

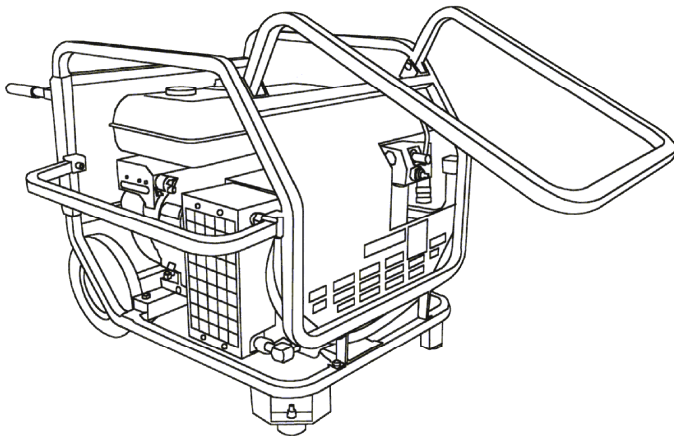
SAFETY MANUAL

USE AND MAINTENANCE

DECEMBER 2010 – 2nd ISSUE

HYDRAULIC POWER PACK

RAPTOR D



IMPORTANT

READ THIS MANUAL BEFORE
USING THE TOOL

KEEP ALWAYS FOR FUTURE
REFERENCES



HYDRAULIC TOOLS

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INTRODUCTION

Dear customer,

Congratulations for having purchased a **DOA** product. The machine you bought, was manufactured with high quality materials to assure your maximum satisfaction and a long lasting service without problems. For your safety and obtaining the best result, we recommend to read this manual and respect the simple instructions contained, this will protect you from accidents and avoid damages to the equipment.

Keep it always available together with its enclosures, so that it can be consulted when necessary.

IMPORTANT

SOME ENCLOSURES CONTAINING INFORMATION ABOUT ACCESSORY PARTS OR SAFETY MANUALS OF THE MANUFACTURERS OF EXPLOSION ENGINES, ALTERNATORS OF OTHER SUBCOMPONENTS OF DOA TOOLS, COULD HAVE BEEN SUPPLIED TOGETHER WITH THIS MANUAL.

THESE ENCLOSURES ARE AN INTEGRAL PART OF THE MANUAL AND THEY MUST BE KEPT TOGETHER WITH THE MANUAL ITSELF..



BE CAREFUL WHEN YOU CONNECT THE POWER PACK TO AN UNKNOWN HYDRAULIC TOOL OR A TOOL WHICH WE DON'T KNOW THE HYDRAULIC MAXIMUM TOLERABLE VALUES OF PRESSURE AND FLOW OF. FOR AVOIDING ACCIDENTS AND DAMAGES TO THE EQUIPMENT, BE SURE THAT THE MAXIMUM VALUES OF PRESSURE AND FLOW OF THE TOOLS CONNECTED TO THE POWER PACK ARE COMPATIBLE WITH THOSE ONE OF THE POWER PACK ITSELF.

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SAFETY SYMBOLS

SAFETY SYMBOLS

This manual contains safety warnings represented by symbols indicating three different levels of danger:



This symbol indicates an operation or situation extremely dangerous which can cause serious accidents or death if proper precautions are not respected



This symbol indicates a dangerous operation or situation that can cause serious accidents or death



This symbol warns about generic danger that can cause accidents and damages to the equipment or the properties.



This symbol indicates important information

IMPORTANT

WHEN THE EFFECTS OF A CERTAIN ACTION ARE NOT EXACTLY KNOWN, REMIND THAT EVEN THE SIMPLEST OPERATION MAY HIDE DANGERS.

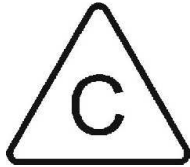
IN CASE OF DOUBTS DO NOT RISK – DO NOT MAKE EXPERIMENTS!

ASK YOUR **DOA** DEALER OR YOUR FOREMAN.

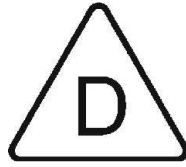
PRODUCT DESCRIPTION

DESCRIPTION

RAPTOR D is a hydraulic power pack powered by ga diesel engine. The power pack can deliver a hydraulic power for tools of the groups :



20 l/min 140 bar
(5 gpm - 2000 PSI)



–

30 l/min 140 bar
(8 gpm - 2000 PSI)

Values belonging to **EHTMA** (European Hydraulic Tools Manufacturers Association) standard.
The power packisare equipped with a hydraulic gear pump and heat exchanger with centrifugal fan, designed for guaranteeing the ideal values of cooling of the hydraulic oil also during summer.
The engine acceleration is **MANUAL** by the mean of a acceleration lever .

TYPICAL APPLICATIONS

POWERING OF HYDRAULIC TOOLS: breakers, dewatering pumps, hammer drills, disc cutting-off machines, pruners, drills, ventilators, etc.

ACCESSORIES

- HYDRAULIC HOSES OF 7 m. WITH QUICK COUPLERS
- HYDRAULIC HOSES OF 10 m. WITH QUICK COUPLERS
- PLASTIC PROTECTIVE COVER

TECHNICAL CHARACTERISTICS

GENERAL VIEW – MAIN COMPONENTS AND THEIR FUNCTIONS

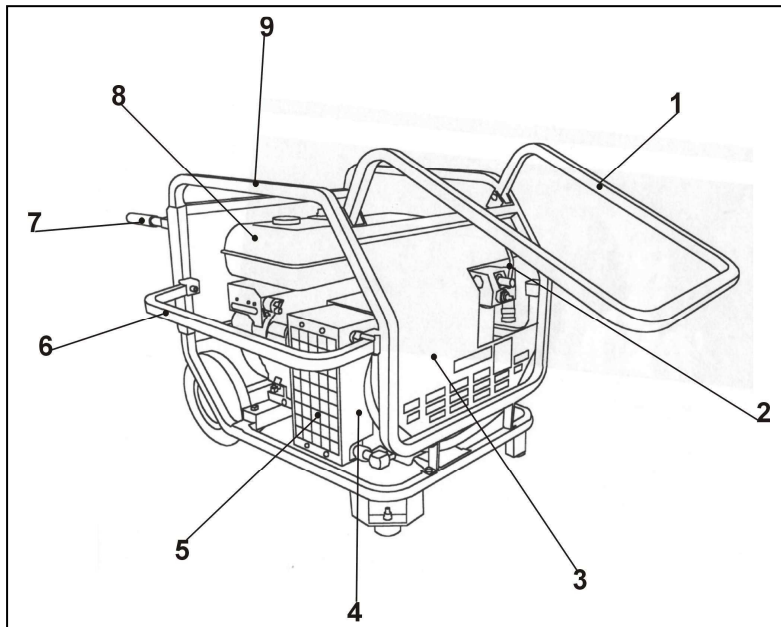
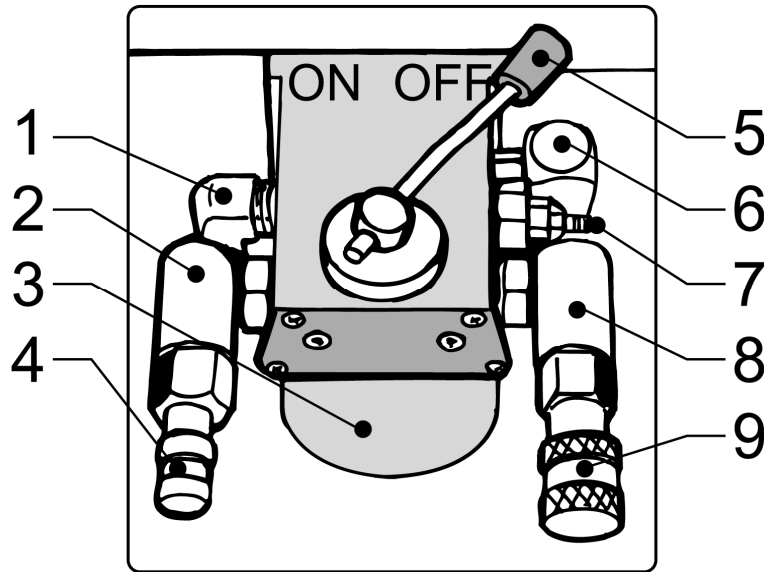


Fig. 1 -HYDRAULIC POWER PACK MODEL RAPTOR D

1. **FOLDING HANDLE** is a long handle allowing a comfortable manoeuvrability of the power pack on the ground, both pulling and pushing. Its length assures that feet are not bumped when the power pack is moved pulling it
2. **ON/OFF FLOW LEVER** (see description in the following chapter)
3. **FRONT PANEL** on the panel there are the various stickers with working instructions, etc.
On some models on the panel there is the hour meter. The panel of some models of RAPTOR there is the flow selection lever that has two positions , the upper position is for selecting 20 liters flow, the lower position selects 30 liters flow, in both position the acceleration is automatic by power on demand ram.
4. **TANK – CONVEYOR BLOCK** is a unit manufactured in sheet steel containing the hydraulic oil tank, air conveyor and all the accessory parts of the power-pack hydraulic part.
5. **HYDRAULIC OIL COOLER** is an aluminium highly-efficient model controlling the oil temperature. It is protected by a bumper grid
6. **SIDE FOLDING HANDLE** allows a comfortable gripping of the power pack and carries out also the function of side bumper bar
7. **REAR FOLDING GRIP** gives a comfortable gripping of the power pack in the rear part.
8. **DIESEL ENGINE MODEL YANMAR or HATZ**
9. **UPPER FRAME** consists of a strong square stainless steel tube.

VIEW OF THE PANEL AND CONTROL VALVE BLOCK



THE VALVE BLOCK is the seat of all components that controls the hydraulic circuit, the part is obtained working a laminated aluminium block

1. **OIL INLET HOLE** – oil enters in pressure in the valve from this hole
2. **ROTATING JOINT** is an adjustable joint where the quick couplers are installed. It permits to fold the quick coupler after the use protecting it against shocks. It also allows the flexible hose to have a natural bend avoiding sharp bends.
3. **FILTER CARTRIDGE** is the hydraulic oil filter. It can easily substituted but it cannot be maintained
4. **MALE QUICK COUPLER** is the quick coupler which the oil comes out under pressure through from "P" power pack. The male quick coupler should always be installed in this position for guaranteeing the right circulation of the oil.
5. **ON/OFF FLOW LEVER** is the lever which the oil is sent to flexible hoses and hydraulic tool through. **It is OFF placed rightwards, it is ON placed leftwards.**
The lever should always be in OFF position at the end of operations or when the engine is started and when the Manta power pack is used as a generator. The illustration shows the lever as installed on the model SCORPION (pointed to the center of the pack), on the RAPTOR D the lever is installed on the front part (pointed to the exterior) but the sense of the ON OFF position is the same , the RAPTOR D imagine of the flow is on the illustration at page 11
6. **OIL OUT LET HOLE** On the model RAPTOR D this hole is plugged as the oil baypasses to tank from an internal passage.
7. **PRESSURE RELIEF VALVE** is the valve adjusting the maximum value of the hydraulic pressure of the power pack. It is adjusted originally at a value of 140 BAR. It can be adjusted at different values of pressure
8. **ROTATING JOINT** is an adjustable joint where the quick couplers are installed. It permits to fold the quick coupler after the use protecting it against shocks. It also allows the flexible hose to have a natural bend avoiding sharp bends..
9. **FEMALE QUICK COUPLER** is the quick coupler which the oil returns to tank "T" The female couplers is in communication with tank and should always be installed in this position for guaranteeing the right circulation of the oil.

HYDRAULIC POWER PACK **RAPTOR D**

TECHNICAL CHARACTERISTICS

WEIGHT AND DIMENSION

WEIGHT (dry)	Kg	98
HEIGHT	cm	65
LENGTH	cm	85
WIDTH	cm	60

HYDRAULIC CHARACTERISTICS

FLOW min max	L/min	15 30
PRESSURE	Bar	130
OIL TANK CAPACITY	liters	10
ON/OFF VALVE TYPE	3 WAY – OPEN CENTER	
GROUP EHTMA	C - D	

ENGINE CHARACTERISTICS

ENGINE TYPE	DIESEL SINGLE CYLINDER
BRAND AND MODEL (STD version)	YANMAR 10,5 HP
POWER	10,5 HP (7,7 KW)
STARTING	ELECTRIC AND RECOIL
ENGINE ACCELERATION	MANUAL with lever
FUEL	DIESEL FUEL
BATTERY TYPE	12 V

HYDRAULIC OIL

Viscosity at the lower expected ambient temperature: max 68 cSt (9°E)
 Viscosity at the higher expected ambient temperature: min. 22 cSt (3.10°E)
 (cSt = centistokes °E = Engler degrees)

HYDRAULIC OILS CORRESPONDENCE CHART

The following chart indicates the most common hydraulic oils recommended for DOA hydraulic tools and power packs. The oils in the chart are suggested for standard temperatures; the left column indicates oils for Winter operations; the right column shows the Summer ones. HYDRAULIC OILS OF OTHER BRANDS CAN ALSO BE USED BUT THEY SHOULD HAVE EQUIVALENT CHARACTERISTICS TO THOSE OF THIS CHART.

HYDRAULIC OIL – CORRESPONDENCE		
	WINTER TEMPERATURES	SUMMER TEMPERATURES
AGIP	ARNICA 32	ARNICA 46
BP	HLP HV 32	HLP HV 46
CASTROL	HYSPIN AWH 32	HYSPIN AWH 46
ELF	HYDRELF DS 32	HYDRELF DS 46
ESSO	INVAROL EP 32	INVAROL EP 46
MOBIL	DTE 13	DTE 15
Q8	HAENDEL 32	HAENDEL 46
SHELL	TELLUS T 32	TELLUS T 46

If you use the hydraulic tools in extreme climatic conditions, please contact DOA for more information.

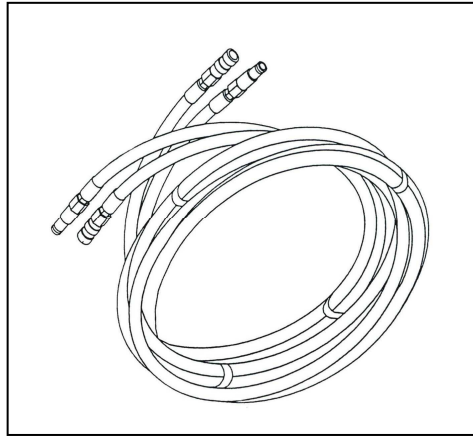
NOTE !

IN CERTAIN COUNTRIES OR IN SOME SPECIAL APPLICATIONS THE USE OF **BIODEGRADABLE OIL** IS PRESCRIBED BY LAW, IN THIS EVENTUALITY CONTACT **DOA** FOR MORE INFORMATION.

NOTE !

NORMALLY THERE ARE NO PROBLEMS OF HYDRAULIC-OIL COMPATIBILITY (MIXING DIFFERENT TYPES OF OILS) WHEN A DOA TOOL IS CONNECTED TO THE CIRCUIT OF AN EARTH MOVING MACHINE OR ANOTHER OPERATING MACHINE, IF THE OIL OF THESE MACHINES IS OF A GOOD QUALITY AND REGULARLY FILTERED.

FLEXIBLE HOSES



THE POWER PACK ARE USUALLY EQUIPPED WITH A COUPLE OF HYDRAULIC FLEXIBLE HOSES OF 7 M. OF LENGTH COMPLETE WITH FLUSH-FACE QUICK COUPLERS

- The following general information can be useful in case of new hose supply or when it is necessary to use hoses with different extensions than the standard ones.

THE FLEXIBLE HOSE consists of a couple of parallel hoses (a PRESSURE hose and a RETURN hose) that connect the hydraulic tool to the power source..

When it is possible, do not use long hoses. The flexible hose should be long enough to permit a good manoeuvrability of the tool but not too long, as a very long hose can be heavy, difficult to transport and to handle and may also cause loss of power.

A flexible hose of ten meters is adequate in most of the cases to guarantee a good manoeuvrability. If a longer hose is necessary, just connect a second extension hose to the first one.

NOTE !

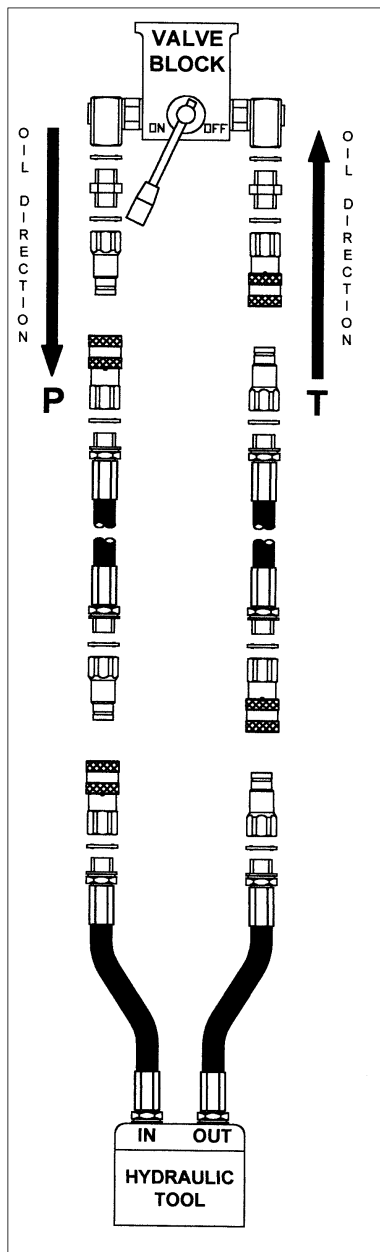
- THE FLEXIBLE HOSE ALWAYS REMAINS FULL OF OIL. THE FIRST TIME A NEW HOSE IS USED, IT WILL GET FULL OF OIL TAKING IT AWAY FROM THE HYDRAULIC CIRCUIT. IT WILL BE THEN NECESSARY TO RESTORE ADEQUATELY THE OIL LEVEL IN THE TANK.
- THE FLEXIBLE HOSES ARE ALWAYS IN CONTACT WITH THE GROUND AND ARE SUBJECT TO STRONG VIBRATIONS AND ABRASION, THUS THEY SHOULD BE RESISTANT TO WEAR AND ABRASION.

FLEXIBLE HOSE – TYPE AND DIMENSIONS

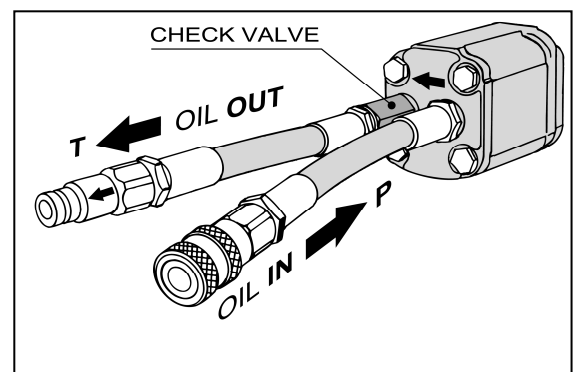
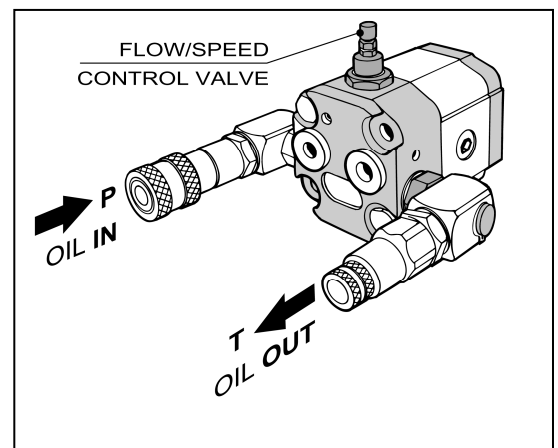
HOSE LENGTH	PRESSURE HOSE DIMENSION – (FITTING TYPE)	RETURN HOSE DIMENSION - (FITTING TYPE)
UP TO 15 METERS	1/2" SAE 100 – R1 (1/2" BSP MALE)	1/2" SAE 100 – R 1 (1/2" BSP MALE)

THE DIMENSION AND TYPE OF HOSES OF THE CHART REFER TO APPLICATIONS OF HYDRAULIC TOOLS WORKING WITH MAXIMUM FLOW OF 34 L/MIN.

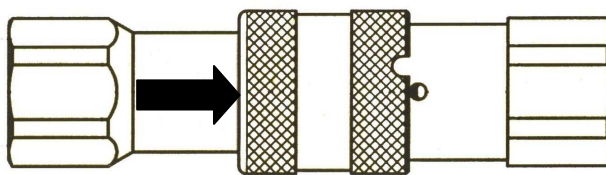
FOR HOSES EXCEEDING 15 METERS, OR WITH HYDRAULIC FLOWS HIGHER THAN 34 LITRES PER MINUTE, CONTACT DOA FOR INFORMATION.



- THE ILLUSTRATIONS SHOWS THE COUPLERS INSTALLATION SEQUENCE ON THE POWER PACK, ON THE HOSES AND ON



QUICK COUPLERS



The DOA power packs and hydraulic tools are equipped with flush-face quick couplers as those one shown in the picture.

The following paragraph supplies information about the couplers and their use.

The standard quick couplers for hydraulic tools recommended by the ETHMA association are:

FLUSH-FACE QUICK COUPLERS

A COMPLETE QUICK COUPLER consists of a male and female element. (see picture)

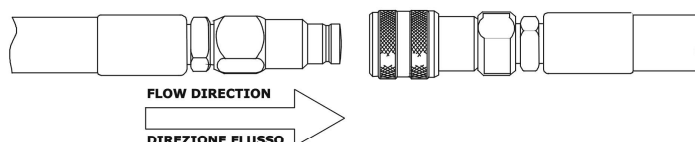
The flush-face quick couplers are STANDARDIZED, and they can be found at the major manufacturers.

The flush face quick couplers grant the best values of oil slipping, generate minimum pressure drops, are easy to clean, do not drip during the operation of even accidental connection / disconnection, and above all they are perfectly sealed out the dirt. This is a very important characteristic for preventing oil contamination and damages to the tools.

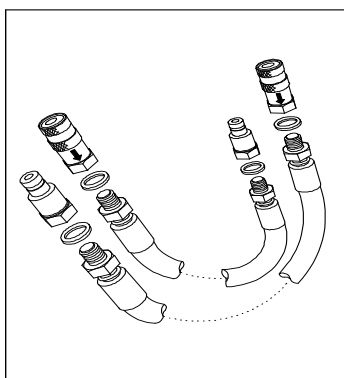
FLOW DIRECTION AND INSTALLATION OF THE QUICK COUPLERS

The ideal flow direction is from MALE → FEMALE.

An arrow is punched on the couplers showing the right direction.



The couplers must be installed on the flexible hose, power packs and tools, respecting the sequence previously described. The following illustration shows the right installation of the couplers on the hoses. If the couplers are properly installed, wrong or inverted connection will be impossible and it won't be necessary to pay attention making a connection. Every coupler will be connected in the right way.



USE OF THE QUICK COUPLERS

CONNECTION

- Make sure that the contact surfaces of the couplers are clean and if necessary wipe the dirt with a rag.
- Position the male coupler towards the female one, centring them.
- Press the male coupler against the female one.
- A “click” indicates that the proper connection is made.

NOTE !

IF A PROPER CONNECTION CANNOT BE MADE EVEN PRESSING THE COUPLERS WITH STRENGTH, IT IS POSSIBLE THAT ONE OR BOTH COUPLERS ARE PRESSURIZED. FOR MAKING THE CONNECTION IT WILL BE THEN NECESSARY TO TAKE AWAY PRESSURE BY UNSCREWING THE COUPLERS FROM THEIR FITTINGS AND ALLOW SOME OIL DROPS TO COME OUT.

IT IS ALWAYS A GOOD PRACTICE FOR AVOIDING PRESSURE TRAPPING BEHIND THE COUPLERS, FIRST TO CONNECT THE RETURN HOSE AND DISCONNECT IT LAST

DISCONNECTION

- Position the knurled bushing of the female coupler so that its slot is in front of the steel ball.
- Push the bushing against the steel ball.
- The male coupler will be released and a “click” will show the disconnection.

OTHER ADVICE

- The connection/disconnection of the couplers must be done always **WITHOUT OIL CIRCULATION – WITHOUT PRESSURE**.
- Disconnect and connect the tools from hoses and power source, just after having set the level of the flow switch valve in **OFF POSITION**.
- The quick couplers must be dismantled from the power pack only with the engine **OFF**.
- If you mount or dismount the quick couplers, use only the right wrenches. If improper tools are used the coupler hexagon can be easily spoiled.
- The quick couplers **CANNOT BE REPAIRED**. Discard immediately damaged or deformed couplers and not force the connection if one coupler is damaged. In this case the damaged coupler will immediately damage also the other good interface.

SAFETY RULES

GENERAL SAFETY INSTRUCTIONS



THE FOLLOWING INSTRUCTIONS ARE GENERAL SAFETY RULES AND HAVE TO BE RESPECTED IN EVERY WORKS WITH POWER PACKS AND HAND TOOLS. WE RECOMMEND TO FOLLOW THEM CAREFULLY IN ORDER TO AVOID ACCIDENTS AND DAMAGES TO THE EQUIPMENT AND THINGS.

- Wear ALWAYS the hard-helmet, safety goggles, gloves, safety shoes, ear protections and, when it is prescribed, a dust mask.
- Wear tight-fitting clothes and avoid operating with short trousers or t-shirts, or other bare parts of the body. Pay attention to long loose hair, gather them to prevent they get in contact and trapped in moving parts.
- Before operating, PREPARE ALWAYS A WORKING PLAN that considers and foresees problems, interruptions and avoids most of all dangerous situations. This little operation strategy, guarantees safety and improves productivity
- Place always the power pack in a plan level, in a sure and stable position protected from the traffic and in a well visible position. Signal one's position not to cause danger for oneself and others.
- If the power pack is transported on vehicles, be sure that it is well positioned on board and it is blocked on the loading platform for avoiding dangerous jerks, bumps or overturning.
- Work only in good physical and mental conditions. Always pay the maximum attention!
- Do not work on unstable or adapted supports (such as oil cans, boxes, wheelbarrows, etc.). If you need to work in elevated positions, use only stable and safe supports approved by the local safety rules.
- When you operate in difficult positions, do not reach out and never lean against the tool. Keep the balance on your legs.
- Be sure that the equipment is in perfect working conditions, without oil leaks.
- Keep the protection devices always in good conditions and preserve the readability of the safety stickers.
- The working area must be examined and well-known to avoid unexpected situations. If you work along roads, make well visible your position and warn the traffic by the use of signals, flashing lights, or other prescribed road signs.



- **WORK ONLY IF THE ENGINES ARE OUTSIDE OR IN A WELL VENTILATED POINT. THE EXHAUST GAS OF THE ENGINES IS ODOURLESS AND ITS INHALATION CAN CAUSE SERIOUS OR FATAL ACCIDENTS.**

THE CONTACT WITH ELECTRIC ENERGIZED LINES CAN BE FATAL

- Pay the maximum attention when you cut, demolish, drill, etc. near energized electric lines that can be buried, walled or hidden.
- Be very careful also to gas and water pipes, telephone lines or other buried cables or ducts.
- The working area must be free from objects that may fall, get spoiled, catch fire, make trip up or make the operation difficult or dangerous.
- Warn and move away imprudent bystanders or other people not authorized or involved with the job.
- If you work in narrow or closed rooms always plan a way out that must be kept free.
- Make sure that the operation point is the right one and that there are the proper authorizations of the owners before starting the works.
- Before working always foresee where the demolition fragments, water pumped, sparks or splinters are going to stop and plan the opportune defences and counter measures.
- Before using the equipment make sure and prevent vehicles, machines or people from passing on the equipment hoses or cables.
- Always connect tools to the power pack or other power sources before starting the engine.
- Keep in a safe dry place this manual and its enclosures, so they can be always available for future consultations.

USE OF THE POWER PACK

WHAT NOT TO DO



THE FOLLOWING LIST IS GIVEN FOR DESCRIBING THE MORE COMMON ERRORS OR IMPROPER AND DANGEROUS USE OF THE POWER PACKS. SINCE IT IS IMPOSSIBLE TO FORESEE ANY DANGEROUS SITUATIONS, THE RULES ARE NOT SUFFICIENT TO GUARANTEE THE TOTAL SAFETY. IT'S RECOMMENDED TO USE ALWAYS THE MAXIMUM CAUTION IN EVERY CIRCUMSTANCES.

IN CASE OF DOUBT DO NOT RISK, BUT ASK YOUR FOREMAN.

- DO NOT USE THE POWER PACK AND THE TOOL IF THERE COULD BE THE POSSIBILITY OF GETTING IN CONTACT WITH ENERGIZED ELECTRIC LINES OR PRESSURIZED PIPES.
- DO NOT START OR USE THE POWER PACK AND THE EQUIPMENT IN CLOSED ROOMS WITHOUT VENTILATION , BE CAREFUL IF THERE ARE STRANGE ODOURS, THEY MAY BE DANGEROUS GASES OR EXHALATIONS.
- DO NOT START THE POWER PACK AND ITS TOOL IF THEY ARE DAMAGED, THERE ARE OIL LEAKS OR SOME PARTS ARE MISSING OR WRONGLY INSTALLED.
- DO NOT ALLOW THE USE OF THE EQUIPMENT TO PEOPLE THAT ARE NOT TRAINED OR WHO HAVE NOT READ THIS MANUAL.
- DO NOT WORK IF YOU ARE NOT IN PERFECT PHYSICAL AND MENTAL CONDITIONS.
- DO NOT WORK ALONE WHEN IT IS POSSIBLE, MAKE SURE THAT SOMEBODY KNOWS WHERE YOU ARE AND WHAT YOU ARE DOING.
- DO NOT BELIEVE IN MESSAGES OR VOICE WARNINGS GIVEN TO COLLEAGUES IN NOISY ROOMS. BE SURE THAT THE WARNING HAS BEEN CORRECTLY UNDERSTOOD.
- DO NOT "POINT" THE TOOL AGAINST COLLEAGUES
- DO NOT STAY WITH THE FACE TOO CLOSE TO THE TOOLS
- DO NOT FILL WITH FUEL WHILE SMOKING
- DO NOT FILL WITH FUEL OR OIL WITH HOT ENGINE. DO NOT USE IMPROVISED OR DIRTY CONTAINERS OR FUNNELS. THIS CAN CAUSE ACCIDENTS, DANGEROUS SITUATIONS AND FAILURES IN THE EQUIPMENT.
- KEEP THE POWER PACK AWAY FROM INFLAMMABLE MATERIALS. DO NOT WORK IN ENVIRONMENTS WITH VAPOURS AND GASES OR UNKNOWN ODOURS.

- DO NOT TRY TO REPAIR THE EQUIPMENT IF YOU ARE NOT A QUALIFIED PERSON. REPAIRS NOT WELL DONE OR USING INAPPROPRIATE PARTS CAN CAUSE DANGEROUS SITUATIONS
- DO NOT CARRY OUT CONTROLS ON THE POWER PACK CHECKING OR TOUCHING WITH BARE HANDS AND ENGINE ON. ALWAYS STOP THE ENGINE AND COOL DOWN THE EQUIPMENT BEFORE CHECKING AND CLEANING IT
- DO NOT PULL THE FLEXIBLE HOSES OF THE POWER PACK. IF THE MACHINE SHOULD BE REPOSITIONED USE THE PROPER HANDLES.
- DO NOT TRY TO LIFT THE POWER PACK ALONE FOR LOADING OR UNLOADING IT FROM VEHICLES. THIS CAN CAUSE DANGERS AND ACCIDENTS

BEFORE WORKING

NOTE !

THE FOLLOWING INSTRUCTIONS AND CHECKS SHOULD BE CARRIED OUT EVERY TIME THE POWER PACK IS USED AFTER A PERIOD OF INACTIVITY OF THE MACHINE OR WHEN IT IS USED BY OTHER PEOPLE

1. CHECK THE LEVEL OF THE ENGINE OIL with cold engine and with the machine in horizontal position visualize its level on the level indicator and fill if necessary
2. CHECK THE FUEL LEVEL be sure that the tank contains enough fuel for finishing the work, fill it if necessary using an appropriate fuel, DO NOT FILL WITH STARTED ENGINE !
3. CHECK THE LEVEL OF THE HYDRAULIC OIL, fill with the same and compatible hydraulic oil than that one of the tank – do not exceed the suggested level, the level should be visible from the level indicating eye. In case of very cold temperatures, follow carefully the instructions “ starting at low temperatures “ below described
4. CHECK THAT THE TOOL USED AND THE POWER PACK HAVE COMPATIBLE HYDRAULIC CHARACTERISTICS – IN CASE OF DOUBT DO NOT RISK but ask your DOA dealer or your foreman.
5. CLEAN THE POWER PACK PROPERLY if it is dirty, in particular clean the cooler eliminating mud or dirt, use compressed air if necessary (see chapter ” cleaning and maintenance of the equipment “). Check and clean also the suction mouth of the cooler cooling air.
6. CHECK THAT ALL THE EQUIPMENT IS COMPLETE AND EFFICIENT, that there are not oil leaks and screws, joints and plugs are well tightened.

START AND USE OF THE POWER PACK

COLD START



THE POWER PACK SHOULD BE PROTECTED FROM BAD WEATHER AND TOO HARD CLIMATES. THE BATTERY AND ENGINE COULD BE QUICKLY DAMAGED IF THE MACHINE IS LEFT EXPOSED TO RAIN AND LOW TEMPERATURES WITHOUT PROTECTION. WHEN THE MACHINE IS NOT USED, IT SHOULD BE STORED IN A DRY AND WARM PLACE PROTECTED FROM RAIN AND DAMPNESS.

IMPORTANT

THE POWER PACK IS EQUIPPED WITH A HYDRAULIC OIL COOLER PLACED ON THE SUCTION LINE. THIS COOLER POSITIONING BETWEEN THE OIL TANK AND GEAR PUMP ASSURES THAT THE COOLER IS NOT PRESSURIZED AND KEEPS IT PROTECTED FROM HARMFUL PULSATION, IMPROVING THE RELIABILITY OF THE MACHINE.

IF YOU WORK IN BAD WEATHER, WHEN THE OIL CAN BE VERY HARD AND VISCOUS, IT IS VERY IMPORTANT TO RESPECT THE FOLLOWING INSTRUCTIONS IN ORDER TO AVOID PROBLEMS OF THE PUMP SUCKING THE OIL (CAVITATION PHENOMENON)

1. USE HYDRAULIC OIL WITH THE RIGHT VISCOSITY (SEE THE TABLE OF THE HYDRAULIC OILS IN THE PREVIOUS PAGES)
2. AFTER HAVING CONNECTED THE FLEXIBLE HOSES AND THE TOOL TO THE POWER PACK (see following paragraph), START THE ENGINE KEEPING IT AT THE MINIMUM FOR A FEW MINUTES, THEN PUT THE FLOW LEVER IN "ON" POSITION, MAKING THE OIL CIRCULATING INTO THE HOSES AND THE TOOL UNTIL THE OIL IS LUKEWARM TOUCHING THE TANK.

IT IS ADVISABLE FOLLOW THIS PROCEDURE IN ALL COLD STARTS

POSITIONING OF THE POWER-PACK

1. Using the transport handle, pull or push the power pack, bringing it to the working point. After having reached the operating point, bend the grips for avoiding bumps or deformations.
2. The power pack should be placed in a flat place protected from the traffic, in well established, firm, visible and well ventilated position.
Inflammable objects or materials should be kept away from the power pack, in particular from the discharge side.
3. Hoses should be laid down tidily and linearly avoiding knots and tangles, also for preventing possible stumbles.
Be sure that no vehicles or machines pass on the hoses spoiling them.
4. Do not work with the power pack left on lorries or on the platform of trucks. It is better to leave the power pack on the ground. If the power pack should work on vehicles, be sure that it is far from the lorry boards or sides, so that both the cooling air of the engine or cooler, and the exhaust gases can circulate and are properly dissolved.

IMPORTANT

If the hydraulic oil, lubricant or fuel is spilt on the ground, for any reason, remove the spilt liquids using sawdust or rags for avoiding accidents and contamination of the ground.

ENGINE STARTING

IMPORTANT

Before starting the engine, the flow lever should be brought in OFF position.

If the lever is left in ON position, the starting will be very hard, the engine does not start and the battery runs down completely in a few moments.

NOTE !

The power pack engine is with battery and recoil starting. Do not leave battery inactive for long periods, they cannot be used if they are left discharged even for quite short periods. When they are stored for long periods, it is advisable to disconnect the positive pole. In these cases it is better to check the charge.

1. If the starting is made by recoil (rope starting) bring the starting switch in **ON** working position.
If the starting is carried out with battery, bring the starting key in the START position and use the battery starting.

FURTHER INFORMATION ON THE COMBUSTION ENGINE STARTING, ARE SUPPLIED IN THE MANUALS OF THE ENGINE GIVEN WITH THIS MANUAL.

CONNECTION OF THE FLEXIBLE HOSES AND HYDRAULIC TOOL TO THE POWER PACK

1. Lay down the flexible hoses avoiding the contact of the couplers with the mud or dirt, if possible.
2. Put the tool on the ground limiting the contact with the mud or dirt. Make sure that the tool is in perfect condition and its accessories are efficient and well installed. Make sure that the tool trigger is free and released; control that the return spring of the trigger is operative and efficient for avoiding an accidental starting.
3. First connect the flexible hoses to the power pack whose engine and flow control lever must be OFF. Connect the female coupler of the hose to the male coupler of the power pack, then make the other connection.

NOTE !

If correctly installed, the male coupler of the power pack is the one corresponding to the pressure line, where the oil “gets out” from the power pack, the correct sequence of couplers installation depends on the positioning of the first male coupler. the male coupler must always be installed on the left of the valve block (see illustration on page 15)



If a flexible hose full of oil remains under the sun, the oil expansion due to the heat can cause a pressure increase and prevent the connection of the quick couplers. To decrease pressure, loosen one coupler, dripping some oil drops de-pressurizing the hose.

4. Now connect the flexible hose to the hydraulic hose of the hydraulic tool, connecting the first the return hose corresponding to the hole with the message **OUT** of the tool bringing the male coupler on the tool.
5. Thus the hydraulic connection is completed.
6. Start the power pack leaving it at minimum for a few minutes. Follow the instruction of the paragraph "cold start" if the starting is occurring at cold.

RAPTOR D has manual acceleration , the engine must be accelerated manually

7. accelerate the engine by using the lever
8. The tool is now ready for starting.
9. Press the tool trigger and work

END OF THE OPERATIONS

1. Lay down the tool avoiding and limiting contacts with the mud and dirt, if possible
2. PUT THE ENGINE ACCELARATION AT IDLE , minimum speed of the engine .
3. Put the ON OFF flow lever of the power pack on the LEFT position in idle position, blocking the oil supply to the tool.
4. Stop the engine bringing the starting key in **OFF** position.
5. Disconnect the tool from the flexible hose releasing first the PRESSURE HOSE corresponding to the tool hole with IN. This operation will prevent accidental pressure trapping inside the tool.
6. Disconnect the flexible hose from the power pack.
7. Roll up the flexible hose in circles of about 60 cm of diameter, connecting the quick couplers at the extremities in the "head/tail" way. This operation will protect the couplers against impacts or scraping and will also help in keeping the hoses well rolled up.
8. Remove the accessories from the tool and control that they have not been damaged during the use. In case of breaks, discard them immediately or repair them for preventing their accidental use in the future.

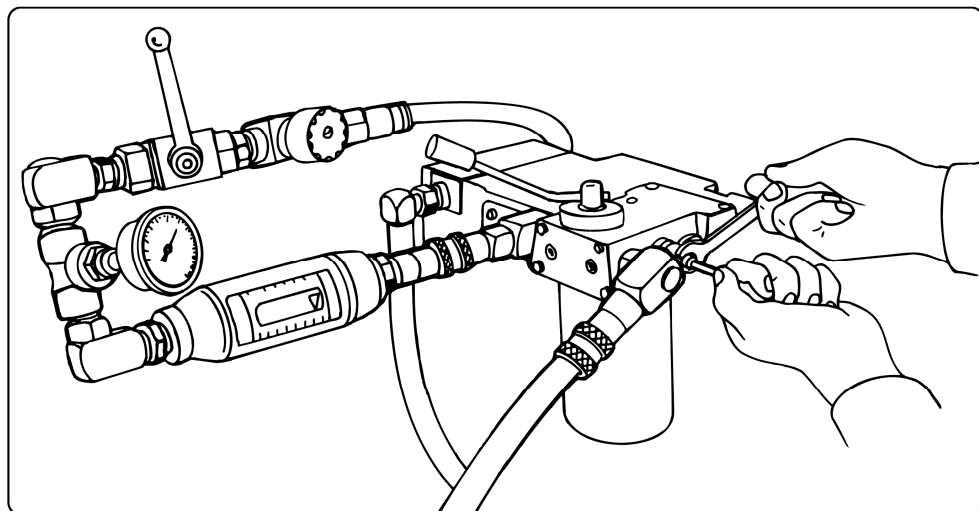
9. Store the power pack when the silencer and the engine are cooled down for avoiding possible risks of fire and accident. Store the power pack and the equipment in a safe place repaired from bumps and atmospheric agents
10. If the power pack should be transported on lorries or trucks, fold the transporting handle and other grips for avoiding deformation during the transport. Take care that the machine is loaded in a proper way and blocked for avoiding tilting and harmful jerks and bumps that could damage both the power pack and the vehicles and cause accidents.



If during the work functioning or other problems appear, indicate the failure and repair it immediately for avoiding the accidental use of the damaged or faulty machine by other colleagues. This could cause dangerous situations.

MAINTENANCE AND CARE OF THE POWER PACK

PRESSURE RELIEF VALVE REGULATION



THE PRESSURE RELIEF VALVE (abbreviation RV) IS SEATED IN THE VALVE BLOCK, THE RELIEF VALVE ADJUSTS AND CONTROLS THE MAXIMUM PRESSURE VALUE OF THE HYDRAULIC CIRCUIT PROTECTING THE TOOLS FROM RUPTURES OR EXCESSIVE PERFORMANCE.

THE RELIEF VALVE IS ORIGINALLY ADJUSTED AT THE CORRECT VALUE, THAT IS
130 BAR (2000 PSI)

IMPORTANT

- It is very important to respect the pressure maximum value recommended for the tool. An **excessive pressure** can cause the break of the tool and equipment and can cause accidents.
A **too low pressure value** to the tool can cause reduction in the performance and increase in the oil temperature.

RELIEF VALVE (RV) REGULATION



THE FOLLOWING ADJUSTMENT OPERATIONS SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL WITH PROPER EQUIPMENT. DO NOT CARRY OUT REPAIRS OR ADJUSTMENTS WITH EXPERIMENTS OR ATTEMPTS WHICH, BESIDES DAMAGING THE EQUIPMENT, COULD CAUSE ACCIDENTS

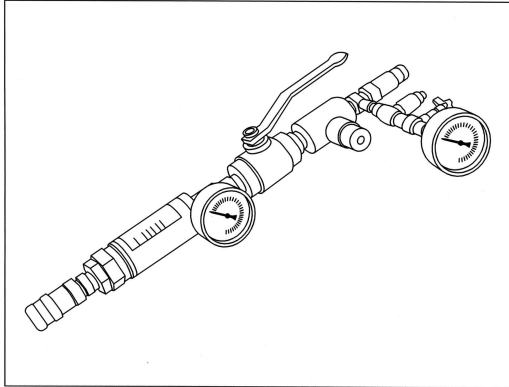
1. Prepare an Allen wrench of 4 mm, an adjustable open wrench of 13 mm. and a hydraulic tester for measuring the pressure and flow (similar to that one shown at the end of this paragraph). If you have not a proper tester, it is possible to use a simple pressure gauge graduated up to about 200 bar, installing it on the pressure line of the power pack (at the end of the flexible pressure hose), or installing it directly on the female quick coupler and introducing the female coupler into the male one of the power pack.
2. Loosen the blocking nut of the RV adjusting screw with a wrench of 13 mm.
3. After having heated the power pack motor and the hydraulic oil (about 40-50° C), bring the flow lever in ON position. This operation will accelerate the motor. Take care that there are not oil leaks in the equipment during this phase.
4. Visualize the maximum pressure value indicated in the pressure gauge. If the RV has a too high calibration, the motor can be stopped because it cannot support the effort caused by a too high load. In this case, turn the RV anticlockwise lowering the calibration
5. With the accelerated motor, adjust the RV acting on the central screw using the Allen wrench of 4 mm.
 - Turning CLOCKWISE, the pressure INCREASES
 - Turning ANTICLOCKWISE, the pressure DECREASES
6. Visualizing the pressure gauge, calibrate the valve at a value of about 155 bar, this calibration will correspond to a real valve setting of 140 bar.

NOTE !

The pressure adjusted in this condition is defined also: STATIC PRESSURE, that is the pressure measured at zero flow. The RV of the power pack should be adjusted at a value of 10% higher than the maximum value recommended for the tool. This overcalibration, is necessary for eliminating inexactness of the RVs that really discharge – cracks the over pressure at a value of about the 10% lower than the calibrated value of the static pressure.

EXAMPLE: if the datum of maximum pressure for the tool is 140 bar, the RV should be calibrated at about 155 bar. This will correspond at a REAL calibration of about 140 bar.

7. After having calibrated the RV, keeping the screw still with the Allen wrench, screw the nut of 13 blocking the RV screw in the desired position. The adjustment is completed.
8. Remove the tester and pressure gauge from hoses and power pack.



HYDRAULIC TESTER

FOR MEASURING THE VALUES OF:
PRESSURE – BACK PRESSURE –
FLOW AND INTERACTION OF THESE
VALUES

POWER PACK CLEANING

A regular cleaning is very important for the good functioning of the equipment. A clean product will immediately allow to find oil leaks or causes of malfunctioning. A clean tool is also more comfortable to use and guarantees a firm grip.

CLEANING WITH HYDRO CLEANER



THESE INSTRUCTIONS REFER ONLY TO THE ASPID AND RAPTOR MODELS, WHICH ARE NOT EQUIPPED WITH CURRENT GENERATOR – DO NOT WASH WITH HYDROCLEANER THE GENERATOR OF THE MANTA POWER PACK. THE MAINTENANCE OF THE MANTA POWER PACK IS DESCRIBED IN THE FOLLOWING PARAGRAPH

- The cleaning with hydro cleaner assures the best results in this type of washing. Put the power pack on a clean surface or a wooden pallet. Be careful not to use too much the water nozzle near the tool to avoid the removal of safety stickers and paint, in particular if hot water is used.



- A hot washing with very high pressure and with the nozzle very close to the surfaces, can cause the removal of the paint and safety adhesives and labels
- Do not insist on the engine electric part with the nozzle – if it is necessary read on the proper paragraph about cleaning contained in the motor manufacturer's manual.

- After the pressure washing let the water drip from the machine also by moving it for helping the water drain from cavities or recessed points.
- With an air gun blow all over the power pack eliminating every trace of water and moisture. Insist on
- With the machine perfectly dry, spray a protective-dewatering product (CRC-or WD40) on all chromed parts and in the tool cavities. Spray also the area of the ON-OFF valve. For allowing the spray to reach all points, move the movable parts.
- Dry up completely the tool handles for guaranteeing a firm grip
- Start the power pack and make it work at minimum for a few minutes

CLEANING WITH RAGS OR PAPER

- The tool can also be cleaned with a damp rag, using a brush with gasohol or an air gun for eliminating all traces of dirt and oil
- Clean in particular the recessed points and cavities and the connection surface of the quick couplers.
- With the machine perfectly dry, spray a protective-dewatering product (CRC-or WD40) on all electric parts, near the ON-OFF valve and in the cavities. For allowing the spray to reach all points, move the movable parts.
- Clean and dry up completely the tool handles for guaranteeing a firm grip.

PERIODIC CONTROLS AND SUBSTITUTION OF WORN PARTS

• EVERY TIME THE EQUIPMENT IS USED:

1. Control the hydraulic oil level
2. Control the level of the engine oil (or make the proper maintenance as specified in the manual of the engine manufacturer).
3. Control the condition of the hoses and quick couplers
4. Carry out a general control of the equipment.
5. Clean carefully the equipment



THE ENGINE OIL SHOULD BE COMPLETELY CHANGED AFTER THE FIRST 20 HOURS OF WORK AND THEN AS INDICATED IN THE MOTOR MANUFACTURER'S MANUAL

• EVERY 60 HOURS OF WORK – ABOUT EVERY 3 MONTHS:

1. Carry out all the controls of the previous paragraphs.
2. Control that all screws, fastenings and fittings are perfectly locked.
3. Control the state of the hydraulic oil that should to be transparent and without foams. If necessary, replace completely the hydraulic oil, changing also the used oil that remains inside the flexible hoses and in the tool.
4. Carry out a complete cleaning of the equipment.
5. Check and blow the engine air filter with compressed air, if it is necessary
6. Clean the equipment carefully.

• EVERY 100 HOURS OF WORK – ABOUT EVERY SIX MONTHS:

1. Replace completely the hydraulic oil, changing also the used oil that remains inside the flexible hoses and in the tool.

2. Change the engine oil as specified in the manual of the engine manufacturer.
3. Replace the engine air filter.
4. Carry out all the other engine controls as specified in the manual of the engine manufacturer.
5. Check the tightening of bolts and nuts and fittings
6. Check the condition of the flexible hose and hydraulic oil cooler
7. Clean the spark plug
8. Clean the equipment carefully.

MORE ACCURATE INFORMATION ABOUT THE MAINTENANCE OF THE ENGINE ARE EQUIPPED WITH THE MANUFACTURER'S MANUAL ENCLOSED TO THIS MANUAL.

MAINTENANCE OF THE FLEXIBLE HOSE

INSPECTION OF THE HOSE

- Lay the flexible hoses on the floor and control if there are oil leaks and the hose surfaces are integral without peeled sections showing metallic braid with broken wires.
- the presence of little sections of wire braid can be tolerated only if the wires are not broken and still braided.
- Control the pressed bushing at the extremity of the hoses and discard immediately hoses showing damaged end terminals with unnatural bending, squeezing, deformations, etc....
- Check that the quick couplers are well dry, without oil leaks and that the knurled bushing on the female quick coupler is intact and can slide freely during the connections. The male coupler should be intact, without dents and deformations. If you try to force the connection of a damaged male coupler, this will damage irremediably also the female.
- If the flexible hoses and quick couplers show oil leaks, even if the couplers are well screwed into the hose fittings, they should be immediately substituted with new parts.
- Replace hoses that show squeezing, unnatural bending, deformations, swellings, etc...

NOTE !

If a flexible hose full of oil remains under the sun, the oil expansion due to the heat can cause a pressure increase and prevent the connection of the quick couplers. To decrease pressure, loosen one coupler, dripping some oil drops de-pressurizing the hose.

The flexible hose always remains full of oil that, depending on the hose length, can have a relevant volume. If you change the hydraulic oil in the power pack it is recommended to replace also the oil in the hoses. This will assure a full replacement and avoid the contamination of the new oil.

DISPOSAL AND SCRAPPING

IMPORTANT

THE HYDRAULIC OIL –
HYDRAULIC OIL FILTERS –
ENGINE OIL –
ENGINE OIL FILTERS –
BATTERIES OF THE POWER PACKS

ACID OF THE POWER PACKS
FLEXIBLE HOSES FULL OF OIL
ALL FUELS

Are **DANGEROUS WASTES** that must be disposed of according to the local regulation of your country



DON'T THROW AWAY THE LIQUIDS AND MATERIALS OF THE ABOVE-MENTIONED LIST. THE INFRINGEMENT OF THE RULES REGARDING THE DISPOSAL OF DANGEROUS WASTES IMPLIES LEGAL RESPONSIBILITIES.

Also the storing and purchase/sales of the materials of the above-mentioned list have to be run according to the specific regulation.
For information about the handling and disposal of the dangerous wastes contact the Environment department of your local municipality.

NOTE !

Except for the liquids and materials of the previous list, the other components of the products manufactured by DOA are fabricated with recyclable materials that can be stored, disposed and scrapped without particular cautions.

MATERIALS AND COMPONENTS USED BY DOA DO NOT CONTAIN ASBESTOS OR OTHER TOXIC ELEMENTS THAT REQUIRE SPECIAL CAUTION FOR THEIR USE.

REPAIR

DISASSEMBLY – INSPECTION OF THE PARTS – REASSEMBLY



THE DOA HYDRAULIC TOOLS ARE PROFESSIONAL PRODUCTS THAT SHOULD BE REPAIRED ONLY BY QUALIFIED PERSONNEL.
THE REPAIR MAY REQUIRE TECHNICAL LITERATURE AND INSTRUMENTS FOR THE CONTROL OF THE HYDRAULIC VALUES AND AN ADEQUATE HYDRAULIC SOURCE NECESSARY FOR CARRYING OUT THE TOOL FUNCTIONING TESTS. IT IS THEREFORE ADVISABLE NOT TO START THE COMPLETE DISASSEMBLY OF THE PRODUCT IF YOU ARE NOT A TECHNICIAN AND PROFESSIONAL TOOLS AND EQUIPMENT ARE NOT AVAILABLE

REPAIR OF PRODUCTS UNDER WARRANTY

IMPORTANT

IF THE MACHINE IS STILL UNDER WARRANTY THE REPAIRS MUST BE CARRIED OUT ONLY BY DOA AUTHORIZED SERVICE AGENTS OTHERWISE THE WARRANTY WILL BE AUTOMATICALLY NULLIFIED.

GENERAL INFORMATION

Although we recommend that the repairs have to be carried out only by authorized DOA service agents, some minor repairs can be carried out also by other engineers, in this case follow these instructions:

BEFORE DISASSEMBLY

- Clean accurately the product and remove any trace of dirt.
- Keep available a clean working surface, paper, rags, tools, an air gun, a rubber hammer, a brass punch, a vice with soft protection for the jaws, a clean container for collecting the tool oil.
- Keep available an exploded view of the tool and part list.
- Consider that when the tool is completely disassembled, it's recommended to replace all exposed seals.

GENERAL PRE - INSPECTION

- Control that the tool is complete and that all parts and fastenings are in their place and well installed.
- Check that the control and starting devices, in particular the safety devices and protections, are efficient, without deformations and in their original state. If they have been modified or repaired adapting them, discard them and order new parts.
- If a safety or warning sticker is damaged, illegible or missing, order new parts checking the part number on the tool part list.
- Control the tool accessories (bits – cut-off discs – hoses, etc.) to be sure that they are of the right type, oriented in the right way and they are not the cause of the problems.
- Control the quick couplers on the tool and on the flexible hoses, make sure they are correctly installed, that they can be connected in the right way to assure the right oil direction.
- Control the flexible hoses, discarding those damaged, worn, squeezed, etc., control also that there are not exposed braids.

PROBLEM / CAUSE / SOLUTION CHART

The following table is a guide for finding and solving the most common working problems. The causes of malfunction often depend on inadequate values of the hydraulic circuit. The control of the PRESSURE-FLOW-BACK PRESSURE values should be carried out with proper instruments and oil at a temperature of **about 40°C**.

PROBLEM:

THE ENGINE DOES NOT START

CAUSE	SOLUTION
Switch – starting key on OFF	Bring on ON
Fuel tap on OFF	Bring on ON
No fuel	Add fuel
Low engine oil level	Add oil engine
Flow lever left on ON	Bring the lever on OFF and start again
Engine failure	Check and/or repair

PROBLEM:

THE HYDRAULIC TOOL HAS BAD PERFORMANCE

CAUSE	SOLUTION
Damaged tool	Check and/or repair the tool

Relief valve low calibration	Calibrate the relief valve
Not calibrated engine acceleration	Regulate the engine acceleration
High back pressure of the tool	Eliminate hose extensions Substitute the hydraulic oil filter Check the quick couplers
Damaged quick couplers	Check/substitute the quick couplers
Overheated hydraulic oil	Check the cooling system Substitute with oil suitable to the season
Damaged gear pump	Check and/or substitute

PROBLEM:

THE TOOL OVERHEATS QUICKLY

CAUSE	SOLUTION
Hydraulic oil low level	Add hydraulic oil
Dirty cooler	Clean the cooler well
Damaged cooler fan	Check and/or substitute
Clogged fan aspiration mouth	Free the obstruction at air passage

Damaged hydraulic tool	Check/repair
RV low calibration	Calibrate the Maximum Pressure Valve
High back pressure of the tool	Eliminate hose extensions Substitute the hydraulic oil filter Check the quick couplers

PROBLEM:

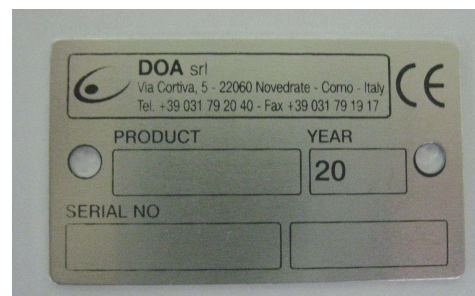
THE ENGINE DOES NOT COME TO THE MINIMUM

CAUSE	SOLUTION
Damaged accelerator cable	Check and repair
High back pressure of the tool	Eliminate hose extensions Substitute the hydraulic oil filter Check the quick couplers
Tool ON-OFF valve not completely pressed – deformed trigger	Check and repair

IDENTIFICATION

Every machine, is equipped of a nameplate for the identification:

- **Name and address of the Manufacturing Company;**
- **Model of the machine;**
- **Serial number;**
- **Year of construction;**



The machine is supplied with:

- User manual;
- Electric wiring system;
- Declaration “CE” of conformity of the constructor;
- Tools of equipment;



WARRANTY

- All parts produced by **DOA S.r.l.** are guaranteed for a period of twelve months from the date of delivery to the final customer, against defect of: material, workmanship-assembly. Cost of labour and transports are not covered by warranty and should be paid by the customer. Parts and complete components not produced by **DOA** such as engines, compressors, alternators, etc., are covered by the warranty of the manufacturer.
- Batteries of power packs and “worn out “ accessories, such as tool bits, drill bits, cut off discs, flexible hoses, quick couplers, or other accessories that have not an identification number, are covered by a warranty of three months from the date of delivery to the final customer.
- **DOA** reserves the right to substitute only those parts recognized to be defective after an inspection of **DOA** engineers under warranty at its own expenses and in its own plant. If the repairs during the warranty period are performed by the customers, **DOA** will reject any charge for labour expenses.

The warranty will be automatically voided if:

- Repairs are performed using non original, adapted or modified parts.
- The maximum hydraulic values of pressure, back pressure and flow are exceeded, or the filtration and other operative conditions of the hydraulic circuits are inadequate to power **DOA** tools.
- If the tool has been modified or used in excessive heavy applications or different from its natural applications.
- If the attached WARRANTY CARD is not properly filled and mailed to **DOA**.

In any case the warranty excludes any redraft or reimbursement for damages of any kind and there are not other explicit or implicit warranties besides the above mentioned one.

FOR ANY CONTROVERSY, THE COMPETENT COURT IS IN COMO-ITALY.