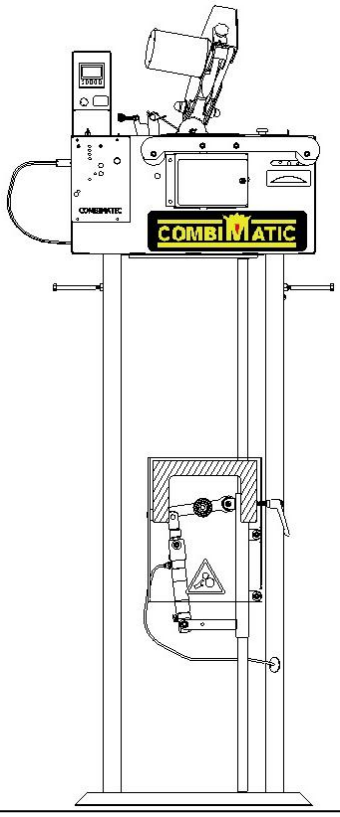
COMBIMATIC



User guide

Before using the machine, read this guide thoroughly and make sure that You have understood it.

MARKUSSON

CONTENTS

There may be discrepancies in the pictures but the information is always correct.

2014-05-25

GENERAL

This user guide describes in detail how to use, maintain and inspect the chain sharpening machine. It also describes the steps to be taken to ensure maximum safety, how the safety components are designed, how they work and how to check and inspect them. It also explains how to carry out any repairs that might be needed.

NOTE:
Everyone who will install, use or repair the chain sharpening machine must read and understand this manual.

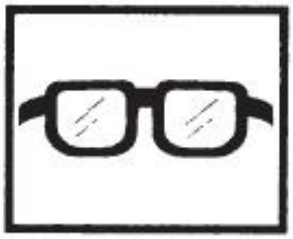
The user guide covers installation, user and the various maintenance actions that can be done by the operator. More detailed servicing or troubleshooting must be done by the dealer's servicing team. The user guide describes all the necessary safety-related components. Anyone who intends to use the machine must read and understand it before the chain sharpening machine is installed. Symbols and warning signs shown on this page appear in this manual and on the chain sharpening machine.
If a warning decal on the machine has been damaged or is worn, a new one must be applied as soon as possible to ensure the greatest possible safety when using the chain sharpening machine.

DESCRIPTION OF FIELD OF APPLICATION

The machine is designed to be used to sharpen cutting chains as used on power saws, forestry machines and harvesters.
The machine can sharpen the cutting teeth of chains and lugs. It works automatically.
The machine must be used indoors.
The machine is powered by a 12-Volt DC supply.

SYMBOLS

Before using the chain sharpening machine, read this user guide thoroughly and make sure that you have understood it all.



Wear eye protection.

Wear safety gloves.

WARNING LABELS

Observe

Cutting Hazard

Direction of rotation

Crushing Hazard

SAFETY REGULATIONS

Locate the machine where it is not exposed to rain or damp.
The site must be well lit.
The machine must not be located close to gas, liquids or other materials that might catch fire or explode.
Only a service technician is permitted to carry out work on the machine.
To avoid mistakes when sharpening chainsaw chains, it is extremely important to understand how the sharpening machine works.
Read the instruction manual carefully before doing any sharpening with the machine.
Always wear safety gloves and safety goggles.
Always check the condition of the grinding wheels.
Cracked, vibrating or wobbling grinding wheels must be discarded.
To avoid breakdowns, clean the machine to remove grinding dust.

MOTOR DATA COMBIMATIC

Grinding motor
Voltage: 12 Volt DC
Rotation speed: 2800 r/min
Peripheral speed: 22 m/s
Power: 90 Watt
Current: 7,5 A
Grinding wheel: 150x4x16 mm
Overcurrent protection: Automatic fuse, ptc type
Machine weight 15,9 kg (without stand)
Machine dimensions: L475mm x D140mm x H395mm (Without stand)
Stand dimensions: L400mm x D460mmm x H1070mm
Working voltage: Min 12 Volt DC, Max 15 Volt DC

COMPRESSED AIR DATA COMBIMATIC

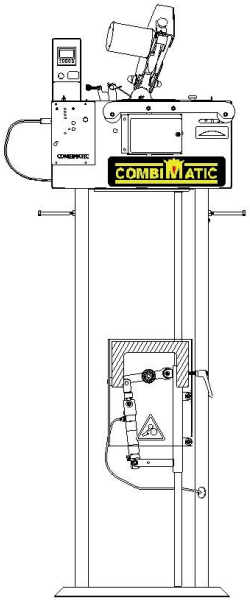
Min 5 Bar
Max 8 Bar

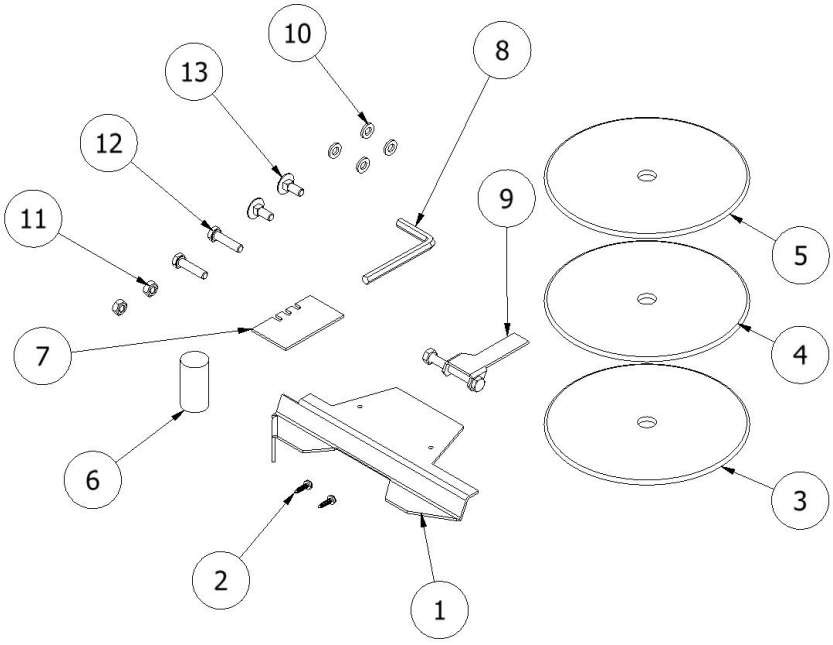
POWER SUPPLY

For the best performance, the machine should be connected to the Markusson Converter. The machine can also be powered from a 12-volt car battery or from a battery charger with an output of 12 – 15 volts DC (min 10 ampere). When using a battery, connect the red cable to the positive terminal (+) and the black one to the negative (-).
If the cables are connected to the wrong terminals, the grinding disc and the feeder motor will turn in wrong direction, causing the machine to break down. Compare the direction of rotation with the arrow on the cover.

NOTE:
Position the battery, battery charger or power converter where there is as little dust as possible. Make sure that the battery terminals are connected to the correct poles of the battery. Position the battery so that sparks from the sharpening machine cannot reach it.

ACCESSORIES





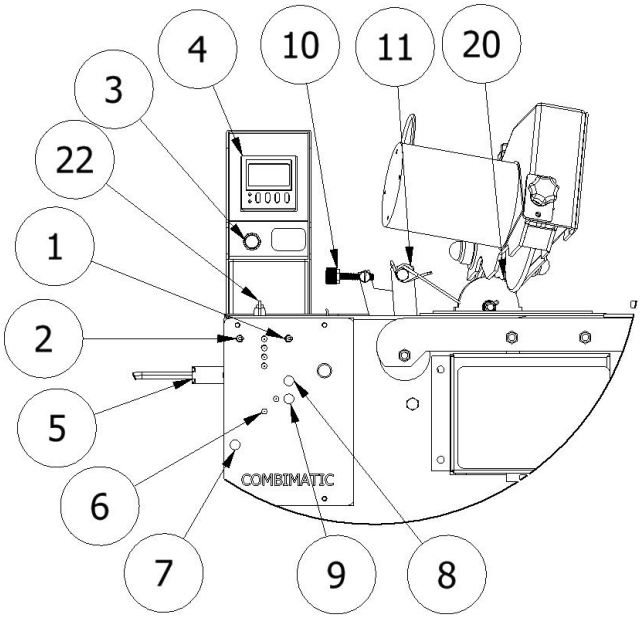
Besides the machine, there are a number of accessories in the kit:

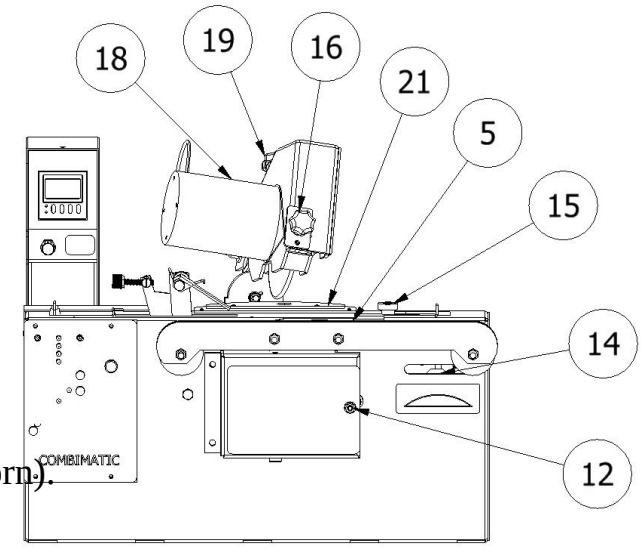
1. Grinding disc guard
2. Torx sheet metal screw x2
3. Grinding disc 150x4x16
4. Grinding disc 150x6x16
5. Grinding disc 150x10x16
6. Profile stone
7. Profile template
8. Allen key
9. Chain feeder
10. Spacers x4, for chain ruler

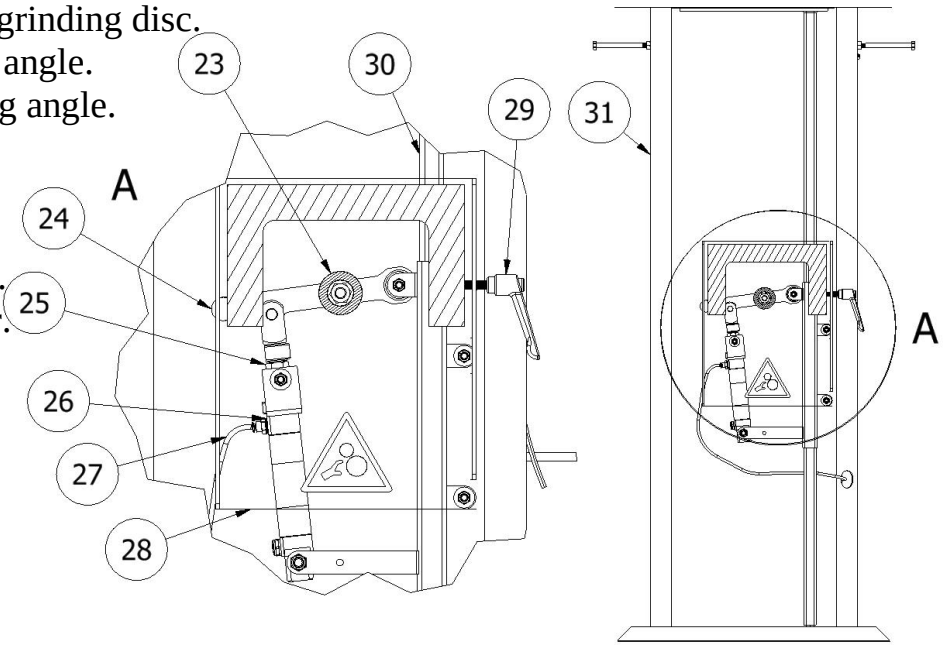
When machine is delivered with a stand, the following are also supplied:
11. M6 nut x2 (stand) 12. M6 Screw x2 13.Carrigebolt M6 x2

FUNCTIONS

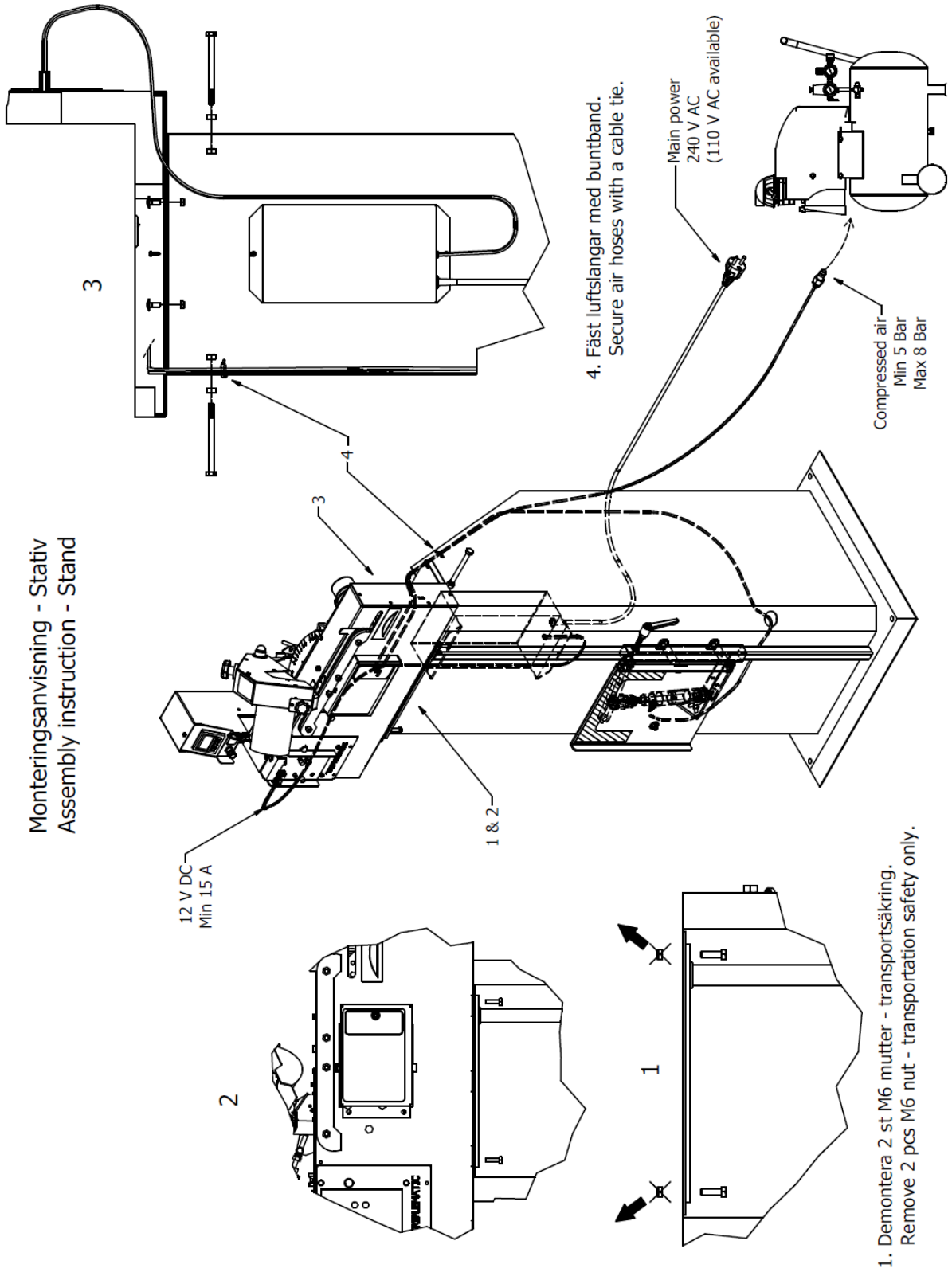
1. Start, sharpening motor.
2. Start, automatic.
3. Speed control
4. Counter
5. Electric power
(12-15 V DC in).
6. Adjustment: feedingdepth / pulse
7. Stop button.
(Zero voltage cutout.
The machine must be
restarted manually)
8. Changing the angle of the grinding
head. (shift from left to right)
9. Power on.
10. Cutting tooth length setting
adjustment.
11. Chain feeder mechanism.
12. Length adjustment between left
and right tooth.
13. Chain rulers.
14. Grinding angle adjustment 0°-35°.
15. Chain lock adjustment
16. Grinding wheel adjustment (when worn).
17. Grinding disc.
18. Grinding motor.
19. Depth adjustment, grinding disc.
20. Graduation cutting angle.
21. Graduation grinding angle.
22. Stroke adjustment.
23. Tensioner
24. Tensioner arm
25. Nut, pneumatic cyl.
26. Pneumatic cylinder.
27. Air hose
28. Protective plastic
29. Locking handle.
30. Tensioner bracket.
31. Stand







ASSEMBLY INSTRUCTIONS, STAND



INSTALLING THE SHARPENING MACHINE

The machine must not be located close to gas, liquids or other materials that might catch fire or explode.

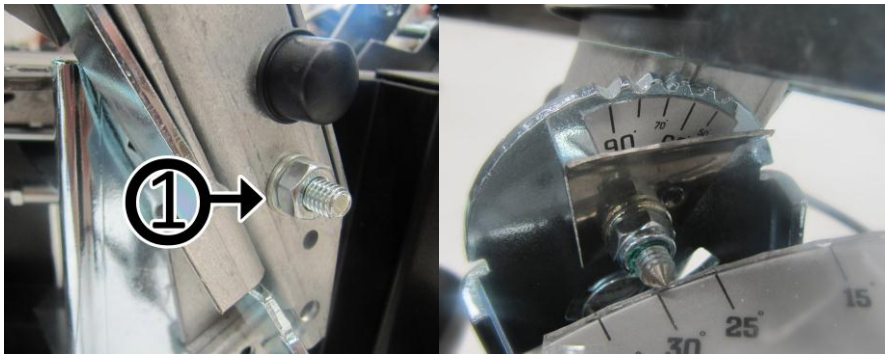
Install the machine on a working bench or a stand.

NOTE:

The machine must be securely fastened. The machine must be fixed in line with or 1-5mm outside of the edge of the working bench.

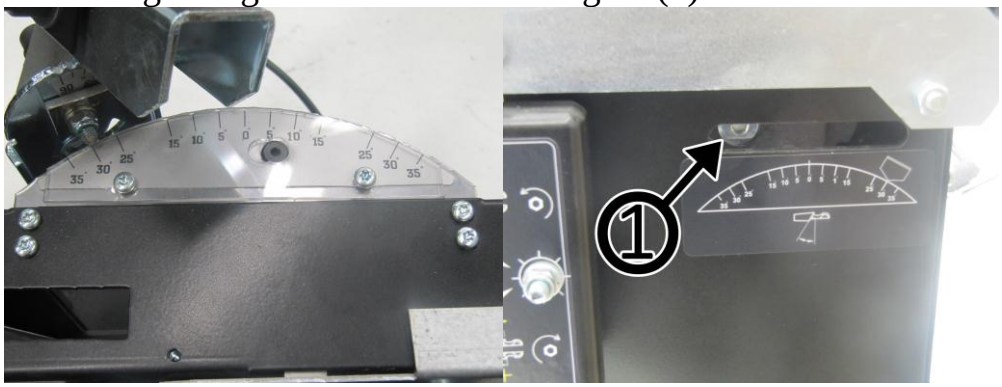
CUTTING ANGLE

The cutting angle can be set between 90°and 50°. Loosen the nut on the back (1) and turn the grinding head to the correct degree marking and then tighten the nut.



GRINDING ANGLE

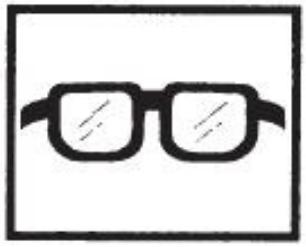
The grinding angle can be set between 0°-35°. If You want to change the angle, loosen the allen screw (1). NOTE: Max three (3) turns. Turn the grinding head to the desired angle. Tighten the allen screw again (1).



CENTRING THE GRINDING WHEEL

If the lengths of the right and left cutting links turn out different on sharpening, this can be adjusted with adjusting screw 12. When the screw is adjusted, the length of the inner or outer cutting links will increase/decrease.

Be prepared to stop the machine if something goes wrong during trial sharpening.



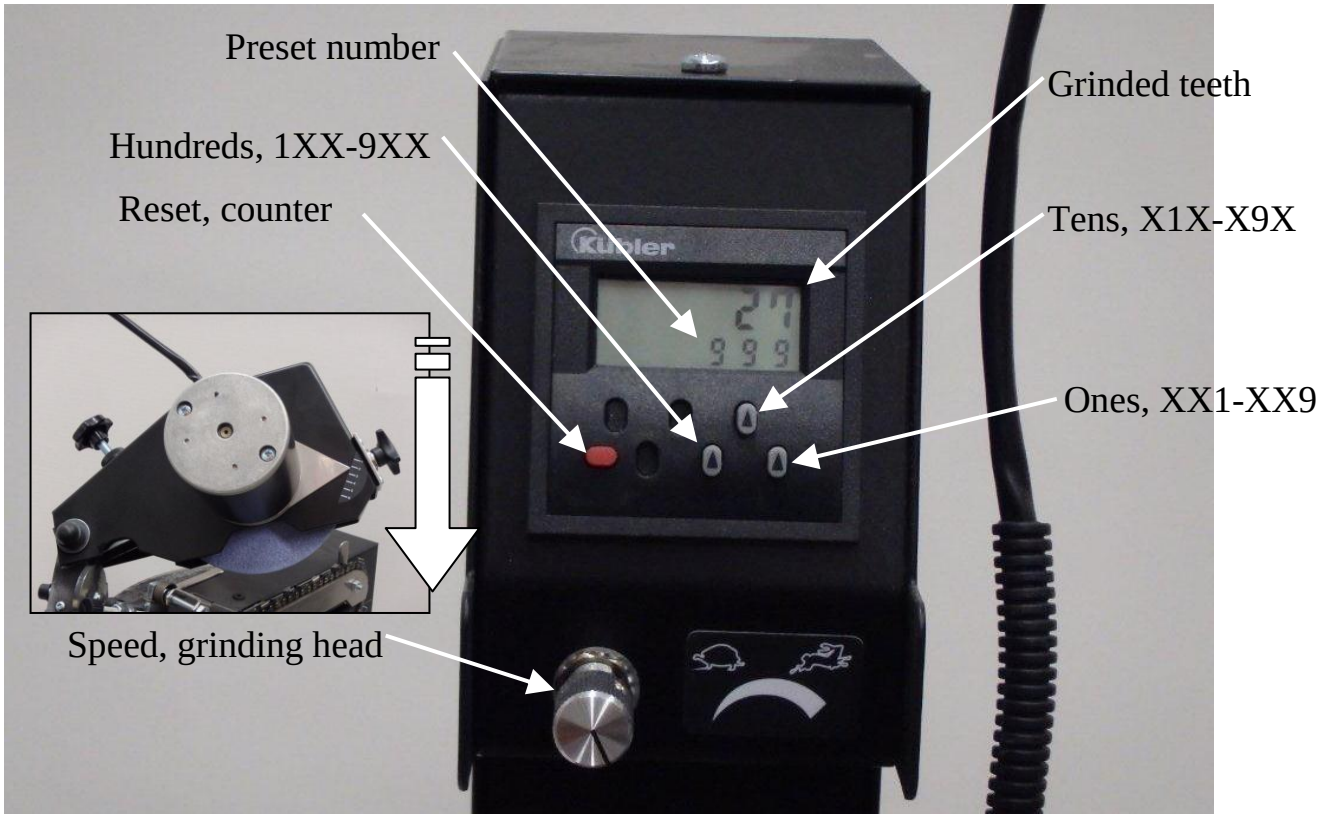
Check the grinding disc for cracks and that it is securely fixed to the hub. Stop the grinding wheel immediately if abnormal vibrations occur.

COUNTER

The counter is placed above the control panel, maximum count is 999 teeth. The counter is programmed using the three buttons to the right. To set the number of teeth, push the right button to set XX0-XX9 (ones), the middle one to set X1X-X9X (tens) and the left one to set 1XX-9XX (hundreds). The number of teeth will be stored in memory until the next time the value is set.
When the machine is running, the number of teeth grinded will be counted and the machine will stop when the preset number is reached.
To restart the machine (and to reset the counter), push the red button.

SPEED CONTROL

The speed control is placed below the counter. This control the lowering speed of the grinding head (grinding wheel) as it grinds the tooth. High speed can be used when grinding 0-1mm of the tooth, low speed when grinding 1-4mm.

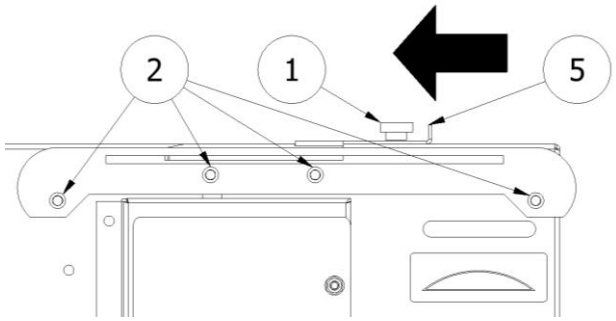


CHAIN LOCK ADJUSTMENT, DIFFERENT CHAIN TYPES

The lock adjustment is placed to the right. This is used to change the locking point on the chain ruler when grinding different types of chains.
To change the locking point: stop the machine when the chain is ”free”. Loosen the plastic nut (1) and move the lever either to 404 / 3/8 / .325 (position 1) or to 3/4 (position 2). When this is done the spacers between the rulers needs to be fitted as shown below. When delivered the spacers are fitted for position 2. Loosen the outer chain ruler, fit spacers as shown below and the re-fit the ruler.

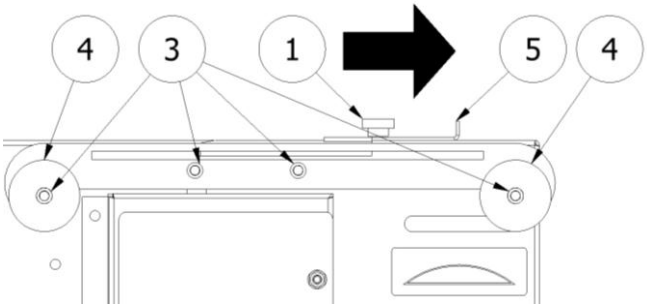
NOTE!
When changing the locking point, the lever must be positioned in either Pos ① – chain size 404 / 3/8 / .325 or Pos ② – chain size 3/4. The lever must not be positioned in between Pos ① and Pos ② as this might cause the machine to break down.

Position ①



1: Plastic nut
2. Spacer 6 x10x2,5 (x4)
5. Lever

Position ②



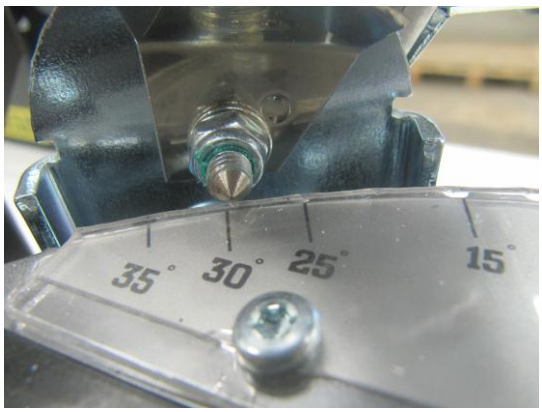
1: Plastic nut
3. Spacer 6 x10 x 4 (x4)
4. Spacer 10 x40 x 3 (x2)
5. Lever

WIRE ADJUSTMENT

For the grinding machine to function properly, it is important that the wire is adjusted correct. It is set in factory but will be worn over time making adjustment or replacement necessary. To adjust the wire correct, follow these steps:
NOTE! The machine is to be set at high speed (rabbit) when adjusting the wire.

1. Start by turning the grinding head to the left.

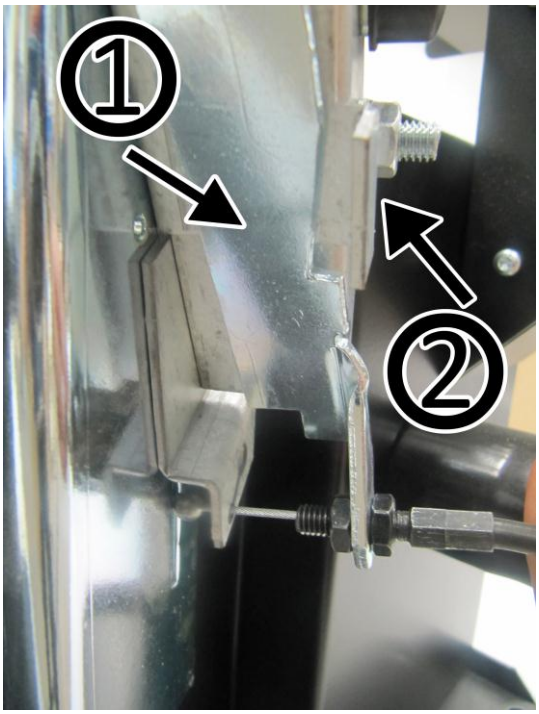
2. Set the angle to 30°.
NOTE: Head to the left.

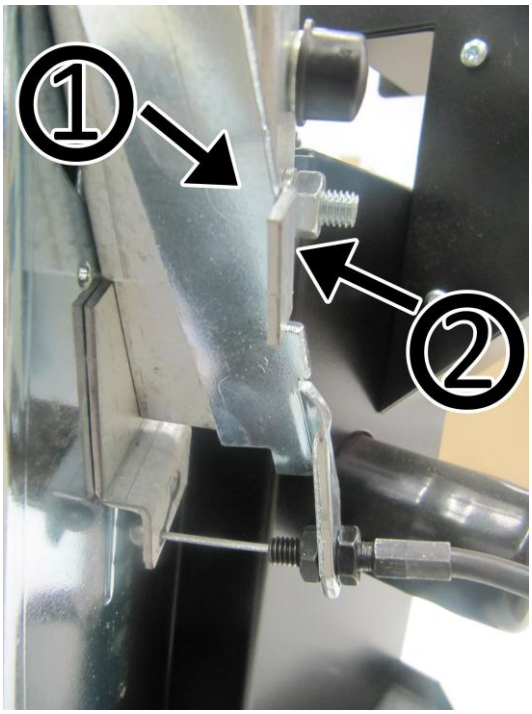


3. Turn the machine and have a look At the back. Start the machine and observe as the lifting arm (1) meets the flange (2).

4. The lifting arm (1) shall meet the flange (2) app. 1,5 sec before lifting again. Use a 0,05 mm feeler gauge between the arm and the flange to control that contact is made.

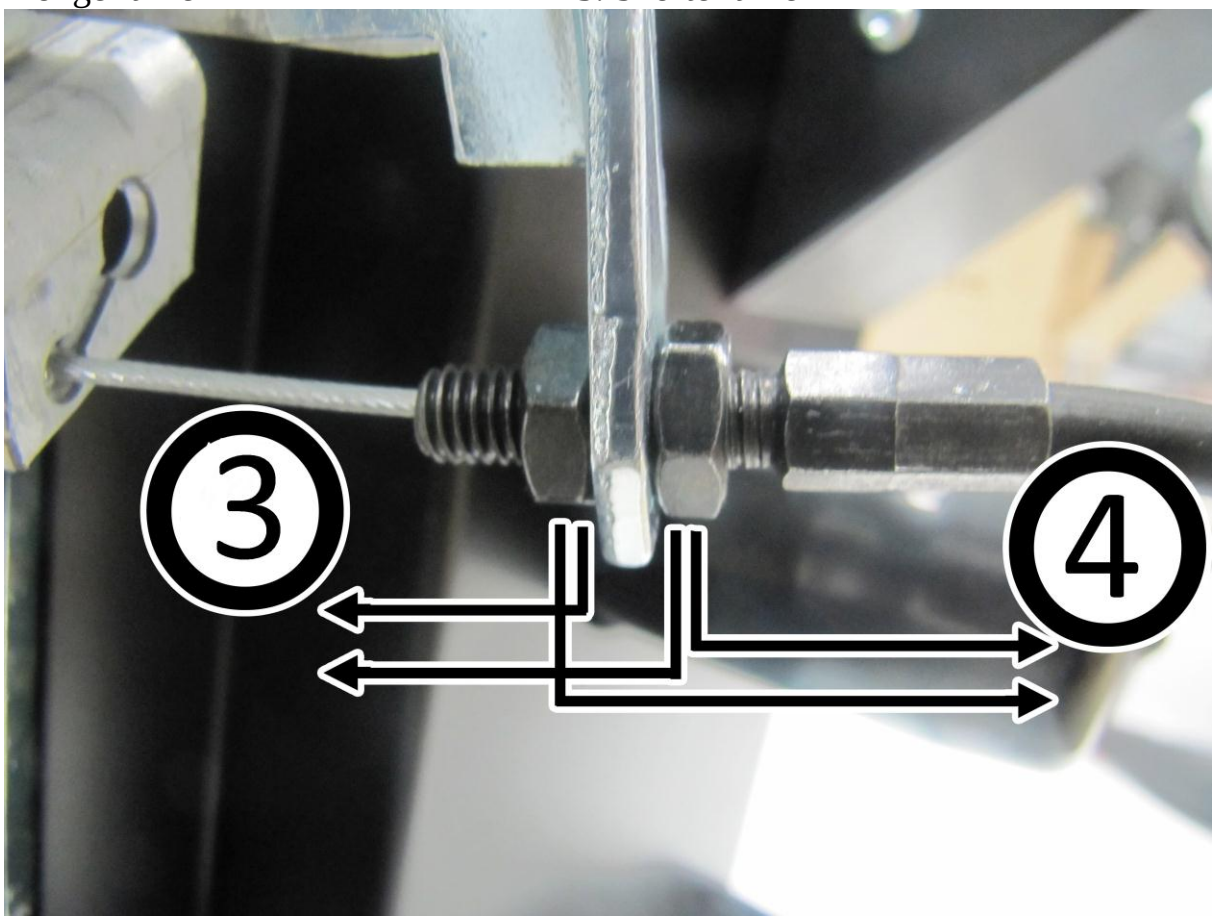
Pictures (step 3 & 4), see next page.





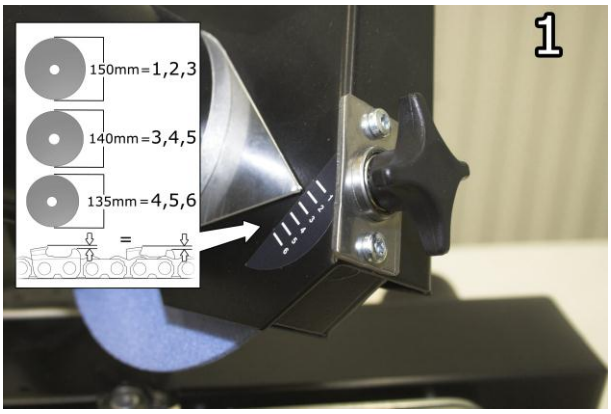
5. To adjust the wire, making the arm make contact with the flange longer, turn nuts as shown below (4). To adjust for a shorter time of contact, see below (3).

4. Longer time 3. Shorter time



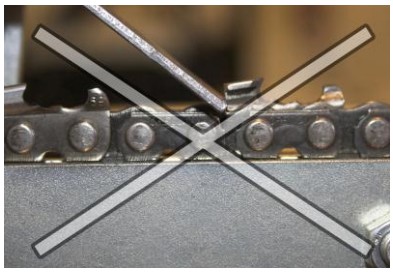
GRINDING WHEEL ADJUSTMENT DEPTH

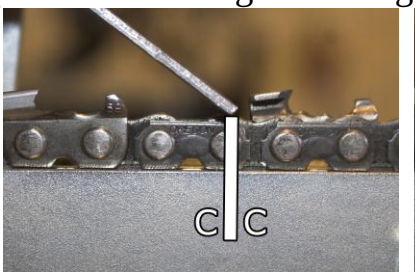
It is possible to adjust the position of the grinding motor turning the knob on the front of the grinding head. An arrow indicates a number on a scale. This adjustment is used as the diameter of the grinding wheel decreases when it is worn.
When fitting a new grinding wheel, the arrow should point at 1-3 on the scale. As the wheel is worn, it should be adjusted to a higher number making sure that each tooth is equally deep.

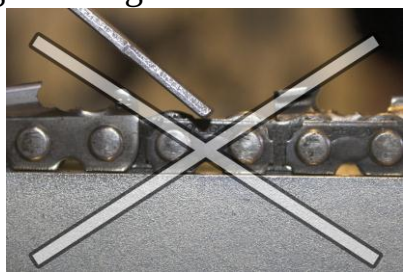


STROKE ADJUSTMENT

The stroke adjustment (distance between to teeth) is done with the wing-nut on top of the machine. Loosen the nut and position it according to the label. This must be changed if chains with different pitch are grinded, for example 3/4 to 404. It is important the the feeder arm stops right above the rivet behind the cutting link. Se pictures below.
NOTE: Not to be mixed up with the cutting tooth length setting.







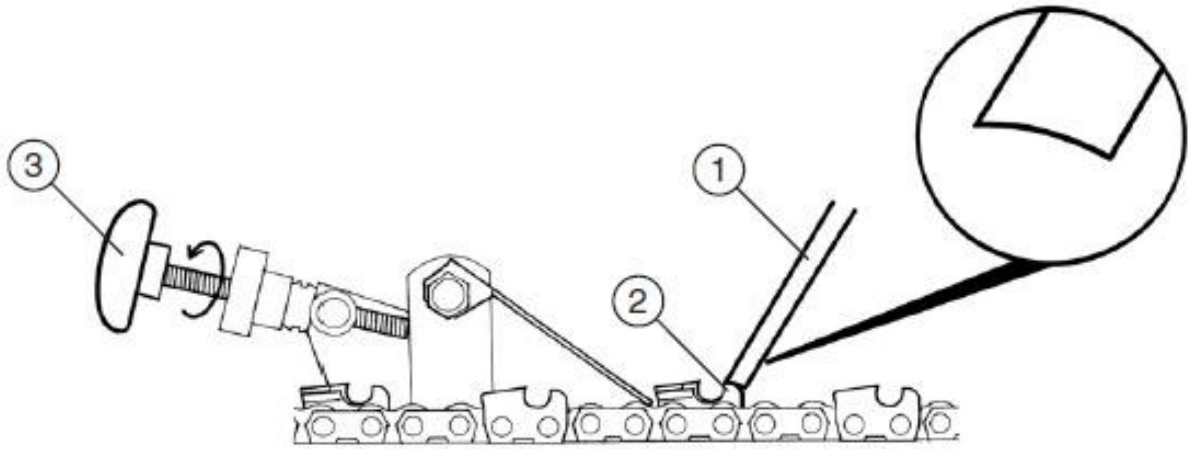
GRINDING THE DEPTH GAUGE LUGS.

WHEN TURNING ON THE DEPTH GAUGE GRINDING, ENSURE THAT THE MACHINE IS IN A MODE WHERE THE CHAIN IS NOT LOCKED. I.E WHEN FEEDING THE CHAIN FORWARD.

Set grinding angle to 0°, see chapter ”GRINDING ANGLE”.

CHECK THE GRINDING DISC FOR CRACKS AND THAT IT IS SECURELY FIXED TO THE HUB.. STOP THE GRINDING WHEEL IMMEDIATELY IF ABNORMAL VIBRATIONS OCCUR.

Fit the appropriate disc (1), (6mm for smaller chains for ex. 404, and 10mm for 3/4-chains). Profile the disc, giving it a profile matching the lug (2). Adjust the feeder arm (3), until the disc (1) meets the lug (2) in correct position. **(See picture below).** Proceed as if grinding the chains cutting links.



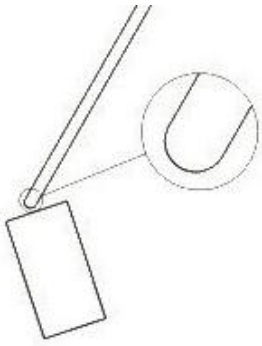
TRIAL SHARPENING

Test the various functions of the machine and study the motions.Always stop the machine when the grinding head reaches itsuppermost position. The chain rulers are then "unlocked" and thechain is free. When you have done a trial run with the machine and feel familiar with it, you can put in a chain. Now test-sharpen a chain, following the instructions in under Sharpening cutting links.
In the interest of safety, use an old chain.

SHARPENING CUTTING LINKS

Always use safety gloves when handling saw chains.
Risk of cutting injury.

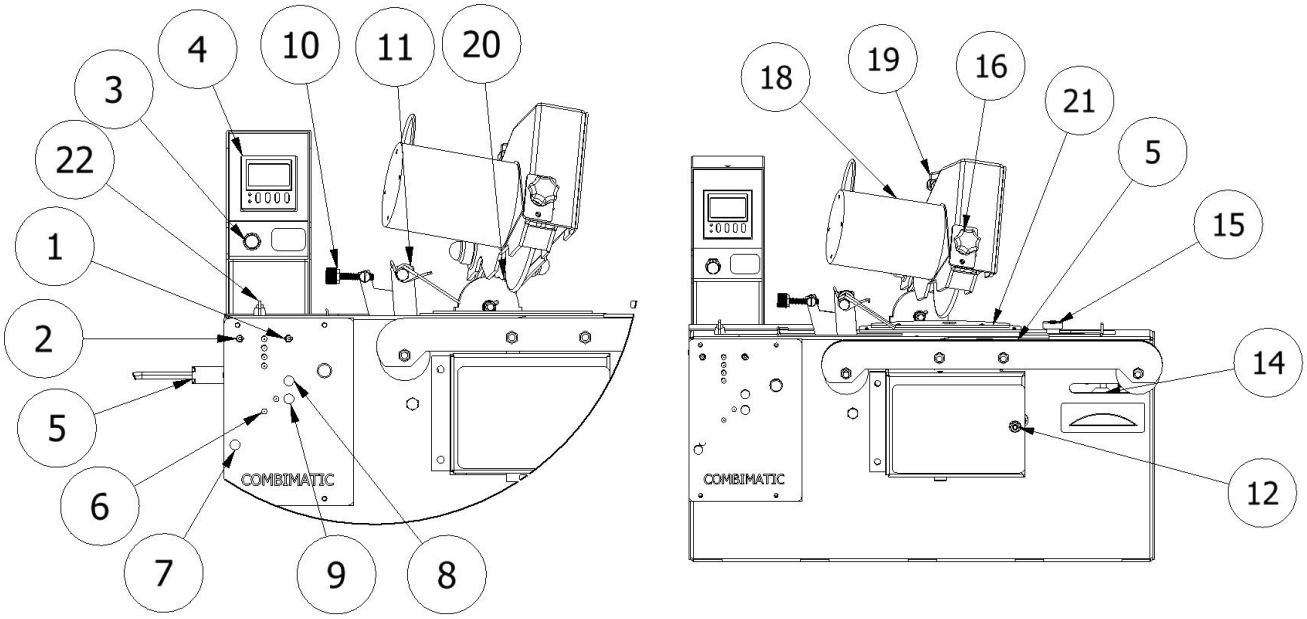
To sharpen a chain in the Combimatic machine, proceed with these steps:
(Numbers correspond to parts shown on page 17)
1. Activate power (Power in) - 8
2. Start grinding motor - 1
3. Profile the disc – see picture below



4. Turn grinding motor off - 1

Place the chain to be sharpened between chain rulers 5.
Pull the chain around by hand and check that it runs freely in the chain rulers
Check also whether the chain has "double links", that it does not have any burrs on the drive links and that it is not damaged.
NOTE: If there are double links, see the instructions for double links.

OPERATION GRINDING MACHINE



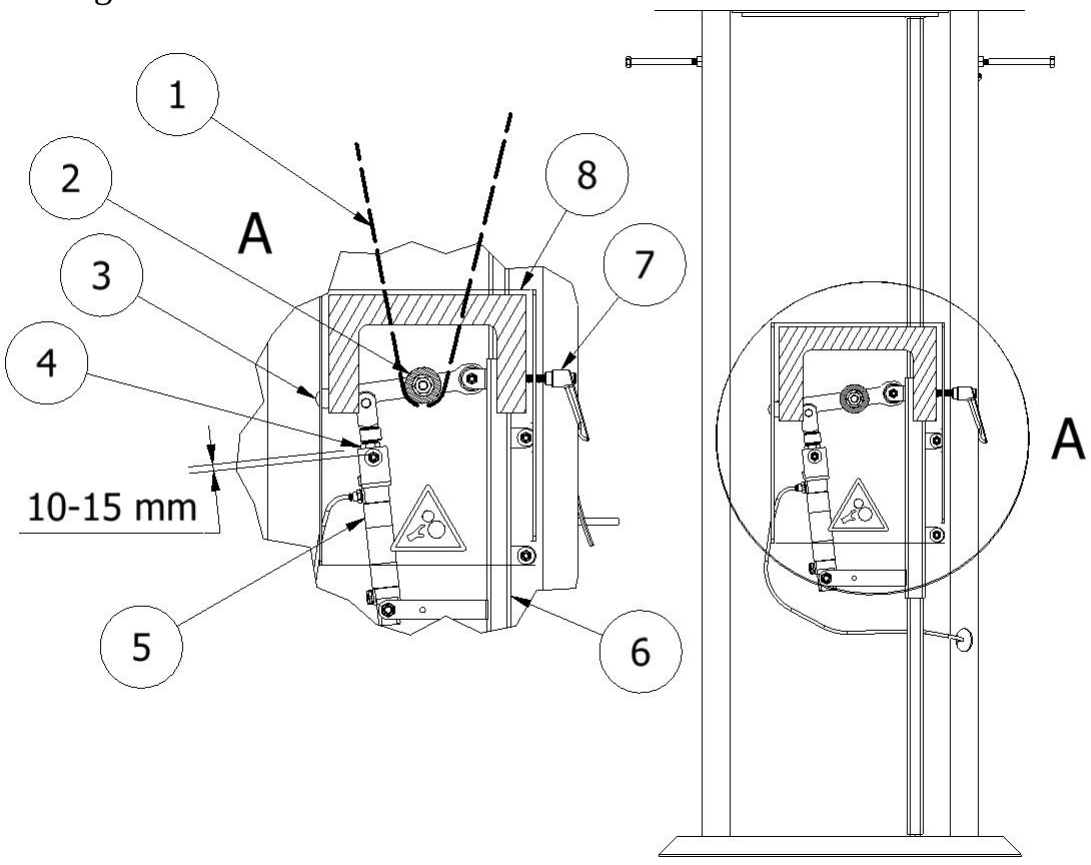
- If the grinding head is pointing in wrong direction, push switch to change = switch 8.
- Start automatic mode (feeding) = switch 2.
- Set the stroke for the chain-type = 15.
- Program the number of teeth to be grinded= counter 4.
- Programmera rätt antal tänder som skall slipas = Räkneverk 4
- Set the approx. sharpening depth = knob 19.
- Set the approx. sharpening length = knob 10.
- Start grinding motor = switch 1.
- Finetune the sharpening depth. = knob 19.
- Finetune the shapening length. = knob 10.
- Stop the automatic mode. = switch 2.
- Stop the grinding motor. = switch 1.
- Adjust grinding speed. = Knob 3 (Grinding a lot of material = turtle)
- Pull the chain back to the first tooth grinded (If double link, start with the link to the left). Reset counter (red button) and start sharpening.

OPERATION STAND & TENSIONER

Always turn power off!

Crushing hazard!

NOTE! Keep hand, fingers and other body parts away from area behind the protective plastic sheet – Crushing Hazard
Positions chain (1) placing it below the tensioner roll (2) by lifting the tensioner arm (3). If necessary, loosen handle (7) and move the tensioner upwards . There should be a gap of about 10-15mm between the nut (4) and cylinder (5) (10-15mm of the piston should be visible). Tighten locking handle (7) again.
If the next chain to be sharpened has the same length, You will only need to lift the arm (3) when replacing chain.
NOTE! In case of emergency – loosen locking handle (7) to release tension and eliminate crushing hazard.



SHARPENING DOUBLE LINKED CHAINS

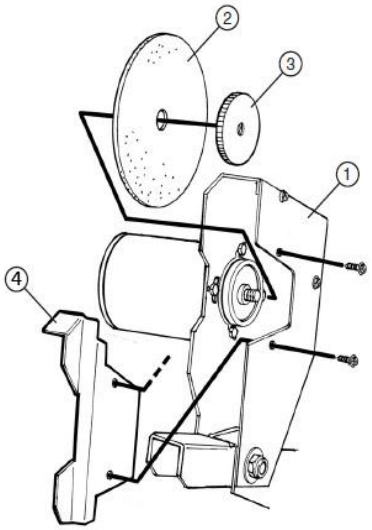
If the chain has a double link, sharpening should start there. Begin with the left one as shown in picture below.

MAINTENANCE

Replacing the grinding wheel (disc).

Always turn power off!

1. Lift the grinding head (1) and remove the guard (4).
2. Hold the grinding wheel (2) and loosen the nut (3) manually or with a pair of pliers.
3. Remove the old wheel and fit a new one. Tighten the nut by hand (3).



SETTINGS AND SERVICE

If one cutting link gets to deep or to shallow in comparison to the next one, this can be adjusted by turning the knob in front of the grinding head (see chapter ”*Grinding wheel adjustment depth*”).

The machine is almost maintenance-free, but it should be kept clean by removing any grinding dust.

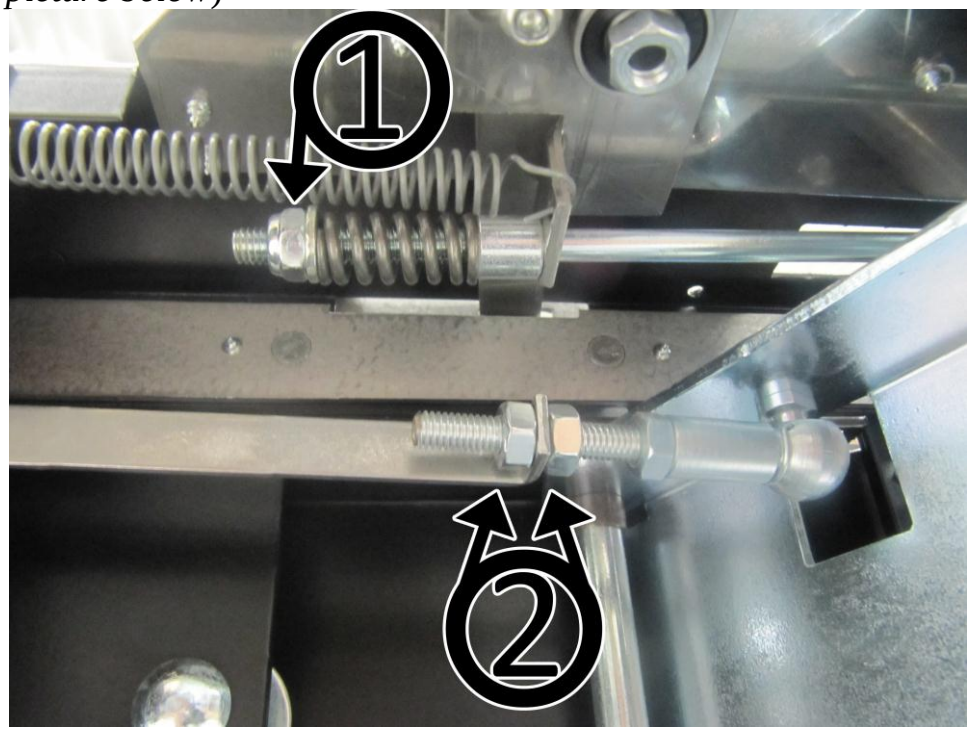
The wires in the machine must be inspected after 40 hours of operation. Tension and condition should be checked (see chapter *“Wireadjustment”*)

If the wire is in poor condition. Replace it immediately!

TROUBLESHOOTING

Always turn power off!

Chain is not fixed during sharpening = Chain looking device must be tightened. Tighten the M6 nut (1) on the back of the machine. Start with 1 turn clockwise, a bit more if needed. (*See picture below*)



Grinding angle shows for example 35° in one direction and 25° in the other when turning the grinding head.
This is adjusted with a pair of M6 nuts (2). Adjust in steps of ½-turn. Turn the head left to right and control the grinding angle. Adjust until angle is the same in both directions. *(See picture above)*

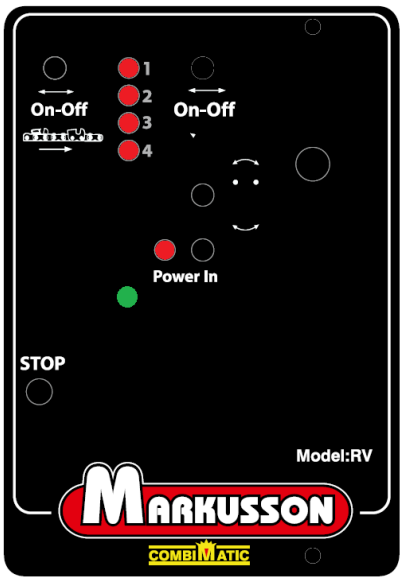
.

More thorough servicing or troubleshooting must be done by the dealer's servicing team.

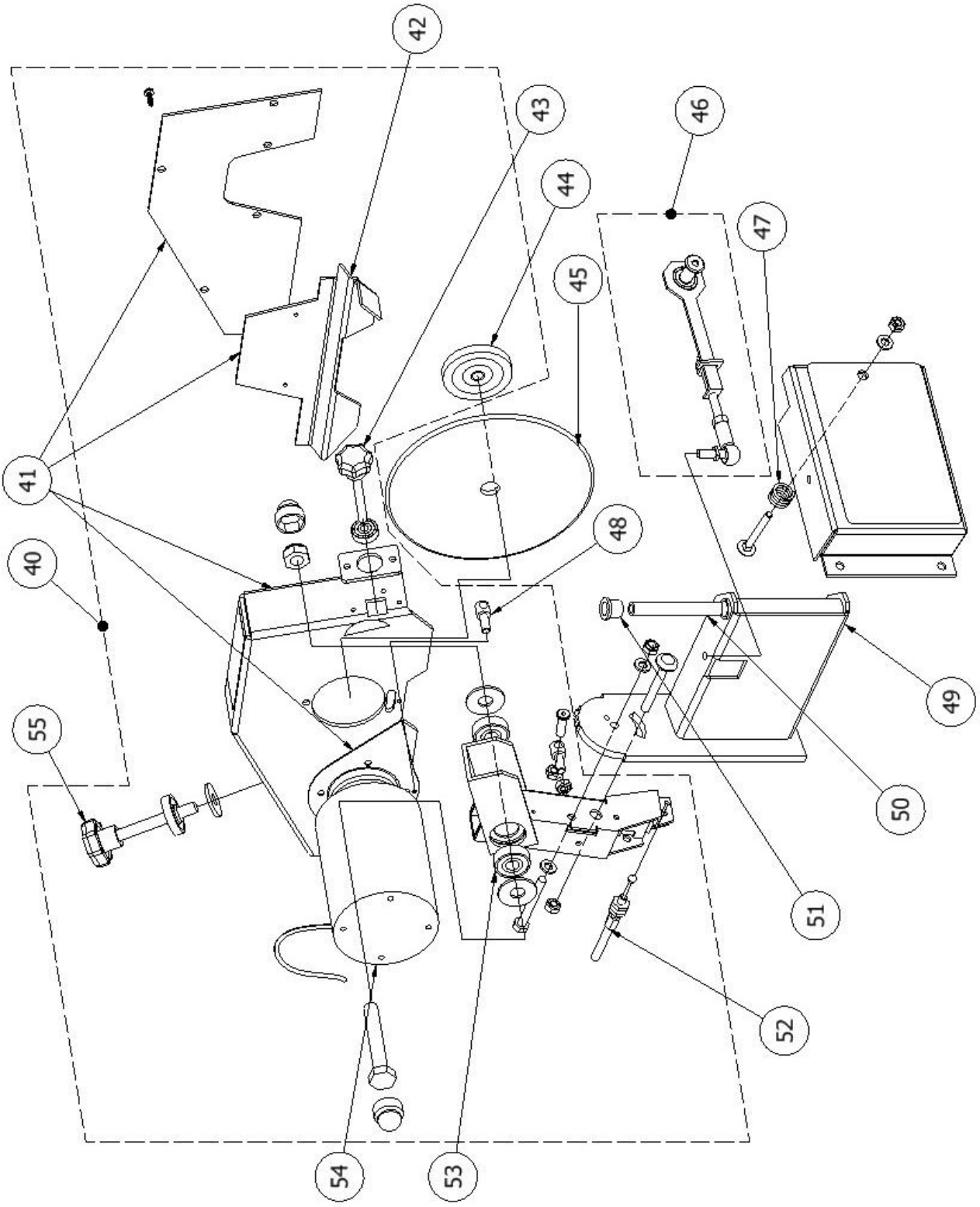
INDICATIONS – LED

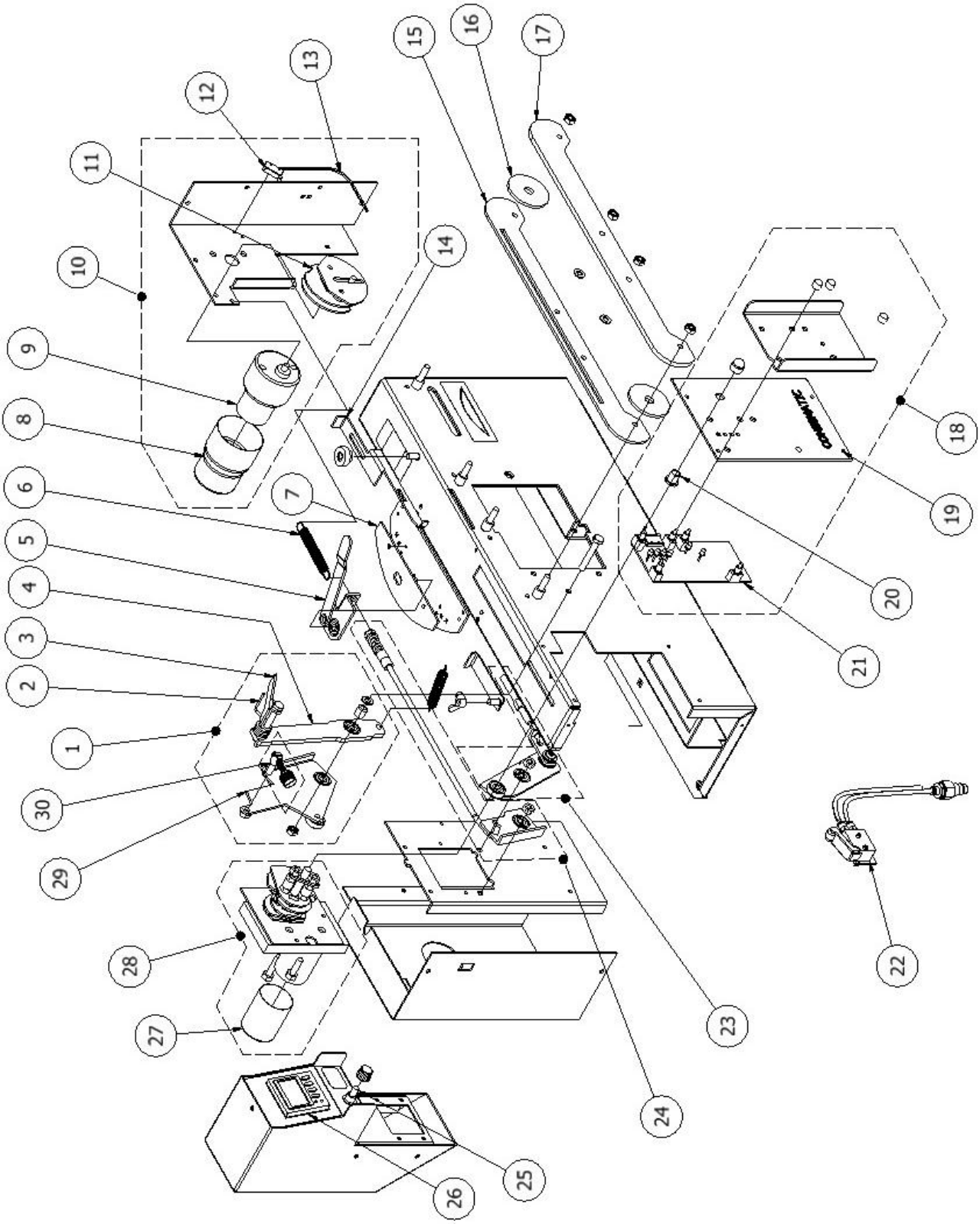
The LED’s 1 – 4 can indicate problems with the motors:

1. Error feeding motor
2. Error grinding motor
3. Pulse length
4. Error turning motor



EXPLODED VIEW

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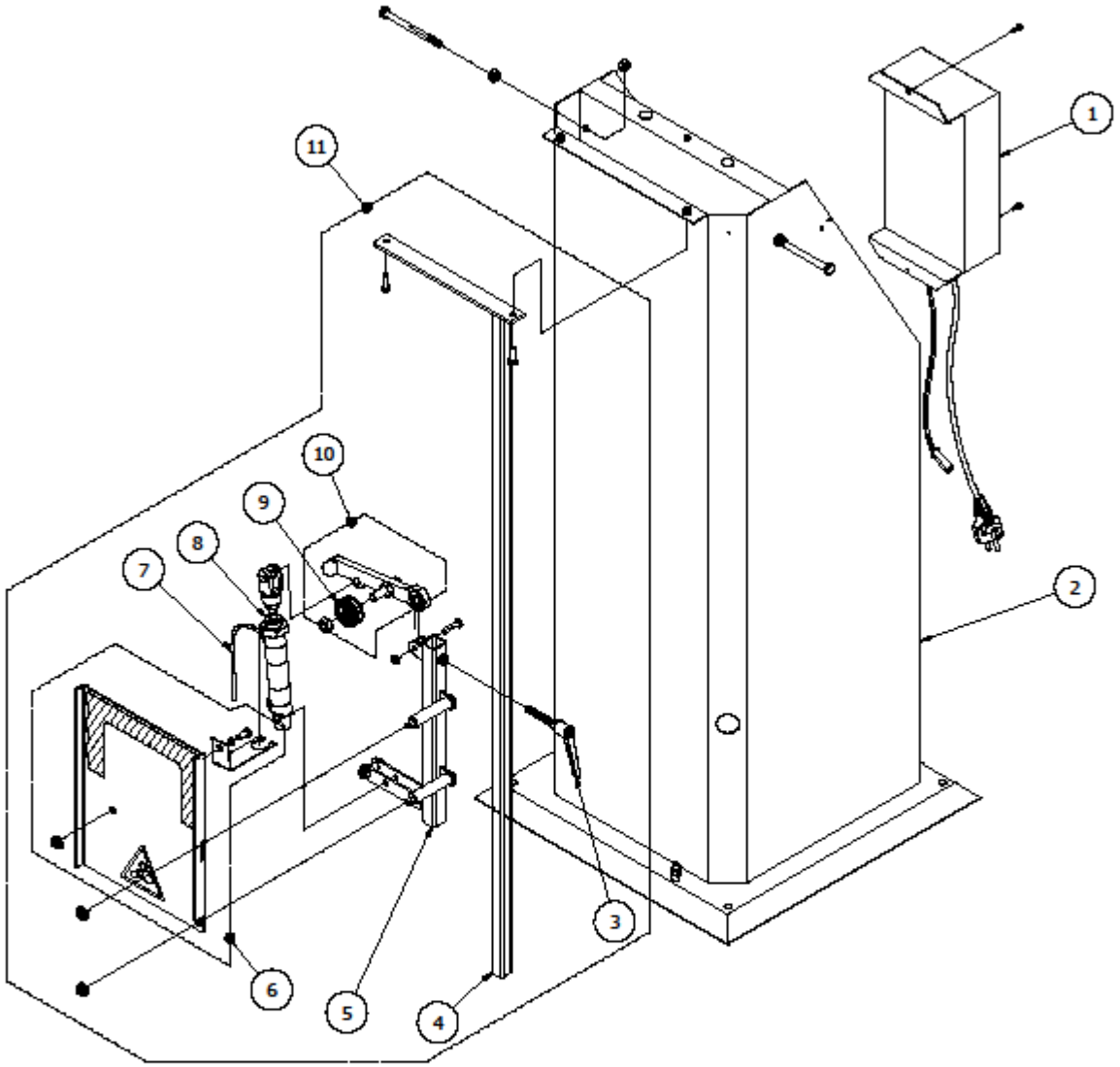
Pos/skiss	Art.nr /Part.No	Benämning / Sv.	Description /Eng.
1	16-201	Frammatning kmpl.	Move unit complete
2	16-045	Fjäder	Spring
3	16-044	Frammatarplåt	Pusher Plate
4	16-202	Hållare	Bracket
5	16-203	Kedjelåsning	Chain locking
6	16-043	Fjäder	Spring
7	16-204	Plastskydd	Plastic protection
8	16-025	Motorskydd	Motor cover
9	16-026	Vändmotor	Motor
10	16-101	Motor komplett	Motor complete
11	16-129	Brytarkurva kmpl.	Cam curve complete
12	16-029	Microbrytare	Microswitch
13	16-102	Kabelstam	Wiring harness
14	16-205	Justeringsplåt	Adjustment plate
15	16-206	Kedjelinjal	Chain ruler
16	16-207	Kedjesbricka	Chain washer
17	16-208	Kedjelinjal	Chain ruler
18	16-209	Styrkort kmpl.	Control unit complete
19	16-210	Panelplåt	Control plate
20	16-032	PDE lager	PDE Bearing
21	16-211	Styrkort	Control unit
22	13-605	Tryckluftsventil kmpl.	Pneumatic valve complete
23	16-212	Wirelyftare kmpl.	Wire lifter complete
24	16-213	Låsdragstång	Lock axle
25	16-214	Vridpotentiometer	Potentiometer
26	16-110	Räkneverk	Counter
27	16-131	Motorskydd	Motor cover
28	16-215	Motor kmpl.	Motor complete
29	16-216	Matararm	Pusher Plate
30	16-047	Justeringsskruv	Adjuster
40	16-217	Sliphuvud kmpl.	Grinder Head complete
41	16-116	Slipkåpa plåtsats	Grinding head complete
42	16-058	Skyddsplåt	Metal protection
43	16-117	Justeringsskruv kmpl.	Adjuster complete
44	16-118	Mutter /slipskiva	Nut for grinding wheel
45		Slipskiva olika sorter	Grinding disc / varieties
46	16-119	Vevstång	Turn arm
47	16-061	Fjäder	Spring
48	16-132	Ögleskruv	Eyebolt
49	16-218	Vridbalk	Turner beam
50	16-120	Axel	Axle
51	16-062	PDE lager	PDE Bearing
52	16-066	Wire	Wire

53	16-065	Kullager	Ball bearing
54	16-057	Slipmotor	Sharping Motor
55	16-056	Justerskruv kmpl.	Adjuster complete



Parts List			
POS.	BENÄMNING	DESCRIPTION	ARTIKELNR./PART NO.
1	Converter	Converter	802
2	Stativ	Stand	14-500
3	Låshandtag	Locking handle	14-601
4	Spännstång	Tensioner pipe	14-602
5	Kolvhållare	Piston holder	14-603
6	Skyddsplast kompl.	Protective plastic compl.	14-604
7	Luftslang	Air hose	14-605
8	Kolv	Piston	14-606
9	Spännrulle	Tensioner	14-607
10	Spännarm kompl.	Tensioner bracket compl.	14-600
11	Luftdriven kedjesträckare kompl.	Air operated chain tensioner	14-600

EC DECLARATION OF CONFORMITY

Manufacturer:
Markusson Development Systems AB
Tegelbruksvägen
762 31 Rimbo, Sweden

Hereby declare that:
Combimatic

Has been manufactured in compliance with the following EC directives:

98/37 EC, The Machine Directive
73/23 EEC as amended, The Low-Voltage Directive
89-336/EEC as amaended, The EMC Directive

The following standards were used as a basis for this declaration.
EN ISO 12100-1, 2
EN 61000-6-3, EN 55014-1, -2

Signed:
CEO: Pär Markusson

Company:
Markusson Development Systems AB
Tegelbruksvägen
762 31 Rimbo, Sweden

Datum: 2011-08-01
Place: Rimbo

Sign: