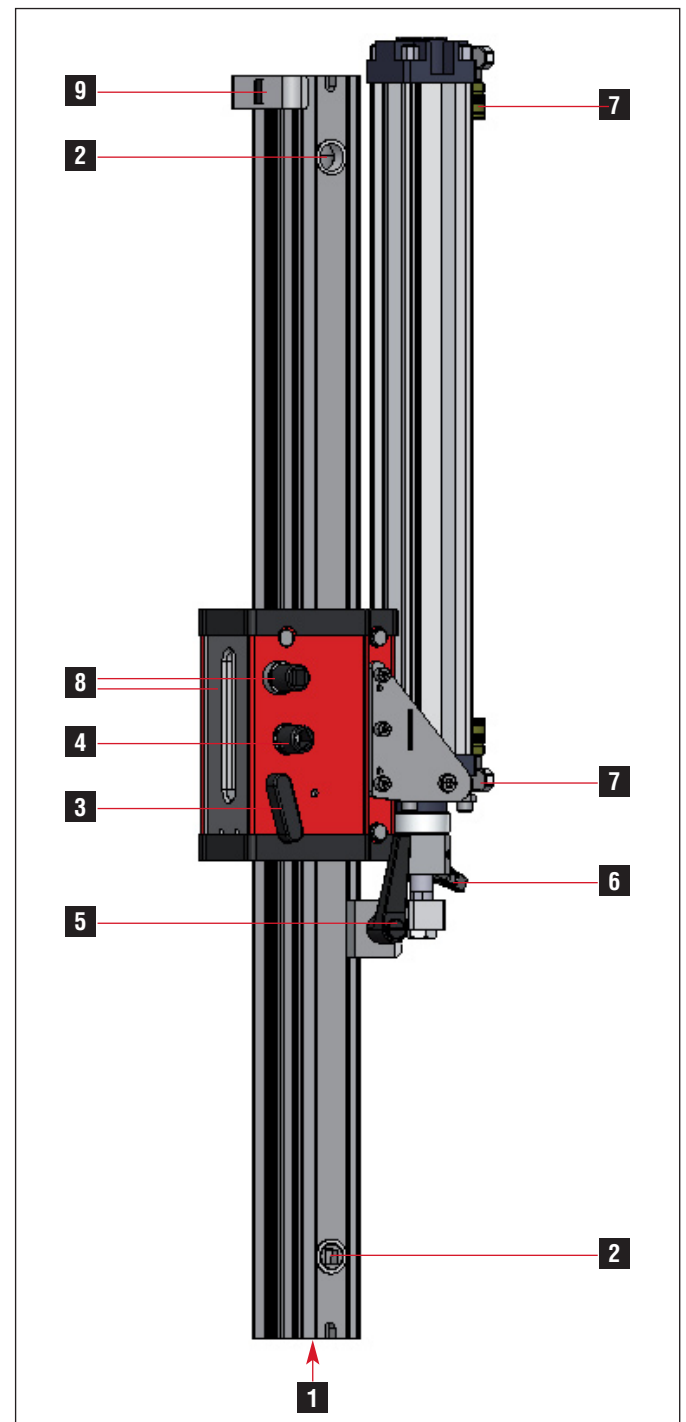
Base plate

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



Guide rail and advance unit

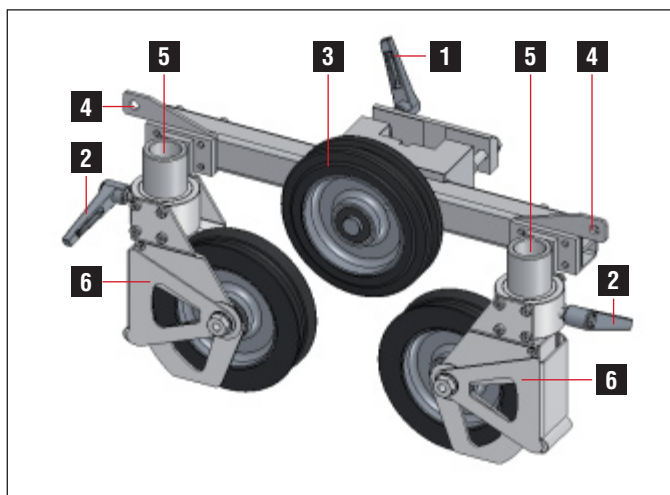
- 1 Internal taper
- 2 Eccentric pin
- 3 Carriage locking mechanism
- 4 Manual advance mechanism
- 5 Piston rod securing clamp
- 6 Return lock
- 7 Compressed air connection
- 8 Drive unit interface and locking mechanism
- 9 End stop



2. Description

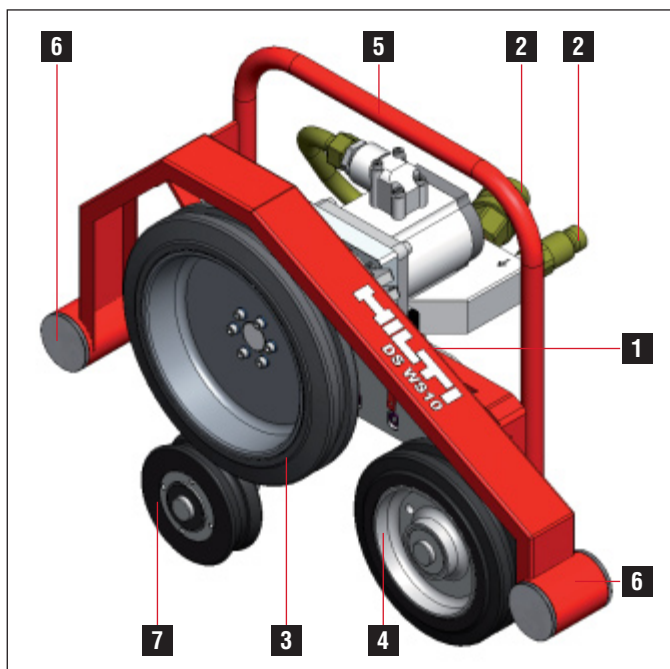
Pivoting pulley crossbar

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



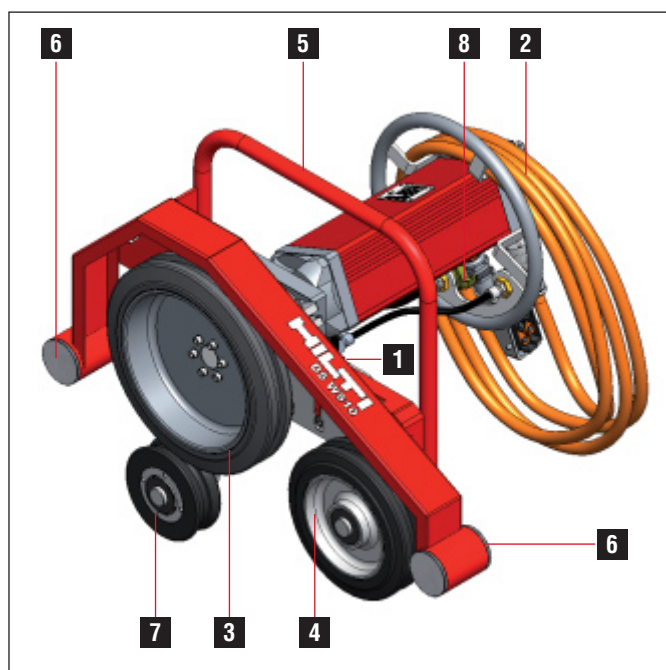
DS WS10 hydraulic drive unit

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



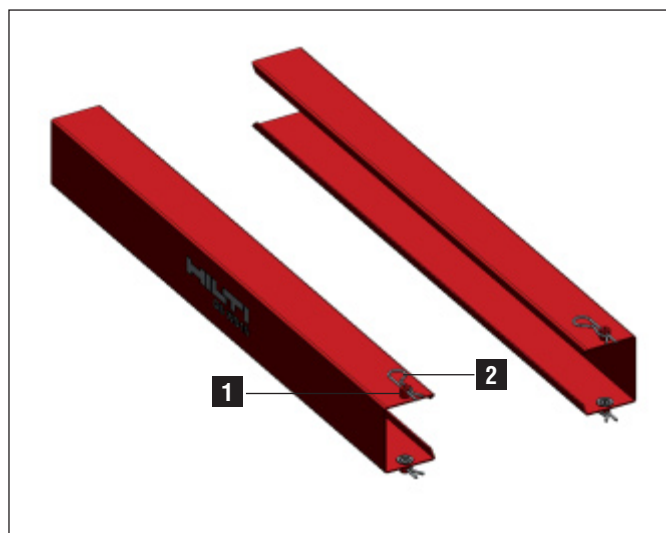
DS WS10-E electric drive unit

- 1 Mounting interface
- 2 Power cable
- 3 Drive pulley
- 4 Return pulley
- 5 Carrying / holding bar
- 6 Guard guides
- 7 Traction pulley
- 8 Cooling water connection – feed/return



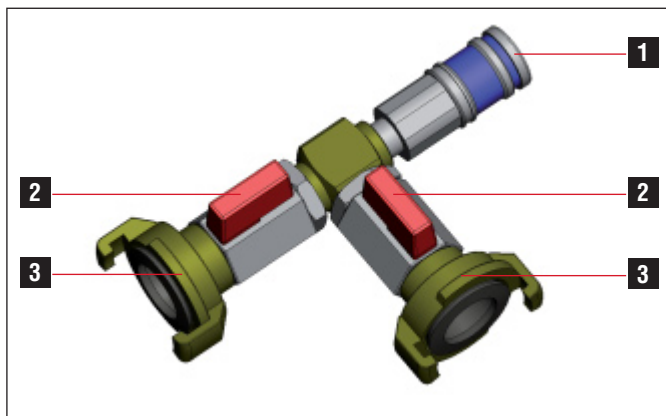
Guards

- 1 Guard mounting pin
- 2 Spring pin



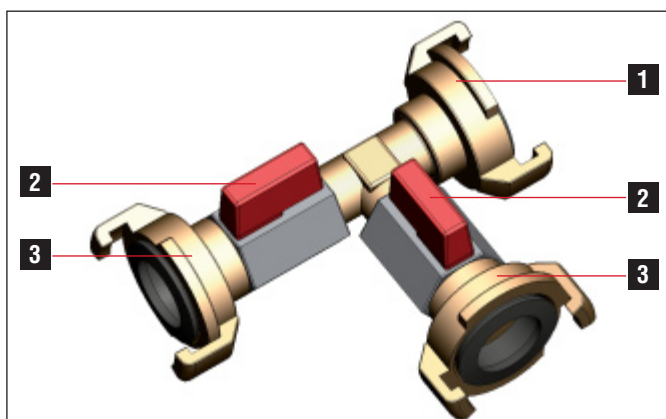
DS WS10 water connection

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



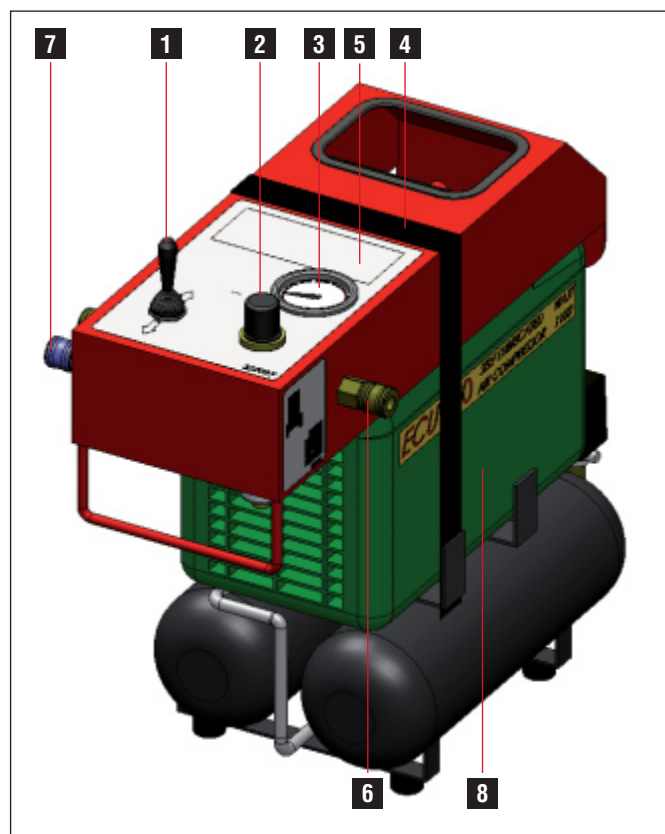
DS WS10-E water connection

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



DS WS10 pneumatic system control unit

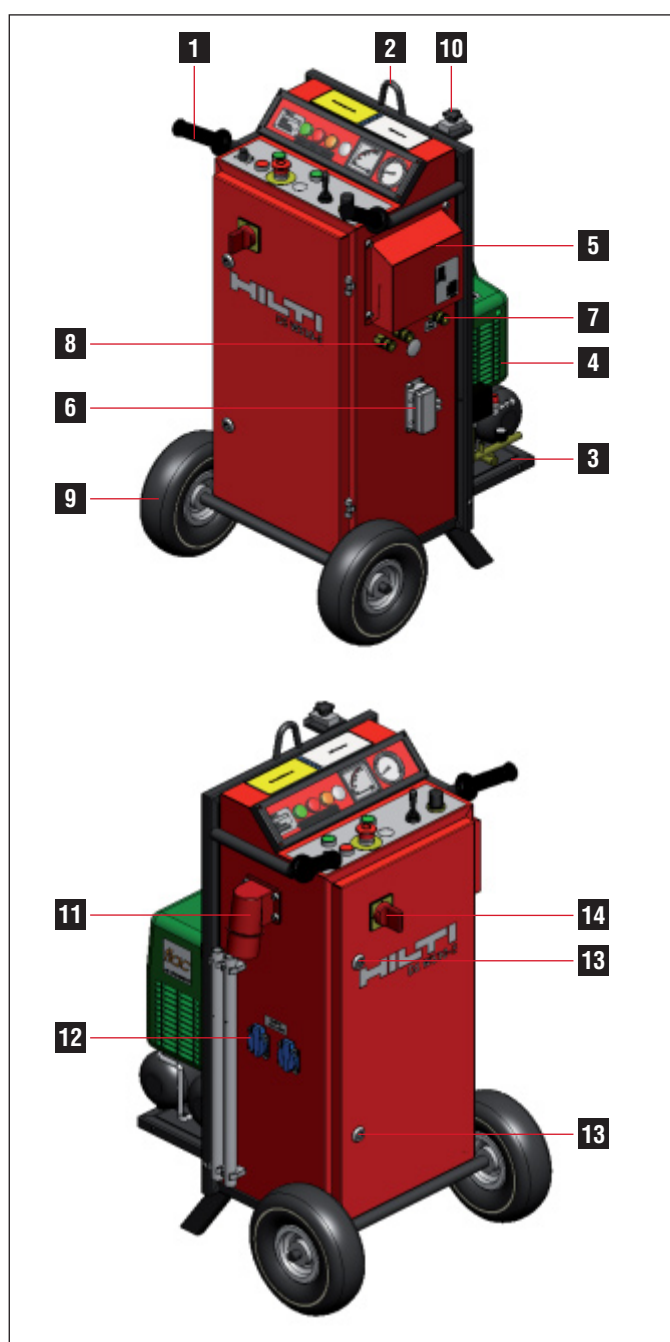
- 1 Advance direction control valve
- 2 Regulator for advance pressure adjustment (wire tension)
- 3 Advance pressure indicator
- 4 Securing band
- 5 Safety and operating instructions
- 6 Compressed air supply connection
- 7 Advance cylinder connection
- 8 Air compressor



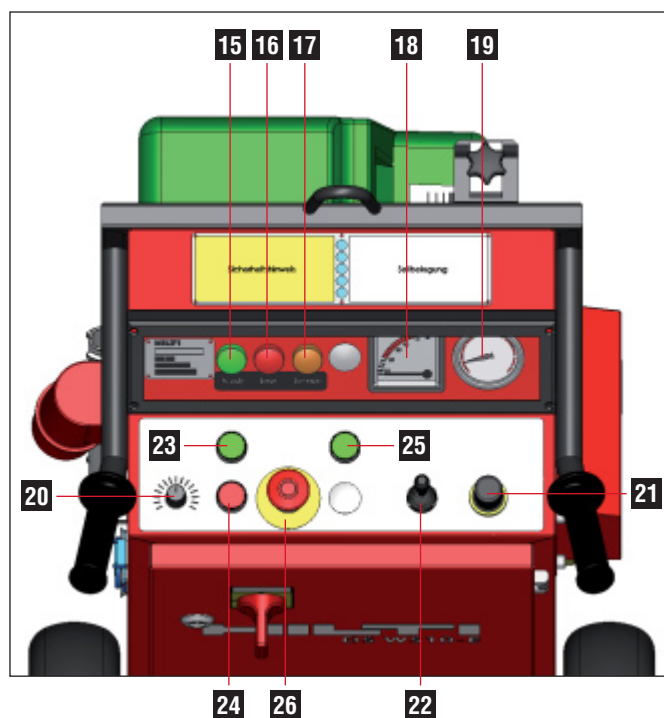
2. Description

DS WS10-E control unit

- 1** Transport and carrying handles
- 2** Lifting point for lifting by crane
- 3** Shelf for attaching the compressor
- 4** Air compressor
(not supplied with the 200 V version)
- 5** Control panel cooling air exit
- 6** Power cable socket
- 7** Air hose connector – compressor
- 8** Air hose connector – saw advance unit
- 9** Wheel assembly
- 10** Vice for use when connecting wire ends



- 11** Electric supply connection 400 V~ / 32 A or 200 V~ / 63 A
- 12** 230 V electric supply socket (not fitted to 200 V~ version)
- 13** Control cabinet door lock
- 14** Main switch



- 15** Green lamp – ready for operation
- 16** Red lamp – lights when a fault occurs
- 17** Yellow lamp – lights when servicing is required
- 18** Electric current indicator (amps)
- 19** Advance pressure gauge (bar)
- 20** Advance speed adjusting knob (m/s)
- 21** Advance pressure adjusting knob (bar)
(pull out to unlock)
- 22** Advance direction selection lever (up / neutral / down)
- 23** Green lamp – lights when drive is switched on
- 24** Red lamp – lights when drive is switched off
- 25** Power converter error acknowledge button
- 26** Emergency stop button (pull out to release)

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 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 pneumatic 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.



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3. Accessories

3.1 Hilti sawing wires and accessories

Safety precautions and instructions for use

- Use only sawing wires that comply with the requirements of EN 13236.
- Connecting together lengths of wires of different diameters, from different manufacturers or of different types (e.g. electroplated or sintered beads) or use of badly worn or out-of-round wires is not permissible.
- Use of damaged wires (e.g. wires with kinks, loose or shifted beads, broken strands, etc.) is not permissible.
- Observe the wire and wire connector manufacturer's instructions when connecting sawing wires and, as far as possible, use only one wire connector in each complete wire loop.
- Use of flexible connectors greatly reduces alternating bending stresses and thus reduces the probability of wire breakage due to fatigue.
- 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.

Guidelines for the use of diamond wires

Machine \ Material	DS WS10		DS WS10-E		DS WS15		DS WSS30	
Reinforced concrete	CS	CM	CS	CM	CM	CH	CM	CH
Heavily-reinforced concrete	20 % steel		20 % steel		20 % steel		20 % steel	
Reinforced concrete dry cutting	Dry		Dry		Dry		Dry	
Steel	–		100 % steel		100 % steel		100 % steel	

Specification	Cutting characteristics	Concrete type	Reinforcement content
CS	Fast-cutting	S: soft, soft aggregates	Normal to high
CM	Good balance between cutting speed and life	M: medium, hard aggregates	Normal
CH	Specially for flint, long life	H: hard, very hard aggregates	Normal
20 % steel	Fast-cutting	Universal	Normal to very high
100 % steel	–	–	Only steel
Dry	–	Universal	Normal to high

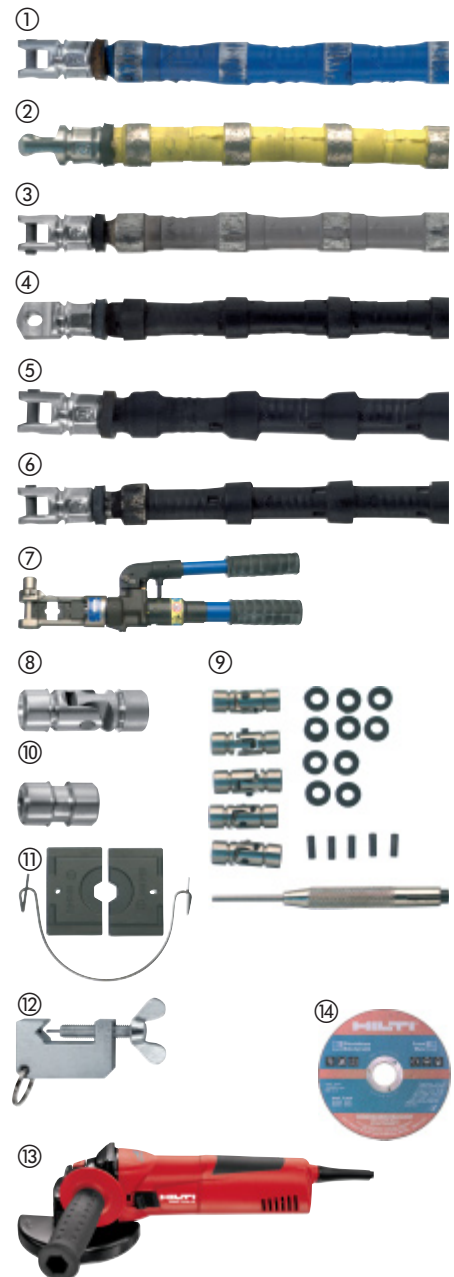
	Sintered			Electroplated		
Spezification	CS	CM	CH	Concrete, dry cutting	20 % steel	100 % steel
No. of beads / m	40	44	40	40*)	40	48*)
Beads dia. (mm)	10.5	10.5	10.5	10.2	10.2	10.8

*) each bead is crimped additionally.

DS-WS10.5 diamond wires

Wire length (m)	Designation DS-W 10.5 CS	Designation DS-W 10.5 CM	Designation DS-W 10.5 CH	Designation DS-W 10.2 20% steel	Designation DS-W 10.8 100% steel	Designation DS-W 10.2 dry
4,6	① 384 528*	② 376 816*	③ 376 818*	④ 384 540*	-	-
7,8	① 384 529*	② 376 817*	③ 376 819*	④ 384 541*	-	-
10	① 384 530*	② 235 835*	③ 235 834*	④ 384 542*	-	-
14	① 384 531*	② 235 836*	③ 235 838*	④ 371 982*	⑤ 371 987*	-
18	① 384 532*	② 315 019*	③ 315 020*	④ 371 983*	⑤ 371 988*	-
22	① 384 533*	② 315 022*	③ 315 023*	④ 371 984*	⑤ 371 989*	-
26	① 384 534*	② 315 025*	③ 315 026*	-	-	-
30	① 384 535*	② 315 028*	③ 315 029*	-	-	-
50	① 384 536	② 370 500	③ 376 630	④ 371 985	⑤ 371 990	-
100	① 384 537	② 370 426	③ 376 631	④ 371 986	⑤ 371 991	-
per/m	① 384 539	② 376 635	③ 376 634	④ 377 830	⑤ 377 781	⑥ 377 782

* with factory-fitted flexible connectors



Accessories for connecting Hilti diamond wires

Designation	Package contents	Ordering designation	Item no.
Crimping pliers For crimping connectors / repair sleeves	1	DS-WSTHY	⑦ 235845
Flexible connectors Quick-release type	1	DS-WCMV	⑧ 340427
Set of flexible connectors Quick-release type with pin and O-ring	5	DS-WCSet	⑨ 371383
Pin Replacement pin for quick-release connectors	10	DS-WP	235842
Sleeve Repair sleeve	5	DS-WS	⑩ 235841
O-ring Fitted between connector and bead	10	O-Ring 10/4,7×2,5	235844
Crimping jaws Replacement jaws for crimping pliers	2	DS-WJ	⑪ 340426
Assembly tool connector For pin removal	1	DS-WMT	⑫ 295161
Angle grinder For cutting diamond wire	1	AG 125-S	⑬ 000000
Cutting disc For cutting diamond wire	1	AC-D 125 1mm	⑭ 304623

3. Accessories

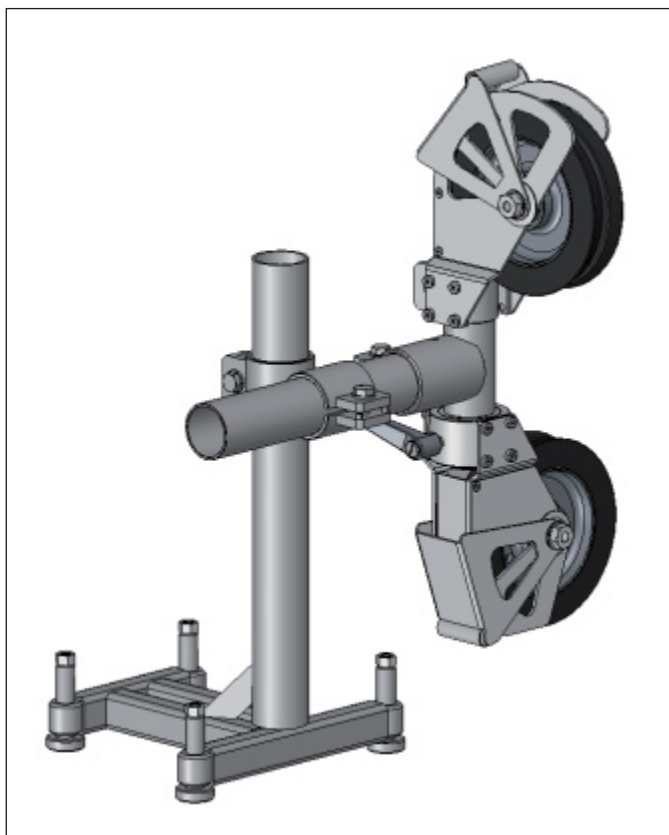
3.2 Wire storage extension (optional)

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



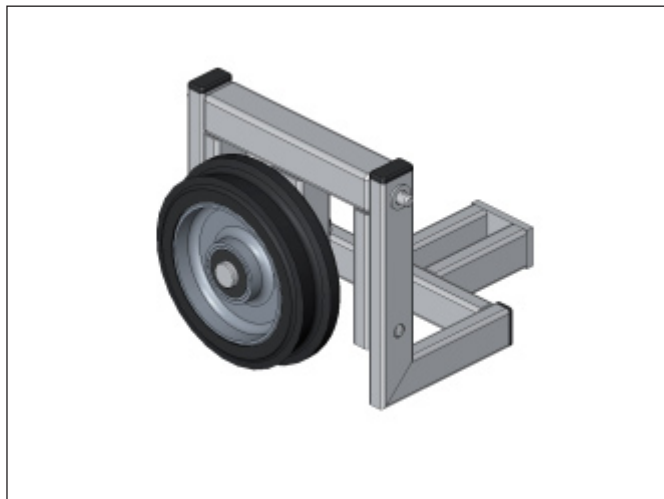
3.3 Pulley stand (optional)

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.

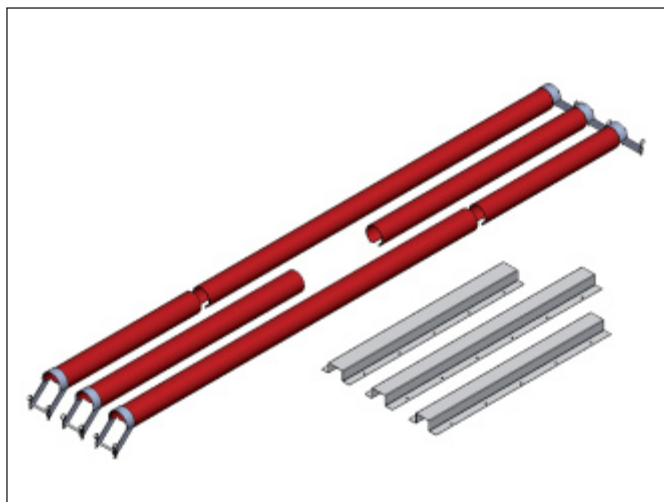


3.4 Release pulley

The release pulley is used to reduce 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.



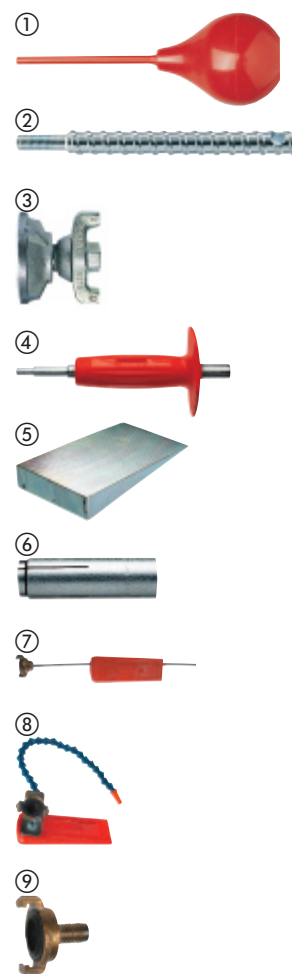
3.5 Wire guards (optional)



Wire guards must be fitted in situations where it cannot be ensured that persons do not enter the danger area while the equipment is in operation, i.e. the area in which flying fragments etc. present a risk of injury, or in situations where there is a risk of damage to property or other equipment within this area. When wire guards are used, check to ensure they are fitted correctly.

3.6 Accessories for setting up and operating wire saws and wire guides

Ordering designation	Quantity	Item no.	Use
DS-WS tool set		339300	Wire saws
comprising:			
Hilti plastic toolbox	1	311869	Storage
Accessories, list of contents and uses	1	339295	Overview of contents
Open-end / ring wrench, 19 mm	1	221189	Fastening
Hammer 1½ kg	1	339303	Fastening
Screwdriver, 6 mm	1	339304	Fastening
BB blow-out pump	① 1	59725	Blowing out anchor holes
Folding rule, 2-metre	1	2731	Marking
Spirit level	1	310306	Marking
Wooden pencil	2	335500	Marking
Cleaning cloth	1	334211	Cleaning
Hilti spray	1	308976	Lubrication
Hilti grease dispenser	1	203086	Lubrication
Flat brush	1	3206	Cleaning
Clamping spindle, short, M12S	② 3	251830	Fastening
DD-CN-SML clamping nut	③ 3	251834	Fastening
HSD-G M12 setting tool	④ 1	243743	Fastening
Water connection nipple	⑨ 1	356700	Water supply
GK seal	5	356701	Water seal for 356700
Steel wedge	⑤ 4	41910	Securing concrete blocks



3.7 Accessories and wearing parts for Hilti wire saw systems

Ordering designation	Quantity	Item no.	Use
M12L clamping spindle, long	② 1	251831	Fastening
HKD-D M12×50 flush anchor *	⑥ 50	252961	Fastening
Water supply, long	⑦ 1	339307	Water supply
Water supply, flexible	⑧ 1	339379	Water supply

* Hole diameter 16 mm



Technical data	4.1 Technical data for the DS WS10 hydraulic drive	20
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4. Technical data

4.1 Technical data for the DS WS10 hydraulic unit

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 operating range:	36 to 50 l/min
Pressure:	max. 210 bar
Optimum operating 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 is activated as the drive unit then no longer runs smoothly (audible and visual indication).



CAUTION

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

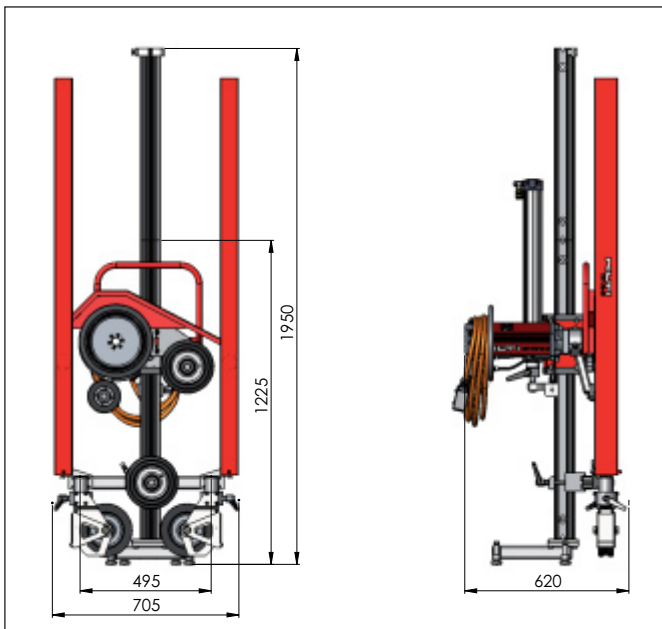
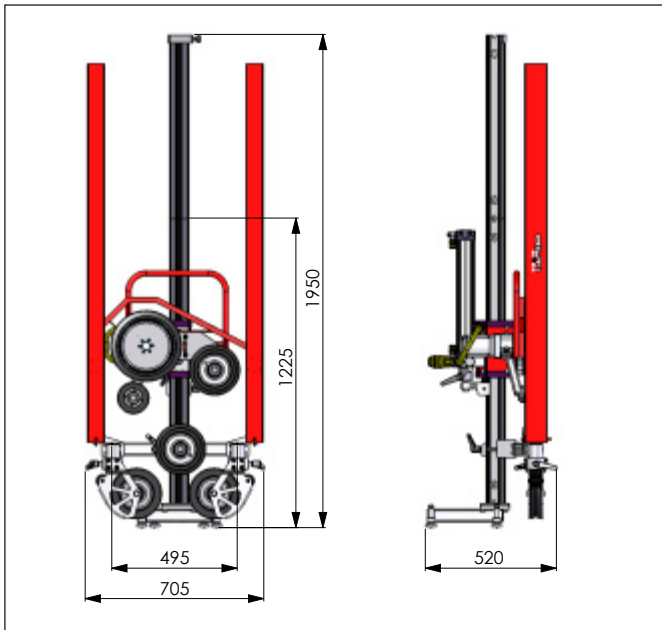
4.2 Technical data for the DS WS10-E control unit

	DS EB-WS10 3x400 V	DS EB-WS10 3x200 V
Rated voltage	400 V~	200 V~
Rated frequency	50 / 60 Hz	50 / 60 Hz
Pin assignment	3P+N+PE / 3P+PE	3P+PE
Rated current	22 A	44 A
Fuse rating	32 A	63 A
Power input, max.	11 kW	11 kW
Generator output, min.	40 kVA @ 32 A	40 kVA @ 63 A
Ground fault circuit breaker in supply	30 mA (type A)	30 mA (type A)
Protection class	IP 54	IP 54
Power outlet	230 V / 10 A	none
Ambient temperature range – storage	-15 to +50°C	-15 to +50°C
Ambient temperature range – operation	-15 to +45°C	-15 to +45°C
Leakage current	≤ 10 mA	≤ 10 mA
Insulation resistance	at least 300 kΩ	at least 300 kΩ

4.3 Dimensions and weights

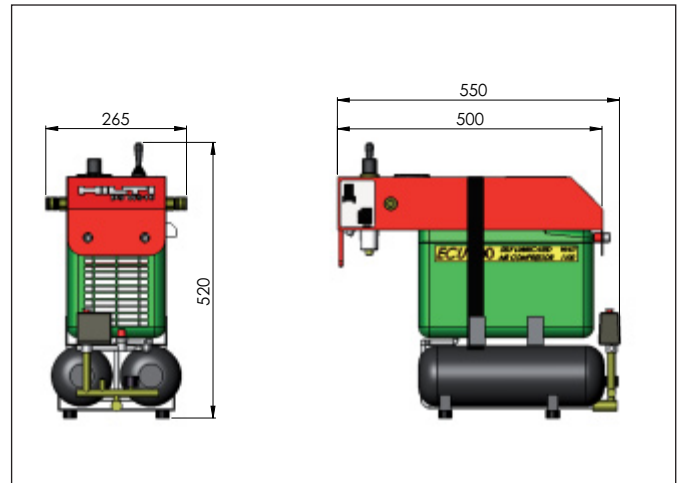
Dimensions of drive and wire storage unit

Weight of DS WS10-E:	81.2 kg
Weight of DS WS10:	69.5 kg



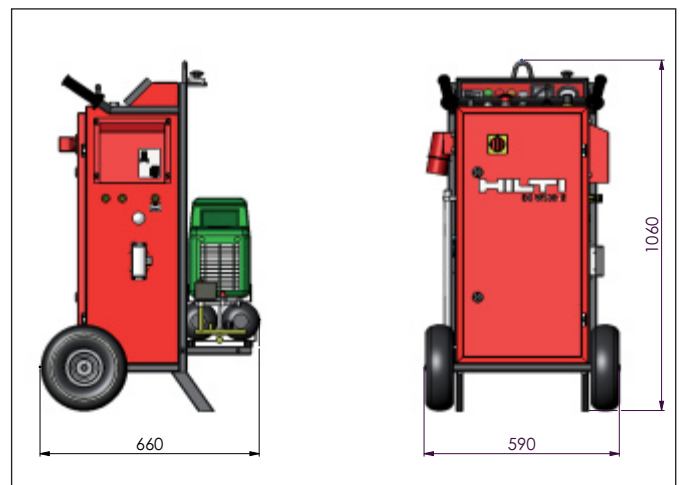
Dimensions of DS WS10 compressor with control unit

Weight:	20.1 kg
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Dimensions of DS WS10-E control unit

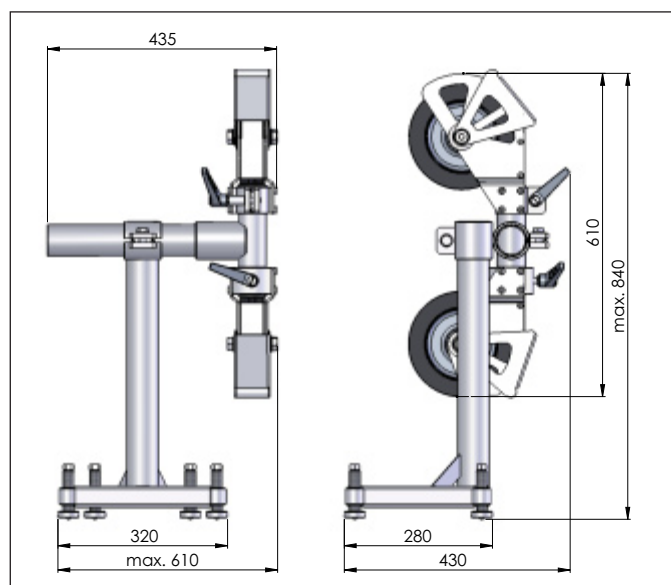
	DS WS10-E 3x400 V	DS WS10-E 3x200 V
Weight:	68.5 kg	78.5 kg



4. Technical data

Dimensions of single pulley stand

Weight: 21.3 kg



Length of internal system supply lines

Short compressed air hose:	1 m
Long compressed air hose:	7 m
Cooling water hose:	10 m
Power cable (DS WS10-E):	7 m
Hydraulic hoses (DS WS10)*:	10 m

* not supplied with the wire saw

4.4 Technical data for the DS WS10 and DS WS10-E drive units

	DS WS10 hydraulic	DS WS10-E 3x400 V	DS WS10-E 3x200 V
Motor power S1	10 kW	9.4 kW	9.4 kW
Motor speed	0 to 1900/min	0 to 1700/min	0 to 1700/min
Wire speed	0 to 27 m/s	0 to 24 m/s	0 to 24 m/s
Protection class	IP 65	IP 65	IP 65
Drive pulley diameter	280 mm	280 mm	280 mm
Cooling water flow rate	*	7 l/min @ 30°C	7 l/min @ 30°C
Cooling water temperature	*	4 to 30°C	4 to 30°C
Cooling water pressure min. / max.	4 to 6 bar	4 to 6 bar	4 to 6 bar
Ambient temperature range: storage	-15 to +50°C	-15 to +50°C	-15 to +50°C
Ambient temperature range: operation	-15 to +45°C	-15 to +45°C	-15 to +45°C

* Please refer to the D-LP15 and D-LP32 operating instructions.



CAUTION

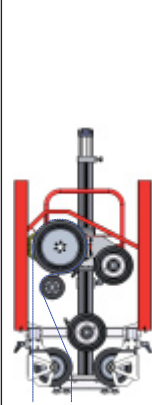

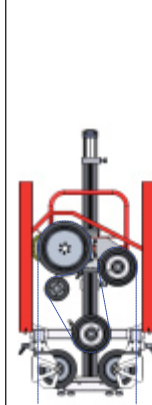
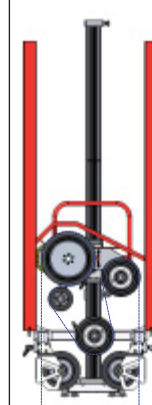
To avoid damage when there is a risk of freezing (temperatures below 4°C), the cooling circuit of the system must be blown out with compressed air after use.

4.5 Compressed air supply

The compressor for the air supply is supplied as part of the wire saw system (but not with the 3 x 200V version). Please observe the operating instructions enclosed with it.

Pressure min. / max.	6 / 8 bar
Flow rate	205 l/min

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 Rating plates

DS WS10 hydraulic drive unit

HILTI DS WS10 01	
Hilti = trademark of Hilti Corporation, Schaan, LI Made in Austria	
Serial number	0001000
Drive wheel ø 280 mm	max. 50 l/min
Diamond wire ø 8 - 12 mm	max. 210 bar
Wire speed 0-27 m/s	10kW
0-1900 min ⁻¹	357147
357072	A 07

DS WS10-E electric drive unit

HILTI DS WS10-E 01	
Hilti = trademark of Hilti Corporation, Schaan, LI Made in Austria	
Serial number	0001000
Drive wheel ø 280 mm	400 V from DS EB-WS10
Diamond wire ø 8 - 12 mm	7l/min at max. 30°C
0-1700 min ⁻¹	IP 65
358232	A 07

HILTI DS WS10-E 01	
Hilti = trademark of Hilti Corporation, Schaan, LI Made in Austria	
Serial number	0001000
Drive wheel ø 280 mm	200 V from DS EB-WS10
Diamond wire ø 8 - 12 mm	7l/min at max. 30°C
0-1700 min ⁻¹	IP 65
358519	A 07

DS WS10-E control unit

HILTI DS EB-WS10 01	
Hilti = trademark of Hilti Corporation, Schaan, LI Made in Austria	
Serial number	0001000
Wire speed 0-24m/s	400 V - 50/60Hz
22A	3P+N+PE
11kW	32A
	IP 54
358232	A 07

HILTI DS EB-WS10 01	
Hilti = trademark of Hilti Corporation, Schaan, LI Made in Austria	
Serial number	0001000
Wire speed 0-24m/s	200 V - 50/60Hz
44A	3P+PE
11kW	63A
	IP 54
358519	A 07

4.8 Noise levels

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

DS WS10-E	103.7 dB(A)
DS WS10 with D-LP15	102.1 dB(A)
DS WS10 with D-LP32	103.5 dB(A)

Typical A-weighted emission
sound pressure level at the workplace
as per ISO 11202*:

DS WS10-E	80.2 dB(A)
DS WS10 with D-LP15	83.5 dB(A)
DS WS10 with D-LP32	84.4 dB(A)

* At a distance of 3 meters

The use of ear protection is recommended.

Safety instructions	5.1 Proper organization of the work area	26
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	5.6 Safety during operation	29
	5.7 Safety instructions for transporting the wire saw	30

5. Safety instructions



WARNING

Failure to observe the instructions listed below may lead to potentially fatal injury and serious damage to property or equipment.

5.1 Proper organization of the work area

a) Approval must be obtained from the site engineer or architect prior to beginning drilling or sawing work. Drilling or sawing work on buildings and other structures may influence the statics of the structure, especially when steel reinforcing bars or load-bearing components are cut through.

b) Ensure that the workplace is well lit.

c) Ensure that the workplace is well ventilated. Exposure to dust at a poorly ventilated workplace may result in damage to the health.

d) Keep the workplace tidy. Objects which could cause injury should be removed from the working area. Untidiness at the workplace can lead to accidents.

e) 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.

f) Ensure that adequately-sized supports are correctly installed so that the remaining structure maintains its stability after completion of the cutting work and removal of the part cut away.

g) Never loiter in the vicinity of loads suspended by cranes.

h) 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.

i) Wear personal protective equipment. Wear safety shoes or boots, protective gloves, a hard hat and eye protection.

j) Wear respiratory protection if the work causes dust.

k) Dress properly for the work. Do not wear loose clothing or jewelry as it could be caught in moving parts. Contain long hair.

l) Keep children away. Keep other persons away from the working area.

m) Do not allow other persons to touch the machine or the extension cord.

n) Avoid unfavorable body positions. Make sure you work from a safe stance and stay in balance at all times.

o) To avoid presenting a tripping hazard, always ensure that cables and hoses leading to the machine are laid flat on the floor.

p) Keep cables and hoses away from rotating parts.

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

r) 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.

s) Do not work from a ladder.

5.2 Safety measures at the danger area

a) Safety measures must be implemented in the area where sawing is taking place so that operators and bystanders cannot be injured or property damaged by a broken sawing wire or debris that may fly off during the sawing operation (wire connectors, diamond beads, spacing springs, small stones, sawing slurry, etc.). Safety measures must also be implemented in the area not directly visible to the operator, i.e. behind where sawing is taking place.

b) Persons must NEVER enter the danger area while sawing is in progress.

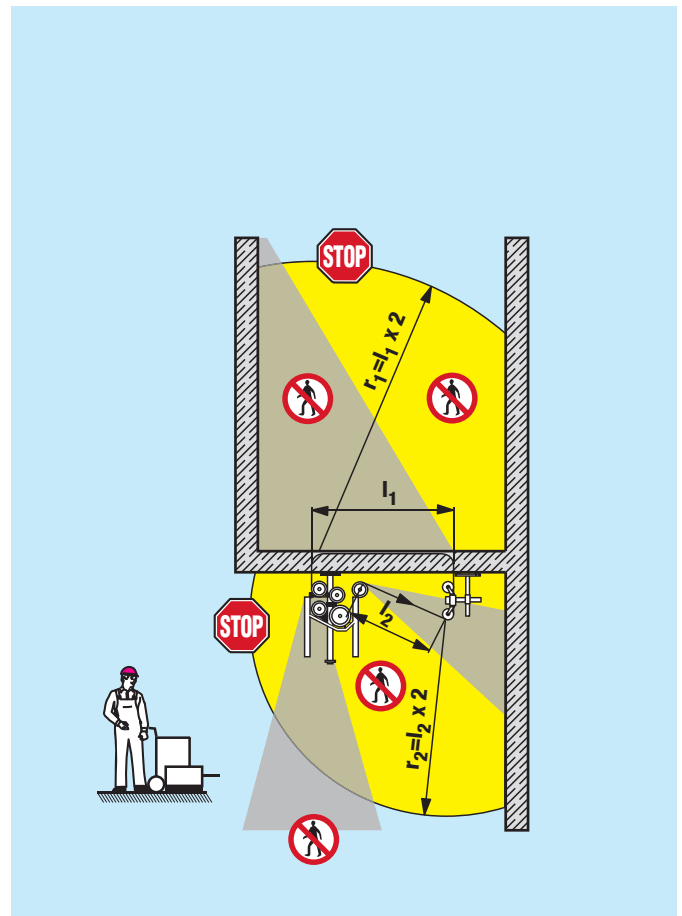
c) Always keep the free wire lengths between the drive unit and object being cut as short as possible (max. 3.5 m) and mount guide pulleys at the wire entry and

exit points in order to reduce the risk of whiplash in the event of wire breakage. The whiplash effect causes great acceleration of the sawing wire, resulting in parts of the wire lashing out or flying off with great force.

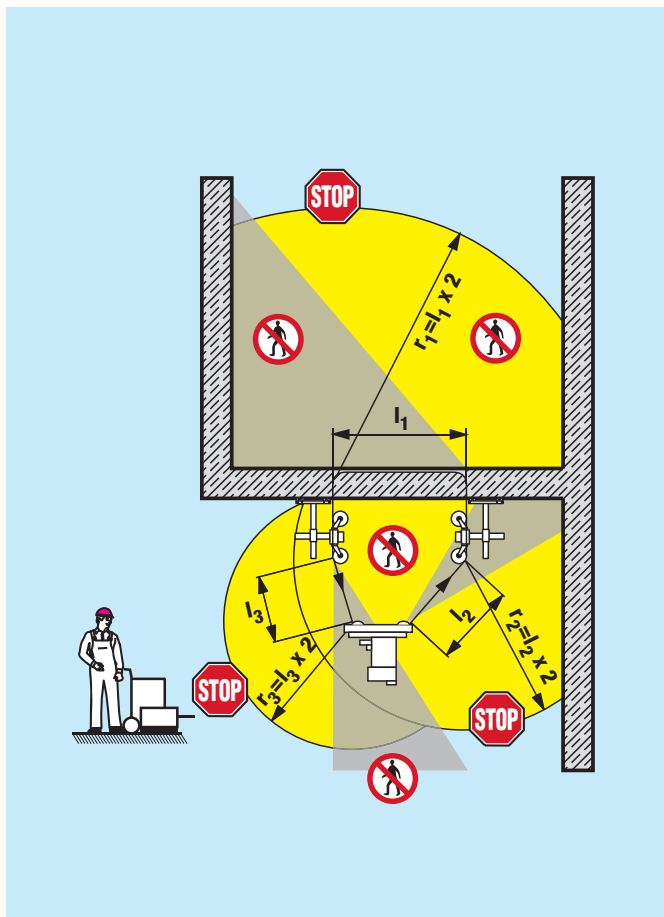
d) Make sure there are no objects such as scaffolding etc. within the wire whiplash area. In the event of wire breakage, the whiplashing end of the wire may be deflected in an unexpected direction by such objects.

e) The danger area has a radius of at least twice the free length of wire that would be unleashed in the event of wire breakage (shown in yellow) and also includes the areas in the extended axes of the direction in which the wire is running (shown in gray). The danger area cannot be limited unless suitable means of protection are employed (protective walls, curtains or wire guards etc.). The protective devices must be arranged and mounted in a way that stops the wire lashing out in the event of wire breakage and reliably prevents objects or fragments flying off.

f) The operator is responsible for cordoning off the area. If necessary, safety personnel must be posted to prevent access to a wide area around the workplace.



g) When setting up and operating the saw system and when removing parts that have been cut away, always ensure that no persons are below the area in which you are working. Falling objects could cause serious injury.



5.3 General safety instructions

- Use the machine only when you have read the operating instructions and you are familiar with the points described, and when you have received appropriate training from a Hilti specialist on safe operating procedures. All warnings and instructions must be observed.
- Use the right machine for the job. Do not use the machine for purposes for which it was not intended. Use it only as directed and when in faultless condition.
- Use the machine, accessories and sawing wires etc., in accordance with these instructions and in the manner intended for the particular type of machine, taking into account the working conditions and the work to be performed. Use of this machine for operations other

5. Safety instructions

than those intended could result in hazardous situations.

d) Use only the genuine Hilti accessories or ancillary equipment listed in the operating instructions. Use of accessories or ancillary equipment not listed in the operating instructions may present a risk of personal injury.

e) Take the influences of the surrounding area into account. Do not use the machine where there is a risk of fire or explosion. Electric tools and machines generate sparks which may ignite dust or gas.

f) Keep the grips dry, clean and free from oil and grease.

g) Do not overload the machine. It will work more efficiently and more safely within its intended performance range.

h) Never leave the machine unattended.

i) Store machines in a secure place when not in use. When not in use, machines must be stored in a dry, high place or locked away out of reach of children.

j) Always disconnect the machine from the electric supply when it is not in use (e.g. during breaks between working), before making adjustments, before carrying out care and maintenance and before changing sawing wires. This safety precaution prevents the machine starting unintentionally.

k) Remove any adjusting key or wrench before switching the machine on. A wrench or a key left attached to a rotating part of the machine may cause personal injury.

l) Before use, the machine, the sawing wire and accessories must be checked carefully to ensure that all items function faultlessly and as intended. Check that moving parts function correctly without sticking and that no parts are damaged. All parts must be fitted correctly and fulfill all conditions necessary for correct operation of the machine. Damaged parts must be repaired or replaced properly by an authorized service center.

m) Avoid skin contact with drilling slurry.

n) Wear a protective mask during work that generates dust, e.g. dry cutting. Connect a dust removal system. Cutting materials hazardous to the health (e.g. asbestos) is not permissible.

o) Follow the instructions concerning care and maintenance.

p) **Children must be instructed not to play with the machine.**

q) **The machine is not intended for use by children, by debilitated persons or those who have received no instruction or training.**

5.4 Electrical safety

a) Take steps to avoid the risk of electric shock. Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges and refrigerators.

b) Check the machine's supply cord at regular intervals and have it replaced by a qualified specialist if found to be damaged. Check extension cords at regular intervals and replace them if found to be damaged.

c) Check the condition of the machine and its accessories. Do not operate the machine and its accessories if damage is found, if the machine is incomplete or if its controls cannot be operated faultlessly.

d) Do not touch an electric cable that has been damaged while working. Switch off at the main switch and unplug the cable at the power outlet.

e) Damaged or faulty switches must be replaced at a Hilti service center. Do not use the machine if it cannot be switched on and off correctly.

f) Have the machine repaired only by a trained electrical specialist (Hilti service center) using genuine Hilti spare parts. Failure to observe this point may result in risk of accident to the user.

g) Do not use the supply cord for purposes for which it is not intended. Never carry the machine by the supply cord. Never pull the plug out of the power outlet by pulling the supply cord.

h) Do not expose supply cords to heat, oil or sharp edges.

i) Connect the machine and its ancillary equipment 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. Install an earth/ground rod if a generator is used.

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

k) Electric cables and their plug connectors must be kept dry. When not in use, close power outlets with the cover provided.

l) Use only extension cables which have an adequate

conductor cross-section and 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.

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

n) Please note that certain components of the power converter retain an extremely dangerous (potentially fatal) high voltage for up to 10 minutes after disconnection from the electric supply.

o) **Before beginning work, check the working area (e.g. using a metal detector) to ensure that no concealed electric cables or gas and water pipes are present.** External metal parts of the machine may become live, for example, when an electric cable is damaged accidentally. This presents a serious risk of electric shock.

5.5 Requirements to be met by users

a) The wire saw system 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.

b) Stay alert, watch what you are doing and use common sense when working. Do not use the equipment when you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating the equipment could result in serious injury.

c) The user and any other persons in the vicinity must wear suitable eye protection, a hard hat, ear protection, protective gloves and safety footwear while the equipment is in use.

d) Dust from material such as paint containing lead, some wood species, minerals and metal may be harmful. Contact with or inhalation of the dust may cause allergic reactions and/or respiratory diseases to the operator or bystanders. Certain kinds of dust are classified as carcinogenic such as oak and beech dust especially in conjunction with additives for wood conditioning (chromate, wood preservative). Material containing asbestos may be worked on only by specialists. **Where the use of a dust extraction device is possible it shall be used. To achieve a high level of dust**

collection, use a suitable vacuum cleaner of the type recommended by Hilti for wood dust and/or mineral dust together with this tool. Ensure that the workplace is well ventilated. The use of a dust mask of filter class P2 is recommended. Observe current national regulations applicable to the materials to be worked on.

5.6 Safety during operation

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 unit 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 drive has been switched off and when the drive pulley has come to a standstill. Switch off or disconnect the electric supply before entering the danger area.

Observe the permissible drive parameters and the recommended guide values for cutting speed and advance pressure when sawing.

Use only sawing wires that comply with the requirements of EN 13236.

The risk of wire breakage can be reduced considerably by using high-quality diamond wires and wire connectors and the appropriate tool for crimping the connectors.

The wire may get hot – don't 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 instructions

When using scaffolds, ladders or platforms etc., check that these are undamaged, of a type that complies with regulations, and that they are set up in accordance with regulations.

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 saw system equipment. Alteration of the factory-set frequency converter parameters (DS WS10-E) is not permissible.

5.7 Safety instructions for transporting the wire saw

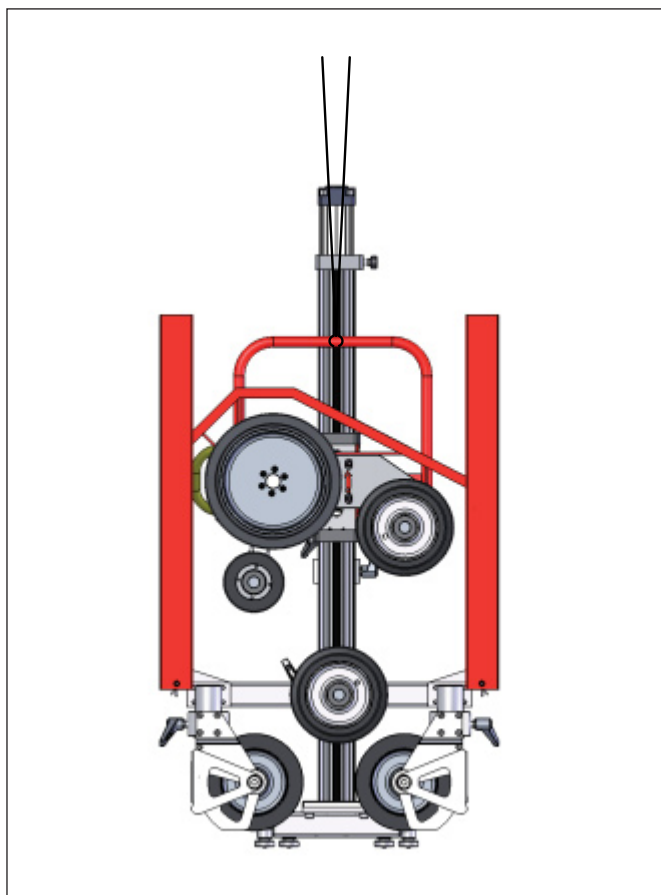
Avoid lifting and carrying heavy objects. Use suitable lifting equipment and means of transport and share heavy loads between several people.

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

Bear in mind that the machine could fall over. Stand it only on a solid, level surface. Place additional supports between the forward-facing pivoting pulleys and the surface on which the saw is standing.

Make sure that the wire saw and its components cannot move about or fall over during transportation.

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.



6. Preparations at the workplace

Preparations at the workplace	6.1 Marking the cutting lines	32
	6.2 Planning wire guidance and the cutting sequence	32
	6.3 Examples of applications	32
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	6.8 Extension cables / conductor cross sections	34
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6. Preparations at the workplace

6.1 Marking the cutting lines

The parts to be cut away are usually marked by the client.

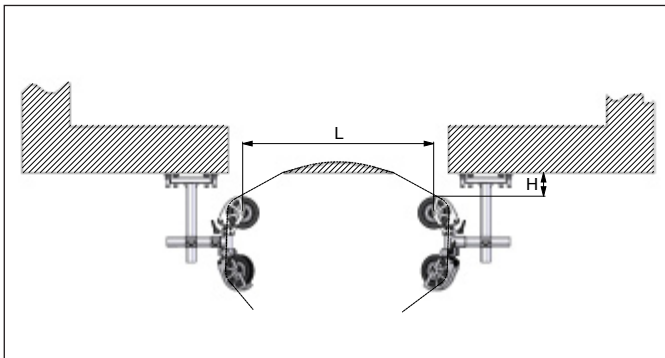
If necessary, adjust the size and weight of the concrete blocks to the prevailing conditions by making dividing cuts (i.e. depending on the work order, the means of handling the blocks, the crane or the maximum floor loading capacity and size of doors).

6.2 Planning wire guidance and the cutting sequence

Thorough training and experience are essential for optimum planning of the cutting sequence, the dividing cuts and the wire guidance system.

A long wire contact length and a large cutting radius results in reduced sawing performance.

The rule of thumb is: $H = L \times 0.2$



When the length of the cut L is 1.5 meters, the distance H should thus be 0.3 meters (1.5 meters \times 0.2 = 0.3 meters).

When planning the wire guidance system, take care to ensure that the length of wire in contact does not exceed 2 meters.

Arrange the cutting sequence so that the sawing wire cannot become trapped by parts of the structure that are cut away.

6.3 Examples of applications

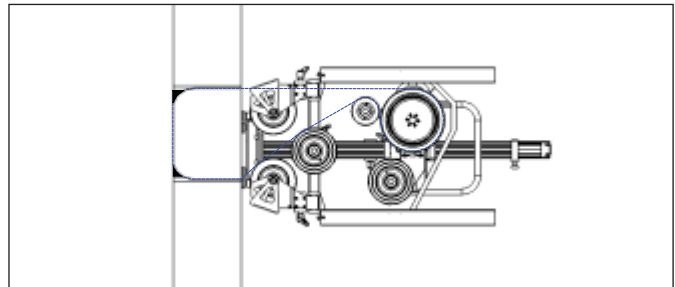
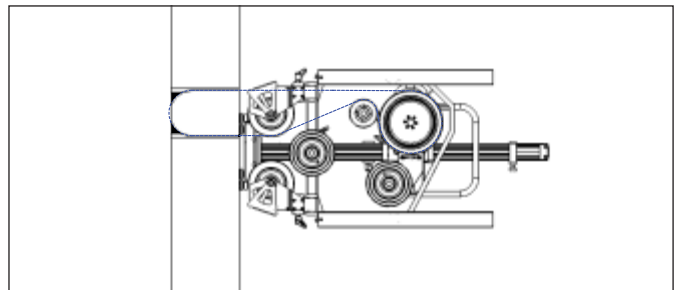
Below you will find recommendations for the most common applications:



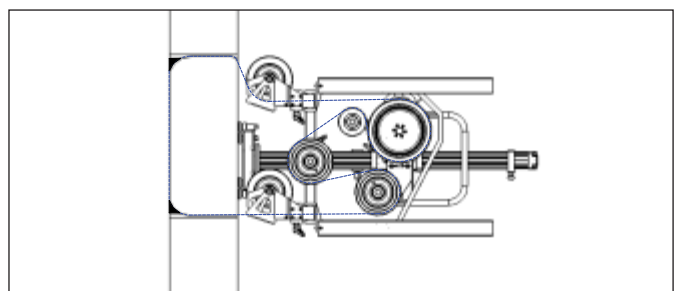
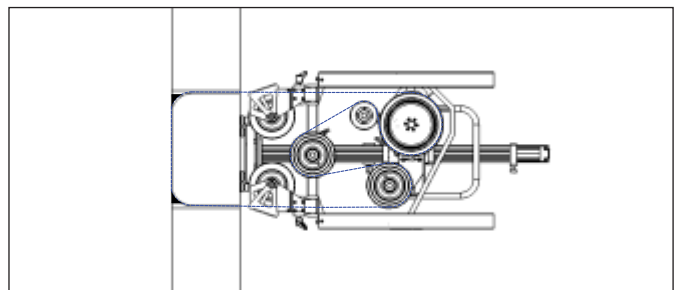
CAUTION

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.

Horizontal or vertical cut, 20–40 cm cutting length

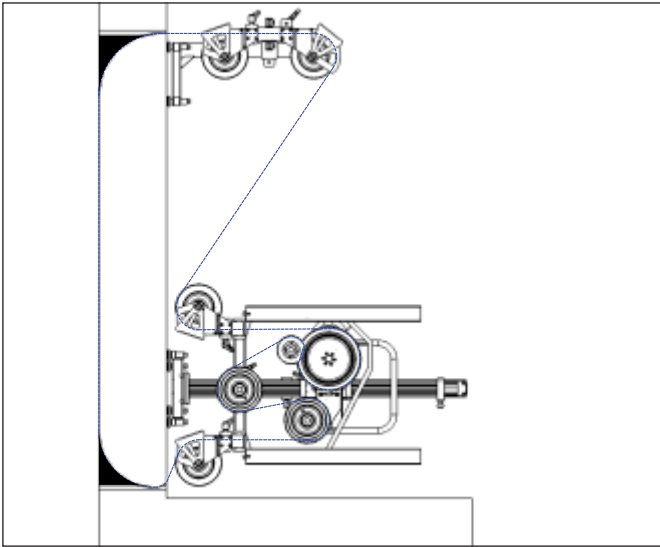


Horizontal or vertical cut, 40–70 cm cutting length

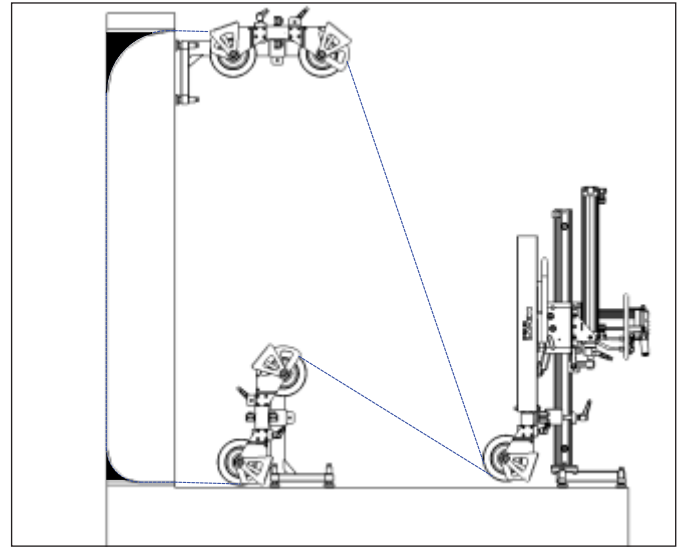


6. Preparations at the workplace

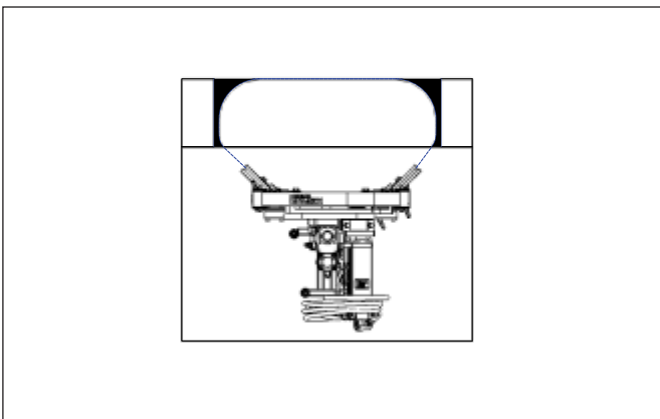
Horizontal or vertical cut, 70–200 cm cutting length



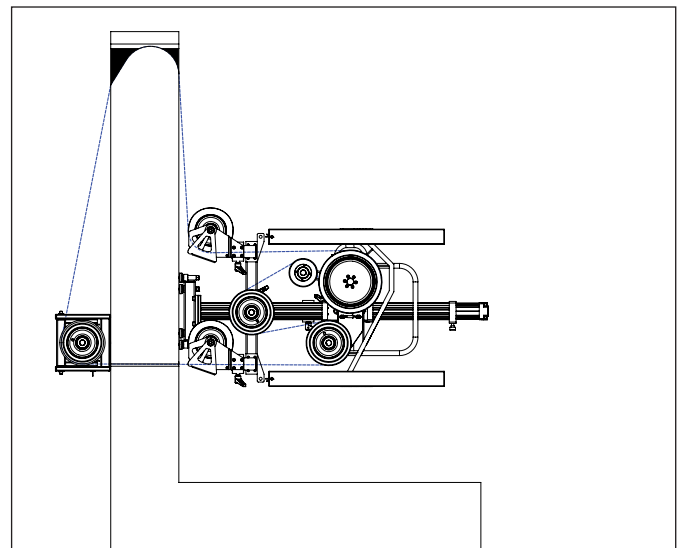
Horizontal or vertical, 50–200 cm cutting length



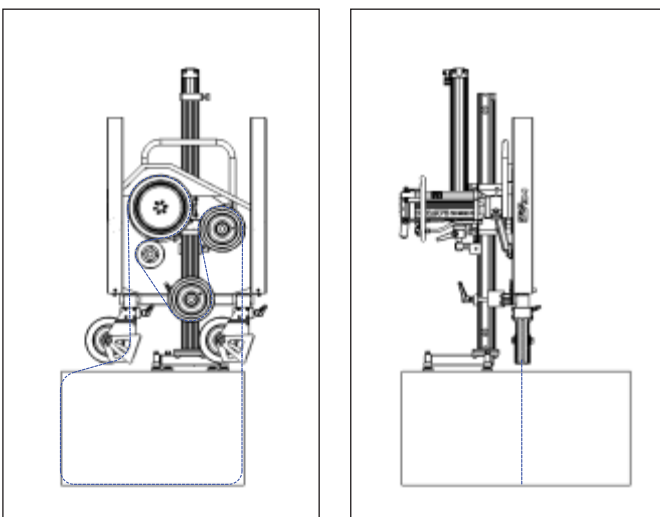
Flush cutting, 50 to approx. 100 cm length



Horizontal or vertical, transverse cutting technique



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



6.4 Determining the necessary wire capacity and wire length

Wire storage capacity required (approximation)
Thickness of object to be cut \times 2

Wire length required (approximation)
Minimum length required for rigging the saw* + length at tension side + $2 \times$ thickness of object to be cut + length of cut + length at slack side

* The minimum wire lengths for rigging the saw can be found in the "Technical data" section.

6. Preparations at the workplace

6.5 Clarifying the situation and securing the workplace

Have you made sure there are no hazardous pipes or cables (gas, water, electricity etc.) in the cutting area? Have the effects of the cutting work on the stability of the structure been clarified and are the supports in place capable of taking up the resulting loads?

Can the possibility of hazards or damage as a result of the cooling water used be ruled out?

Have safety measures been implemented to ensure that no persons can be injured or property and equipment damaged by falling objects or debris that may fly off during the sawing operation?

Can the parts of the structure that are to be sawn out be removed safely in a controlled operation and subsequently disposed of?

Does the electric supply and water supply available for use meet the specified requirements?

Is the required equipment in the correct specification available for use?

Has the work to be carried out been approved in full by the site engineer or architect?

6.6 Electric power supply / fuse rating – DS WS10-E



CAUTION

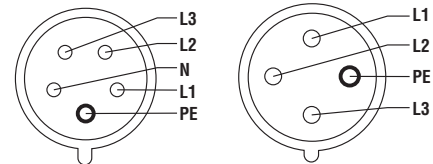
Irrespective of whether using mains power or generator power, always check that an earth/ground conductor and ground fault circuit breaker are present in the power supply and that these are connected. The fuse rating of the electric power supply at the construction site must be as follows:

Voltage version	3 x 400 V	3 x 200 V
Fuse rating	32 A	63 A
Ground fault circuit breaker:	30 mA (type A)	30 mA (type A)

6.7 DS WS10-E pin assignment

Voltage version	3 x 400 V	3 x 200 V
Pin assignment	3P+N*+PE	3P+PE
Plug type	32 A / 6 h	63 A / 9 h

Pin layout:



L1 = phase 1, L2 = phase 2, L3 = phase 3, N = neutral conductor, PE = earth conductor

* The 230 V power outlet on the control unit functions only when the neutral conductor (N) is connected.



CAUTION

If required, the supplied CEE connector may be fitted to your power cable by a qualified electrician.

6.8 Extension cables / conductor cross sections

Use only extension cables which are approved for the intended field of use and with conductors of adequate cross section. In accordance with EN 61029-1, conductors must have at least the following cross sections: 1.5 mm² for 16 A, 4 mm² for 32 A and 10 mm² for 63 A (conductor cross section = cross-sectional area of individual conductors).

Inadequate conductor cross sections and long cables result in a drop in voltage and may cause the cable to overheat.

Extension cables must be fully unrolled before the machine is operated.

6.9 Cooling water supply

At a water temperature of 30°C, a water flow rate of approx. 7l/min is required to cool the drive unit (DS WS10-E).

The machine's automatic cut-out will be activated in the event of inadequate cooling (DS WS10-E).

6. Preparations at the workplace

Use only clean cooling water.

Where pressure in the water supply line is low, a non-return valve should be fitted in order to prevent dirty water finding its way into the water supply.



7. Setting up the saw system

Setting up the saw system		
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7. Setting up the saw system

7.1 Drilling the 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 where only low tolerances are permissible. Hammer drills may be used on thinner walls 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.

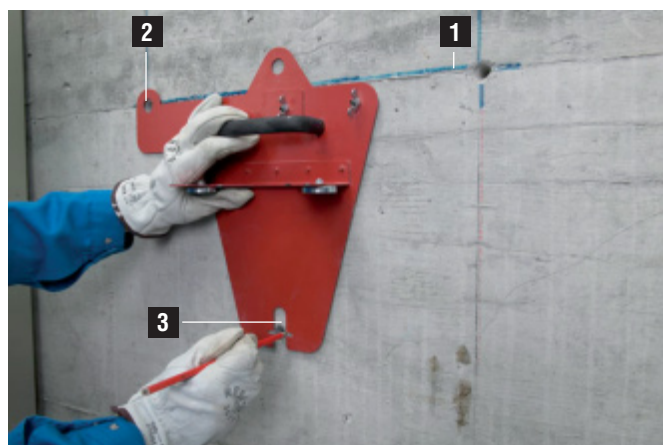
NOTE

In very thick structures, a slightly tapered cut makes it easier to remove the part that has been cut out.

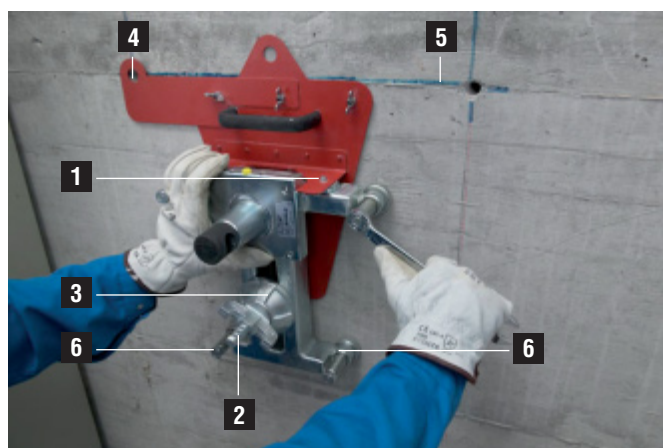
7.2 Securing the base plate

To ensure efficient and safe operation it is essential that the saw and, where applicable, the pulley stands are fastened correctly and securely using fasteners of adequate size.

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

WARNING

Use an anchor suitable for the material on which you are working and observe the anchor manufacturer's instructions.

NOTE

Hilti M12 metal expansion anchors are usually suitable for fastening diamond core drilling equipment to uncracked concrete. Under certain conditions it may be necessary to use an alternative fastening method. Please contact Hilti Technical Service if you have any questions about secure fastening.

Your Hilti representative will be pleased to provide advice in case of questions concerning fastening security on

7. Setting up the saw system

base materials such as brittle or cracked concrete, masonry and synthetic or natural stone.



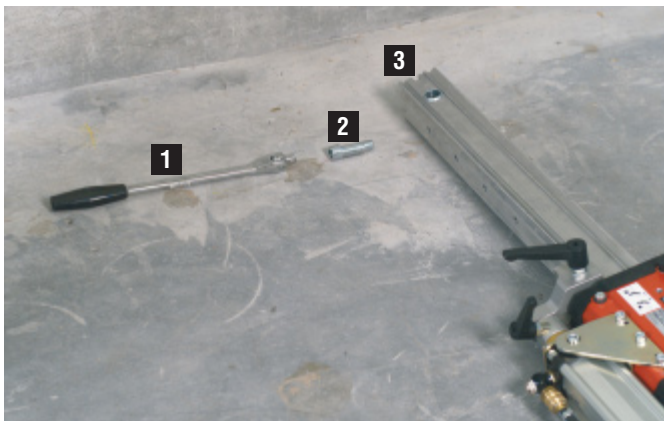
WARNING

The use of vacuum base plates 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.

7.3 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.

7.4 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.



CAUTION

Use only the specified accessory components for extending storage capacity and never extend storage capacity beyond the maximum permissible length of 2 meters.

7. Setting up the saw system

7.5 Fitting the end stop



Fitting the end stop.



CAUTION

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

7.6 Fitting the pulley crossbar



Bring the pulley crossbar into position (note the distance from the wall).



Close the locking bar and tighten the clamping lever.

7.7 Mounting the drive unit



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.

7. Setting up the saw system

7.8 Connecting the air hose to the pneumatic cylinder



Connect the compressed air hose to the pneumatic cylinder.

7.9 Pulling the wire through, rigging and connecting the wire

When feeding the wire through by hand, ensure that the marks on the wire indicating correct running direction correspond to the direction of rotation arrow on the drive unit. Seen from the front of the machine, the drive wheel rotates in a counter clockwise direction.

Should the running direction indicator marks on the wire no longer be visible, the direction of travel can be determined from the shape of the diamond beads as they have a slightly 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.



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 (piston rod clamp).



1 Advance movement locking lever

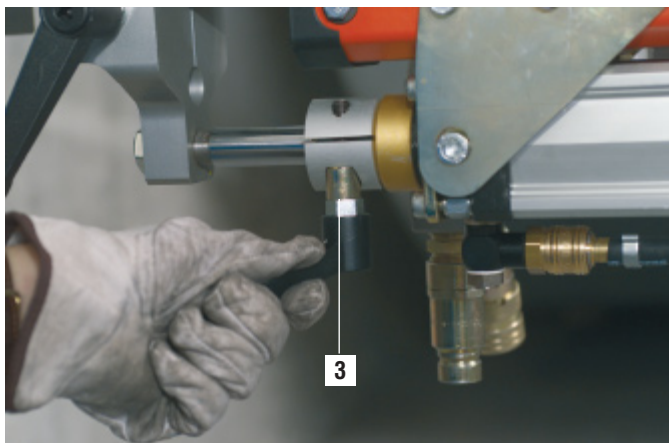
Lock the drive unit in position.

7. Setting up the saw system



2 Piston rod securing lever

Release the return lock **3**, slide the piston rod all the way in and then lock the piston rod **2** and return lock **3** 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 **1** can be released after tightening the return lock.



CAUTION

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

7.10 Fitting the guards



Bring the guard into position.



Secure the guard with the spring pin.



CAUTION

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



CAUTION

The long guard must be fitted when the wire storage extension is in use.

7. Setting up the saw system

7.11 Connecting the air hoses to the control unit

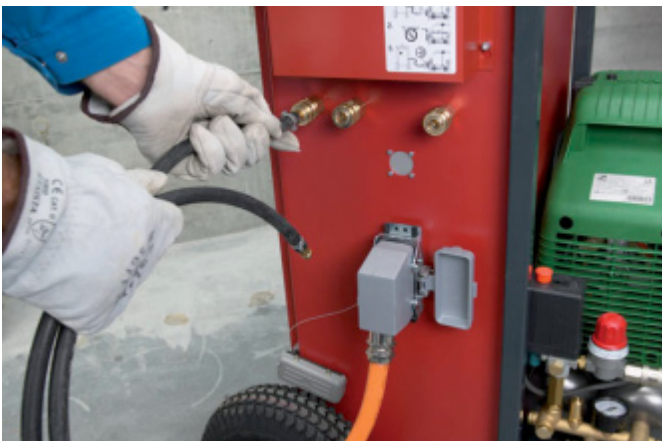


Connect the compressed air hoses to the compressor and to the control unit (DS WS10).

7.12 Connecting the water supply



Fit the T-piece connector to the hydraulic unit (DS WS10).
Connect the cooling nozzle water hoses to the 3-way connector (DS WS10).



Connect the compressed air hoses to the compressor and to the control unit (DS WS10-E).



Fit the T-piece connector to the drive unit (DS WS10-E).
Connect the cooling nozzle water hoses to the T-piece (DS WS10-E).



Mount the cooling water nozzles at the wire entry points.

7. Setting up the saw system

7.13 Connecting the hydraulic hoses (DS WS10)



Connect the hydraulic hoses to the drive unit (DS WS10).



Connect the hydraulic hoses to the valve block / hydraulic unit (D-LP15 / D-RC22 or D-LP32).



CAUTION

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

7.14 Connecting the power cable to the control unit (DS WS10-E)



Connect the power cable and secure the plug (DS WS10-E).

8. Operation and the sawing procedure

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8. Operation and the sawing procedure

8.1 Checks before beginning sawing

- Is the danger area cordoned off properly and have the appropriate safety measures been implemented?
- Are the guards and end stop fitted correctly?
- Have the necessary supports and covers been put in place properly?
- Have steps been taken to ensure controlled drainage of cooling water?
- Has each item of equipment been fitted or set up securely enough?
- Has the sawing wire been rigged correctly with the beads facing in the right direction and can the wire be pulled through the kerf easily by hand?
- Are the guide pulleys in exact alignment with the sawing wire?
- Is the advance cylinder stroke length adequate?
- Have the electric cables, water hoses, air hoses and, where applicable, the hydraulic hoses (DS WS10) been laid in a safe position, connected correctly and the connections secured?
- Have the water nozzles been positioned correctly (the water should be drawn into the kerf by the sawing wire)?
- Do the electric power and water supplies meet the specified requirements?

8.2 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 (DS WS10).



Set the advance pressure (DS WS10-E).



Operate the advance control valve (DS WS10).



Operate the advance control valve (DS WS10-E).

8. Operation and the sawing procedure

8.3 The starting procedure

- The main switch is in the ON position and the “power” indicator lights green.
- The advance lever is in the “sawing” (advance) position and the sawing wire is under slight tension. All other switches are set to OFF or “0”.
- The piston rod is locked in position by way of the return lock and the locking lever on the carriage has been released.
- The water valves are open and cooling water is being fed directly to the cutting face.
- Set the advance pressure to approx. 1 to 2 bar at the control unit by means of the control knob (pull out to release).
- Adjust sawing speed to approx. 12–15 m/s (DS WS10-E or DS WS10 with D-LP 32).



Switch on the main DS WS10 drive unit and allow the wire to start running.



Switch on the main DS WS10-E drive unit and allow the wire to start running.

Use the speed regulator (DS WS10-E) or adjust the oil flow (D-LP 32) to gradually increase the speed of the wire while simultaneously increasing the advance pressure.



CAUTION

Switch the main drive off immediately if the wire does not begin to run right away. The drive pulley will suffer damage if the sawing wire slips while the pulley rotates.

- Set the advance control valve to the middle (neutral) position and check whether the sawing wire can be pulled through the kerf easily by hand. If not, proceed as follows:
- 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.
- Check and adjust the wire guidance system to ensure optimum alignment.

Repeat the starting procedure.

Increase speed until the optimum cutting speed is reached.

Set the pneumatic advance pressure (bar) so that the electric current indicated is just below the red area on the gauge (DS WS10-E) or set the hydraulic operating pressure to a value between 80 and 120 bar (DS WS10).

NOTE

If the cutting arc of the wire is too flat, full use cannot be made of the electric power available due to inadequate effective advance pressure.

8. Operation and the sawing procedure

8.4 Checks while sawing is in progress



CAUTION

Stay close to the control panel while sawing is in progress so that you are ready to press the emergency stop button at any time.

■ 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 and the drive unit has been switched off (power switched off).

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

■ Check 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 (DS WS10) remains within the 80 to 120 bar range or, respectively, the electric current drawn (DS WS10-E) remains just below the red area on the gauge. If the pressure (DS WS10) or current (DS WS10-E) drops below the optimum value, it can be raised by increasing the pneumatic advance pressure or, respectively, by reducing the radius of the cutting arc.

8.5 Readjusting saw advance at the end of the stroke

When the end of the stroke is reached, switch off the drive unit and switch off the electric power. Engage the advance movement locking lever **1** on the carriage.



1 Engage the advance movement locking lever.

Set the pneumatic advance control **2** to the neutral (middle) position.



2 Advance direction control valve (DS WS10)



2 Advance direction control valve (DS WS10-E)

8. Operation and the sawing procedure



CAUTION

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

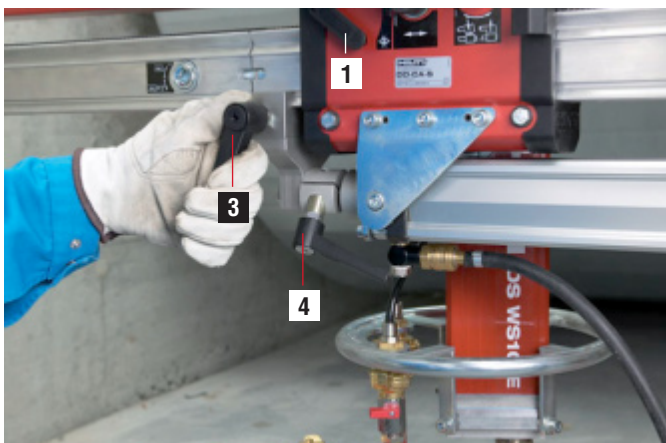
The return lock **4** and piston rod securing clamp **3** can then be released and the piston rod **5** pushed in by hand.



3 Piston rod securing clamp

4 Return lock

5 Piston rod



Subsequently clamp the piston rod, set and tighten the return lock **4** and then disengage the advance movement locking lever **1**.

8.6 Steps before and after ending 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.

■ Reduce wire speed before cutting right through and switch off the drive as soon as the object is cut through.

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

■ Remove the sawing wire and disassemble the pulley stands, drive unit and wire storage unit as far as necessary by following the assembly instructions in the reverse order.



9. Cleaning, maintenance and repair

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9. Cleaning, maintenance and repair

CAUTION

Unplug the supply cord from the electric socket and disconnect the compressed air supply hose.

CAUTION

Keep the machine, especially its grip surfaces, clean and free from oil and grease. Do not use cleaning agents which contain silicone.



CAUTION

At temperatures below zero the equipment should be warmed up slowly prior to being put into operation and the cooling circuit must be completely emptied by blowing out with compressed air before long breaks or periods of disuse.

9.1 Cleaning

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 electrically powered units such as the compressor and the hydraulic unit (DS WS10) or control unit (DS WS10-E), with a medium-hard brush and plenty of water right away at the end of each working day. Cleaning the system should be planned as part of the daily working schedule.

9.2 Maintenance

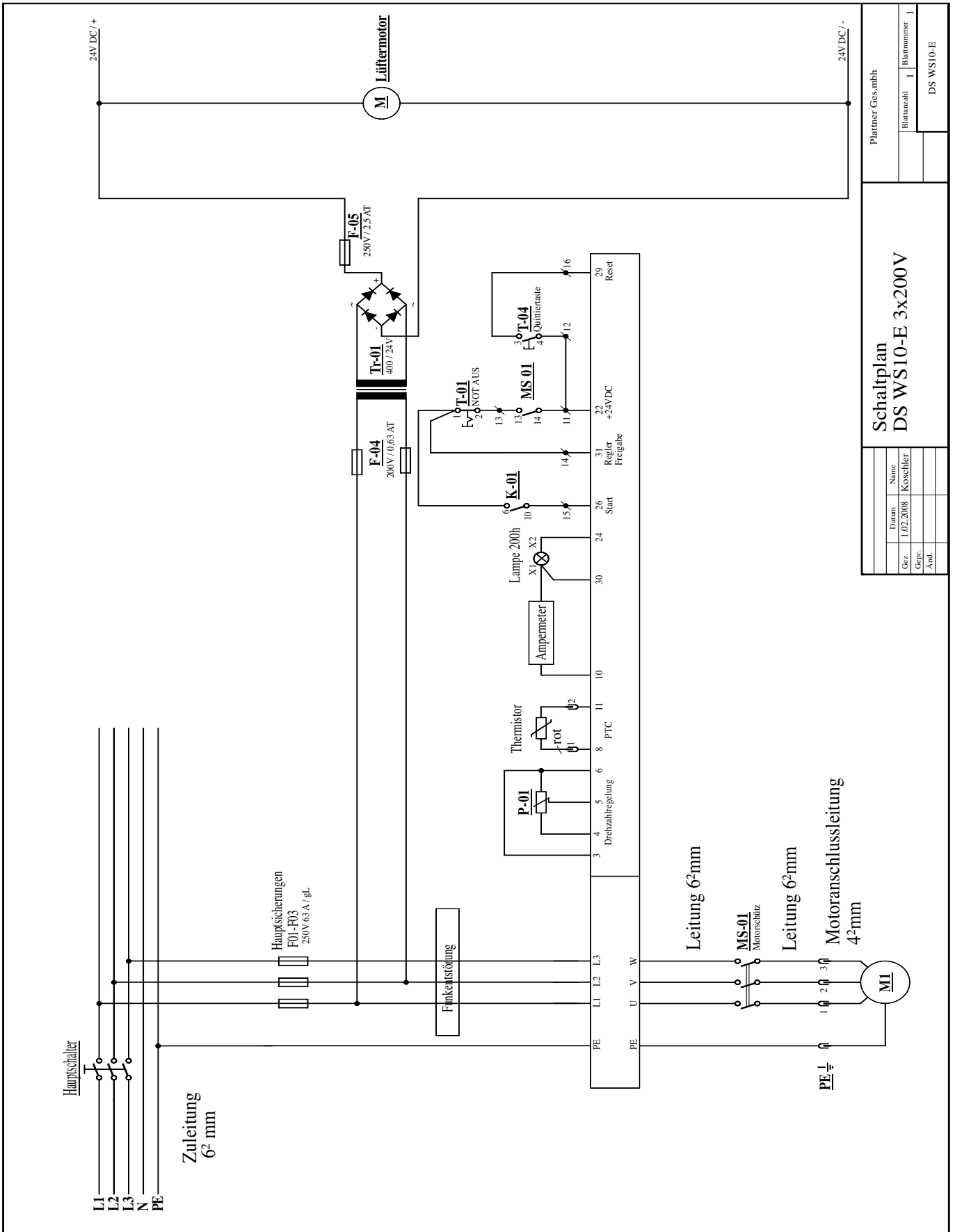
After cleaning, check that all moving parts operate smoothly, that they function correctly and are not damaged. Check that the drive unit, under no load, moves smoothly over the complete piston stroke when an air pressure of max. 1 bar is applied. Damaged or malfunctioning parts must be replaced before further use of the system in order to avoid accidents or costly consequential damage.

Spraying the parts of the system, when clean, with a concrete parting agent reduces the tendency for dirt and concrete residues to adhere and makes subsequent cleaning easier.

Drain the service unit at the control panel and the compressor pressure container at least once a month.

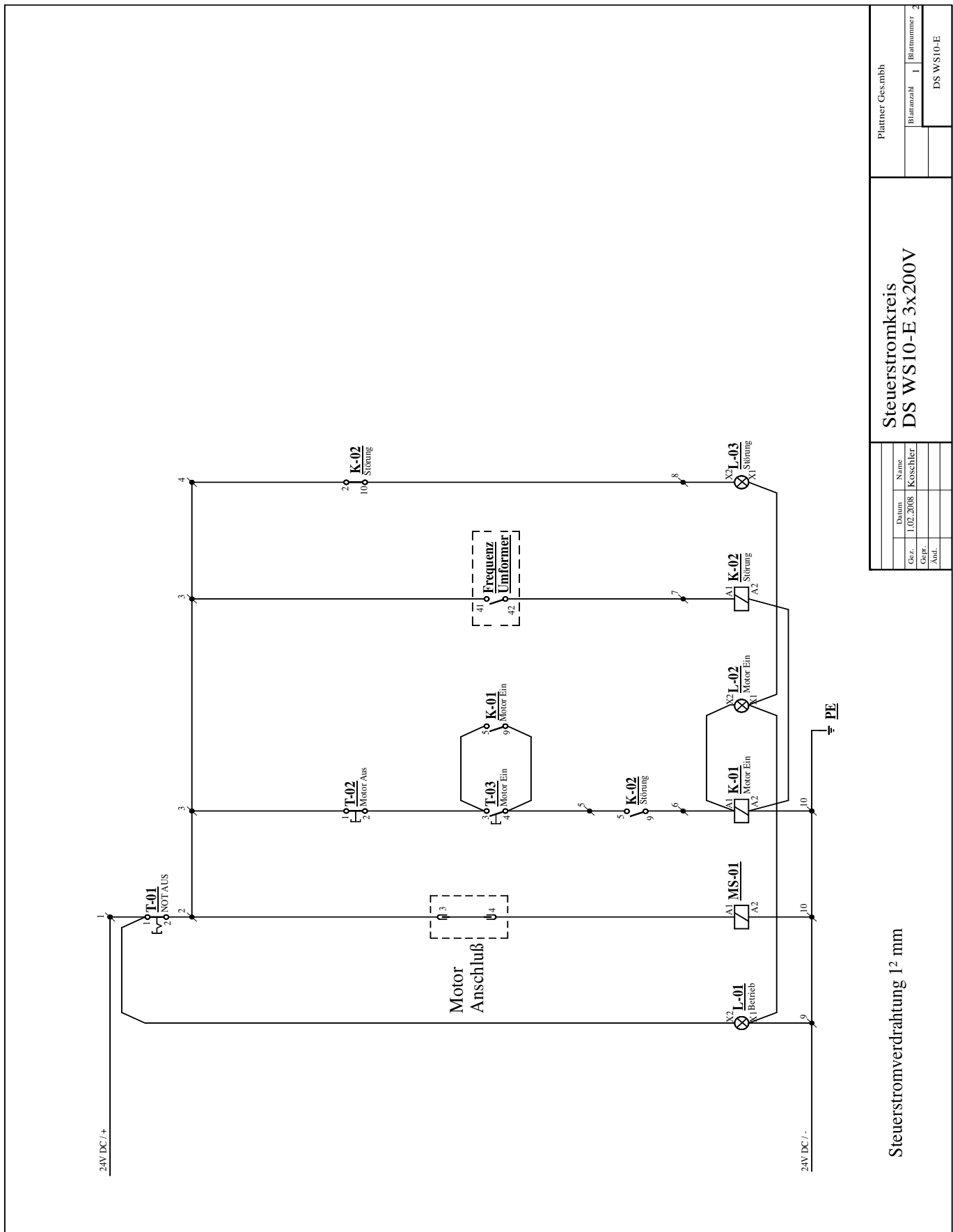
The air filters located at top right and at the base of the control unit must be checked periodically for soiling and replaced if necessary.

9.3 Electrical circuit diagram for DS WS10-E 3x200 V control unit

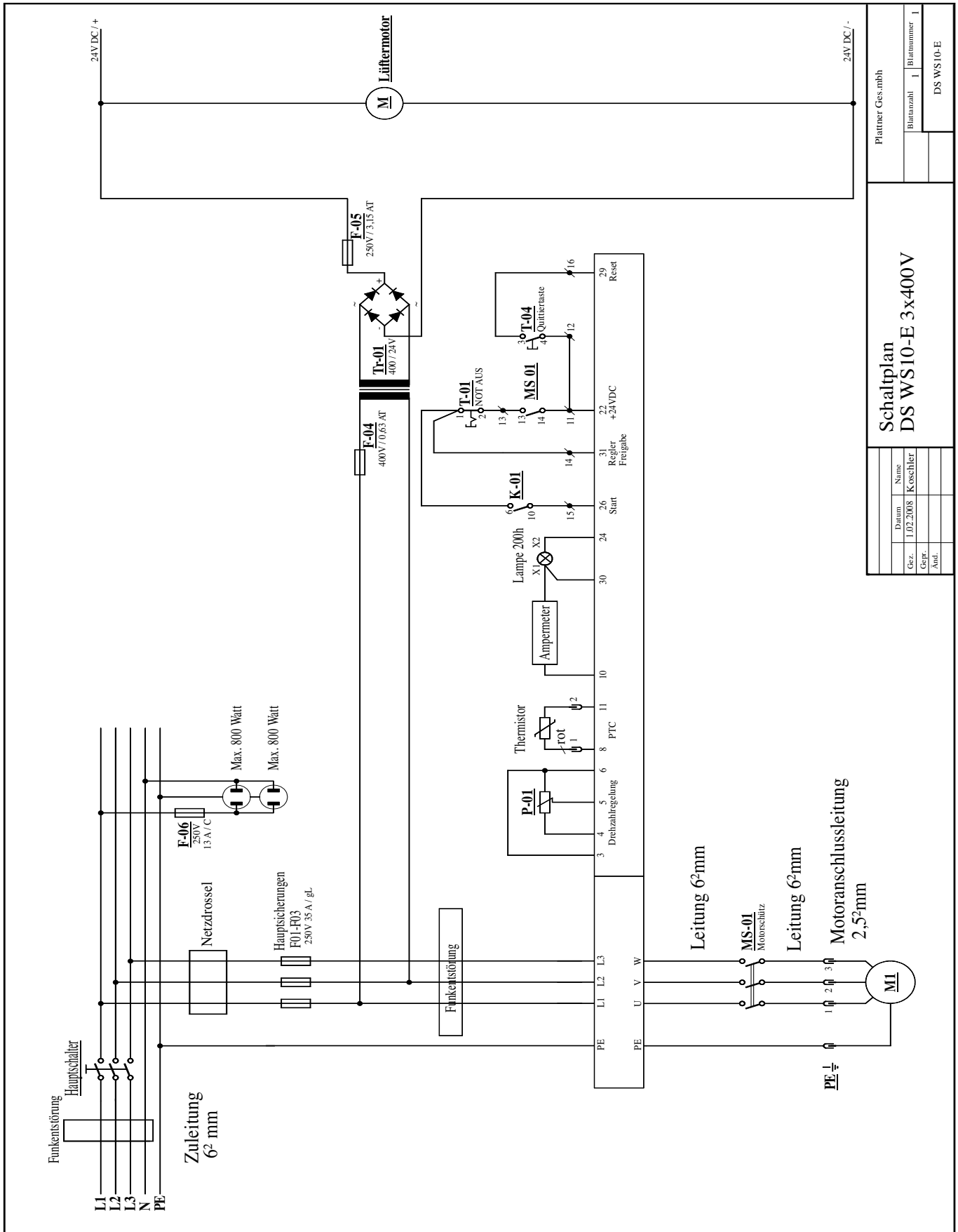


9. Cleaning, maintenance and repair

9.4 Electrical circuit diagram for DS WS10-E 3x200 V control unit (control circuit)



9.5 Electrical circuit diagram for DS WS10-E 3x400 V control unit

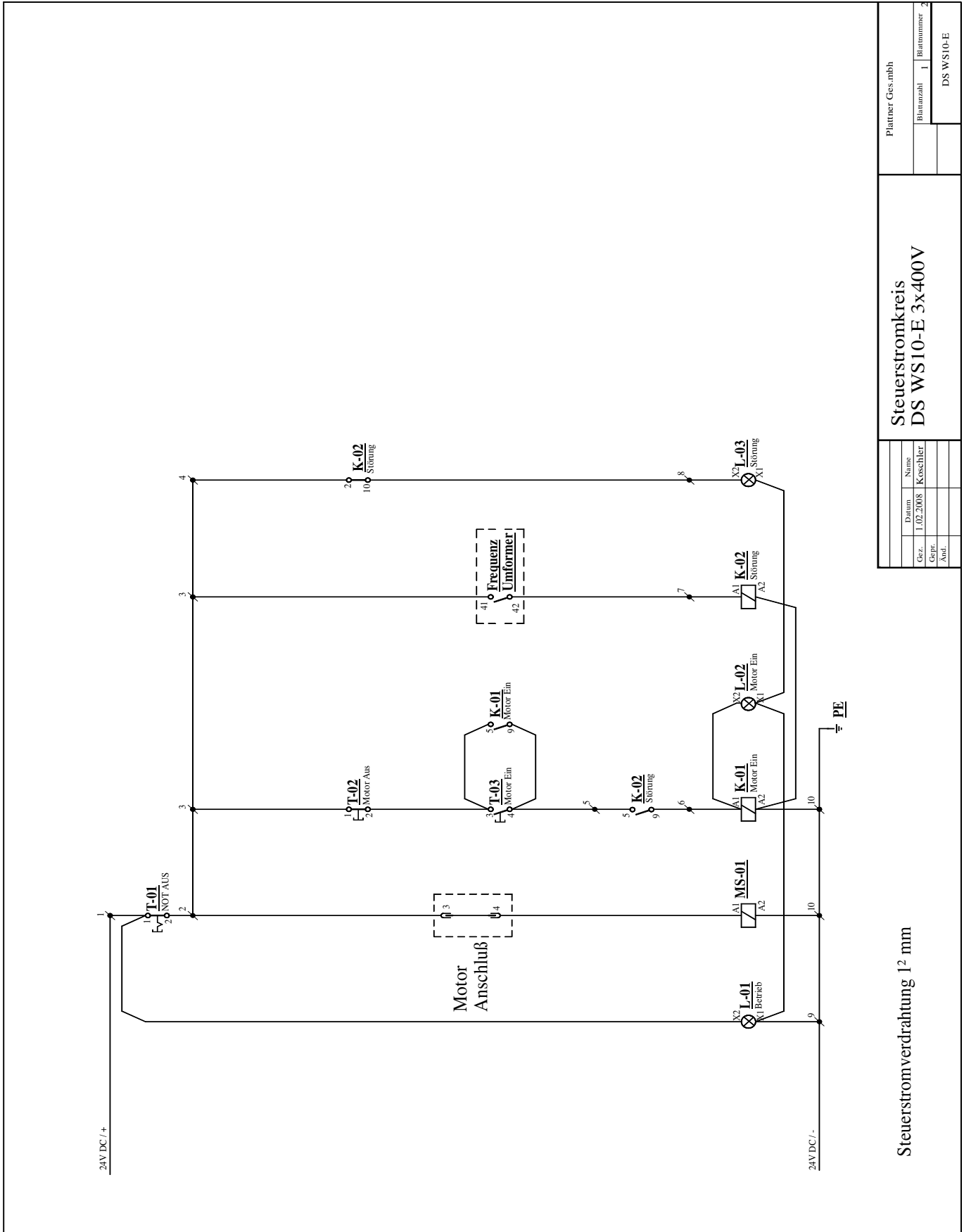


Plattner Ges.mbh	
Blattanzahl	Blattnummer
1	1
DS WS10-E	

Schaltplan DS WS10-E 3x400V	
Datum	Name
1.02.2008	Kochschieber
Gez.	
Gepr.	
And.	

9. Cleaning, maintenance and repair

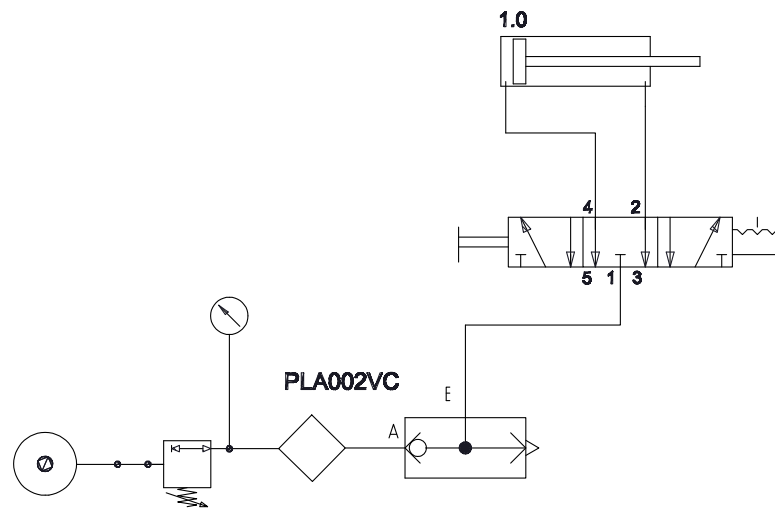
9.6 Electrical circuit diagram for DS WS10-E 3x400 V control unit (control circuit)



Plattner Ges.mbh	
Blattanzahl	Blattnummer
1	2

Datum	Name
1.02.2008	Koschler
Gedr.	Autr.

9.7 Pneumatic circuit diagram for DS WS10 / DS WS10-E





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10. Troubleshooting

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

The wire passes over too many / too sharp corners (< 90°) on the concrete

- Round off the corners by chiseling and pull the wire through well by hand.
- Fit guide pulleys to make the angle at corners less acute.
- Reduce the number of corners by changing the wire guidance system.

The wire tension is too high

- Reduce tension by reducing pressure in the system.

The length of wire in contact / cutting length is too long

- Divide the cut up into several shorter lengths.
- Reduce the contact length by fitting additional guide pulleys.

The wire is fitted the wrong way round (beads not facing in the specified direction)

- Check the running direction and change it if necessary (narrow end of beads ahead).

A new wire sticks in an existing, narrower kerf

- Use a thinner wire.

The sawing wire is damaged

- Check the wire for kinks.
- Check if the connectors are fitted the right way round and that they're thinner than the wire.
- Check if the wire has always been used in the same running direction.

10.2 The drive pulley slips / the wire is not driven

The diamond wire is too loose, i.e. wire tension is too low

- Check that the saw advance control valve is in the "Tension" position.
- Increase tension by increasing the pressure.
- Check whether the cylinder or carriage have reached the end of their travel.
- Check that the carriage moves smoothly and easily on the rail.

The drive pulley is badly worn

- Replace the drive pulley.

10.3 The wire jumps off the drive pulley or guide pulley when starting

The return lock was not set and tightened

- Slide the return lock all the way toward the cylinder and secure it in position.

Guide pulleys not aligned correctly

- Adjust the guide pulleys to bring them exactly into alignment with each other.

10.4 Little or no sawing progress

The working hydraulic pressure (DS WS10) or electric current input (DS WS10-E) is too low

- Increase the pneumatic advance pressure.
- Cut in a tighter arc.

The cut or length of wire in contact is too long

- Reduce the length of wire in contact by using a release pulley.
- Reduce the length of the cut / divide the cut into several shorter lengths.

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 wire.
- Fit a new wire.

The advance cylinder has reached the end of its stroke or the carriage is at the end stop

- Reposition the end stop.
- Readjust the cylinder and fit the wire storage extension if necessary.

10.5 The diamond wire wears too quickly

Cutting speed is too low, i.e. wire drive speed (r.p.m.) is too low

- Increase cutting speed by increasing wire drive speed.

Too little cooling / flushing water (dust is created)

- Direct the flow of water exactly toward the wire and in to the kerf.
- Increase the water flow.

Tension on the wire is too high relative to length of wire in contact at the cutting face

- Increase the length of cut and / or reduce wire tension.

Cutting through very abrasive material

- Use a diamond wire of a different specification.

10.6 The sawing wire wears unevenly / one-sided

The wire was not twisted before joining the ends together

- Twist the wire approx. 0.5 turn per meter length in a counterclockwise direction (as seen from the wire end) before joining the ends.

10.7 The diamond wire collapses / beads are pushed together

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.

10.8 The diamond wire is pulled out of the crimped connector

Use of the wrong crimping pliers (inadequate crimping force)

- Use the crimping pliers recommended by the manufacturer of the connector.

The jaws of the crimping pliers are worn

- Replace the jaws.

The sawing wire was not pushed far enough into the connector

- Push the wire into the connector as far as it will go.
- Cut the wire exactly at right angles and remove an adequate length of the plastic coating.

The connector was crimped too close to one of its ends

- Crimp the connector exactly at the position specified by the connector manufacturer.

10.9 The wire breaks immediately before or after the connector

Wire breakage due to fatigue

- Reduce bending stress on the wire by using flexible connectors.
- As far as possible, use only one connector for each wire loop (one continuous length of wire).
- Fit a new wire if breakage occurs several times in quick succession.

10.10 The wire begins to vibrate strongly during sawing

Wire tension is too high or too low

- Optimize the wire tension by adjusting the pressure.

The guide pulleys are not exactly in alignment with each other

- Adjust the pulleys to bring them into alignment.

The guide pulleys are too far apart (unguided wire length too long)

- Reduce the unguided length by mounting additional pulley stands.
- Set up the saw closer to the point at which the cut is being made.

A guide pulley is worn and out of round or a small stone is stuck in the groove

- Check the pulleys for true running and renew them if necessary.
- Check the pulley grooves and clean them out if necessary.

10. Troubleshooting

10.11 The air compressor doesn't start

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.

10.12 The air compressor can't build up pressure

The compressor's air tank was empty when connected to the control panel.

- Disconnect the air hose from the compressor, allow the compressor to run until it is switched off by the pressure sensor and then reconnect the air hose.

10.13 Drive pulley speed begins to fluctuate rapidly (audible) (DS WS10)

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.

10.14 The machine doesn't start, the green "ready" indicator lamp doesn't light (DS WS10-E)

The cable is not under power

- Check the fuse or circuit breaker in the distribution box for the electric supply to the workplace.

The main switch is in the "off" position

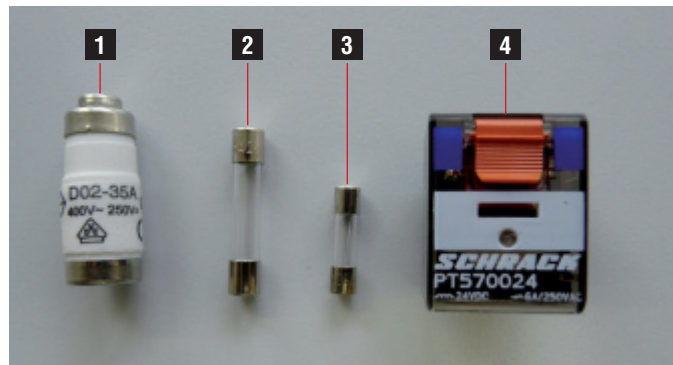
- Switch on at the main switch.

The voltage at one of the phases is too low or a phase is missing completely

- Check the 3 phases individually. **1**
- Check the extension cable and plugs / power outlets for faults or loose contacts.

A fuse in the control box is defective

- Replace the defective fuse (spare fuses are located in the control unit).
- Mains supply fuse **1**
- Transformer fuse **2** + **3**
- Relay **4** (2x)



10.15 The machine doesn't start, the green "ready" and red "fault" indicator lamps light (DS WS10-E)

The power cable from the drive unit is not plugged into the control panel

- Connect the cable

The thermal motor cut-out has been activated due to the machine overheating

- Increase the flow of cooling water or use colder water.

The power converter overload cut-out has been activated

- Do not overload the machine.
- Shade the control unit from the heat of the sun.
- Check that the control unit cooling system is functioning and renew the filters if necessary.

NOTE: To reset the power converter, wait approx. 30 seconds and then press the reset button.

10.16 The machine doesn't start although the green "ready" indicator lamp lights (DS WS10-E)

The emergency stop button is pressed in

- Pull out the emergency stop button.

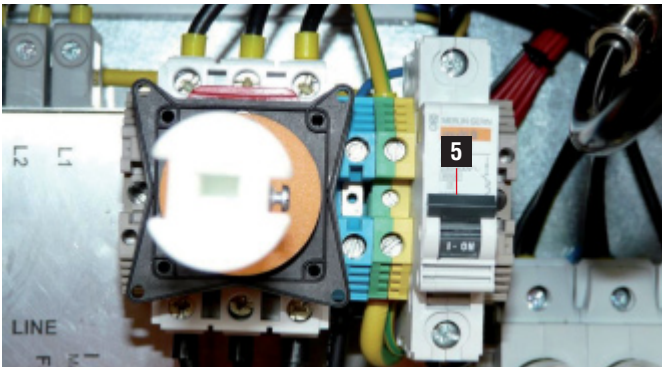
10.17 The 230V power outlet doesn't work (DS WS10-E)

No neutral conductor in the electric supply (3 P+PE)

- Check the electric supply.

The circuit breaker has been tripped

- Eliminate the cause of the malfunction and reset the circuit breaker **5**.

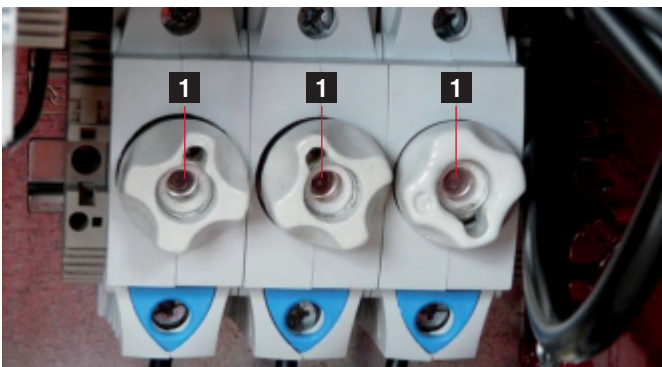


10.18 Current input is too high when idling and sawing (DS WS10-E)



The system is overloaded

- Reduce sawing advance pressure.
- Check that the sawing wire moves easily and eliminate any causes of resistance to movement.
- Reduce the length of cut, i.e. the length of wire in contact



A phase is missing

- Check the electric supply.
- Check the fuses **1** in the control unit and replace them if necessary.

10.19 The service indicator lights and the drive unit may be inoperative



- The saw has been in operation for at least 200 hours. The drive unit and control panel must be returned for servicing as soon as possible in order to prevent damage.
- The saw has been in operation for 250 hours and the safety cut-out has been activated in order to prevent serious damage.

10.20 The ground fault circuit interrupter has been tripped

Insulation fault

- Have the equipment and the electric supply checked by a qualified electrician.

The total leakage current exceeds the ground fault circuit interrupter's tripping value

- Disconnect other appliances from the mains supply used (especially those with an HF electric drive).

11. Disposal



Return waste material for recycling

Most of the materials from which Hilti machines or appliances are manufactured can be recycled. The materials must be correctly separated before they can be recycled. In many countries, Hilti has already made arrangements for taking back old machines and appliances for recycling. Ask Hilti customer service or your Hilti representative for further information.



For EC countries only

Disposal of electric appliances together with household waste is not permissible.

In observance of European Directive on waste electrical and electronic equipment and its implementation in accordance with national law, electric appliances that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.

The disposal of drilling or sawing slurry directly into rivers, lakes or the sewerage system without suitable pretreatment presents environmental problems. Ask the local public authorities for information about current regulations.

- Collect the drilling or sawing slurry (e.g. using a wet-type industrial vacuum cleaner).
- Allow the slurry to settle and dispose of the solid material at a construction waste disposal site (the addition of a flocculent may accelerate the separation process).
- The remaining water (alkaline, pH value > 7) must be neutralized by the addition of an acidic neutralizing agent or diluted with a large volume of water before it is allowed to flow into the sewerage system.

12. Manufacturer's warranty

Please contact your local Hilti representative if you have questions about the warranty conditions.

13. EC declaration of conformity (original)

Description	Compact wire saw
Designation	DS WS10 / DS WS10-E
Year of design	2003 / 2006
Serial number	1001 up to 9999

We declare, on our sole responsibility, that this product complies with the following directives and standards: until 19th April 2016: 2004/108/EC, from 20th April 2016: 2014/30/EU, 2006/42/EC, 2011/65/EU, EN 60204-1, EN 12100.

This equipment (DS WS10-E) complies with the applicable standard provided that the short-circuit power S_{SC} at the interface point between the user's supply and the public supply network is greater than or equal to 1.3 MVA. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the supply network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{SC} of greater than or equal to 1.3 MVA.

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