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ELECTRIC-HAMMER

EH 23/... 

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Operator's Manual

Foreword

For your own safety and protection from bodily injuries, carefully read, understand and follow the safety instructions in this manual.

Please operate and maintain your Wacker machine in accordance with the instructions in this manual. Your Wacker machine will reward your attention by giving trouble-free operation and a high degree of availability.

Defective machine parts are to be replaced as soon as possible.

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We expressly reserve the right to technical modifications- even without express due notice - which aim at improving our machines or their safety standards.

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SAFETY INSTRUCTIONS FOR THE USE OF DRILLING AND BREAKING HAMMERS WITH ELECTRIC DRIVE

General instructions

1. Drilling and breaking hammers may only be operated by persons who
 - * are at least 18 years of age,
 - * are physically and mentally fit for this job
 - * have been instructed in operating drilling and breaking hammers and proven their ability for the job to the employer
 - * may be expected to carry out the job they are charged with carefully.

The persons must be assigned the job of operating drilling and breaking hammers by the employer.

2. Drilling and breaking hammers are to be applied for their proper use. Both the manufacturer's operating instructions and these safety instructions have to be observed.
3. The persons charged with the operation of these hammers have to be made familiar with the necessary safety measures relating to the machine. In case of extraordinary uses, the employer shall give the necessary additional instructions.
4. It is possible that these drilling and breaking hammers exceed the admissible sound level of 89 dB (A). According to the rules for the prevention of accidents regarding emission of noise, the employees have to wear ear protection if the sound level reaches 89 dB (A) or more.

Operation

1. The function of operation levers or elements is not to be influenced or rendered ineffective.
2. Make sure that the machine is connected only to voltage and frequency as indicated on its name plate. Choose correct cross section for extension cord. See calculation example and diagram included in this manual.
3. The operator has to switch off drilling and breaking hammers, to disconnect them from the electric mains and to store them in such a manner that they do not turn over before leaving the machines or going on breaks.
4. Wear safety goggles in order to avoid injuries to the eyes.
5. We recommend wearing suitable working gloves.
6. Wear safety shoes while working with drilling and breaking hammers.
7. Drilling and breaking hammers are always to be operated with both hands on the handles provided for this purpose.
8. When working with drilling and breaking hammers, especially when carrying out drilling jobs, the operator has to have a firm stand, particularly when working on scaffolding and ladders.
9. Drilling and breaking hammers are to be guided such that hand injuries caused by solid objects are avoided. When carrying out demolition jobs at elevated places, special care is required to prevent the machine or the operator from falling.
10. Avoid body contact with earthed components. When breaking connecting passages, make sure that there are no electric wires or gas pipes. No one may stay in the room to which the passage is broken through, as there is danger of injuries because of falling stones or tools.
11. During operation the tool holder must be closed. Tools and tool holder must be checked for wear in order to guarantee proper functioning of holder.
12. The operation of this machine may cause broken - off pieces to be flung away. Therefore, during operation, no one except the operator is to come near this machine.
13. Drilling and breaking hammers have to be disconnected from the electric mains before changing tools.
14. The tools always have to be in perfect conditions.
15. Do not operate these machine in areas where explosions may occur.

16. Do not misuse the electric cable to pull or lift up the unit or to pull the plug out of the socket. Protect cable from heat, oil and sharp edges.
17. Electric equipment and material may only be used if they comply with the operational and local safety requirements. They must be in proper condition and this condition is to be maintained.
18. Do not expose electric tools to rain. Do not use electric tools in damp or wet surroundings.

Safety checks

1. Drilling and breaking hammers may only be operated with all safety devices installed.
2. Before starting operation, the operator has to check that all control and safety devices function properly.
3. Before starting operation, the overload clutch of drilling hammers has to be checked for proper functioning.
4. Regularly check cable for damage.
5. In case of defects of the safety devices or other defects reducing the operational safety of the drilling and breaking hammers, the supervisor has to be informed immediately.
6. In case of defects jeopardizing the operational safety of the hammers, the machine has to be switched immediately.

Maintenance

1. Only use original spare parts. Modifications to this machine, including the adjustment of the maximum engine speed set by the manufacturer, are subject to the express approval of Wacker. In case of non-observance all liabilities shall be refused.
2. Disconnect the drilling and breaking hammer from the electric mains before carrying out maintenance and repair jobs.
3. Work on the electric parts of the machines may only be carried out by skilled technicians.
4. The green and yellow ground wire of the connecting cable of machines without protective insulation has to be longer than the other wires so that it is not ripped out first in case the strain relief fails. A break in this wire would entail grave danger. Check ground wire for passage after repairs.
5. As soon as maintenance and repair jobs have been completed, all safety devices have to be reinstalled properly.

Transport

When being transported on vehicles, precautions have to be taken that these hammers do not slip or turn over.

Maintenance checks

According to the conditions and frequency of use, drilling and breaking hammers have to be checked for safe operation at least once every 6 months by skilled technicians, such as those found at Wacker-service depots and have to be repaired if necessary.

Please also observe the corresponding rules and regulations valid in your country.

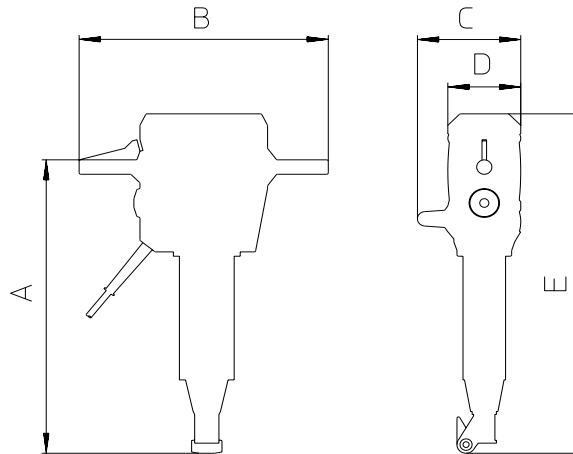
	EH 23/110/22	EH 23/230	EH 23/230 EE 25x108	EH 23/230 CH	EH 23/230 w. elect.	EH23/230 EE 28x160
Machine No.	0007774 ...	0007770 ...	0007772 ...	0007773 ...	0007771 ...	0007776 ...
Operating weight (mass) without tool kg:	22,4					22,8
Voltage V:	110 ~	230~				
Power input kW:	2,2					
Current consumption A:	22	10,8				
Frequency Hz:	50/60					
Percussion rate min ⁻¹ :	1320					
Special lubricating grease	grease Unirex N2					
Shaft for breaking tools	∅ 27x80	SW 25x108	∅ 27x80	SW 28x160		
Drive motor	Totally insulated universal motor					
Single stroke impact (at tool tip) J(mkp):	40 (4)					
Sound pressure level at operators station L _{PA} :	97 dB(A)					
The weighted effective acceleration value, determined according to ISO 8662, Part 1 m/s ² :	is 7,8					

Field of application

For breaking concrete and asphalt as well as rubble-laden ground, for demolishing concrete, masonry and similar building materials (undisturbed and frozen ground) etc., for ripping up roads and concrete, asphalt, tar as well as wood-block and stone paving, for cutting off clay, loam, turf and salts, for breaking compacted or tamped ground, for ramming in posts and earth rods.

CAUTION! Always use the proper pin driving tool with the machine when ramming posts or ground rods. Damage will occur to the percussion system if posts and/or rods are directly inserted into the toolholder. This will eliminate any responsibility for warranty claims and prevent unnecessary customer complaints.

Dimensions



		A	B	C	D	E
EH 23/110/22	EE 27x80	655	529	210	148	756
EH 23/230	"	655	529	210	148	756
EH 23/230	EE 25x108	655	529	210	148	756
EH 23/230 CH	EE 27x80	665	529	210	148	756
EH 23/230 w. electronic	"	665	529	210	148	756
EH 23/230	EE 28x160	710	529	210	148	810

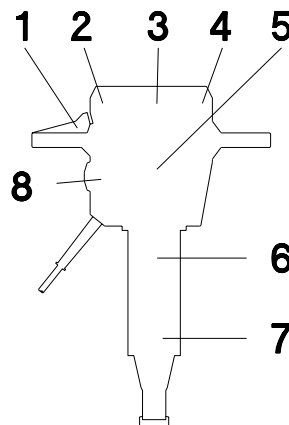
Functional description

On activation of the switch lever (1), and electric motor (2) drives the crank mechanism (3) through a transmission (4).

The rotary motion of the crankshaft journal is converted by means of a con-rod (5) and a guide piston (6) into a linear motion and transmitted through an air cushion ("pneumatic spring") to the percussion piston (7).

The percussion piston (7) then strikes the tool directly (without any intermediate piston).

A built-in electronic control (8) ensures a low starting current and constant speed off the drive motor when idling and under load.



Transport to work site

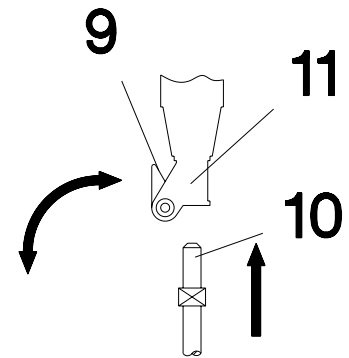
Conditions:

- Only use suitable lifting equipment with a minimum lifting capacity of 30 kg for the transport of the electric hammer.
- Always switch off engine during transport!
- Tie down the electric hammer securely during transport on the loading surface of a vehicle.

Note: Also refer to the specifications in safety instructions.

Attaching the tool

1. Swivel catch (9) on tool holder (11) outwards.
2. Clean shaft (10) and grease slightly.
3. Insert tool right in.
4. Press catch (9) on tool holder (11) right back.



Only use sharp tools!

Only use tools with perfect shaft (10) to avoid recoil!

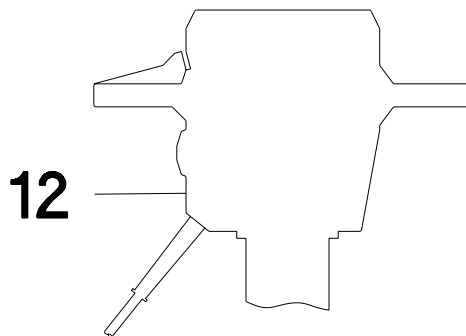
Connection

Check before connecting:

1. The mains voltage must be the same as that indicated on the nameplate (12).
2. The electric breaker is operated with 110/115/230/240 V AC (light current).
3. Check whether the necessary fuse is available in the mains supply.

EH 23/110/22	EE 27x80	-A 22
EH 23/230	"	-A 10,8
EH 23/230	EE 25x108	-A 10,8
EH 23/230 CH	EE 27x80	-A 10,8
EH 23/230 w. electronic	"	-A 10,8
EH 23/230	EE 28x160	-A 10,8

4. The electric breaker is fully insulated and there is therefore no green/yellow PE conductor in the power supply cable .

**Notes on correct handling**

Place the electric breaker with tool on the material in question and switch on by pressing the switch lever.

After a few seconds the electric breaker reaches its full percussion rate.

Exploit the weight of the electric breaker when working.

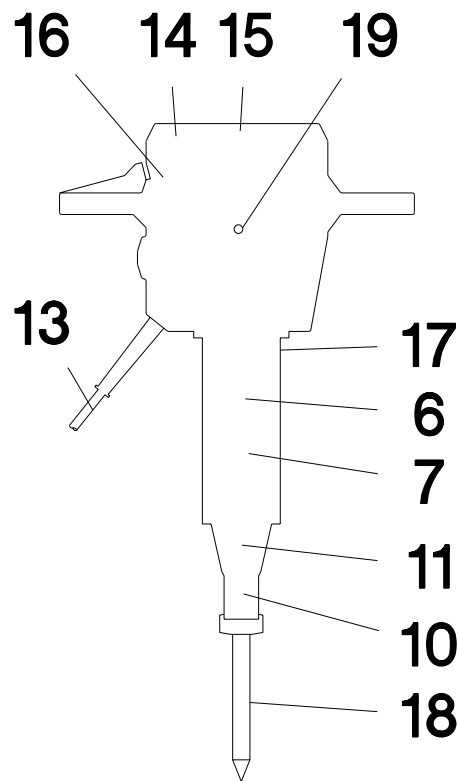
Applying great force against the surface being worked does not improve the performance of the tool.

In order to avoid no-load strokes and to ensure easy handling, it is necessary to apply a certain amount of pressure on the handles.

Position the chisel in such a way that the material to be worked can be split. This prevents the tool from jamming and the demolition performance is increased.

Maintenance schedule

Check all external screw connections for tight fit approx. 8 hours after first operation.		
Component	Maintenance work	Maintenance interval
Feed cable Protective hood Tools	Check for perfect condition, change if defective. Ventilations slits free of dirt, clean if necessary. Check the shaft and cutting edges and, if necessary, sharpen, reforge or replace.	daily
Motor head	Regrease via grease nipple (see technical data)	20 hours
Carbon brushes Motor head Percussion system Tool holder	Check for wear - if remaining length less than 12 mm in spite of cut - out facility - replace. Check all screws tight fit - if necessary, retighten. Dismantle, clean, regrease. Check for wear.	80 hours
Electric breaker	Maintenance - WACKER service station.	300 hours



Carbon brushes

- Check carbon brushes:

1. Replace carbon brushes (16) if the surface has been worn down unevenly.
2. Replace carbon brushes (16) if they are less than 12 mm long.

- If shut-down device has triggered replace carbon brushes (16).

Lubrication of the motor and transmission

The sealed motor armature bearing and the transmission mean that additional lubrication within the maintenance interval of 300 hours is unnecessary.

Lubrication of the percussion system

1. The percussion system (17) is to be moderately greased with special grease (see technical data) via the grease nipple (19) located on the crankcase (accessible via the lubrication bore on the hood) roughly every 20 hours of operation or at the latest if the tool shaft (10) runs dry.

2. After about 80 hours the percussion system (17) is to be dismantled, cleaned and regreased. Slightly grease the percussion piston (7) and guide piston (6) on the running surfaces only. The percussion rate deteriorates if too much grease is applied to the percussion piston bottom and guide piston end face. The needle sleeve in the con-rod is to be washed out and regreased using special grease (see technical data).

Lubrication of the tool holder, tolerances

1. Only insert tools (18) with a cleaned and slightly greased shaft (10) into the tool holder (11).

2. The tool guidance system is to be regularly checked for wear. A new tool (18) must be 400 mm from the collar of the shaft (10) and have a play of max. 10 mm. Replace severely worn tool holders (11) in order to avoid breakdowns in operation and damage.

EH 23/110/22

7774

EH 23/230

7770

EH 23/230 EE 25x108

7772

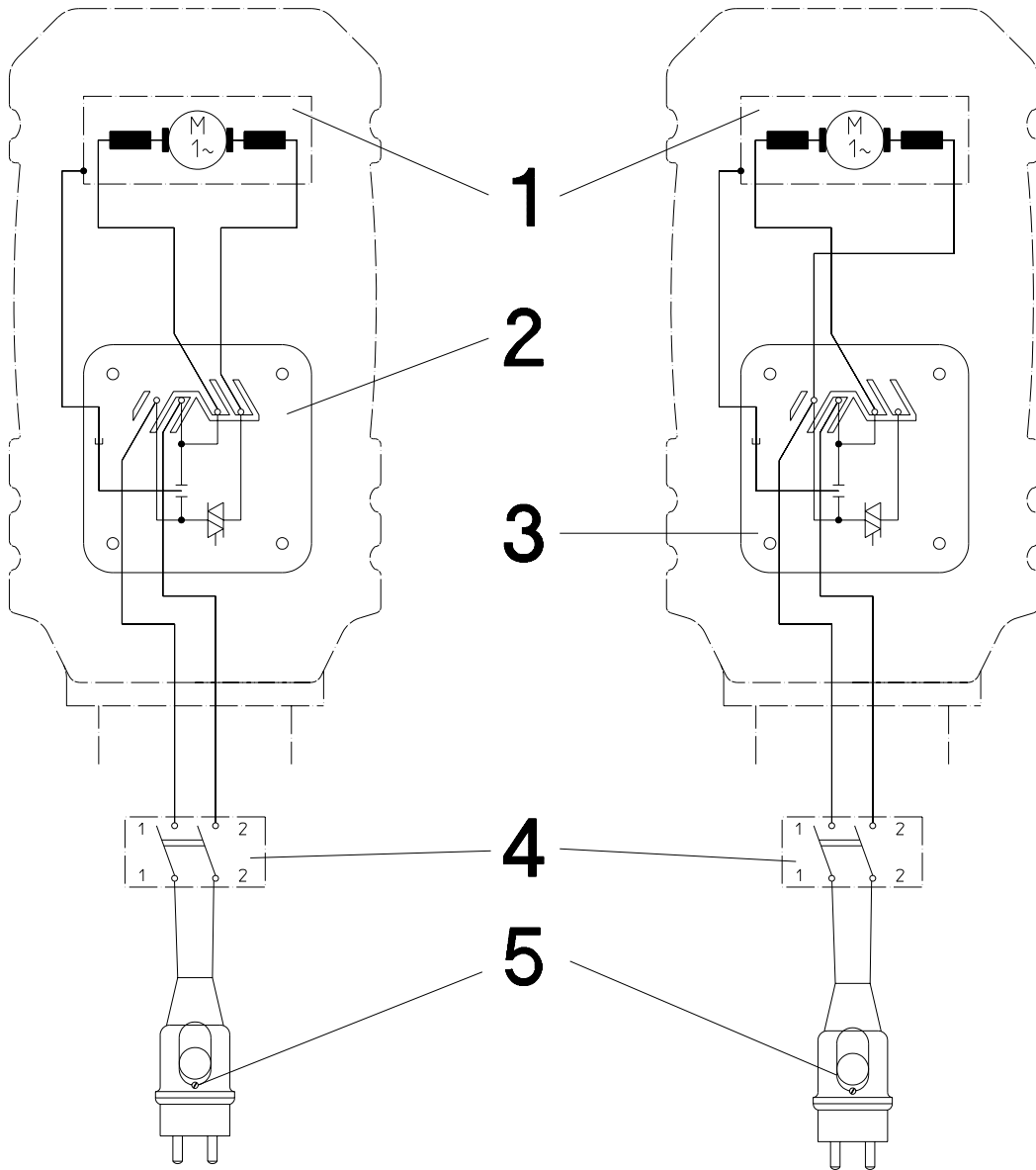
EH 23/230 CH

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EH 23/230 EE 28x160

f. New Zealand

7776



1. Motor
2. Electronics with suppression capacitor
3. Connection without electronics (electronics bypassed)

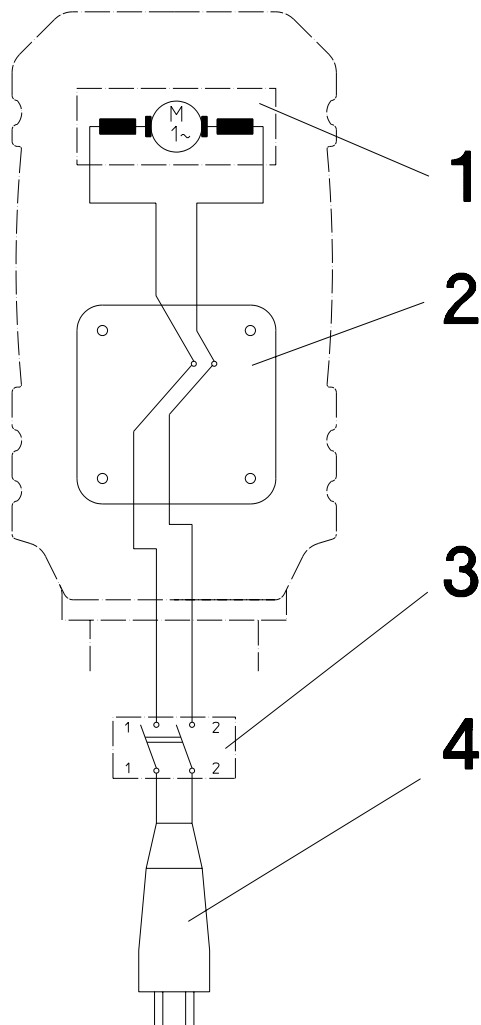
4. Switch

5. Plug

EH 23/230 w. speed control

f. Spain

7771



1. Motor

2. Cover with terminal board

3. Switch

4. Plug

Selection of required cross section for extension of cables and power lines

This procedure takes into consideration:

1. The ohmic and inductive resistance of the line with an admissible loss of voltage of 5% and $\cos \phi = 0,8$ as per voltage-frequency-curves.
2. The admissible warming-up of the lines as per VDE standard (table of required minimum cross section).

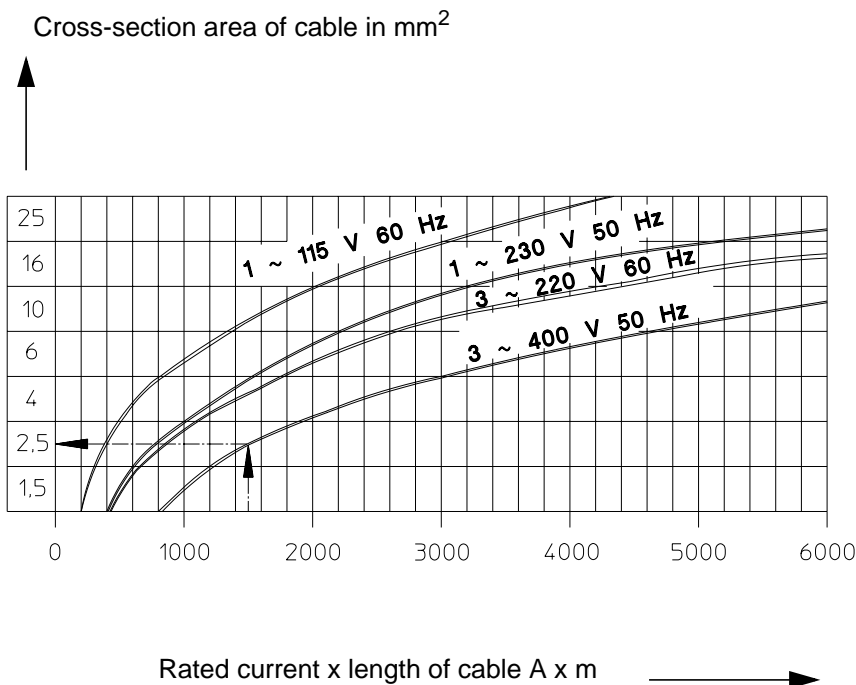
ATTENTION! The larger one of both cross sections has to be chosen.

Example:

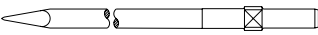








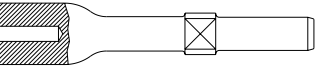
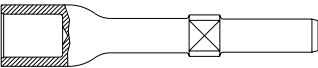
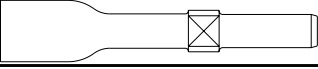

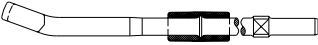
Nominal voltage 3 ~ 400 V, 50 Hz
 Rated current 15 A Line length 100 m
 15 A x 100 m = 1500 A x m

 Cross section as per diagramm: 2,5 mm²
 Cross section as per table: 15 A : 1 mm²
 Chosen cross section: 2,5 mm²

Voltage - Frequency - Curves



Minimum cross-section area according to VDE		
Cable	Max. load	Max. fuse
mm ²	A	A
1	15	10
1,5	18	10/3~16/1~
2,5	26	20
4	34	25
6	44	35
10	61	50
16	82	63
25	108	80

Tools with \varnothing 27x80, EE SW 25x108* shanks		Type	Ref.-No.
Moil point	Effective length 280 mm 280 mm		4001322 0036379 *
Flat chisel, width 30 mm	Effective length 280 mm 280 mm		4001323 0036380 *
Wedge chisel, width 35 mm	Effective length 300 mm		4002158
Wide chisel, width 75 mm	Effective length 300 mm		4002191
Spade, width 120 mm	Effective length 300 mm 300 mm 650 mm		4001324 0036381 * 4002161
Asphalt cutter, width 75 mm	Effective length 250 mm		4002193
Ramming hood (w/o ram rod)	150 x 150 mm		0039871
Ram rod	Effective length 130 mm		0039776
Driving hood for posts up to \varnothing 80 mm (w/o ram rod) to \varnothing 120 mm (w/o ram rod)			0039869 0039870
Driving mandrel (bore \varnothing 12,8 mm) suited for Dehn rods \varnothing 20 mm Driving mandrel (bore \varnothing 16 mm) suited for Dehn-and Langer-Glienke rods \varnothing 25 mm			4001360 4001361
Ramming hood can be provided with bore or threaded bore up to \varnothing 35 mm Ramming hood can be provided with bore from \varnothing 10 mm up to \varnothing 55 mm			0063990 0044138
Blank unhardened for special tools \varnothing 50 mm Blank unhardened for special tools \varnothing 70 mm			4001396 0038785
Wedge set \varnothing 34 mm			4002354
Tie tamping tool Tie tamping tool Tie tamping tool	30 x 80 30 x 80 (noise-reduced) 30 x 120		4001327 0038947 4002192

ATTENTION! Use safety glasses when doing this job.

When reforging of the tools becomes necessary, care should be taken that only that part of the tool that needs reforging is heated. Moreover, it is important that the heat is increased slowly and that it is constantly watched, otherwise heat cracks are likely to occur on hardened tools.

Forging temperature: 800° to 1000° (1470° to 1830° F) bright cherry - red to yellow

The tool should be forged within these limits and, if necessary, should be heated repeatedly. A temperature below 800° C (1470° F) may cause tension cracks, whereas when the temperature exceeds 1000° C (1830° F) the steel is overheated and spoilt. After forging, the tools should be quenched in an ash or sand box. Do not harden the tools before they have cooled from the forging.

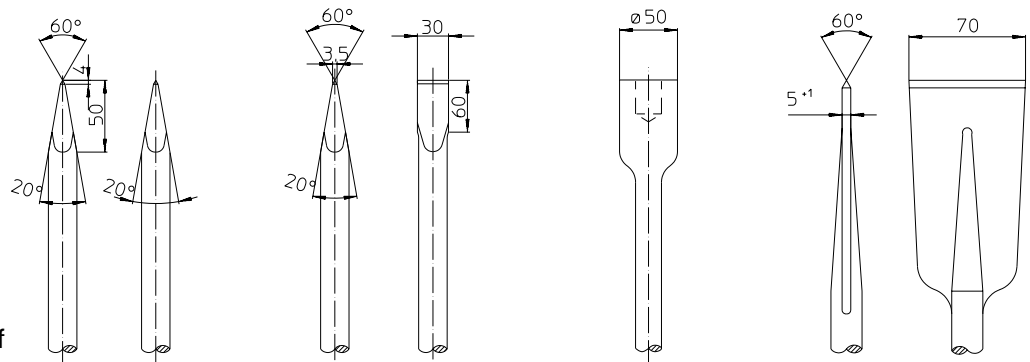
Hardening: Heat point or blade in direction of tool shank up to a cherry red colour (780° - 810° C) over the shortest distance possible (approx. 30 - 40 mm), then quench in water with approx. 20° C while constantly swinging tool around.

Tempering: Heat tool at shaft approx. 10 cm behind tip until point or blade reaches brown-red tempering colour:

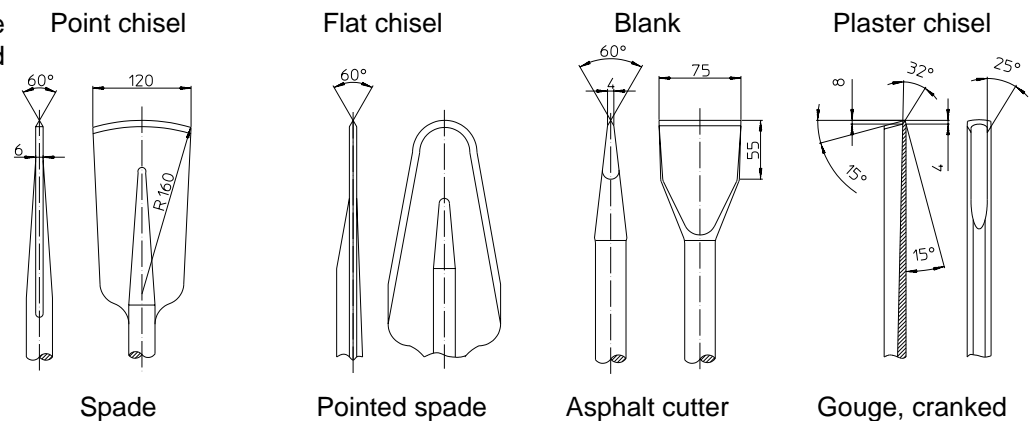
Let tool cool off in air.

Polish one side of the tool's point or blade to be able to recognize tempering colour.

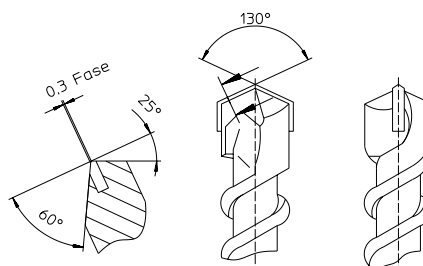
Grinding: Sharpen the insert tools on grinding wheels-favourably sandstone-under sufficient cooling water. The edges should not be allowed to turn blue as the hardness of the tools will be affected. Take care to achieve the proper cutting edge and pointed angle. The harder the material to be cut, the greater the angle should be.



Tools made out of tempering steel - C70W2 - can be forged, hardened and ground



Tools with hardmetal bits may only be sharpened on special emerywheel machines for hard metal



Carbide-tipped twist drill

Carbon brushes

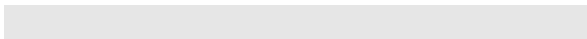
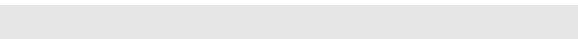
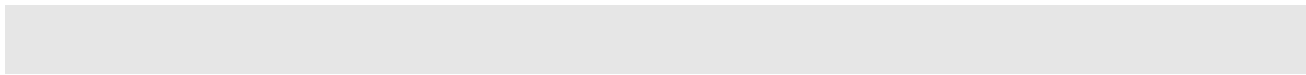
Cause: - Carbon brushes worn.
 Remedy: - Replace carbon brushes.

Power supply cable

Cause: - Damage.
 Remedy: - Replace completely.

Electronics

Cause: - Failure of the electronics.
 Remedy: - The wiring diagram shows how it is possible to continue to use the machine in the event of an electronic fault by changing the motor connection.



EC - CONFORMITY-CERTIFICATE

Wacker Construction Equipment AG , Preußenstraße 41, 80809 München

hereby certify that the construction equipment specified hereunder:

1. Category: **Breaking hammer**
2. Type:

EH 23/230	EH 23/110/22
------------------	---------------------

3. Equipment item number:

0007770 ... 0007771 ... 0007772 ... 0007773 ... 0007776 ...	0007774 ...
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4. absolute installed power:

2,2 kW

has been evaluated in conformity with Directive 2000/14/EC:

Conformity assessment procedure	At the following notified body	Measured sound power level	Guaranteed sound power level
Annex VIII	VDE Prüf- und Zertifizierungsinstitut Zertifizierungsstelle Merianstraße 28 63069 Offenbach/Main	105 dB(A)	109 dB(A)

and has been manufactured in accordance with the following directives:

**2000/14/EG
EMV - Richtlinie 89/336/EG
EN 55014
EN 61000-3-2
98/37/EG
HD 400, IEC 745
EN 500-1
EN 500-4**


.....
Dr. Sick
Board of Directors

File certificate carefully



VDE Prüf- und Zertifizierungsinstitut

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

CERTIFICATE

Registration Number 6236/QM/06.97

This is to certify that the company

WACKER



Wacker Construction Equipment AG
Wacker-Werke GmbH & Co. KG

with the locations

Head Office Munich
Preussenstr. 41
80809 München

Production plant Reichertshofen
Karlsfeld logistics centre
Sales regions with all branches all over Germany

has implemented and maintains a
Quality System for the following scope

Machine manufacture
Construction machines

This Q System complies with the requirements of

DIN EN ISO 9001:2000

This Certificate is valid until 05.06.2006

VDE Testing and Certification Institute
Certification

D-63069 Offenbach/Main, Merianstraße 28
Date 02.06.2003

The VDE Testing and Certification Institute is accredited by DARA Accreditation Bodies
according to DIN EN 45012 and notified in the EU under ID. No. 0366.



