



SAFETY MANUAL USE AND MAINTENANCE

PP600-E/S/H/A HIGH PRESSURE HYDRAULIC POWER PACK



TRANSLATION OF THE ORIGINAL VERSION
Rev. 6 11/2020

IMPORTANT

**READ THIS MANUAL BEFORE
USING THE TOOL**

**KEEP ALWAYS FOR FUTURE
REFERENCES**

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PART LIST AND EXPLODED VIEW ARE ATTACHED TO THIS MANUAL IN A SEPARATE BOOKLET.

INTRODUCTION

Dear customer,

Congratulations for having purchased a **TEHMA** 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 reading 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 ELECTRIC MOTORS, ENGINES, ALTERNATORS OF OTHER SUBCOMPONENTS OF TEHMA 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 YOU 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

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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 TEHMA DEALER OR YOUR FOREMAN.

PRODUCT DESCRIPTION

PRODUCT DESCRIPTION

PP600 is a high pressure hydraulic power pack that can be powered by a 2,2 kW electric motor 230V/110V/120V (**PP600-E**), a 3,6 kW engine (**PP600-S**), a 7,7 kW hydraulic motor (**PP660-H**) or a 3 kW pneumatic motor (**PP600-A**).

The machine has been engineered to power high pressure tools or hydraulic cylinders, the hydraulic pressure can reach 700 bar and can be easily reduced or adjusted by using the relief valve integrated with the machine.

The power packs are equipped with a high-quality piston pump, all other hydraulic components have been chosen to assure the best performances, robustness and a long-lasting use without problems. The engine acceleration is manual.

TYPICAL APPLICATIONS

Powering of high-pressure hydraulic tools or equipment like: rescue tools, lifting cylinders, railroad maintenance tools, concrete crackers, demolition tools, hydraulic rock splitting tools and all equipment that work with pressures up to 700 bar.

ACCESSORIES

- SET OF HYDRAULIC HIGH-PRESSURE HOSES LENGTH 5 m/10 m WITH QUICK COUPLERS
- HIGH PRESSURE MALE QUICK COUPLER THREAD 3/8" NPT
- HIGH PRESSURE FEMALE QUICK COUPLER 3/8" NPT

SOUND POWER LEVEL

The sound level measured in accordance with Directive 2000/14 / EC is:

Average sound pressure dB (A): 74 (230V) / 74 (110V) / 78 (S) / 74 (H) / 71 (A)

Sound power level (LWA): 94 (230V) / 94 (110V) / 98 (S) / 94 (H) / 91 (A)

Guaranteed acoustic power (LwAG): 97 (230V) / 97 (110V) / 101 (S) / 97 (H) / 94 (A)

Maximum acceptable power level LwAG: 101

TECHNICAL CHARACTERISTICS

GENERAL VIEW – MAIN COMPONENTS AND THEIR FUNCTIONS



Fig. 1 - PP600-E/S HIGH PRESSURE HYDRAULIC POWER PACK

1 - **FRAME** is made in robust steel tubes with rubber feet and handle.

2 - **COOLING SYSTEM** with double fans available on PP600-EC model

3 - **MOTOR:**

- **ELECTRIC** 2,2 kW, 230V/110V single phase 50Hz and 120V single phase 60Hz
Complete with main switch and RCBO protection (PP600 E – PP600 EC)
- **PETROL ENGINE** 3,6 kW
Complete with starter handle and ON/OFF switch (PP600 S)
- **HYDRAULIC** 7,7 kW (PP600 H)
- **PNEUMATIC** 3 kW (PP600 A)

NOTE:

This motor comes with a FRL (Filter Regulator Lubricator.)

- The regulator is used to vary the pressure of the air entering the motor.

The pressure cannot exceed 7 bar.

- The lubricator is used to lubricate the motor vanes and is equipped with a tank

to be filled with oil before starting the unit. For specifications, see the table on pag. 9.

4 - **OIL FILTER** for hydraulic circuit

5 - **QUICK COUPLING – PRESSURE LINE**

6 - **QUICK COUPLING – RETURN LINE**

7 - **HYDRAULIC OIL TANK** the oil capacity is 5 litres, tank is manufactured in steel sheet to resist to heat and impacts. Into the tank are located the high-pressure pumps.

VIEW OF THE CONTROL VALVE BLOCK

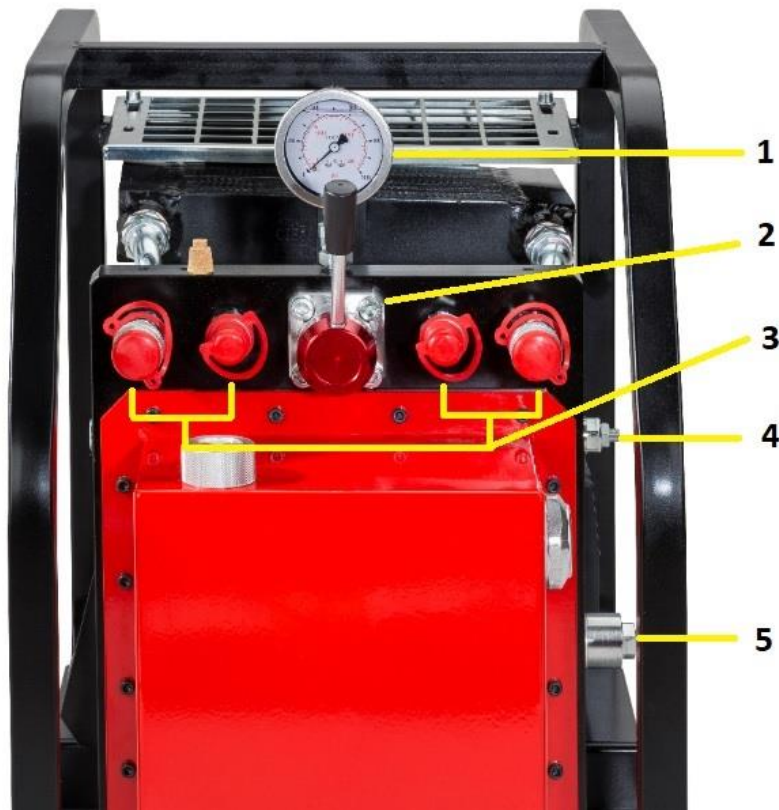


Fig. 2 THE VALVE PLATE is the group that includes all hydraulic control components , the part is obtained working a laminated aluminium block

- 1 - PRESSURE GAUGE** is positioned in the center for reading the pressure.
- 2 - ON/OFF FLOW LEVER** is the lever that controls the distribution valve that delivers oil to tools , the central position in the illustration is the OFF position where the tools are still , the lever must be put in this position before start and put off motor.
- THREE POSITION HYDRAULIC CONTROL VALVE**
The lever has **three** positions that allow to control in two directions the cylinders or the too: **A** and **B**
 - LEFT POSITION P1– Pressure out form left circuit
 - CENTRAL POSITION OFF – Pressure in hold/stop/neutral it is the engine starting position (see position in the picture)
 - RIGHT POSITION P2– Pressure out from the right circuit
- 3 - OUTPUT QUICK COUPLERS** used to connect 2 tools to the power pack. Through the ON/OFF lever you can shift from one channel to the other.
- 4 - “MAXIMUM PRESSURE” VALVE** is the valve that adjust the maximum pressure limit in the unit.
- 5 - “CUT-OFF” VALVE** releases the pressure when it is near its limit.

NOTE: The regulation screws of both valves 4-5 must be secured by the locknut to prevent from get lost due to vibration and consequently change the pressure regulations.
The "MAX PRESSURE" and "CUT-OFF" valves have been adjusted by TEHMA to the maximum working pressure that can be accepted by its tools.

PP600-E/S/H/A HIGH PRESSURE POWER PACK

TECHNICAL CHARACTERISTICS

WEIGHT AND DIMENSION

WEIGHT (dry)	Kg	42.5-46.5* (E) / 30.5 (H) / 44 (S) / 38 (A)
HEIGHT	cm	51.5 - 53.5*
LENGTH	cm	52
WIDTH	cm	36 - 39.5^

* (EC) / ^ (S)

HYDRAULIC CHARACTERISTICS

PRESSURE min max	210 - 700 bar
PRESSURE IS REGULATED BY <i>TEHMA</i> FOR CONCRETE CRACKER CC300	
FLOW max	3 l/min
OIL TANK CAPACITY	5 liters
CONTROL VALVE TYPE	3 position – at “H” configuration OPEN CENTER
PUMP TYPE	3 PISTONS

STANDARD HYDRAULIC HOSES CHARACTERISTICS

HOSES DIMENSION	THERMOPLASTIC TWIN HOSE SET - 1/4" - WORKING PRESSURE 700 BAR
LENGTH	5 m
TERMINAL THREADS	3/8"NPT

MOTOR CHARACTERISTICS

MOTOR TYPE	<u>ELECTRIC</u> SINGLE PHASE
POWER	230V / 110V (50Hz) - 120V (60Hz) 2,2KW
MOTOR TYPE	<u>PETROL</u> ENGINE
POWER	3,6KW
MOTOR TYPE	<u>HYDRAULIC</u>
POWER	7,7KW (MAX oil flow 30-45 L/min – 150-200 bar)
MOTOR TYPE	<u>PNEUMATIC</u>
POWER	3KW (MAX air flow 7 bar)

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 **TEHMA** 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 10	DTE 15
Q8	HAENDEL 32	HAENDEL 46
SHELL	TELLUS T 32	TELLUS T 46
OIL FOR FRL GROUP	(FILTER REGULATOR LUBRICATOR)	
MODEL PP600-A	SAE 10	

If you use the hydraulic tools in extreme climatic conditions, please contact **TEHMA** 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 **TEHMA** FOR MORE INFORMATION.

NORMALLY THERE ARE NO PROBLEMS OF HYDRAULIC-OIL COMPATIBILITY (MIXING DIFFERENT TYPES OF OILS) WHEN THE TOOL USED WAS CONNECTED BEFORE TO OTHER POWER PACKS THAT COULD HAVE OTHER OILS, NORMALLY THERE ARE NO PROBLEMS IF THE OIL OF THESE MACHINES IS OF A GOOD QUALITY AND REGULARLY FILTERED.

OIL FILTER AND HYDRAULIC OIL MUST BE COMPLETELY CHANGED EVERY 250 HOURS, WHEN CHANGING THE OIL IS BETTER CHANGE ALSO THE OIL IN THE FLEXIBLE HOSES



NEVER USE OILS CALLED ESTHERI FOSFORIC ! THESE OILS ARE EXTREMELY TOSSIC AND AGGRESSIVE, BE CAREFUL NOT TO CONNECT THE POWER PACKS TO TOOLS THAT WERE WORKING WITH THESE OILS , MIXTURES WITH THESE OILS CAN DAMAGE THE PACK OR THE TOOLS .

THE OIL LEVEL MUST ALLWAYS BE VISIBLE FROM THE LEVEL EYE

FLEXIBLE HOSES



THE POWER PACK CAN BE SUPPLIED WITH A COUPLE OF HIGH PRESSURE HYDRAULIC FLEXIBLE HOSES OF 5 M. LENGTH COMPLETE WITH QUICK COUPLERS.
THE STANDARD FLEXIBLE HOSES SUPPLIED WITH **PP600-E** ARE OF THE BEST QUALITY AND RATED TO RESIST TO A PRESSURE OF 700 BAR.
THE THREAD DIMENSION IS 3/8" NPT



DO NOT USE HOSES OR COUPLERS THAT ARE NOT RATED FOR 700 BAR , IF THIS IS NOT RESPECTED THIS NEGLIGENCE CAN RESULT IN SERIOUS ACCIDENTS AND DAMAGE TO THE EQUIPMENT

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.
- BE ABSOLUTELY SURE THAT IN CASE OF NEW HOSE ARE USED THEY HAVE TO BE RATED TO RESIST AT 700 BAR

QUICK COUPLERS

THE STANDARD QUICK COUPLERS INSTALLED ON **PP600-E** ARE RATED TO RESISTS AT 700 BAR – COUPLERS ARE SUPPLIED WITH PLASTIC CAPS THAT PROTECT FROM DIRT AND IMPACTS, IT IS ADVISED TO ALLWAYS PUT THE PROTECTION ON THE COUPLERS AFTER USE.



FEMALE QUICK COUPLER
CEJN code 101151404
TEHMA code A161103



MALE QUICK COUPLER
CEJN Code 101156404
TEHMA code A161104

TEHMA high pressure power packs and hydraulic tools are equipped with quick couplers made by CEJN like those one shown in the picture.

USE OF THE QUICK COUPLERS

CONNECTION

- Make sure that the contact surfaces of the couplers are clean and if necessary with a rag.
- Position the male coupler towards the female one, centring them.
- While pulling back the female knurled external bush press the male coupler against the female one.
- Release the female bush and 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.

DISCONNECTION

- Pull the knurled bushing of the female coupler away from the male .
- Pull the male away from female.
- The female coupler will be released and a “click” will show the disconnection.

OTHER ADVICES

- The connection/disconnection of the couplers must be done always WITHOUT OIL CIRCULATION – WITHOUT PRESSURE.. the control valve lever must be in the OFF central position in the connection/disconnection
- Disconnect and connect the tools from hoses and power source, just after having set the lever of the flow control valve in **OFF CENTRAL 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.
- In case of change of damaged couplers with new ones it's important to pay attention to the Teflon seal and to put it back rolling it on the 3/8 NPT thread before to tighten the new coupler.

SAFETY RULES

GENERAL SAFETY INSTRUCTIONS



MAKE SURE THAT THE TOOL OR CYLINDER YOU ARE ACTIVATING FROM THE PP600 IS RATED TO RESIST TO A PRESSURE OF 700 Bar OR TO THE PRESSURE YOU HAVE REGULATED FROM THE PACK

THE FOLLOWING INSTRUCTIONS ARE GENERAL SAFETY RULES AND HAVE TO BE RESPECTED IN EVERY WORKS WITH POWER PACKS AND 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.
- Gloves are important to be worn because if the tool is damaged the high pressure oil can be sprinkled out from cracks of the tool with a very harmful effect on skin
- 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.
- 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.



THE "MAXIMUM PRESSURE" AND "CUT-OFF" VALVES POSITIONED ON THE SIDE OF THE UNIT HAVE BEEN ADJUSTED BY TEHMA TO THE MAXIMUM WORKING PRESSURE THAT CAN BE ACCEPTED BY ITS TOOLS.

MODIFYING THE CALIBRATION OF THESE VALVES CAN POSE SERIOUS RISKS FOR THE OPERATOR AND THE HYDRAULIC EQUIPMENT, THEREFORE IT IS ADVISABLE TO PROCEED WITH THIS INTERVENTION ONLY WHEN STRICTLY NECESSARY AND AFTER HAVING ASCERTAINED THE PRESSURE LIMITS DECLARED BY THE MANUFACTURERS OF THE TOOLS TO BE CONNECTED TO THE UNIT.

TEHMA IS NOT RESPONSIBLE FOR ANY DAMAGES RESULTING FROM THE VARIATION OF THE OIL PRESSURE SUPPLIED BY THE UNIT, AS WELL AS FROM THE IMPROPER USE OF THE EQUIPMENT OR OTHER MODIFICATIONS MADE TO ITS PRODUCTS.

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.

WHAT NOT TO DO

- DO NOT MODIFY THE CALIBRATION OF THE SAFETY VALVES ON THE SIDE OF THE UNIT
- 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 (**PP600 S**) 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 (**PP600 S**) 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 OIL LEVEL in the FRL (Filter regulator lubricator group) (**PP600 A**) make sure that the tank contains enough oil to operate the unit.
4. CHECK THE AIR PRESSURE in the FRL (**PP600 A**) make sure that it does not exceed 7 bar.
5. 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
6. CHECK THAT THE TOOL USED AND THE POWER PACK HAVE COMPATIBLE HYDRAULIC CHARACTERISTICS – IN CASE OF DOUBT DO NOT RISK but ask your *TEHMA* dealer or your foreman.
7. 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.
8. 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

COLD START



THE POWER PACK SHOULD BE PROTECTED FROM BAD WEATHER AND TOO HARD CLIMATES. THE 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.

IF YOU WORK IN BAD WEATHER, WHEN THE OIL CAN BE VERY HARD AND VISCIOUS, 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 TILL THE OIL TANK WILL BE WARM WITH THE HAND CONTACT

IT IS ADVISABLE FOLLOW THIS PROCEDURE IN ALL COLD STARTS

POWER-PACK POSITIONING

1. 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.
2. 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.
3. Do not work with the power pack left on 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 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.

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 control

valve or trigger is free and released in its OFF to avoid unwanted activation; control that the return spring of the tool trigger is operative and efficient for avoiding an accidental starting.

3. Connect the flexible hoses to the power pack (engine and flow control lever must be OFF), and to the tool
4. Start engine of power pack and allow warm up (if this has not done before)



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 OPERATOR MUST BE FAMILIAR WITH THE EFFECT TO THE TOOL DERIVING FROM THE POSITION OF THE CONTROL VALVE, OPERATOR MUST KNOW WHAT HAPPEN WHEN HE OPERATES THE CONTROL VALVE

5. Thus the hydraulic connection is completed.
Accelerate the engine as needed and use tool by operating on the pack control valve , be sure that the action needed from the tool is definitely deriving by the position of pack control valve

END OF 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
4. Disconnect the tool from the flexible hose and disconnect the flexible hose from the power pack.
5. Roll up the flexible hose in circles of about 60 cm of diameter, cover the couplers with the protection plastic caps.
6. Store the power pack when the muffler 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
7. If the power pack should be transported on trucks 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

MAXIMUM PRESSURE REGULATION

THE "MAXIMUM PRESSURE" AND "CUT-OFF" VALVES POSITIONED ON THE SIDE OF THE UNIT (SEE FIG. 2 Pag 7) PERFORM TWO DIFFERENT FUNCTIONS:

- THE "MAXIMUM PRESSURE" VALVE IS THE SAFETY VALVE THAT ADJUSTS AND CONTROLS THE MAXIMUM PRESSURE OF THE HYDRAULIC CIRCUIT PROTECTING THE TOOLS FROM BREAKAGE OR EXCESSIVE PERFORMANCE.
- THE "CUT-OFF" VALVE RELEASES THE PRESSURE WHEN IT IS NEAR THE MAXIMUM LIMIT, PREVENTING THE UNIT AND THE CONNECTED TOOLS FROM OPERATING AT MAXIMUM EFFORT MORE THAN NECESSARY.

It is very important to respect the pressure maximum value recommended for the tool.

An **excessive pressure** can cause breakage of the tool and equipment and can cause accidents.

Too **low pressure** on the tool can cause a decrease in performance and an increase in oil temperature.

The pressure gauge located on the valve top always indicates the pressure used or reached by the tool during its use.



The "MAX PRESSURE" and "CUT-OFF" valves have been adjusted by TEHMA to the maximum working pressure that can be accepted by its tools.

Changing the calibration of these valves can pose serious risks for the operator and the hydraulic equipment, therefore it is advisable to proceed with this intervention only when strictly necessary and after checking the pressure limits declared by the manufacturers of the tools to be connected to the control unit.

IN ANY CASE THE MAXIMUM PRESSURE MUST NOT EXCEED 700 bar.

INSTRUCTIONS FOR ADJUSTING THE MAXIMUM PRESSURE

1. Turn on the unit with the lever that controls the distribution valve in the central position (OFF) without tools or pipes connected.
2. Let the unit run for a few minutes in order to allow the oil contained in the circuit to reach the correct operating temperature.
3. Loosen the "CUT-OFF" valve locknut (see FIG.2 page 7) and tighten the central screw until a small pressure is applied to the bottom of the valve.
4. Turn the lever that controls the distribution valve on the channel where the quick couplings are fitted. The pressure should rise rapidly and reach 650-700 bar.
5. Now is possible to loosen the "MAXIMUM PRESSURE" valve locknut and adjust the maximum pressure by CAREFULLY acting on its screw.
6. Once the desired pressure has been set, retighten the "MAXIMUM PRESSURE" valve locknut.
7. Then loosen the "CUT-OFF" valve screw until it clicks and the pressure drops from the set value to 50-100 bar.

8. Try rotating the central distribution lever in the central position and then again on the previous channel to check the correct adjustment of the "CUT-OFF" valve.

NOTE: a correct calibration implies that the pressure rises rapidly from 0 to the previously set pressure and once this limit is reached, it drops again to 50-100 bar.

9. Once the desired pressure has been set, retighten the "CUT-OFF" valve locknut.

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

- 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 pack 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 5 HOURS OF WORK AND THEN AS INDICATED IN THE MOTOR MANUFACTURER'S MANUAL

- **EVERY 150 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 300 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.

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 !

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.

At the end of their life, all components of the machine must be separated and disposed of in compliance with the laws in force in your country.

NOTE !

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

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

REPAIR



THE TEHMA 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 TEHMA 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 **TEHMA** 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.

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- must be done with oil at a temperature of **about 40° C**.

PROBLEM:

THE ENGINE DOES NOT START

<i>CAUSE</i>	<i>SOLUTION</i>
Engine switch is in OFF	Bring on ON
Central distribution lever in working position	Put lever in OFF CENTRAL position
Fuel tap on OFF (PP600 – S)	Bring on ON
No fuel Low engine oil level	Add fuel Add oil engine
Low engine oil level (PP600 – S)	Add oil engine
If the problem persists, contact the authorized dealer or TEHMA	

PROBLEM:

THE HYDRAULIC TOOL HAS POOR PERFORMANCES

<i>CAUSE</i>	<i>SOLUTION</i>
Damaged tool	Check and/or repair the tool

Low pressure	Check the oil level and refill it NOTE With the tool SP400/SP600 connected, make sure to carry out this operation after completely retracting the central wedge.
Improper circulation of the oil	Control that oil pressure can reach well the tool – control couplers proper connection - Check the quick couplers
Oil filter too dirty No oil in the tank	Substitute the hydraulic oil filter Control and refill
Damaged quick couplers	Check/substitute the quick couplers
Overheated hydraulic oil	Check the oil level Substitute with oil suitable to the season
If the problem persists, contact the authorized dealer or TEHMA	

PROBLEM:

THE TOOL OVERHEATS QUICKLY

CAUSE	SOLUTION
Hydraulic oil low level	Add hydraulic oil
Tool operation too frequent and too long operations	Take breaks to allow the oil to cool down.
Damaged tool	Check and/or substitute
If the problem persists, contact the authorized dealer or TEHMA	

WARRANTY

- All parts produced by **TEHMA** 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 **TEHMA** 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.
- **TEHMA** reserves the right to substitute only those parts recognized to be defective after an inspection of **TEHMA** engineers under warranty at its own expenses and in its own plant. If the repairs during the warranty period are performed by the customers, **TEHMA** 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 **TEHMA** 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 **TEHMA**.

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 additional information please read carefully the document "Warranty and general sales conditions" attached to this manual in a separate booklet.

FOR ANY CONTROVERSY, THE COMPETENT COURT IS IN LUGANO-SWITZERLAND.

Manufacturer and European authorised representative (E.A.R.)

Manufacturer:



TEHMA SA
Vicolo Concordia 1, 6932
Lugano - Breganzona, Switzerland

European authorized representative (E.A.R.):



Virgilio Tentori Srl
Via Belfiore 31/D, 23900
Lecco, Italy



LABEL



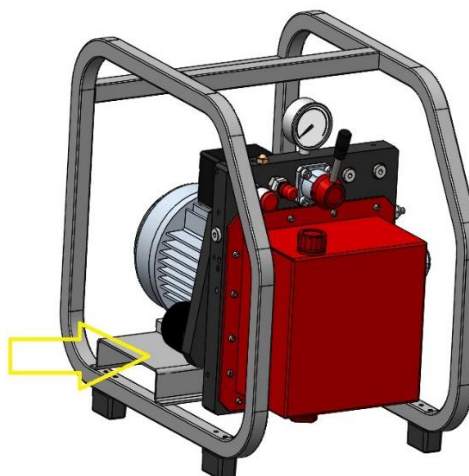
PRODUCT
CENTRALINA PP600 E

YEAR 2018 **SERIAL No** XXXXX

MAX PRESSURE 620 bar **WEIGHT** 46.5 KG



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FAC-SIMILE EU DECLARATION OF CONFORMITY






DICHIARAZIONE CE DI CONFORMITÀ

DIRETTIVA 2006/42/EC
(Allegato II parte 1, sezione A)

Noi Virgilio Tentori Srl nella qualità di mandatario, per conto della ditta TEHMA SA, Lugano (CH) dichiariamo sotto la Ns. esclusiva responsabilità che la macchina sotto descritta:

DENOMINAZIONE: CENTRALINA IDRAULICA (allegato I, punto 29)

TIPO: PP 600 E1/E2 PP 600 S PP 600 H PP 600 A

POTENZA NETTA INSTALLATA 2,2 kW 3,6 kW 7,7 kW 3 kW

NUMERO DI MATRICOLA: P6E2-XXX

ANNO DI COSTRUZIONE: 2020

è conforme ai requisiti essenziali di sicurezza previsti dalle seguenti disposizioni legislative:

Direttiva 2006/42/CE e successive modifiche ed integrazioni (Direttiva macchine);
 Direttiva 2014/30/UE (Direttiva EMC)
 Direttiva 2014/35/UE Direttiva Bassa tensione
 Direttiva 2000/14 CE e successive modifiche ed integrazioni, recepita in Italia con D.Lgs.282/2002, secondo la procedura prevista dall'allegato VI comma 2.

Sono state inoltre applicate le seguenti norme:

UNI EN 12100	UNI EN 13857
EN ISO 4413	CEI EN 60204-1
CEI EN 50081-1	CEI EN 50082-1
EN ISO 3744	

ORGANISMO DI CERTIFICAZIONE n.0428	PP 600E1	PP 600E2	PP 600S	PP 600H	PP 600A
ITALCERT S.r.l. - Viale Sarca, 336 Milano - ITALIA	110V	230V			
Livello di potenza acustica dB(A)	94	94	97	94	94
Livello di Potenza Acustica garantita dB(A)	97	97	100	97	97

Virgilio Tentori è il custode e detentore del Fascicolo Tecnico.

Galbiate: 15/01/2020

Il legale Rappresentante e
custode e detentore del F.T.
Virgilio Tentori

Sede Legale: 23900 LECCO (Lc) - Via Belfiore 31/D - Sede Operativa e invio corrispondenza: 23551 GALBIATE (Lc) - Frazione Ceppo, 1