

2009-06-22

***Read through the whole of these Operating Instructions
before you start to work with the machine!***

OPERATING AND MAINTENANCE INSTRUCTIONS FOR THE COLUMBUS ELECTRIC IMPACT WRENCH TYPE WNR-STD

COLUMBUS impact wrench is a special machine which is designed mainly for undoing and tightening wheel nuts on heavy vehicles, such as trucks, buses, earthmovers etc.

The figures within brackets () correspond to the figures in the attached spare parts list.

SAFETY!

Never run the electric motor more than three seconds in blocked position, otherwise the motor may overheat and get damaged.

Always release the right hand handle at each impact, otherwise the electric motor may overheat and get damaged.

Only use the machine when it is standing on a firm, flat floor. Do not use the machine if it is standing on a table, pallets or similar.

This machine is equipped with a preloaded spring (lift spring 210).

Always release the lift spring tension before making any repairs or adjustments close to the lift spring unit.

If the machine body is unloaded, for instance the machine is laid down on its side for transport or for repairs, and the left hand handle (lift handle 1920) is pressed by mistake, the wheel stand catapults with full power and can hurt part of the body or damage the lift spring.

Hence, never touch the left hand handle (lift handle) unless the machine is in working position (horizontally)

The machine is equipped with a rotary flywheel and an electrical motor.

The electrical motor must always be switched off if the machine is left without supervision.

During transport the machine body should be in its lower position and locked with a strap or rope.

ELECTRIC INSTALLATION

Electric installation and repairs of the machine must be done by an authorized electrician.

GENERAL

The wheel nut runner is powered by a 1,1 kW electrical motor and it is intended for a power supply of 400/230 VAC, 50 Hz, 3-phase as standard. *Other supply specifications on request.*

The unit is equipped with an electrical motor and a reversal switch. By means of a belt drive the motor is adapted to impart a constant speed and energy of movement to a flywheel. For each direction of rotation, the flywheel is fitted with a clutch which couples the flywheel to a wrench holder.

Each shaft is furnished with a control handle.

The handle on the right shaft connect and disconnect the flywheel and controls the flywheel brake.

The button on the left shaft operates the clutch, interconnecting flywheel and wrench holder. The energy of movement of the flywheel is imparted to the wrench holder. The rotation of the flywheel is checked by the resistance of the wheel nut. If the resistance of the wheel nut is bigger than the energy of movement of the flywheel the flywheel stops.

ADJUSTMENT OF WORKING HEIGHT

With the machine positioned horizontally - press the left hand handle and lift or press the machine body up or down on its stand.

Notice! There are many different ways to adjust the height of the machine body:

- I)** For instance by blocking one wheel of the nut runner with your foot and pull or press the shafts upwards or downwards. This method is fast and comfortable but requires some practice and technique.
- II)** An other method and probably the most common to adjust the height is to point at the wheel nut of the vehicle and lift or press down the machine body by the shafts.
- III)** The most common method by the non-experienced user, is to gripe the plastic knob and lift or press down the machine body. However - this method is very slow and uncomfortable and should only be used when you put the machine aside after having finished the work.

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- **UNDOING WHEEL NUTS**

- Vehicles with deactivated parking brake should be secured by wedges at the wheels.
- Lift the vehicle to a suitable height and make it safe using stands or similar.
- Put a suitable socket on the wrench holder (300).
- Switch on the motor with the switch (1140) to run in the desired direction of rotation.
- Pull the left hand handle and adjust the machine body into desired position. See: "Adjustment of height".
- The socket is then guided on to the wheel nut.
- The guiding on of the socket to the wheel nut facilitates by rotating the socket tube. This is made by simultaneously pressing the right hand handle(1910) and pushing the impact button (1930).
When the socket is brand new or there are layers of dirt or paint on the wheel nut, one may have to rotate the wrench holder tube by hand to facilitate the guiding on of the socket. Clean the wheel nut if necessary.
When working with un-braked wheels, the recommended working position is: - nine o'clock for undoing the wheel nuts and three o'clock for tightening the wheels nuts. Otherwise the torque of the nut runner tends to rotate the wheel of the vehicle and lift the machine.

NOTICE! *To prevent loss of power, make sure that the wrench holder tube is in line with the wheel nut.*

- Pull the right hand handle and wait until the flywheel (500) has reached full rotation.
- Release the right hand handle a little to decrease the drive between the motor and the flywheel. Simultaneously push the impact button (1930). **Immediately release the impact button after the impact is completed. These two manoeuvres must be done simultaneously.**

Always release the right hand handle at each impact, otherwise the electric motor may overheat and get damaged.

Notice! *The impact button (1930) must always be pressed hard enough to produce a clean and correct impact - i.e. full connection between the angle pawl and the shoulder of the wrench holder. Only this produces a clean and powerful impact and a complete stop of the flywheel after the impact.*

If the pressure on the impact button is not hard enough, the angle pawl (620) may slide off the shoulder of the wrench holder (300) and damage the impact mechanism.

Notice! *Never run the nut runner with the impact button (1930) and the right hand handle (1910) constantly activated. This can produce a series of powerless blows which seriously damage the parts of the impact mechanism.*

The nut runner must only give one clean and powerful impact at each impact. The flywheel then comes to a complete stop.

Notice! *You will damage the impact mechanism of the wheel nut runner if you make too many impacts on a nut which doesn't move or come loose. If the wheel nut doesn't move after approx. five impacts, check what is wrong with the screw joint and take necessary steps to remove the nut. After too many impacts on a nut that does not move, the wheel bolt will crack and must be replaced.*

NOTICE! *If the right hand handle is not released enough it may happen that the angle pawl (620) jams. If it jams, declutch by releasing the right hand handle. If this doesn't help, reverse the motor and run in the opposite direction of rotation to release the angle pawl.*

- To impart a new impact, - pull the right hand handle again and press the button when the flywheel has come to full rotation.
- Repeat the impacts until the nut is completely loosened.
- To transport the wheel nut from the inner to the outer position keep both the right hand handle and the impact control-lever down until the nut is completely undone.

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TIGHTENING OF WHEEL NUTS

Before you fit the wheel and nuts, make sure that the contact surfaces between the wheel and hub are free from rust and dirt, and that the rest surfaces are okay.

Carefully clean and lubricate the nuts, washers and studs.

NOTICE! Damaged nuts and bolts must always be replaced in order to obtain the exact prescribed press force of the screw joint. The wheel nuts must be tightened accordingly to the sequence prescribed by the manufacturer.

- Screw on the nuts a couple of turns by hand.
- Proceed as above: "UNDOING WHEEL NUTS" but in reverse order.
- When the nut has come into its bottom position (end of the run-up phase) the flywheel stops, immediately release the button and the right hand handle - declutching the electric motor.

Always release the right hand handle at each impact, otherwise the electric motor may overheat and get damaged.

- For each following impact, the tightening force increases according to the figures below.

MEAN TIGHTENING TORQUE

Run-up phase approx	370 Nm	37 kpm
1 st impact	520 Nm	52 kpm
2 nd impact	640 Nm	64 kpm
3 rd impact	710 Nm	71 kpm

Notice: every following impact increases the torque. Hence, too many impacts may damage the screw joint as well as the rim and hub.

The above figures are obtained from a test carried out by the Chalmers Testing Institute in Gothenburg. These figures must only be used as a guide line.

Notice! - To get the exact prescribed torque at the final tightening phase a manual torque wrench should be used. The wheel nuts must always be tightened and retightened accordingly to the prescription of the vehicle manufacturer.

SERVICE AND MAINTENANCE

To retain the best possible functioning, the machine must be kept free from dirt and dust.

The moving parts must be lubricated regularly with oil.

Grease the bearing of the wrench holder tube with motor oil. Remove the flywheel cover (1600). Tilt the machine forward. Move the flywheel backwards with your hand in order to open the gap between the flywheel and the rear end of the wrench holder tube. Drop some motor oil into the gap between the flywheel and the rear end of the wrench holder. Let the machine remain tilted for a while, allowing the oil to penetrate into the bearing. Grease the flywheel shaft with motor oil. Tilt the machine backwards and drop some motor oil into the hole indicated oil on the wrench holder tube. Let the machine remain tilted for a while so that the oil can penetrate into the bearing. All moving parts of the machine such as - lift spring unit, wheel axles, handles, rocker arm bushings, wire attachments, trunnions etc. must be lubricated regularly with motor oil.

Keep the shafts of the lift stand clean. This makes the height adjustment easy.

Notice! Grease or oil on the shafts makes dirt and dust fasten easily to the shafts and makes the height adjustment heavy.

Be careful with oil near the clutch and brake linings!

CHANGING AND ADJUSTMENT OF DRIVE BELT

Note! Drive belt wax must not be used. It will damage the brakes of the machine and the machine will not work properly.

Remove the cover (1800).

Undo the belt tension screw (1430 left) to slacken the belt tension.

Undo and remove the rear nut of the flywheel shaft (400).

Release the flywheel brake by undoing the brake adjustment screw - at right.

Pull out the flywheel assembly enough to remove the front nut of the flywheel shaft.

Pull out the whole assembly - flywheel and wrench holder with shaft (500, 310)

Place the new drive belts around the motor pulley and at the inside of the drive belt cover.

Insert the flywheel assembly and lift the clutch brake (700) a little to allow the clutch carrier (550) to enter. Fit the front nut and the locking washer (Nord Lock) to the shaft before guiding the whole unit into its final position.

Check that the drive belts are well positioned.

Adjust the **flywheel's axial clearance (about 0, 5 mm)** with the front nut of the shaft, and tighten the flywheel shaft with the rear nut. **Check after that that the clearance is okay, i.e. the flywheel (500) and wrench holder tube (300) should rotate freely when you move it by hand.**

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Make sure that the push rod (1210), between the motor and the adjustment screw is correctly positioned. Start the electric motor and adjust the belt tension by tightening the adjustment screw (1430). Then check that the electric motor stops at full resistance. There should be a gap between the handle and the shaft of about 5 - 15 mm. I.e. at full resistance the motor should stop before the right hand handle reach the bottom.

Never run the electric motor more than three seconds in blocked position, otherwise the motor may overheat and get damaged.

Readjust the belt tension if necessary and check again.

Notice! A correct belt tension is of most importance to get clean impacts and full power out of the machine.

Notice! The shape of the right hand handle must not be changed by bending it upwards. The movement of the handle will then be too small to give full belt tension.

Adjust the flywheel brake, so that the flywheel stops within around 2 seconds.

Notice - the flywheel brake is released as soon as the right hand handle is operated.

CHANGING AND ADJUSTMENT OF LIFT SPRING

Remove the cover (1800) and lift the machine body up to its upper position.

To release the tension of the lift spring (210), use two screw drivers - 6 mm thick and about 200mm long.

Insert one of the screw drivers into a hole in the tensioning roller (230). Turn the roller and remove the retaining pin (270). Then release the spring tension, step by step by using the two screw drivers.

Remove the forward and reversal switch (1140).

Compress the spring unit so you can grip the shaft (250) with a pair of pliers. Protect the shaft from being damaged by the pliers. Push the shaft backwards some millimetres. Grip the shaft in the rear end, and pull out.

Remove the spring unit upwards. Replace the damaged parts.

Make sure that there are no damages on the shaft (250), so that the rollers (200) and (230) can rotate freely on the shaft.

When fitting a new lift spring, it is important that the hooks of the lift spring fit well into the holes of the lift drum (200) and the tensioning roller (230). If not - adjust the holes with a drill so that the hooks perfectly enter the holes, and the ends of the spring touch the rollers.

If the original holes turn out to be too big after the adjustment and the spring risks to slip out of the holes, new holes can be drilled close to the old ones.

The new hole of the lift drum (200) should be drilled approx. 15 mm clockwise from the old hole.

To prevent the end of the spring hook from coming out at the grooves of the lift drum, the new hole of the lift drum should be drilled as close as possible to the peg of the lift drum. Before you drill the holes, put a mark on each roller indicating the direction of the hooks of the lift spring and drill in the direction of the marks.

To get as good position as possible of the new lift spring, the new holes must be drilled in the exact direction of the hooks of the new spring then it will fit and work well.

Notice - never try to adjust the ends of the new spring. This will reduce the strength of the spring.

All details – shaft (250), rollers (200 and 230), guiding sleeve (220) and lift spring (210) – should be greased with motor oil or grease for best function.

Compress the spring unit and fit it into the machine. Line up the holes in the rear end. Insert the lift shaft into the tensioning roller and the lift drum - chamfered end of the shaft backwards. Make sure that the lift shaft fully enters its hole in the front panel of the machine body then lock the wire in the upper wire attachment bar.

Fit the forward and reversal switch.

Wind up the wire on the lift drum by rotating the spring unit by hand. Keep the wire tensioned so it stays in the grooves of the lift drum. Check that the wire is correctly winded on the lift drum.

Tension the lift spring and lock with the pin (270). Check that the lift and lowering force is well balanced. If not adjust the lift spring until correct balance is achieved.

Always make sure that all parts are greased with motor oil.

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INSTRUCTIONS FOR REMOVING AND FITTING OF THE PAWL LINK PIN

Notice! The lock-screw (650) of the pawl link pin (660) is covered by a lock washer secured with two welding spots.

Removal of the pawl link pin:

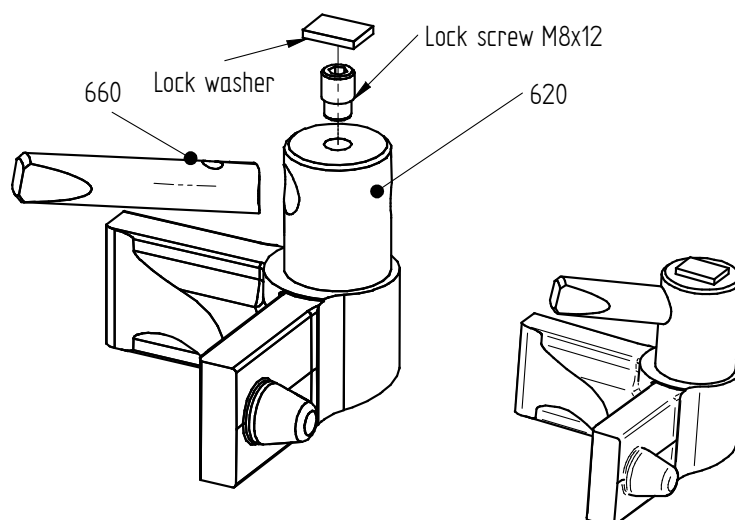
Remove the welding spots of the lock washer with a grinding machine. Remove the lock-screw with an in-set (Allen) key. Then remove the pawl link pin. If necessary drill a hole of about 3 mm Ø through the flywheel drum just beneath the end of the pawl link pin. **Notice!** The hole must be in line with the pawl link pin when the pin is in its left position - this to make it possible to drive out the pin with a drift.

Fitting of the pawl link pin:

Inspect the old angle pawl (620). If it is in good condition it can be used again. Before you fit the new pawl link pin make sure that the rests of the welding spots and the lock washer have been completely removed from the angle pawl. Grease and fit the angle pawl. Turn the angle pawl to the left and insert the pawl link pin into the hole. If necessary use a small hammer to press the pin into the hole. Before you fit the lock-screw, make sure that the hole for the lock-screw is well centred in the angle pawl, if not adjust it. Tighten the lock-screw as hard as possible. Grind down the lock-screw to the surface of the shaft of the angle pawl. Place a strip of steel of maximum 2mm in thickness above the lock-screw and secure it by a couple of welding spots.

Notice! A welding electrode with about 50% nickel (Ni) and 50% iron (Fe) should be used for this purpose. If you don't have any welding facilities, you must lock the lock screw with **Lock Tite 620** or any other corresponding brand.

Important! Make sure that the thickness of the lock washer including the welding spots do not exceed 3mm measured from the surface of the shaft to the top of the welding or lock washer. **Notice!** If it exceeds 3mm it can hook in to the flywheel brake and cause damages to the brake and other components. Also make sure that the angle pawl can move freely from side to side.



Any modifications or alterations of the construction of the machine, affecting the function negatively and not having been sanctioned by the manufacturer automatically annul the factory warranty.