

# SAFETY MANUAL USE AND MAINTENANCE

DECEMBER 2002 – 2nd ISSUE

## HYDRAULIC POWER PACKS

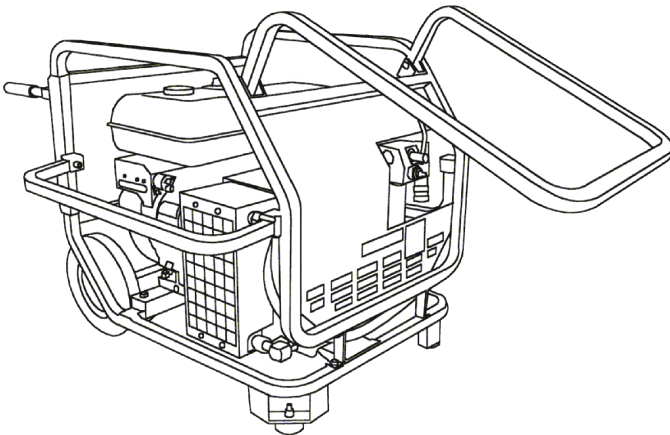
**SCORPION**

**ASPID**

**RAPTOR**

**SUPER RAPTOR**

**MANTA**



### IMPORTANT

READ THIS MANUAL BEFORE  
USING THE TOOL

KEEP ALWAYS FOR FUTURE  
REFERENCES



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Kabelwerkzeuge und Werkzeuge für die Montage und Demontage

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# INTRODUCTION

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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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**DATA, ILLUSTRATIONS AND CHARACTERISTICS OF THIS MANUAL ARE ONLY INFORMATIVE AND NOT BENDING. DOA RESERVES THE RIGHT TO MAKE MODIFICATIONS AT ANY TIME AND WITHOUT PREVIOUS NOTICE.**

# SAFETY SYMBOLS

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## 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

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### PRODUCT DESCRIPTION

**SCORPION - ASPID – RAPTOR** and **MANTA** are hydraulic power packs powered by gasoline or diesel engines. Besides hydraulic energy, the **MANTA** model can supply also 2500-Watt electric energy. The power packs are designed for starting hydraulic tools, such as:



**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 packs are 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 automatic and occurs through a small hydraulic ram. The model **SCORPION** has manual acceleration

### TYPICAL APPLICATIONS

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

The **MANTA** model can power also electric tools, electric machines and illuminate, thanks to the integrated electric generator.

### 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

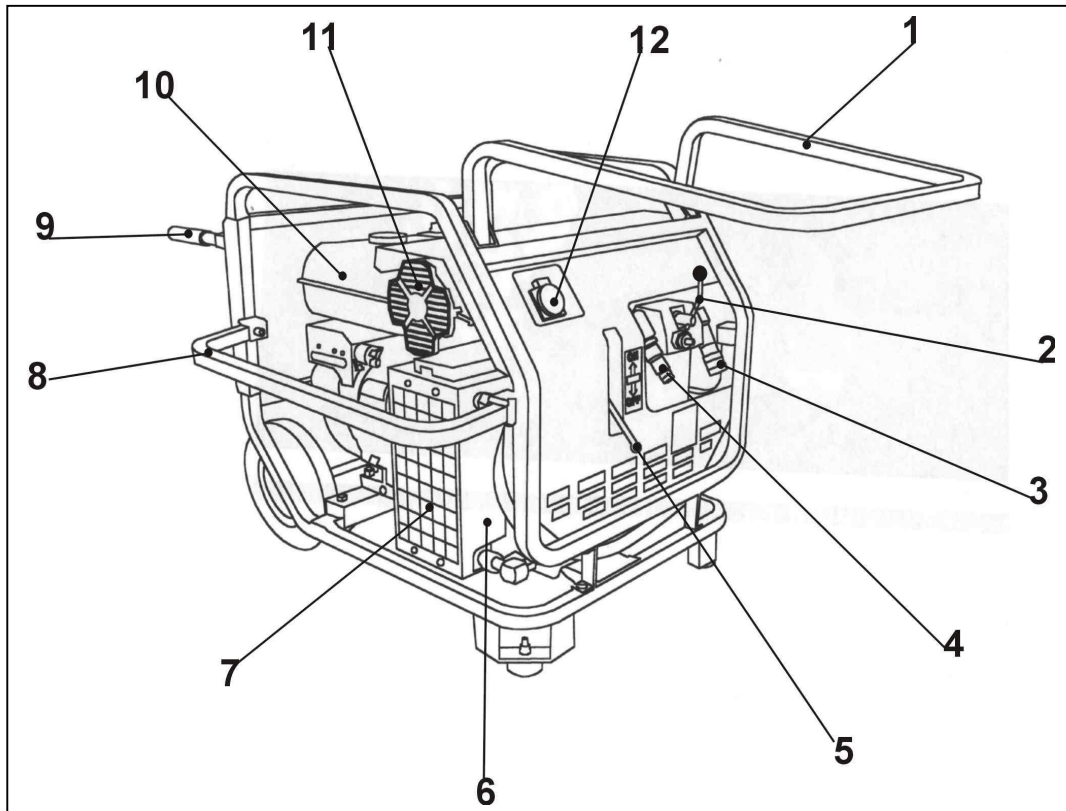
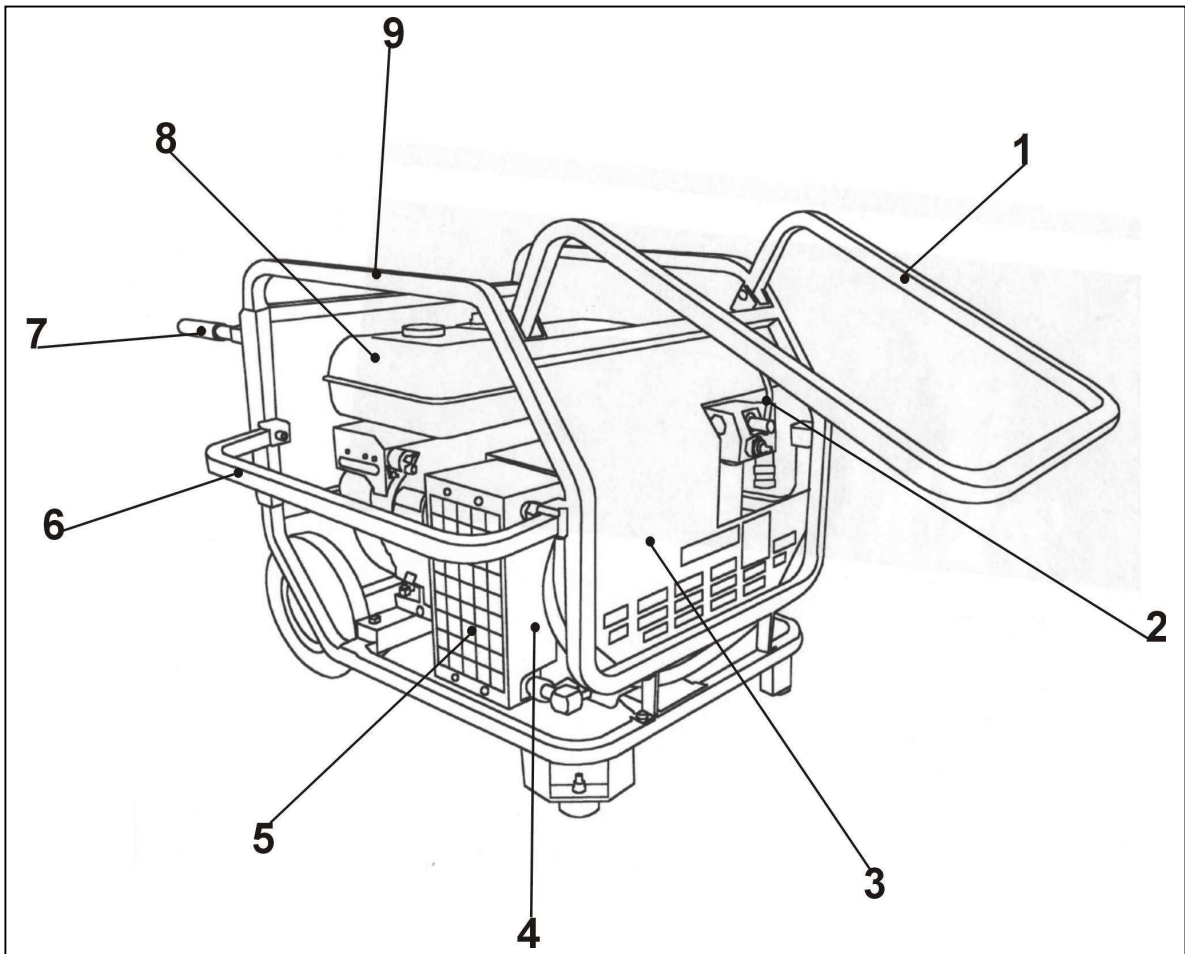


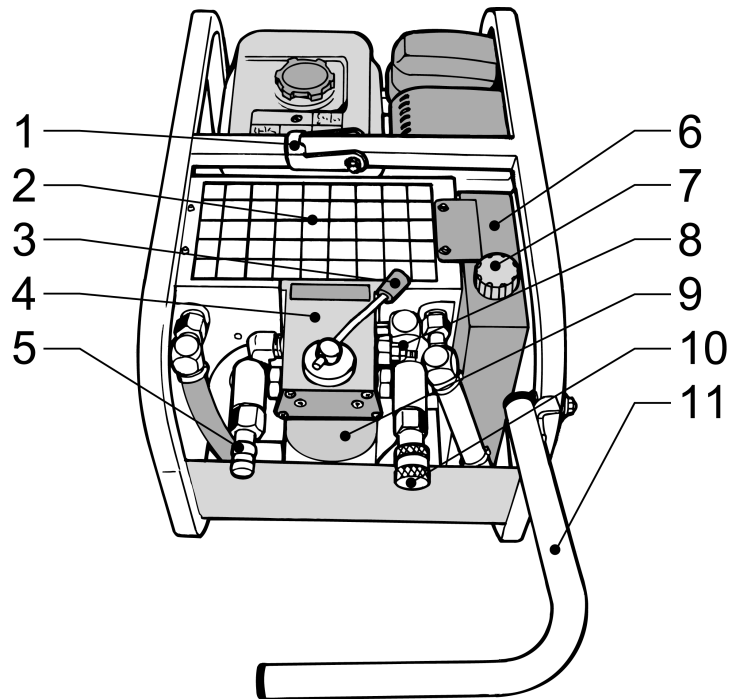
Fig. 1 - HYDRAULIC POWER PACK WITH ENERGY GENERATOR MOD. **MANTA**

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 CONTROL LEVER**
3. **FEMALE QUICK COUPLER**
4. **MALE QUICK COUPLER**
5. **LEVER FOR STARTING AND STOPPING THE CURRENT GENERATOR** this lever should always be brought **DOWNWARDS** - generator OFF position when the generator is not used.
6. **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.
7. **HYDRAULIC OIL COOLER** is an aluminium high-efficient model controlling the oil temperature. It is protected by a bumper grid
8. **SIDE FOLDING HANDLE** allows a comfortable gripping of the power pack and carries out also the function of side bumper bar.
9. **REAR FOLDING GRIP** gives a comfortable grip of the power pack in the rear part.
10. **EXPLOSION ENGINE**
11. **GENERATOR** generates electric current, and is started by a hydraulic motor.
12. **SOCKET** the electric sockets can also be positioned on the side of the pack



**Fig. 2 -HYDRAULIC POWER PACK MODELS ASPID - RAPTOR**

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. **EXPLOSION ENGINE**
9. **UPPER FRAME** consists of a strong square stainless steel tube.



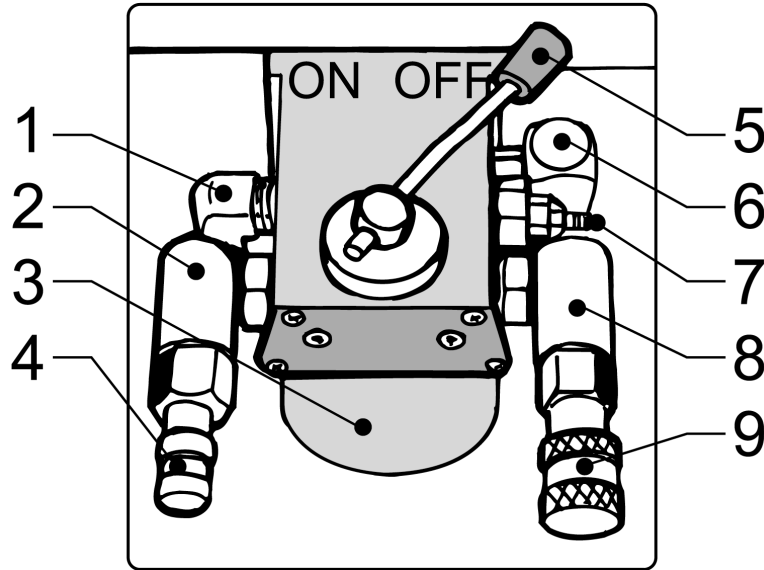
**Fig. 3 - HYDRAULIC POWER PACK MODEL SCORPION**

1. **LIFTING EYE** can be bent for avoiding impacts
2. **OIL COOLER** high efficiency type installed on the return line
3. **ON-OFF LEVER** The lever delivers the flow to tools the illustration shows the lever in **OFF**
4. **VALVE BLOCK**
5. **MALE QUICK COUPLER** – oil exits the pack from this coupler in pressure **P**
6. **OIL TANK**
7. **CAP**
8. **PRESSURE RELIEF VALVE**
9. **HYDRAULIC OIL FILTER**
10. **FEMALE QUICK COUPLER** oil return to pack from this coupler **T**
11. **BENDABLE HANDLE** on some models is configured like an “U”

NOT ILLUSTRATED - on the side and on the back of the frame there are 4 auxiliary handles that eases all movements and lifting



## 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 other power packs the lever is installed on the front part ( pointed to the exterior ) but the sense of the ON OFF position is the same
6. **OIL OUT LET HOLE ( only model SCORPION )** – the oil exits the valve at low pressure from this hole and returns to tank. On the models ASPID – RAPTOR – MANTA 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 WITH MODEL **MANTA**

## **TECHNICAL CHARACTERISTICS**

### **WEIGHT AND DIMENSION**

<b>WEIGHT ( dry )</b>	<b>Kg 95</b>
<b>HEIGHT</b>	<b>cm 65</b>
<b>LENGTH</b>	<b>cm 85</b>
<b>WIDTH</b>	<b>cm 60</b>

### **HYDRAULIC CHARACTERISTICS**

<b>FLOW</b>	<b>l/min 30</b>
<b>PRESSURE</b>	<b>bar 140</b>
<b>OIL TANK CAPACITY</b>	<b>liters 10</b>
<b>ON/OFF VALVE TYPE</b>	<b>3 WAY – OPEN CENTER</b>
<b>GROUP EHTMA</b>	<b>C - D</b>

### **ELECTRIC CHARACTERISTICS**

<b>POWER</b>	<b>2500 WATT</b>
<b>VOLT (depending on model)</b>	<b>48-120-240 VOLT</b>
<b>FREQUENCY (depending on model )</b>	<b>50 Hz ( USA, CANADA 60 Hz )</b>
<b>ALTERNATOR CLASS OF INSULATION</b>	<b>IP – 19 (depending on model )</b>
<b>TYPE OF SOCKETS STD</b>	<b>1 socket SCHUKO 120 V</b>
	<b>1 socket SCHUKO 230 V</b>

### **ENGINE CHARACTERISTICS**

<b>ENGINE TYPE</b>	<b>SINGLE CYLINDER 4 STROKES</b>
<b>BRAND AND MODEL ( STD version )</b>	<b>ROBIN EH 41</b>
<b>POWER</b>	<b>13,5 HP</b>
<b>STARTING</b>	<b>ELECTRIC AND RECOIL</b>
<b>ENGINE ACCELERATION</b>	<b>AUTOMATIC with POD ram</b>
<b>FUEL</b>	<b>UNLEADED PETROL</b>
<b>BATTERY TYPE</b>	<b>12 V</b>

# HYDRAULIC POWER PACKS

## MODEL **SCORPION - ASPID - RAPTOR**

### **TECHNICAL CHARACTERISTICS**

#### **WEIGHT AND DIMENSION**

		<b>SCORPION</b>	<b>ASPID</b>	<b>RAPTOR</b>
WEIGHT ( dry )	Kg	42	75	82
HEIGHT	cm	43	65	65
LENGTH	cm	60	85	85
WIDTH	cm	40	60	60

#### **HYDRAULIC CHARACTERISTICS**

		<b>SCORPION</b>	<b>ASPID</b>	<b>RAPTOR</b>
FLOW	l/min	20	20	20 – 30*
PRESSURE	bar	95	140	140
OIL TANK CAPACITY	liters	4	10	10
ON/OFF VALVE TYPE		3 WAYS - OPEN CENTER		
GROUP	EHTMA	C	C	C – D

- The model RAPTOR features a lever located on the front panel that can select two flows: 20 or 30 litres per minute

#### **ENGINE CHARACTERISTICS**

	<b>SCORPION</b>	<b>ASPID</b>	<b>RAPTOR</b>
ENGINE TYPE	SINGLE CYL. 4 STROKES		
BRAND AND MODEL	ROBIN EX 17	ROBIN EH 25	ROBIN EH 41
POWER	6 HP	8,5 HP	13,5 HP
STARTING	RECOIL	RECOIL	ELECTR/RECOIL
ENGINE ACCELERATION	MANUAL	AUTOMATIC	AUTOMATIC
FUEL TYPE	UNLEADED PETROL		
			ALL MODELS

## 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
<b>AGIP</b>	ARNICA 32	ARNICA 46
<b>BP</b>	HLP HV 32	HLP HV 46
<b>CASTROL</b>	HYSPIN AWH 32	HYSPIN AWH 46
<b>ELF</b>	HYDRELF DS 32	HYDRELF DS 46
<b>ESSO</b>	INVAROL EP 32	INVAROL EP 46
<b>MOBIL</b>	DTE 13	DTE 15
<b>Q8</b>	HAENDEL 32	HAENDEL 46
<b>SHELL</b>	TELLUS T 32	TELLUS T 46

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

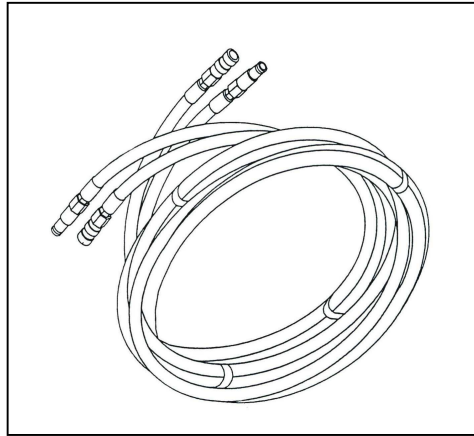
**NOTE !**

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.

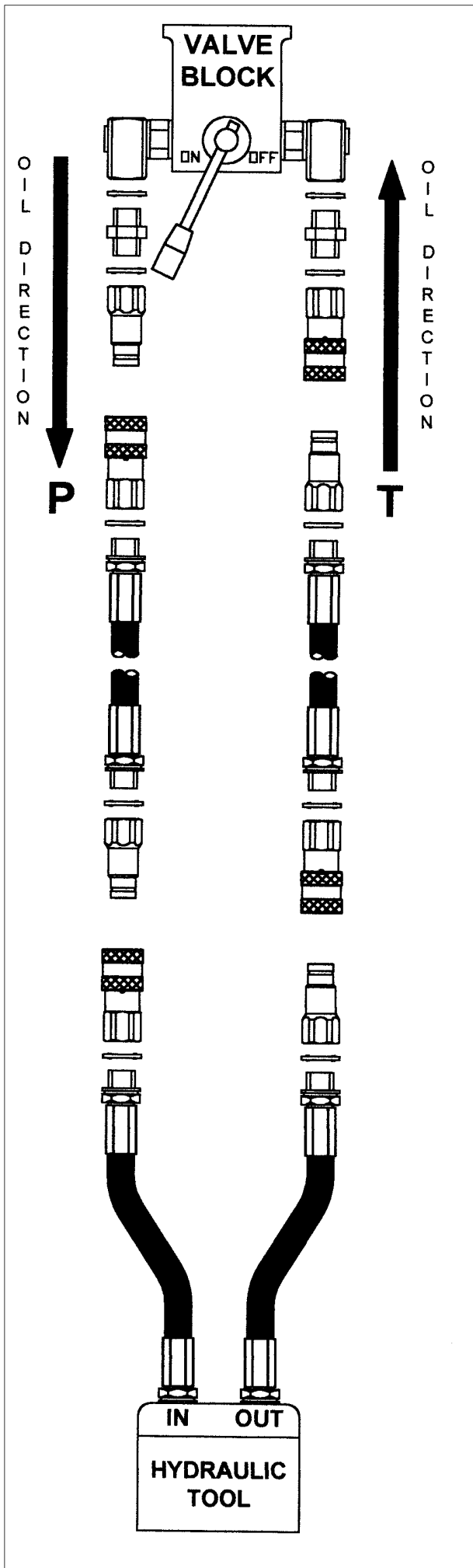
## FLEXIBLE HOSE – TYPE AND DIMENSIONS

HOSE LENGTH	PRESSURE HOSE DIMENSION – ( FITTING TYPE)	RETURN HOSE DIMENSION - ( FITTING TYPE )
UP TO <b>15</b> METERS	$\frac{1}{2}$ " SAE 100 – R1 ( $\frac{1}{2}$ " BSP MALE)	$\frac{1}{2}$ " SAE 100 – R 1 ( $\frac{1}{2}$ " BSP MALE)
UP TO <b>30</b> METERS	$\frac{1}{2}$ " SAE 100 – R2 ( $\frac{1}{2}$ " BSP MALE)	$\frac{3}{4}$ " SAE 100 – R1 ( $\frac{3}{4}$ " BSP FEMALE)

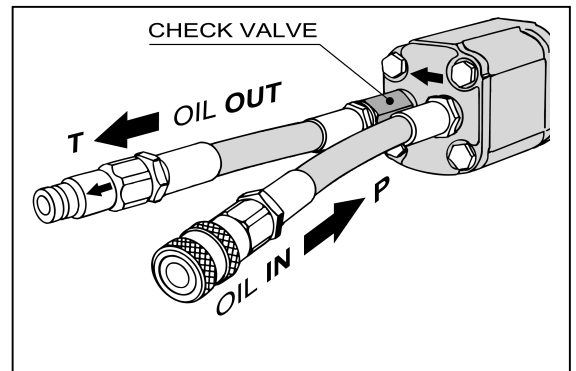
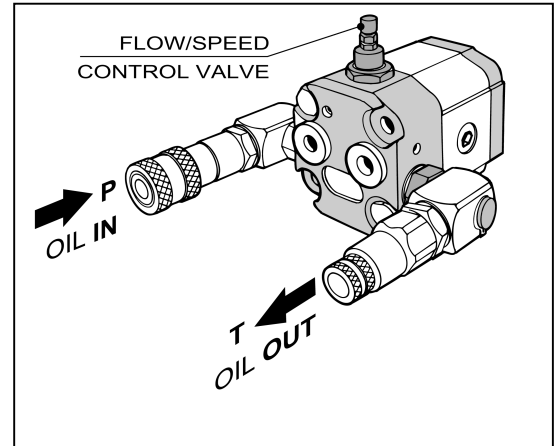
THE DIMENSIONS AND TYPE OF HOSES OF THE CHART REFER TO APPLICATIONS OF HYDRAULIC TOOLS WORKING WITH MAXIMUM FLOW OF 34 L/MIN.

**NOTE !**

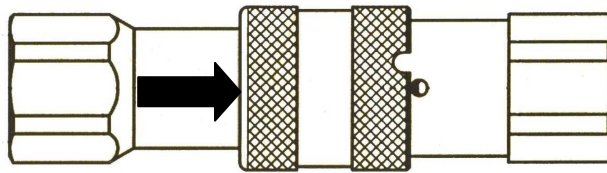
FOR HOSES EXCEEDING 30 METERS, OR WITH HYDRAULIC FLOWS HIGHER THAN 34 LITRES PER MINUTE, CONTACT DOA FOR INFORMATION.



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



## QUICK COUPLERS



The DOA power packs and hydraulic tools are usually 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)

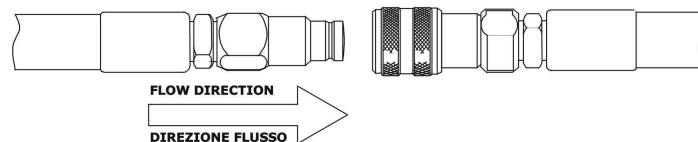
The flush-face quick couplers are STANDARDIZED, and they can be found at the major manufacturers.

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.

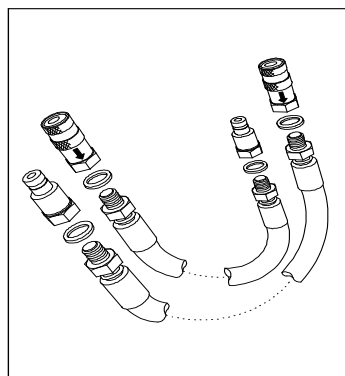
### FLOW DIRECTION AND INSTALLATION OF THE QUICK COUPLERS

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

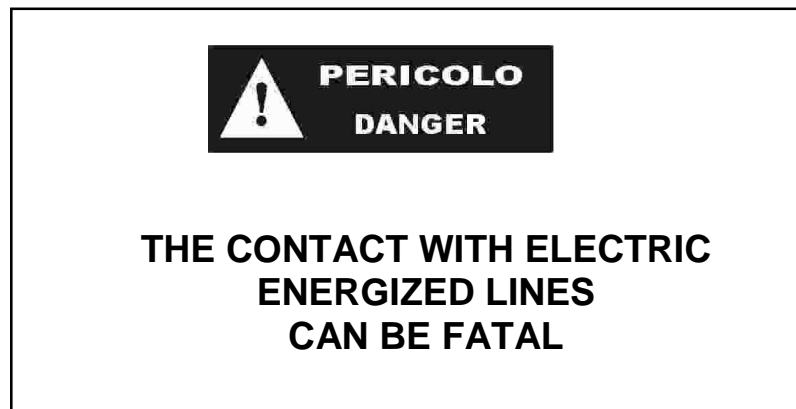


**THE FOLLOWING INSTRUCTIONS ARE GENERAL SAFETY RULES AND HAVE TO BE RESPECTED IN EVERY WORKS WITH POWER PACKS AND HAND TOOLS. WE RECOMMEND TO FOLLOW THEM CAREFULLY IN ORDER TO AVOID ACCIDENTS AND DAMAGES TO THE EQUIPMENT AND THINGS.**

- 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.

# DANGER

- **WORK ONLY IF THE EXPLOSION 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.**
- 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

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## 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.

## WHAT NOT TO DO

- 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.

# POWER PACK START AND USE

## 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 REPAIRED FROM RAIN AND DAMPNES.

### IMPORTANT

THE POWER PACKS MODEL **ASPID RAPTOR MANTA** ARE 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.

(The model SCORPION has the cooler installed on return line )

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

## POWER-PACK POSITIONING

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 motors can have an electric battery starting or a rope-starting one or both. The batteries used on the RAPTOR and MANTA models can be of a special type called at DRY CELL –PURE LEAD. These batteries have no liquids, thus they do not need refills or maintenance, they can be overturned and handled with no special care and sent by mail or carriers without problems. Do not leave them 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. Open the fuel tap
2. Put the starter in the motor cold starting, use the starter lever for helping the starting. When the motor has started, the starter lever should be brought in the normal position.
3. If the starting is a 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 starter.

**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.

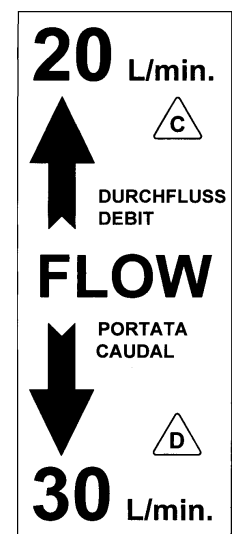
## NOTE !

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 )

## FLOW SELECTION LEVER ON THE POWER PACK RAPTOR

On the front panel of some models of RAPTOR power packs there is a two position lever that allow to select two different flows for powering as needed tools at 20 or 30 liters ( 5 or 8 GPM )

- WITH LEVER IN THE UPPER POSITION THE FLOW IS **20** LITERS PER MINUTE
- WITH LEVER IN THE LOWER POSITION THE FLOW IS **30** LITERS PER MINUTE
- **Acceleration is automatic in both positions**



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.

**NOTE !**

The model **SCORPION** has manual acceleration only, so that the engine must be accelerated manually

7. Bring the flow lever of the power pack to **ON** position making circulate the oil.
8. The tool is now ready for starting.
9. Press the **ON-OFF** tool starting control (trigger). After this operation the motor of the power pack will accelerate automatically.  
The acceleration has been caused by the increase in the pressure generated by the hydraulic tool in operation. This increase in pressure is perceived by a hydraulic ram whose rod moves the throttle of the carburettor accelerating the engine.

## **USE OF THE ELECTRIC GENERATOR IN MANTA POWER PACK**

The MANTA power pack, besides its normal function of hydraulic energy generator, can be used as a current generator. The electricity is generated by an alternator integrated in the machine and is started by an hydraulic motor. The generator can be connected and disconnected with a lever that switches the oil to the hydraulic motor of the generator. The change of energy is rapid and easy. Before using the generator, it is important to respect the following advices for avoiding accidents, dangerous situations and damages to the equipment:



- Check that, both the alternator and the socket are integral and dry
- Do not use the generator in case of heavy rainfall, strong dampness or in situations where an accidental contact between the generator and water is possible.
- Stop immediately the operations if the generator emits sparks or strange noises or if the hydraulic oil is damp.
- Do not start damaged electric tools or with one part missing
- Read and follow carefully the safety instructions contained in the manufacturer's manual of the alternator enclosed to this manual

## OPERATIONS

1. The power pack should be without flexible hydraulic hoses and with both flow levers and generator lever in **OFF** position
2. start the power pack and heat the oil and motor for a few minutes
3. first bring the generator lever in **ON** position – upward position
4. then bring the flow lever also in **ON** position – the generator will begin to work emitting the characteristic noise and the motor will accelerate automatically
5. check that everything works regularly, then connect the electric tool to the electric socket of the generator.

### END OF THE OPERATIONS WITH THE GENERATOR

1. if you want to disconnect the generator temporary keeping the power pack on, bring only the flow lever in **OFF** position
2. if you want to stop the operations completely, bring first the flow lever and then the generator one in **OFF** position
3. disconnect the plug of the electric tool and switch off the power pack

## END OF THE OPERATIONS

1. Lay down the tool avoiding and limiting contacts with the mud and dirt, if possible.
2. Put the flow lever of the power pack in **OFF** position, blocking the oil supply to the tool.
3. Stop the engine bringing the switch or starting key in **OFF** position.
4. 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.
5. Disconnect the flexible hose from the power pack.
6. 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.
7. 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.

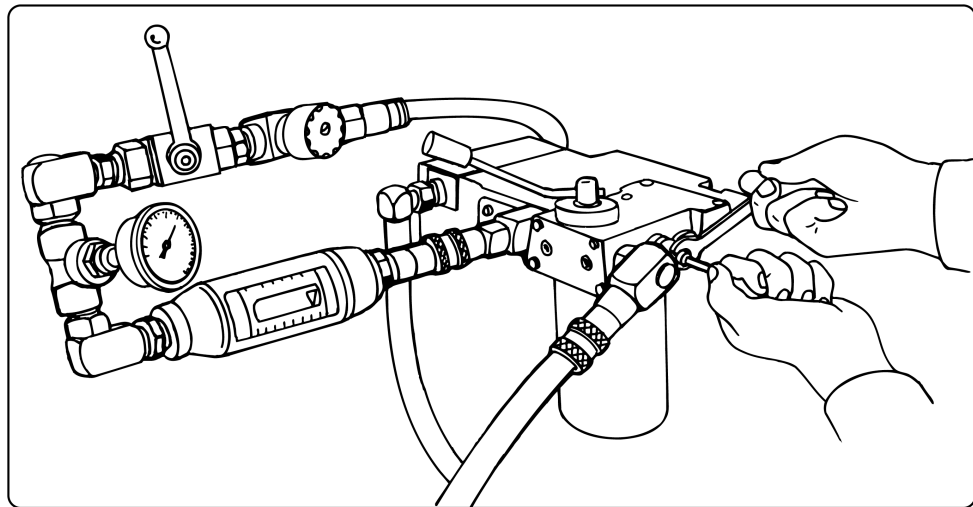
8. Store the power pack when the silencer and the engine are cooled down for avoiding possible risks of fire and accident. Store the power pack and the equipment in a safe place repaired from bumps and atmospheric agents
9. If the power pack should be transported on lorries or trucks, fold the transporting 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  
**140 BAR (2000 PSI)**

ON THE MODEL **SCORPION** THE RELIEF VALVE IS ADJUSTED AT **95 BAR**

### 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.

## 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

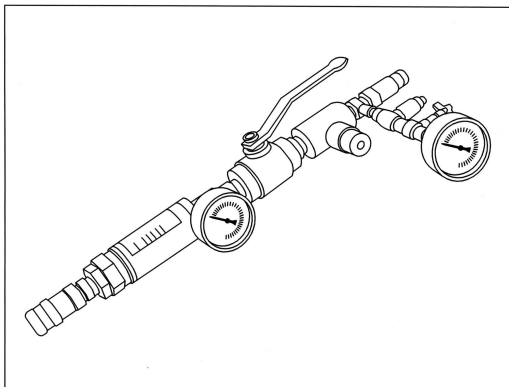
- end of the flexible pressure hose), or installing it directly on the female quick coupler and introducing the female coupler into the male one of the power pack.
2. Loosen the blocking nut of the RV adjusting screw with a wrench of 13 mm.
  3. After having heated the power pack motor and the hydraulic 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

## CLEANING OF THE POWER PACK

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 hydrocleaner 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.



THE GENERATOR OF MANTA MODEL SHOULD NOT BE WASHED WITH WATER, THIS COULD CAUSE SERIOUS ACCIDENTS AND DAMAGES TO THE POWER PACK. THE GENERATOR CLEANING COULD BE CARRIED OUT USING A RAG LIGHTLY SOAKED WITH GASOHOL, PASSING ON ALL SURFACES TAKING CARE OF ELIMINATING ALL TRACES OF DIRT. AFTER HAVING CLEANED THE GENERATOR, BLOW IT WITH AN AIR GUN INSISTING IN PARTICULAR IN THE CAVITIES AND RECESSED POINTS. BLOW ALL THE SURFACES CAREFULLY ELIMINATING ANY TRACE OF DAMP. IF IT IS POSSIBLE, LEAVE THE MANTA POWER PACK IN A DRY AND WARM PLACE SO THAT POSSIBLE TRACES OF DAMP CAN EVAPORATE, THEN START THE POWER PACK WITH CAUTION AND START THE GENERATOR CHECKING THAT EVERYTHING WORKS WELL.

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

## **IMPORTANT**

**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.

### **NOTE !**

- 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...

### **CARE AND MAINTENANCE OF THE FLEXIBLE HOSES**

The flexible hoses can be cleaned with a pressure washer after having laid it on a clean surface. Clean with the water jet in particular near the area of the clips where the dirt is going to deposit. Move the hoses during the washing, so the water jet can reach all parts and in particular the quick couplers.

After the washing, blow the flexible hoses with an air gun in particular in the area of the quick couplers till they are completely dried.

Roll up the flexible hoses in a roll having a diameter of about 60-70 cm and connect the quick couplers at the ends 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.

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.

**NOTE !**

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

### REPARATION OF PRODUCTS UNDER WARRANTY

**IMPORTANT**

IF THE TOOL 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

<i>CAUSE</i>	<i>SOLUTION</i>
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
Not engaged starter lever	Put starter in cold starting
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**

<b>CAUSE</b>	<b>SOLUTION</b>
Damaged tool	Check and/or repair the tool
VPM low calibration	Calibrate the Maximum Pressure Valve
Not calibrated engine acceleration	Regulate the engine acceleration
Damaged accelerator ram	Check and/or repair the ram
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**

<b>CAUSE</b>	<b>SOLUTION</b>
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
VMP 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**

<b>CAUSE</b>	<b>SOLUTION</b>
Damaged accelerator ram	Check and repair
High back pressure of the tool	Eliminate hose extensions Substitute the hydraulic oil filter Check the quick couplers
Clogged oil circulation	Check/eliminate obstruction
Tool ON-OFF valve not completely pressed – deformed trigger	Check and repair



## 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 RAVENNA-ITALY.**