PORTABLE IMPACT WRENCH MAV 2500

CERT. N° IT05/0072





Dear Customer,

*we would like to take this opportunity to thank you for choosing an **FCS srl** product. We are pleased to give you this manual to permit you an optimal use of our product in order to obtain a better outcome of your work.*

We invite you to read carefully recommendation that follows and provide this manual to the personnel that will deal with the treatment and the maintenance of the machine.

***FCS srl**. Is at your back and call for all the clarification you will need, both in the starter stage and in every moment of the use of the machine.*

*In case of extraordinary and ordinary repairs, **FCS srl** provides you, here and now, its personnel to give you all the services and spare parts you will need.*

This document contains all the necessary information for the set in motion, for the use according to safety guidelines and for the ordinary maintenance of the machine.
We suggest to carefully look up at it and to respect the instruction written here, and to set it in an accessible place for look up at it when necessary.
We suggest to contact ***FCS srl*** in case of spare parts, advices in choosing particular equipment and for all the eventualities.
We suggest the machine's owner to fill the lines below as they are essential data for request services and spare parts.

Machine's model: .....

Machine's serial number: .....

Engine serial number: .....

Year of construction: .....

Date of purchase:.....

Manual Code: M-MAV1200-01-01

Revision n.: 02

Date of filling: 29-05-2012

Index

1. PREFACE

1.1 MANUAL'S AIM

This manual is an integral part of the machine and has the aim to give all the necessary information for:

- The correct raising awareness of the operators for safety issues.
- Machine's handling, packed and unpacked in safety conditions;
- Machine's correct installation;
- The depth knowledge of its work and of its limits;
- Its correct use in safety conditions;
- To do maintenance request interventions, in a correct and safety way;
- To break up the machine in safety conditions and according to guidelines for workers and environmental protection.

The responsible of the staff department, when this machine will be installed, according to guidelines, have to read carefully this manual and have to make the operators and the maintenance men read it for the parts that are up to them, to conductors and maintenance men in charge, for the parts that interest them.

The time you spend for this will be largely reward by the correct works of the machine and by its use in safety conditions.

This document presumes that, in the establishment in which the machine is designed for, are applied the safety and hygiene of the work guidelines.

The instructions, the pictures and the documents that are in this manual are of reserved technical nature, owner strictly possession and mustn't be reproduced in any way, both in full and in part.

The customer has also the responsibility to be sure that, if this document will be modified by the constructor, only the update versions are present in the point in which the machine is used.

NOTE: It is forbidden to reproduce o translate in full o in part this manual without the authorization written by FCS srl.

1.2 HOW TO READ THE MANUAL

This manual is divided in chapters, each one is referred to a specific operator (Install men, conductor and maintenance man), for which are be defined the necessary qualifications to operate on the machine in safety conditions.

The sequence of the chapters corresponds to the machine's life time logic.

To ease the immediate understanding of the text, we use terms, abbreviations and pictograms, which meaning is indicated at paragraph 1.6.

The manual has a cover, an index and a series of chapters (sections). In the initial page there are machine's and model's identification data, and eventually the serial number, the revision of the manual and a picture/design of the described machine, to ease the reader to identify the machine and its manual.

UNIT OF MEASUREMENT

The unit of measurement are those provided in the **I**nternational **S**ystem (**IS**).

1.3 RETENTION OF THE MANUAL

The manual has to be keep in safe and must be with the machine in each transfer of property that it would have during its life.

The retention have to be eased by handling with care, with clean hands and without putting it on dirty surface.

You mustn't pull out or modify any part. The manual must be file in an environment without damp and heat and near to the machines. The constructor, under user's request, can give further copies of the manual.

1.4 MANUAL UPDATE METHOD

The Constructor has the right to modify the project and improve it without communicate it to customers, and without update the manual already given to the user.

In addition, in case of modifications in the machine installed, according with the Constructor and that need the modification of one or more chapters of the manual, it will be up to the constructor to send manual's owner the chapters that have to be modified, with its new model of revision.

The user, according to the indications that are in the upgrade document, has to substitute in all the copies the old chapters, the initial page and the index with those of the new level of revision.

The constructor is responsible of the descriptions in the Italian version; some translations couldn't be verified at all, so if there is an inconsistency, you have to make reference to the Italian version and eventually call up our counting house that will do the appropriate modification.

1.5 ADRESSEE

This manual is for: the install man, the operator and the trained personnel for the machine's maintenance.

EXPOSED PERSON

Every person who is, completely or in part, in a dangerous area.

OPERATOR

The officer that has to install, operate, adjust, clean, repair and move a machine and has to do its maintenance.

TRAINED PERSONNEL – TRAINED OPERATOR

Who had attend a training course, a specialization course, etc., and are experienced in installation, operation and maintenance, reparation and machine's transport.

Adressee's qualification (see paragraph 1.6)

The machine is intended for industrial use, so not for a general use but for a professional one, so its use could be entrust to qualified figures, in particular:

- Be of age;
- Physical and psychically able to do work that are particularly technical difficult;
- Are adequately trained about the use and about machine's maintenance;
- Are been judge able by the employer to execute the entrusted task;
- Are able to understand and interpret the manual of the operator and the safety guidelines;
- Knowledge of the emergency procedures and their accomplishment;
- Are able to put in action the specific type of equipment;
- Are confident with the specific guidelines;

1.6 GLOSSARY AND PICTOGRAMS

In this paragraph are listed in non common terms or with a different from common meaning.

Here follows the abbreviations that are used and the meanings of the pictograms to indicate the qualification of the operator and the machine's status, its use allows to, rapidly and univocally, give necessary information for the correct use of the machine in safety conditions.

GLOSSARY (All. I p. 1.1.1 Dir. 2006/42/CE)

DANGER

A likely source of wound or a health damage;

DANGER AREA

Every area inside and/or near to a machine where the presence of a person is a risk for safety and health of this person;

EXPOSED PERSON

Every person that is totally or in part in a danger area;

OPERATOR

People entrust to install, operate, adjust, clean, repair and move the machine and do the maintenance;

RISK

Combination of probability and seriousness of a hurt or a damn for health that could arise in a dangerous situation;

SHELTER

Machine's element that is specifically used to guarantee the protection throughout a material crash barrier;

SECURITY DEVICE

Device (different from a shelter) that reduces the risk, alone or associated with a crash barrier;

EXPECTED USE

Machine's use according to information given in the manual;

INCORRECT USE RESONABLY EXPECTED

A machine's use, different from that given in the manual, that could be associated to human behaviour easily foreseeable.

OTHER DEFINITIONS

MAN-MACHINE INTERACTION

Any situation in which the operator interact with the machine in any operative stage in any moment of its life;

OPERATOR QUALIFICATION

Minimum level of ability that the operator have to own to execute the described operation;

NUMBER OF OPERATORS

Number of operators adequate to execute in an optimal way the described operation and results from a careful analysis made by the constructor, so a use made by a different number of operators could obstacle the expected result or could endanger personnel involved;

MACHINE'S STATUS

Machine's status involves operation modalities, for example automatic gear, maintained action control (jog), stop, etc., the conditions of Securities present in the machine as protections included, except protections, pressed emergency stop, type of thermal insulation etc.

RESIDUAL RISK:

Risk that continue inspite of are been adopted protection measures integrated in the project of the machine and inspite of the adopted complementary protection measures.

SECURITY COMPONENT PART

Component part:

- Designed for execute a security function;
- Its break down and/or malfunctioning, endanger people (ex: lifting equipment; fixed protector; mobile, adjustable, etc, electronic and electric device, optical pneumatic, hydraulic, that interstops a protector, etc.)

PICTOGRAMS

Descriptions anticipated by this symbol have: very important information/prescription, in particularly about safety.

The failed respect could carry:

- Dangers for operators safety
- Lose of contractual warranty;
- Discharge of constructor's duty.

Its functions is to give relevance to particular information as:

DANGER

It refers to dangers dealing with the described activity. When there is “DANGER” we refer to activities that could occur while using the machine and could endanger people.

ATTENTION

It refers to dangers dealing with the described activity. When there is “ATTENTION” we refer to activities that could occur while using the machine and could endanger the machine.

WARNNG

We refer to integrations or suggestions for a correct use of the machine and to illustrate basic characteristics.

SAFETY’S PICTOGRAMS

- **Pictograms inside a triangle indicate DANGER .**
- **Pictograms inside a circle impose a PROHIBITION/OBLIGATION.**

Pictograms	Description
	Danger electric tension.
	Arms crushing.
	Hitching on. .
	Dragging.
	Generic danger.

	No entry for not authorized personnel.
	Don’t remove security devices.
	Don’t clean, oil, grease, repair or adjust working parts by hand.
	Don’t execute works before remove tension.
	Obligatory protection gloves.
	Obligatory safety footwear.
	Obligatory safety helmet.

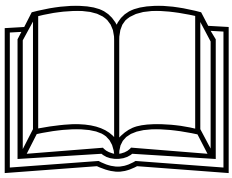
UNIFIED SYMBOLS ON THE MACHINE

Unified symbols that follows indicate danger operation or situations that could occur while using the machine.

ATTENTION

If the sticky tags (illustrated above) aren't still readable, you have to substitute them with new ones.

This symbol indicates that you have to consult the manual.



This symbol indicates burn danger due to high temperature near thermic engine (muffler, manifold, etc.).

2. GENERAL INFORMATION

2.1 CONSTRUCTOR'S IDENTIFICATION DATA

CONSTRUCTOR:

FCS srl

REGISTERED OFFICE – PREFECTURE:

Via Enzo Ferrari, 30 - 45038 Polesella (RO) - Italy

AFTER-SALE/SPARE PARTS' SERVICE

Phone number: +*39 0425* 947707

Fax:+39 0425 30132

E-mail: fcsrail@fcsrail.com

2.2 IDENTIFICATION DATA AND MACHINE'S PLATE

Every machine is identified by a CE plate on which are written, in a permanent way, its data.

While communicating with the constructor or with the service department you have always to quote them.

Via E. Ferrari n° 30 45038 Polesella ROVIGO - ITALY

Phone: +39 0425 947707 Fax: +39 0425 30132

www.fcsrail.com

MOD:	Portable impact wrench MAV2500
S / N	……
N	/
Kw	1,7
Kg	19

CE

2.3 DECLARATIONS

The machine is realized according to the main requirements envisaged by the EU directives, that could be applied when put on the market. **ALLEGATO IV Direttiva 2006/42/CE** The machine isn't included in the mentioned in ALL.IV of the Direttiva 2006/42/CE.

ATTREZZATURE FERROVIARIE

FCS srl
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+39 0425 947707 +39 0425 30132
www.fcsrail.com fcsrail@fcsrail.com

DECLARATION OF CONFORMITY CE

(All. IIA DIR. 2006/42/CE)

THE MANUFACTURER

The company FCS srl, located in Street Enzo Ferrari 30, Postcode 45038, Polesella (RO) ITALY

IT IS HEREBY CERTIFIED THAT THE MACHINE

Machine **Portable impact wrench** Model **MAV 2500**

Serial Numbel..... Year of manufacture.....

Commercial Name **Porable impact wrench** Destination Railway

IS COMNFORMABLE TO INSTRUCTIONS

Directive 2006/42/CE of European Parliament and of the Council of 17 May 2006 for the machines and amendment the directive 95/16/CE.

Directive 2004/108/CE of European Parliament and of the Council of 15 December 2004 about the reapproaching of the regulations of the members countries about to electromagnetic compatibility.

The machine is conformable at legislative decree 81/2008 and next modification of integrations.

AND AUTHORIZE

Mr. **Fabio Coltro**

Address **Via Enzo Ferrari, 30** Post Code **45038**

City **Polesella (RO)** Country **Italy**

TO KEEP THE TECHNICAL FILE

Polesella, 05/01/2012

Fabio Coltro

President

CERT. N° IT05/0072

2.4 APPLIED COPYRIGHT LAW

UNI EN ISO 12100-1	Machinery safety – Fundamental concepts, general principles of design – Part 1: basic terminology, methodology
UNI EN ISO 12100-2	Machinery safety - Fundamental concepts, general principles of design - Part 2: Technical principles
UNI EN ISO 14121-1	Machinery safety – risk evaluation- Parte1: Principles
UNI EN 894-1	Machinery safety – Ergonomic requirements for the design of information and command devices- General principles for the interaction of man with information and command devices.
UNI EN 953	Machinery safety - Shelters – General requirements for the design and the construction of fixed and mobile shelters
UNI EN ISO 13857	Machinery safety – Safety distance to prevent the reach of dangerous area with arms and legs

2.5 WARRANTY AND TECHNICAL SUPPORT

The materials provided by FCS srl enjoy of a 12-months warranty accrue from put on work, established by the bill given to the client.

Warranty application is regulated by FCS srl's terms of sale and use .

FCS srl reserves to repair or substitute parts we retain defective during warranty period. With the substitution od the retire defective part, FCS srl reserve free from any expenditure made by the Dealer or by the Client of the Dealer as presumed break down, present or future, ex. failed gain, conventional penalty, etc.

Ordinary and extraordinary maintenance have to happen according to manual's instructions. Warranty doesn't cover parts that are prone to normal wear and tear and declension. The equipment not build by FCS srl are prone to their constructor's warranty. Warranty will cease :

- If the Client doesn't obey to the payment contract;
- If the machine is used in a non conventional way instead of Sign's indications (machine's alteration, manoeuvre errors, overloaded, fuel use, hydraulic oil, improper lubricating or cooling water, non-observance of maintenance's rules also for non utilization periods, etc.);
- If the failure is due to the installation made by FCS srl's non authorized equipment or if the machine has been modified o repaired without FCS srl's authorization
- If are used non original spare parts or the extraordinary maintenance interventions and/or reparations are not made by FCS srl's non authorized personnel;

For all non included cases and for all kind of service we recommend to directly call FCS srl by recorded delivery or by fax, in case of phone arrangements.

FCS srl doesn't reserve any responsibility for delays or failed interventions

FCS srl is not responsible for breaks down or malfunctions due to technical interventions done on the machine by non authorized personnel.

2.6 RESPONSABILITA' RESPONSIBILITY

FCS srl is dispensed from any responsibility and obligations about any kind of accident to people and things, that could occur for::

- Failed observance of the instructions written in this manual concerning the conduction, the transport, the use and the maintenance of the machine
- Violent actions or incorrect manoeuvre during the transport, use and maintenance of the machine
- Made modifications to the machine without FCS srl authorization
- Events that doesn't deal with the normal and correct use of the machine

Anyway, if the user would attribute the accident to a machine's fault, would have to demonstrate that the occurred damage was a main and direct consequence of this "fault".

The responsibility of the formation, education, training and retraining of the personnel that uses the machine described in this manual, is exclusively depend on owner/user of the machine.

ATTENTION

For the maintenance's reparations you have to use only original spare parts.. FCS srl declines all the responsibility for damages that could occur for non-fulfilment for what said before.

The machine is guaranteed according to contract stipulated during the sales.

Anyway, warranty decades if rules and instructions written in this manual haven't been obeyed.

3 SAFETY

3.1 GENERAL WORNING

The machine has been designed and made by FCS srl to execute the locking and the loosening of the screw spikes, bolts and nuts for anchoring the rails to the sleepers and for all the operations of locking/unlocking nuts, stud bolts, etc when there isn't electric current.
In the ergonomic handle with rubber pads, thought to have low vibrations on the arm, there are machine's commands that guarantee precision and fast work, all in maximum safety for operator.

We observe rules, dispositions, prescriptions, ordinances, guidelines in force for this kind of machine.

The materials used and the equipment's parts, and the production processes, too, are warranty of quality and check, satisfy the maximum safety and reliability needs.

If you use the machine for the specified aims in this manual, if you manoeuvre it with the required carefulness, if you execute a careful maintenance and revisions professional made, you can expect high performances, long and continue life availability of the machine.

Experience allows FCS srl to have, for its products, high safety during the work. Nevertheless, these security conditions during the work can't be completely realized without the help of the operators and their assistant that had to always keep in mind general safety rules, here follows the main ones.

The machine could be used on rails with a maximum banking of 200 mm, and a maximum slope of 40%. If you lean to the ground this machine, it remains bridled avoiding run a way movements.

3.2 REQUIRED OPERATOR'S TRAINING

Every operators have to read entirely with maximum attention this manual and respect what is written.

The Employer is obliged to verify that the operator owns all the abilities required for the conduction of the machine and has carefully look over the manual and has to give to machine's user devices for personal protection (gloves, shoes, clothes, etc.) according to rules in force.

3.3 NOISE

The level of pressure and acoustic power that follows have been done with the machine's engine at the maximum speed.

Level of acoustic pressure continue, at minimum number of revolutions is 78 dB (A)

Level of acoustic power continue under loan is 100 dB (A).

3.4 EXPECTED USE

The machine has been designed and made by FCS srl for lock and unlock hitch's organs (screw spikes) of railway lines.

There must be carefully respected safety prescriptions passed from Railway Administrations for works on rails and near them. You have to start working only after the officials in charge for safety have given their acceptance.

You have quickly and carefully execute the guidelines conveyed by the Site Manager or the safety responsible. Always leave devices and material in a way that these ones can't collide with others railway vehicles. Don't use if there is a third rail.

3.5 SAFETY WORK

FCS srl doesn't answer for accidents, working's anomalies and/or damages during the machine's use, due to user's non observance of laws, prescriptions, dispositions and rules in force.

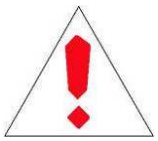
The use of the machine is allowed only at the trained personnel. Only authorized people can stay near the machine. You have always to stay by safety distances from mobile parts and check that during its work normal safety prescriptions are respected. You always have to assure that advertisement given to other people are understand and executed.

Dangers that couldn't be deleted from safety measures adopted by the constructor couldn't be caused by an incorrect use of the machine or by a failed respect, due to the user, of the rules described in this manual.

3.6 BASIC SAFETY INSTRUCTIONS

BASIC SAFETY INSTRUCTIONS FOR THE USE OF THE MACHINE

1. The operator and all the personnel that interact with the machine must be equipped of specific individual protection's devices (DPI).
2. Machine's manoeuvre and use are reserved only for in charge personnel.
3. Before starting the engine you have to assure that driving seats are in a neutral position.
4. Before starting the manoeuvres you have to assure that in the sphere of activity of the machine there aren't people. If you need, signal the start of the operation.
5. You constantly have to check the working area to identify dangerous points a san area where means or people pass.
6. Before execute maintenance operations, stop the engine
7. Execute fuelling only with off engine
8. Don't use the machine in a room or close place to avoid inhale poison gases
9. Don't move the machine with on engine
10. Lift the machine with care and only throughout the special prone handles
11. Adequately light the working area



ATTENTION

It is impossible to list all the possible safety rules, so we entrust operator good sense, who, if he works with care and caution, guarantees the best safety against every kind of accident.

3.7 ENVIRONMENTAL CONDITIONS FOR WHICH THE MACHINE HAS BEEN DESIGNED FOR

The machine in standard configuration is designed to be used in these environmental conditions:

- Work temperature: + 25°C
- Max temperature: + 40°C
- Min temperature: – 20°C
- Relative dump: 20% - 80% (without moisture)

The machine in standard configuration has to work only in these environmental conditions.

ATTENTION

It is forbidden the use of the machine in standard execution in areas that are different from the listed above. The eventual use of the machine in non suitable places can cause the malfunctioning or the breaking of the machine's hydraulic components.

3.8 NOT ALLOWED USES

- Use the machine for aims that are different from those it is designed for
- Not handled machine, manoeuvre and started according to its safety/service rules
- Carelessness and/or absence of maintenance as prescribed or use of non original spare parts
- Use of the machine out of allow environmental conditions
- Use the machine with excluded or damaged safety devices
- Use the machine modified in any of its parts without a written FCS srl authorization
- Use of the machine on rails without respect the rules of the railway body owner of the railway
- Use of the machine on rails open traffic
- Use of the machine on track circuit
- Use the machine in presence of a third rails
- Use the machine in presence of inclination superior or equal to 40%
- Go away during its normal working

3.9 ALLOWED USES

- Use the machine built only with the compatible equipment, in specific working conditions.
- Use the machine only on non open traffic rails.

3.10 CARE AND MAINTENANCE

To execute maintenance and reparation works, you have to move the machine in a place authorized by the responsible of the yard

To maintain the machine clean, never use liquids easy flammable and corrosive products.

Stop the engine before every reparation, maintenance and fuelling work. After fuelling screw on the top of the tank. Avoid fuelling with hot engine. If necessary leave the maximum level at ¾ of its capacity.

If the fuel leaks don't start the engine but clean the area tainted by the fuel. Periodically verify that there aren't leaks of fuel. In case of any anomaly or bad functioning stop the machine and repair when the engine is cold.

Observe the normal fire rules and fuelling with off engine, always keeping in mind tank's capacity to avoid leaks of fuel, in particular with hot engine.

Execute check and maintenance work prescribed according to the engine's maintenance table, as well as all the little reparation and check of tightening of bolts.

For the eventual lifting of the machine you have to respect the indicated lifting points defined compared to the barycentre.. For the maintenance is fundamental the use of suitable tools.

ATTENTION

It is impossible to list all the possible safety rules, so we entrust operator good sense, who, if he works with care and caution, guarantees the best safety against every kind of accident

3.11 RESIDUAL RISK

Dangers that couldn't be deleted from safety measures adopted by the constructor couldn't be caused by an incorrect use of the machine or by a failed respect, due to the user, of the rules described in this manual.

The personnel in charge of the machine must be equipped of specific individual protection's devices

DANGER

During every kind of work pay attention of high voltage line, if you are next to them could cause DEATH.

4 MACHINE'S DESCRIPTION

4.1 GENERAL

The machine has been designed and made by FCS srl to execute the locking and the loosening of the screw spikes, bolts and nuts for anchoring the rails to the sleepers and for all the operations of locking/unlocking nuts, stud bolts, etc when there isn't electric current.
In the ergonomic handle with rubber pads, thought to have low vibrations on the arm, there are machine's commands that guarantee precision and fast work, all in maximum safety for operator.
We can provide under request

- Trolley for the movement and storing
- 3 wheels trolley

4.2 TECHNICAL CHATACTERISTICS

ENGINE	
Cycle	2 strokes
Cylinder number	1
bore x run	43 x 32 mm
Capacity	46,5 cc
Max power	1,7 Kw (2,3 Cv)@7500rpm
Max torque	0,34 Kgm@5500rpm
Cooling	Air cooling
Air filter	Dry
Fuel	Mixture 4%
Fuel tank's capacity	1 litre
Hour waste	380 g/cv h
Number of revolution at minimum	2700rpm±250
Maximum number of devolution at idle	9880rpm
Maximum number of revolutions under loan	7120rpm
Minimum noise	78 dBA
Noise under loan	100 dBA
Handle vibrations	4 m/s^2
Handle vibrations under loan	19 m/s^2
Max torque	2500 Nm
Clamping pulse per minute	1850
Dimensions (length x width x Height)	700x330x390 mm
Ignition	Electronic
Starting	Manual

5 INSTALLATION

5.1 TRANSPORT AND MOVEMENT

The lifting of the machine can be done only by using highlighted devices' grips that are on the machine and identified by special pictograms.

ATTENZIONE

Lifting operations have to be done at off engine.

We recommend to use expected personal safety devices as: gloves, safety footwear with steel tip and overalls.

DANGER

Bump and crushing danger. During the lifting and moving you have to operate carefully.

5.2 PUT ON USE

5.2.1 FIRST START

At the first start of the machine you have to execute checks that follow:

1. Verify that the machine has:
   - Declaration of conformity CE
   - Use and Maintenance's manual
   -
2. General visual check of the machine
3. Check and verification of the presence of identification's plate and of safety labels
4. Check and verification of the level of:
   a. Fuel
   b. Engine oil
5. Check and verify of oil lacks from the engine
6. Check and verification of the level of:
   - Fuel
   - Engine oil
7. Verify electric cables's status (check the eventual presence of scratches, weakens, spelled wires or shealts,etc.)
8. Check the functionality of safety and emergency devices
9. Check commands and indicators' efficiency
10. Varnishing's check
11. Execute a functioning's test to idle in every expected operative conditions
12. After executing tests verify if there are lacks
13. Operate with the machine after an adequate warming-up period

ATTENTION

Before starting the machine the operator in charge has to read completely this manual

5.2.2 CHECKS AT THE BEGINNIG OF EVERY WORKING DAY

Before the start of every working day you have to check:

1. General check of the machine in particular verify if there are liquids' lacks (oil, fuel etc.)
2. Verify the electric cables (check the eventual presence of scratches, weakens, spelled wires or shealts,etc.)
3. Check commands and indicators' efficiency
4. Varnishing's check
5. Verify fuel level

If one or more described points above happen, don't use the machine and provide for re-establish the machine in efficiency conditions.

If there are any anomalies that the operator couldn't solve, contact FCS srl.

5.3 PROTECTION AND STORING

When it is expected that the machine has to remain idle for a quite long period, it is necessary to take precautions to preserve machine's functionality.

5.3.1 IN PREPARATION FOR A BRIEF INACTIVITY

1. Put the machine in a way that can guarantee the adequate safety

5.3.2 STORING AND PREPARATION FOR A LONG INACTIVITY

As above, also:

1. Remove the fuel and start the engine until the fuel inside is consumed
2. Remove the plug and inject engine oil in the cylinder and then withdraw the ignition handle to move the cylinder and distribute the oil
3. Clean the air filter
4. Protect the muffler to avoid that foreign bodies could enter
5. Squirt protective oil on all the machine
6. If possible store the machine in a cover place, air, dry and non dusty, or protect the machine with a plastic sheet to avoid storm damages

5.3.3 RECLAMATION AFTER A LONG INACTIVY

1. Carefully clean the machine
2. Remove the protection on the muffler
3. Verify fuel's level, engine oil
4. Start the engine and idle it for some minutes
5. Check the functionality of safety and emergency devices
6. Check commands and indicators' efficiency

5.4 MACHINE'S LIFTING

Lift the machine by hands at off engine and with the muffler away from the body after a adequate time of engine cooling.

If possible empty the tank and fix the tool before pack the machine away. Assure that the switch of the engine is off during the transport.

ATTENTION

Lifting operations must be done at off engine.

We recommend to use expected personal safety devices as: gloves, safety footwear with steel tip and overalls.

DANGER

Bump and crushing danger. During the lifting and moving you have to operate carefully.

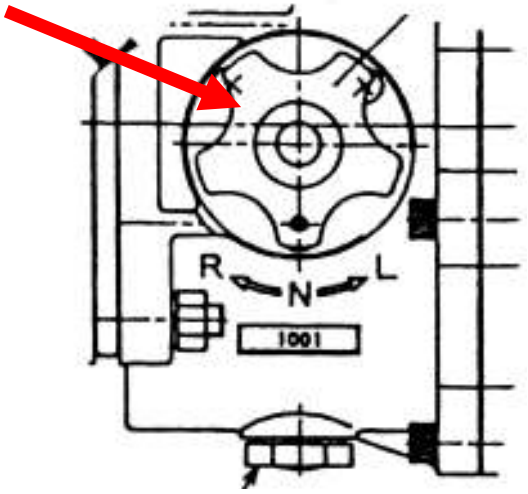
6 MACHINE'S USE

6.1 IGNITION OF THE ENGINE

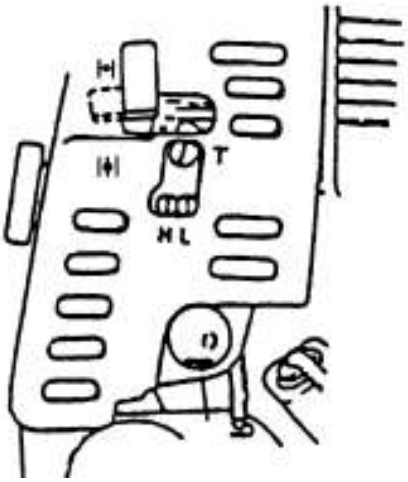
To start the engine proceed as follows:

Place the machine on a stable support or on a consistent ground

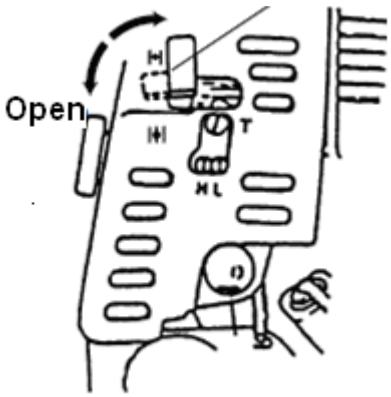
Place the gear shift in the position NEUTRAL



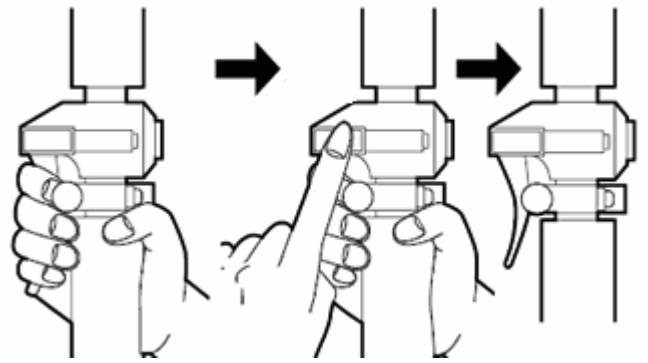
Pull the fuel filler bulb for some times to fill the carburetor



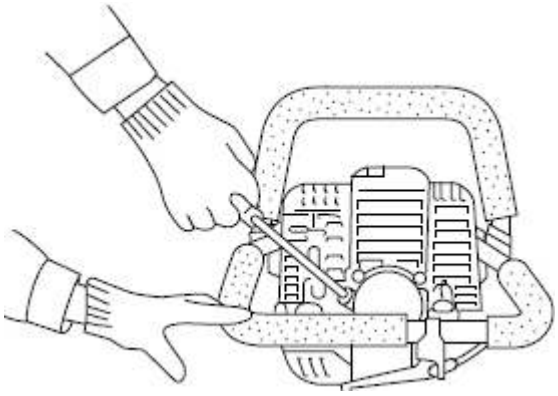
Place the choke lever for the ignition in a close position



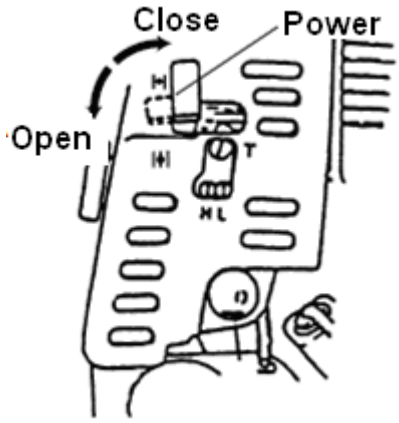
Pull the accelerator button



Pull hard the power retractable handle paying attention to firmly maintain the machine. Then accompany the starting handle in the neutral position.



After the engine is on, place the power handle for the ignition in a slightly open position. If the engine should off, close the power lever and repeat the ignition procedure.



If the engine shouldn't start, repeat the procedure from the beginning.

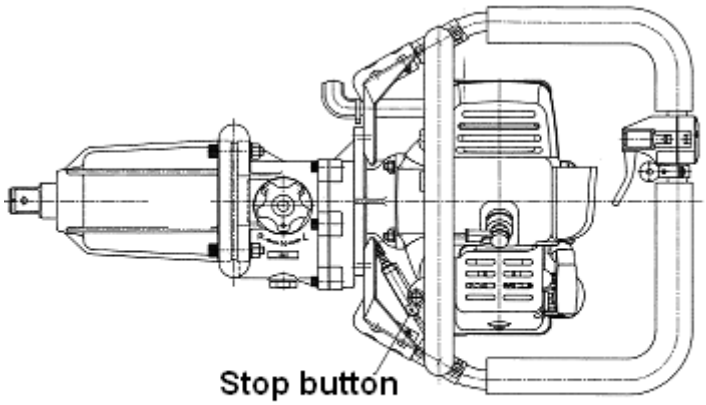
DANGER

Once the engine is running never abandon the machine and maintain it in a well fixed position.

6.2 SWITCHING OFF THE ENGINE

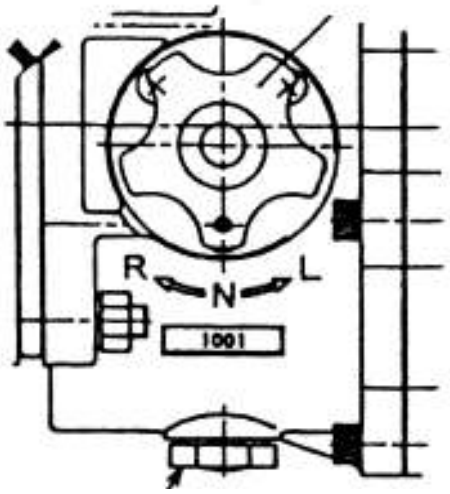
Release the accelerator lever to decrease engine's revolutions.

Pull the engine switching off's button



Replace the machine on a stable support or on a consistent ground.

Place the gear shift in the position Neutral.

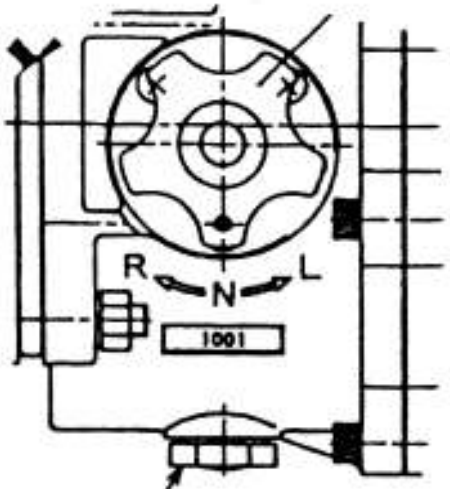


6.3 HOW TO USE THE MACHINE

Place the gear shift on the position R (clockwise rotation) if you want to lock the screw-spikes, bolts and nut for anchoring the rail on the sleeper.

Place the gear shift on the position L (counterclockwise rotation) if you want to unlock screw-spikes, bolts nut for anchoring the rail on the sleeper.

When you want to invert the direction of rotation of the chuck, release the accelerator lever to bring the engine at the minimum number of revolution.



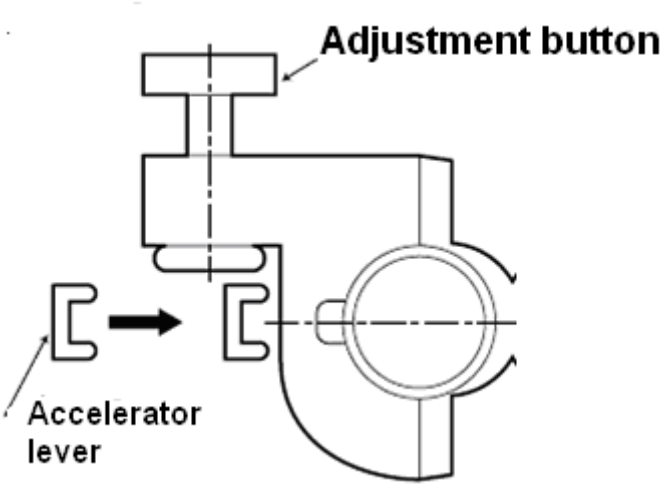
DANGER

Don't invert the direction of rotation before having bring the engine at the minimum number of revolutions.

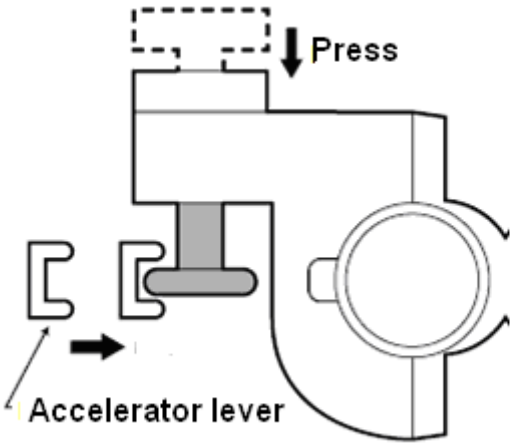
You can press adjustment button to adjust precisely the number of revolutions and so to adjust the torque.

By operating with the accelerator completely pressed, you'll obtain the maximum torque available (about 1030Nm).

By operating with the accelerator pressed in parts you'll obtain an inferior torque (about 800Nm).



To partialize the accelerator you can use an adjustment button that could be adjusted so late to function as mechanical block for the accelerator lever of a determined idle of rotation of engine.



DANGER

User that doesn't follows the instruction to lock and unlock screw spikes as described in the manual, exposes to potential danger situations.

ATTENTION

We recommend to use expected personal safety devices as: gloves, safety footwear with steel tip and overalls.

ATTENTION

FCS S.R.L. is not responsible for damages that could occur to people or things because of an incorrect use of the machine that doesn't follows the indications that are in the manual.

6.4 SOCKET'S CHANGE

ATTENTION

Socket's change have to be done at off machine.

We recommend to use expected personal safety devices as: gloves, safety footwear with steel tip and overalls.

6.5 LIGHTNING

Use the machine just in a well lighted place.

6.6 INSTRUCTION FOR EMERGENCY SITUATIONS

In case on emergency you can switch off the machine using the standard procedure, so by releasing the accelerator lever and pressing the switching off button.

ATTENTION

Don't use the emergency button to switch off the engine instead of the normal switching off procedure.

6.7 REFUELLINGS

Always consult the engine use manual to identify the correct fuel to use.

Engine tank have always to be filled throughout the socket indicated on the tank and indicated on the machine by the special label (see paragraph "UNIFIED SYMBOLS ON THE MACHINE").

After fuelling close the tap of the fuel's tank. Avoid fuelling with hot engine. If necessary leave the maximum level at ¾ of its capacity.

If the fuel leaks don't start the engine but clean the area tainted by the fuel. Periodically verify that there aren't leaks of fuel. In case of any anomaly or bad functioning stop the machine and repair when the engine is cold.

Observe the normal fire rules and fuelling with off engine, always keeping in mind tank's capacity to avoid leaks of fuel, in particular with hot engine.

DANGER

Petrol is extremely inflammable and explosive. A fire or an explosion could burn you and others.

Fill the tank in open space, at cold engine, and clean the accidental lacks..

Do not handle petrol near to free flames or sparks.

ATTENTION

The structure of this kind of machine needs a particular care during fuelling operation.

7. SEARCH FOR BREAK DOWN

BREAK DOWN	POSSIBLE CAUSES	REMEDIATION
The engine won't start	– Lack of fuel	– Fill the fuel tank
	– Plug wet by excessive fuel	– Remove the plug – Pull the power retractable handle for 5 – 6 times – Install the plug – Place the choke lever open pull the power retractable handle
	– Fuel channel bent or disconnected	– Verify the integrity of the channel
	– Malfunction of carburetor	– Lack of air in the carburetor – Incorrect adjustment of the – Diagram of the wrong – 's valve incorrectly adjusted
	– switch in the stop position	– Turn the switch on
	– Spark not present	– incorrect onnection starting coilIncorretta – amount of air – Failed starter coil
	– Short circuit stop switch	– Repair or substitute
	– Dirty plug	– Clean or substitue the plug
	– wrong distance candle	– Adjust the play correct at 0,6 mm
	– Faulty connection cable plug	– Verify the connection
	– failed coil injection	– Substitute
The engine stalls after start	– Lack of fuel	– Riempire il serbatoio di carburante
	– power handle in close position	– open the power valve
	– Air enters in the feeding system	– Verify the connections
	– Malfunctioning of the carnurettor	– Lack of air in the carburettoe – Incorrect adjustment – Diagram of the wrong – 's valve incorrectly adjusted
	– Plug doesn't work	– Substitute the plug
	– failed coil injection	– Substituite
engine overheating	– Wrong % of mixture	– Fill the tank with correct % of fuel
	– Wrong plug	– Substitute the plug
	– Dirty cylinder	– Clean the cylinder
	– Dirty cooling channel	– Clean the cooling channel
Motor shaft does not rotate	– Gear shift in neutral position	– Spin the gear shift in position R or L
	– Clutch consumed	– Substitute
Reduced output power	– Dirty air filter	– Clean the air filter
	– clogged silencer or clogged cylinder flue pipe	– Clean
	– Loss of pressure in the cylinder	– Replace seal rings or the cylinder
	– Motor shaft consumed	– Substitute

	– Clutch consumed	– Substitute
	– Flat cam consummate	– Substitute
	– Hammer consumed	– Substitute
	– Molla di ritorno danneggiata	– Substitute

8 MAINTENANCE

ATTENTION

Maintenance operations have to de executed only by FCS srl's Customer Service or by qualified personnel

8.1 PREFACE

In order to obtain best performances and to assure all the elements the maximum life, is necessary that use and maintenance's rules are carefully followed by the operators in charge. For this we suggest to Customenrs, in their interest, to carefully read these notes and to consult the manual every time they need suggestions to avoid eventual inconvenients.

As the machine normally works closet o water, sand, ground, etc, a rational lubrication is necessary, that assumes a vital importance for the long use of the machine and to contain its exercise's cost.

For further clarifications call up our customer care:

- All the maintenance's operations have to be executed at off engine.
- Ordinary maintenance includes all the necessary information for the good functioning and preservation of the machine.
- We suggest to let the same operator do maintenance's operations, who knows by heart how the machine works and has to know what it's here in the manual.
- Check of lubricant's levels must be done at cold machine and set on a plane place. Before checking levels, carefully clean areas to inspect to avoid foreign bodies enter. In case of re-establishment, use clean bins and assure that foreign bodies don't enter in the lubricant.
- Hydraulic oil, engine oil, grease, cooling liquid and any other liquid use for the good working of the machine, must be of good quality, without contaminations and brand-new.
- The substitution of engine oil must be done at hot machine to ease the lack.
- Some maintenance's interventions to the engine must be researched in the specific manual.
- During the disassembling and re-assembling you always have to use the extractor, keys and suitable equipments to avoid deteriorate parts.
- To unlock parts solidly adherent, use copper's hammer or wooden mallet.
- Separate clearly elements of various groups and screw back the nut in part on its pins or studs. Clean the pieces with a slice or rags, and then clean with de-grease putting off the residuals with compressed air.
- After gringing process or remarchining with abrasive bodies , carefully clean the parts or pass them with compressed air assuring the complete asportation of the abrasive dusty.
- During the re-assembling of various parts, assure that they are clean and then carefully lubricate.
- Pay the maximum attention on safety rings and to the cotter pins: if they have damages traces immediately substitute them.

Ordinary maintenance's operations indicated on the table that follows must have the same frequency of the machine's working hours indicated on the column at the right, under period.

8.2 MAINTENANCE TABLE

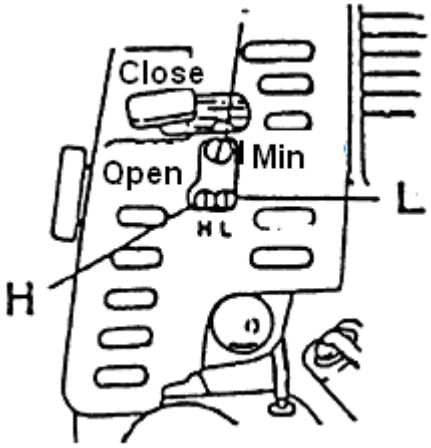
Nº	OPERATION	PERIOD
1	Check all threaded connections and make sure they are tight	daily control
2	Check fuel level and when you top up clean if there are lacks of fuel	daily control
3	Check the oil level through the special window. The oil level should be at the center of the window. If the oil is below this level, top up.	daily control
4	Check the starter and in particular the rope and the return spring	weekly maintenance
5	Clean the exterior of the plug	weekly maintenance
6	Remove the plug and check the play between the electrodes. Adjust the play at 0,6 mm or substitute the plug	weekly maintenance
7	Clean the cooling fins on the cylinder and check that the air intake of the starter is not clogged	weekly maintenance
8	Clean the air filter	weekly maintenance
9	Clean the fuel filter	weekly maintenance
10	Rinse the fuel tank with gasoline	monthly Maintenance
11	Clean the outside of the carburetor and the area around	monthly Maintenance
12	Clean the impeller and the space around	monthly Maintenance
13	Replace the plug	100 hour
14	Clean the exhaust	100 hour

8.3 ADJUSTMENT OF THE CARBURETOR

The machine is adjusted before its exit from the factory, with the correct minimum revolutions number.

When the engine minimum idle is high (chuck's rotation) or it's too low (the engine switches off) it's necessary to adjust the engine acting on the adjustment screw of the minimum.

- Spin the adjustment screw of the minimum clockwise to increase the minimum revolutions number
- Spin the adjustment screw of the minimum clounterclockwise to decrease the minimum revolutions number



Adjustment of the screw L (adjustment screw low revolutions number)

And screw H (adjustment screw high revolutions number)

In conditions of minimum revolutions number, spin the screw L to the right or to the left searching the maximum revolutions number, and then from this position, spin the screw to the left of 1/8 – 1/4 of turn.
In conditions of maximum revolutions number spin the screw H to the right or to the left as for the screw L

Standard adjustment of the screws L and H is 1 turn and 1/8 from the position close.

8.4 VERIFY PLUG'S STATUS

Remove the plug and touch the metal part with the exception of the thread

Pull the switch handle

In normal operating conditions can be seen the spark.

Attention: Never touch the plug with the threaded area of the seat, the inner gas can explode.

When you pull the handle switch, do not touch the metal part of the candle, danger of electric shock

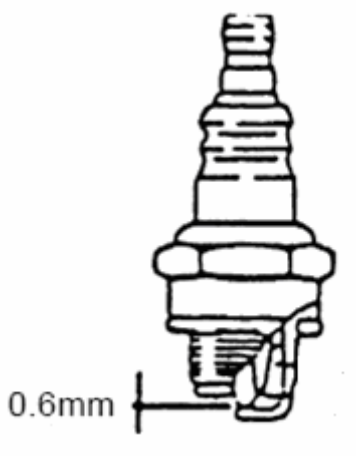
Clean the plug to prevent residual fuel possibility of fire

Use only the recommended plugs

In a state of optimal functioning of the electrodes on the plug will show dark brown and dry.

If the plug is dirty, clean it and check the electrode gap

The correct distance is 0,6 mm



The plug condition is influenced by following factors

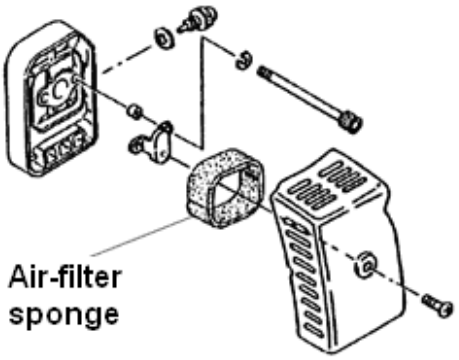
- badly adjusted carburetor
- Wrong fuel mixture (too much oil in the gasoline)
- Dirty air filter
- Heavy Duty operating conditions (operating in cold)

Plugs should be replaced after approximately 100 hours of operation or earlier if the electrodes are badly eroded.

8.5 AIR FILTER

When the filter is dirty or impregnated with dust, it can cause several problems:

- malfunctioning carburetor.
- Starting problems.
- Reduction of engine power
- Wear and tear on engine parts
- Fuel consumption abnormal.



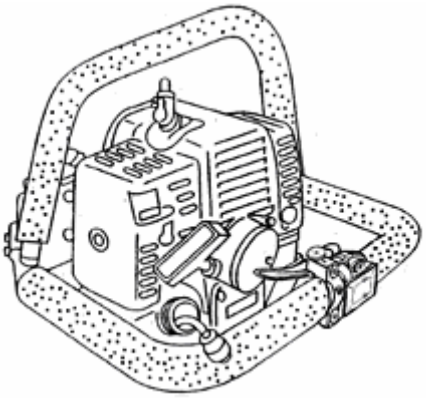
CLEAN AIR FILTER

The air filter should be cleaned of dust and dirt regularly and if damaged must be replaced

- Remove the air filter cover and filter
- Rinse the filter with warm soapy water and then squeeze it dry before reinstalling
- If the air filter is damaged should be replaced with a new one.

8.6 FUEL FILTER

If the fuel filter is clogged by impurities in the fuel, it will not flow into the carburetor and the engine will be subject to failure

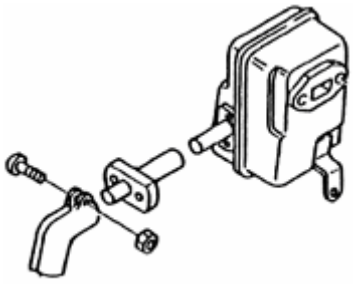


A regular check-up is recommended

- Drain all fuel from the tank and carried from the tank to the filter
- Remove the filter element holder assembly and wash in warm water with detergent.
- Rinse thoroughly until all traces of detergent are eliminated.
- Press, but do not wring and dry it.
- If the item is too dirty, replace it.

8.7 EXAHUST

The exhaust outlet duct and the exhaust gas from the cylinder must be cleaned regularly, every 100 hours, with carbon deposits accumulated to prevent malfunction of the engine.



Remove the muffler and clean up the excess carbon from the exhaust pipe be careful not to get dirt inside the cylinder.

8.8 IMPACT MECHANISM

When the mechanism of impact wear you hear a hollow sound when the percussion**.** It shows a power reduction and extra percussion that could cause damage and breakage. Remove all the oil in the gearbox and the carcass of the percussion system by checking the degree of wear, at least once a month and then grease the area.

9 FIRE

In case of start of a fire, use a CO2 extinguisher (not supplied) according to guidelines in force.

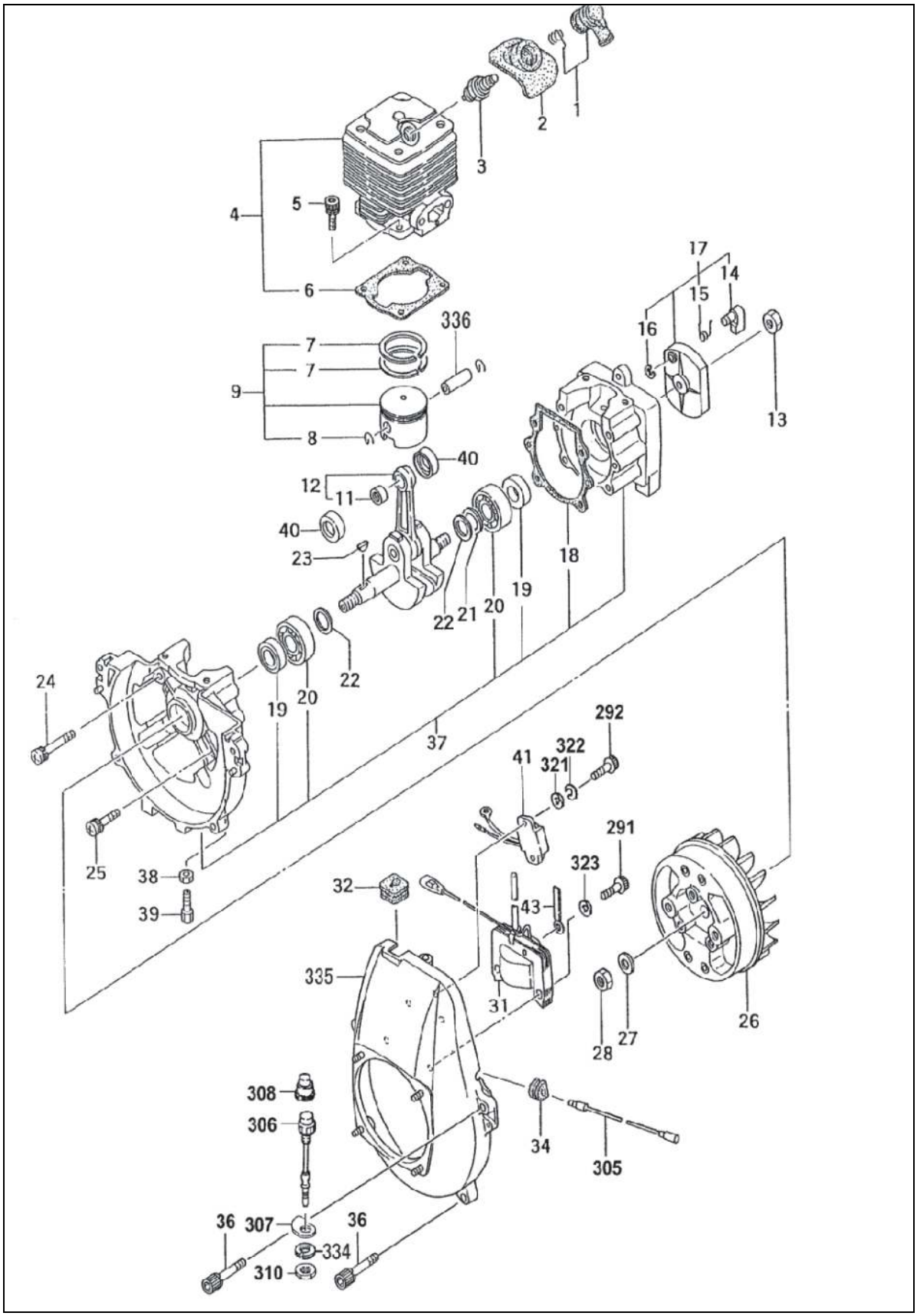
In case of machine's fire or if the machine is near a fire, give the alarm in the yard and call up the firemen.

10 BREAKING UP AND DISPOSAL

At the end of machine's life, remember that the owner of the mean must provide for the breaking up and for the machine's disposal according to guidelines in force and throughout authorized disposer for each component of the machine.
Remember that every time that you substitute oil, hose and every machine's detail prone to different disposal, you always need to make reference to rules in force and to authorized disposals.

11 SPARE PARTS

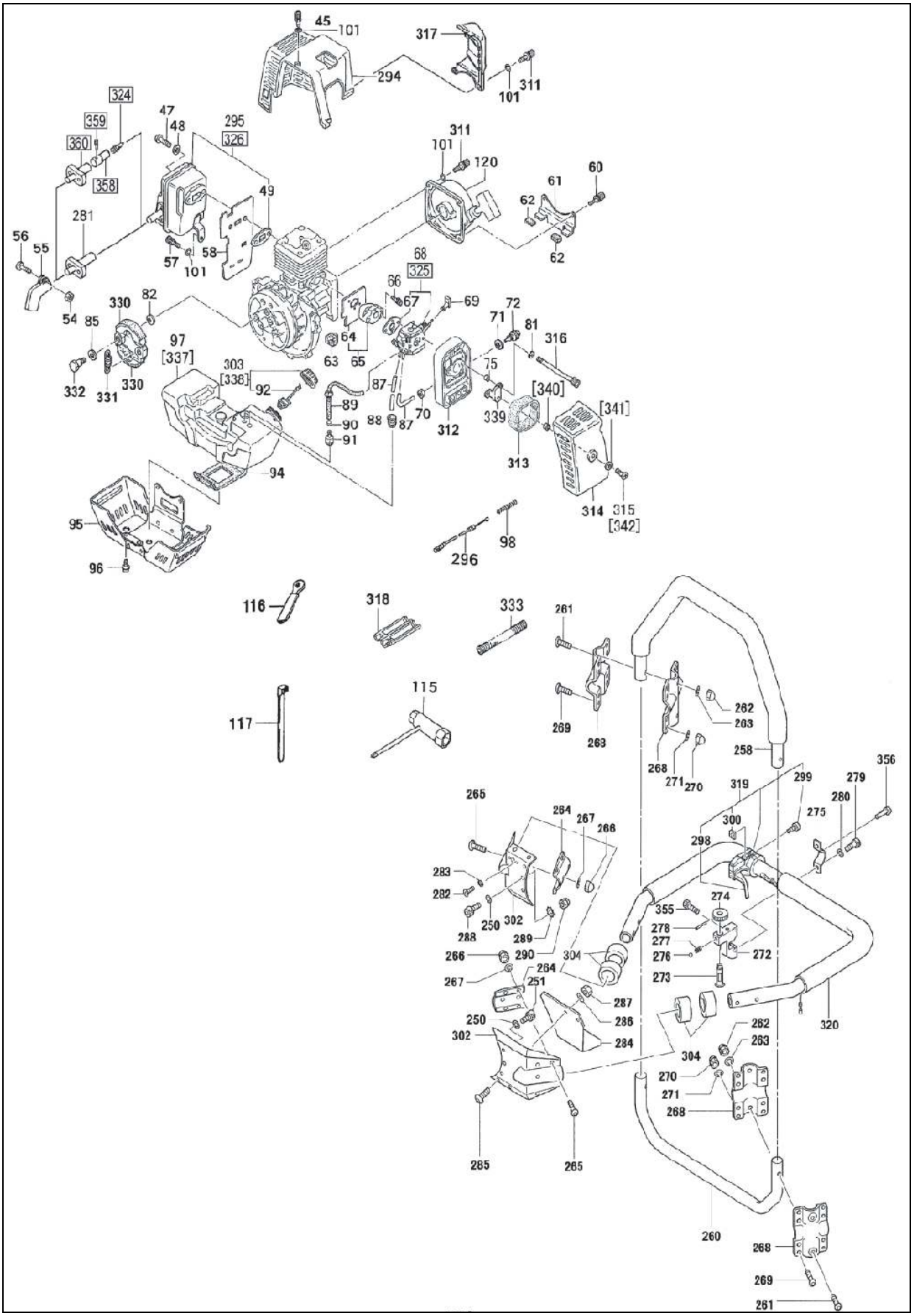
11.1 ENGINE EXPLODED VIEW



Reference	Part identification	Quantity
1	spark plug	1
2	Plug's plastic protection	1
3	Plug model BPMR6A	1
4	Cylinder kit (Rif 4, 5, 6)	1
5	Bolt 5x18/S	4
6	Cylinder gasket	1
7	Piston ring	2
8	Seeger	2
9	Piston kit (Rif 7, 8, 9)	1
11	Roller bearing, 1014125	1
12	Crankshaft (Rif 11,12)	1
13	nut	1
14	pawl	1
15	pawl spring	1
16	Ring Stop	1
17	starter pulley (Rif 14, 15, 16, 17)	1
18	Crankshaft seal housing	1
19	oil seal 15257	2
20	Ball Bearing 6202 C3	2
21	Thickness crankshaft 0.05	V
21	Thickness crankshaft 0.10	V
21	Thickness crankshaft 0.15	V
21	Thickness crankshaft 0.20	V
21	Thickness crankshaft 0.30	V
22	Drive shaft gasket	2
23	key	1
24	screw	2
25	screw	2

26	Complete rotor magnet	1
27	washer	1
28	nut	1
31	Coil injection complete	1
32	gasket rope	1
34	gasket rope	1
36	screw	4
37	Housing shaft (Rif 18, 19, 20, AND 37)	1
38	nut	1
39	screw	1
40	Collar piston pin	2
41	injection complete	1
43	Fastener rope	1
291	screw	3
292	screw	2
305	rope	1
306	Full stop button	1
307	Saucer restraint stop button	1
308	Protective rubber stop button	1
310	nut	1
321	nut	2
322	washer	2
323	washer	3
334	washer	1
335	impeller housing	1
336	piston pin	1

11.2 ENGINE COMPONENTS' EXPLODED VIEW



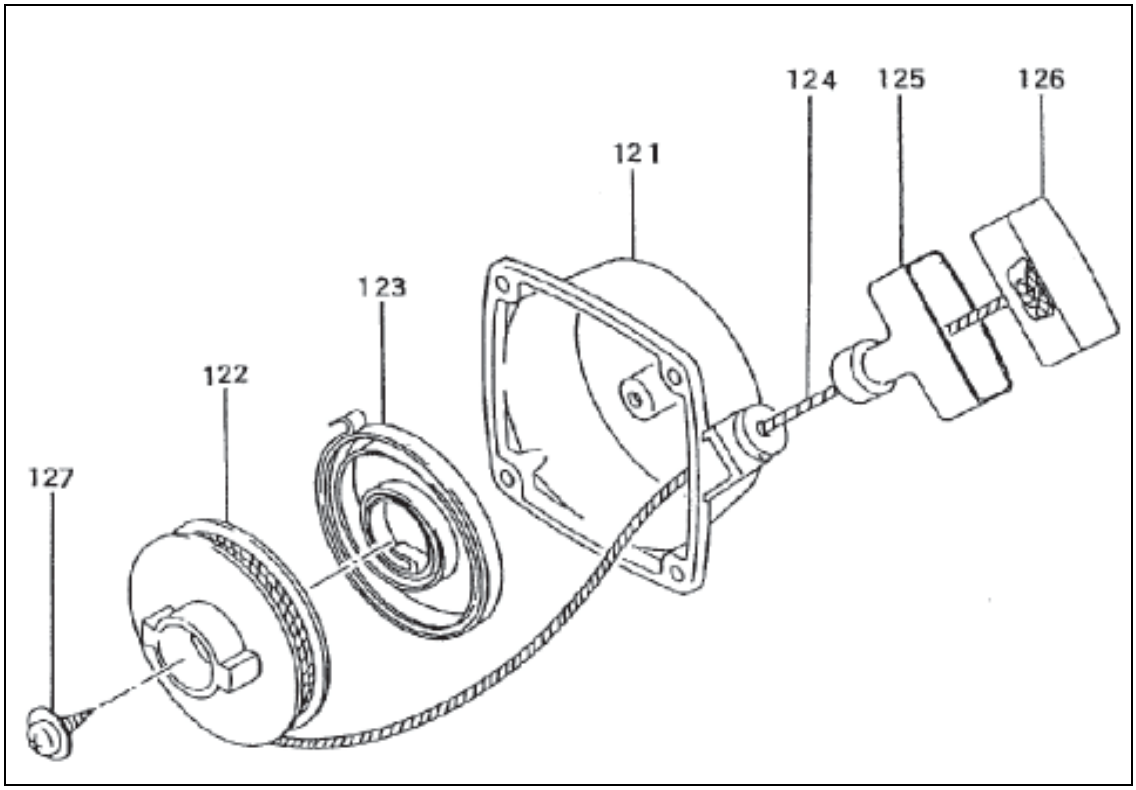
Riference	Part identification	Quantity
45	screw	1
47	screw	2
48	Gasket	2
49	exhaust gasket	1
54	Nut	1
55	complete tube	1
56	screw	1
57	screw	1
58	screw	1
60	screw	2
61	tank support	1
62	Vibration-damping fuel tank	2
63	Vibration-damping fuel tank	2
64	Gasket	1
65	Set (Rif 64, 65)	1
66	Screw	2
67	Carburetor gasket	1
68	Carburetor Kit (Rif 67, 68)	1
69	choke lever 1565-30	1
70	Nut	1
71	Gasket	1
72	Pump start full	1
75	collar	2
81	Gasket	2
82	Gasket	2
85	Gasket	2
87	fuel hose	2
88	Gasket	1

89	Tank hose's entity	1
90	Clip	1
91	Filter body entity	1
92	Chain fuel cap	1
94	Antivibration	1
95	Support Tank Full	1
96	screw	2
97	Fuel tank	1
98	Adjusting spring	1
101	Gasket	4
115	key	1
116	tie rope	1
117	tie rope	1
120	buffer	1
250	Gasket	6
251	screw	3
258	Rubber shock mount	1
260	Conduit tank	1
261	screw	4
262	screw	4
263	Gasket	4
264	Pot Handle	2
265	screw	8
266	screw	8
267	Gasket	8
268	Support	4
269	screw	16
270	screw	16
271	Gasket	16

272	Kit (Rif 272,273,274,276,277,278 AND 355)	1
273	valve adjustment	1
274	button	1
275	Support	1
276	Sphere	1
277	Spring	1
278	Pin	1
279	screw	2
280	Gasket	2
281	Support	1
282	screw	2
283	Gasket	2
284	Protection	1
285	screw	2
286	Gasket	2
287	screw	2
288	screw	3
289	Gasket	3
290	screw	3
294	Exhaust protection	1
295	Kit exhaust (Rif 49, 295)	1
296	throttle cable	1
298	Accelerator	1
299	screw	1
300	screw	1
302	Support	2
303	Kit cover (Rif 92, 303)	1
304	Antivibration	4
311	screw	2

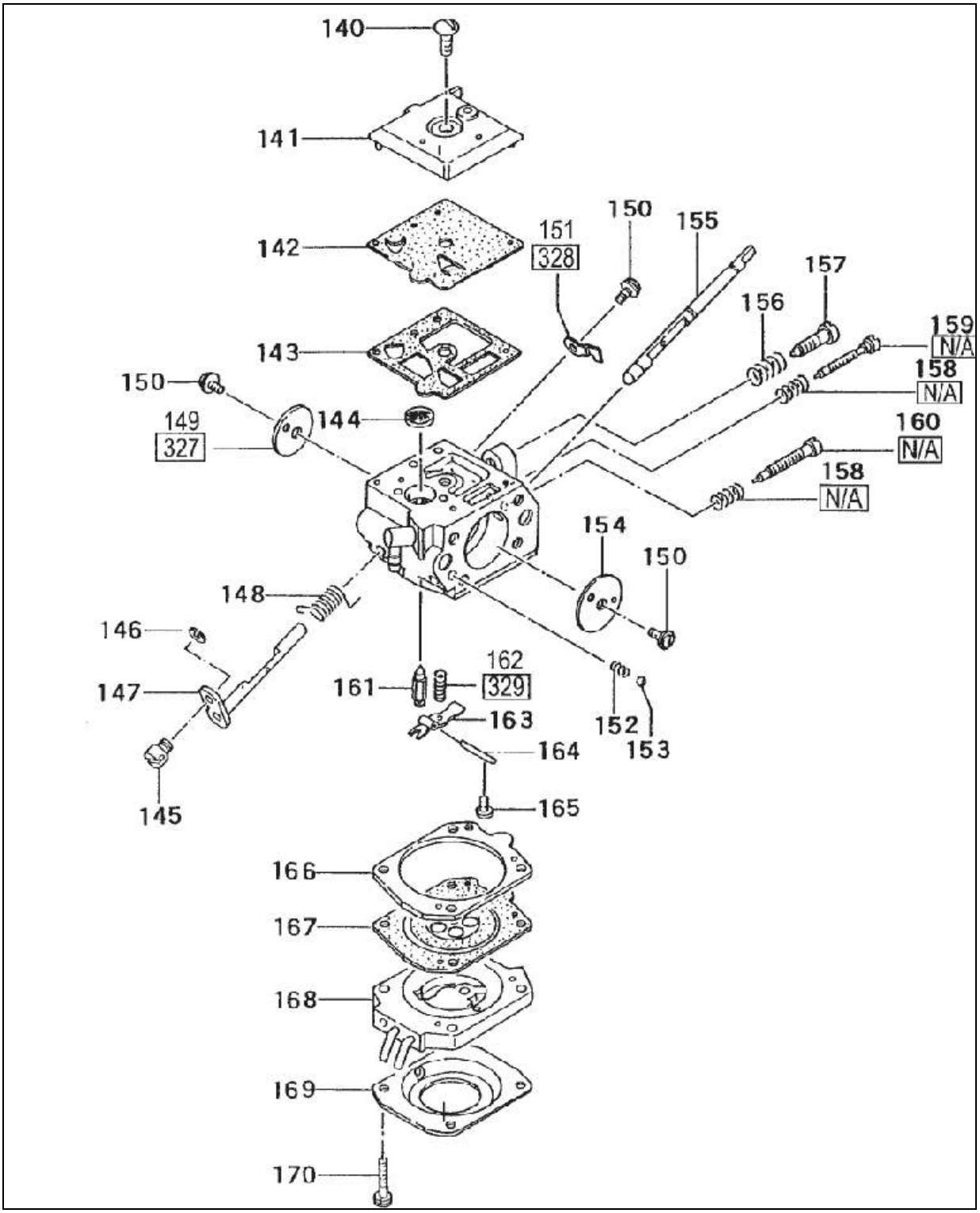
312	Filter body	1
313	Filter	1
314	Filter cap	1
315	screw	1
316	screw	2
317	Air Filter Cover	1
318	Connector	1
319	Throttle lever assembly (Rif 298,299,300,319)	1
320	Handles assembly	1
324	flame Stop	1
325	Carburetor	1
326	exhaust	1
330	full engagement	2
331	spring clutch	1
332	screw	2
333	Protezione	1
337	tank	1
338	tank cap	1
339	cap	1
340	Collar	1
341	Gasket	1
342	screw	1
355	screw	2
356	Rivet	1
358	Outlet pipe	1
359	screw	2
360	Support tube output	1

11.3 STARTER



Rifererence	Part identification	Quantity
121	Full Body Starter	1
122	reel starter	1
123	Return spring	1
124	starter cable	1
125	handle starter	1
126	Cover starter handle	1
127	screw kit	1

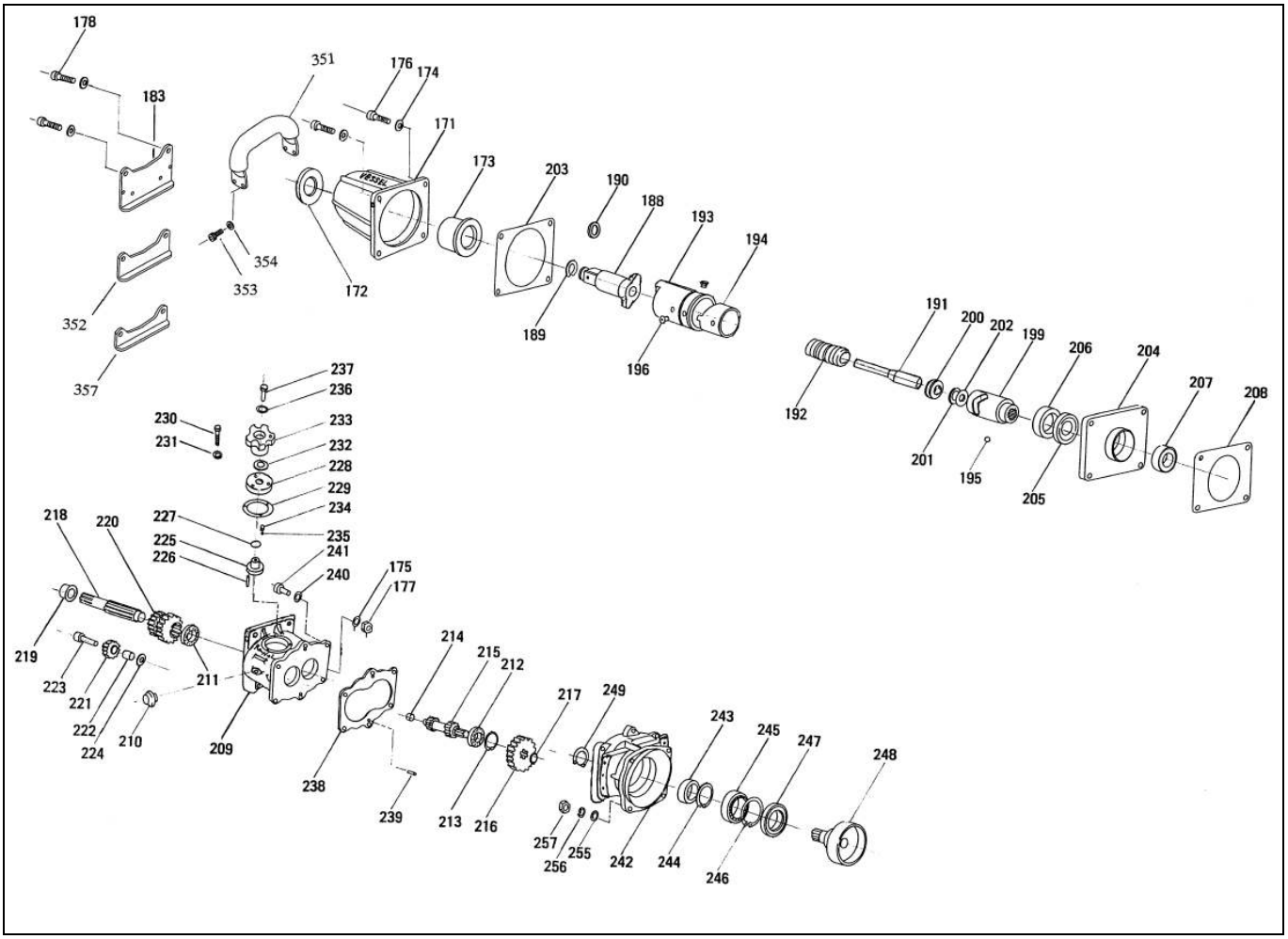
11.4 CARBURETOR



Rifererence	Part identification	Quantity
140	screw kit	1
141	body pump	1
142	pump seal	1
143	diaphragm pump	1
144	Input filter	1
145	junction	1
146	Stop ring	1
147	Throttle Shaft Kit	1
148	spring accelerator	1
149	throttle valve	1
150	Screw off	3
151	Plate retainer	1
152	Chocke spring	1
153	Steel ball	1
154	choke valve	1
155	Shaft chocke	1
156	Idle adjusting spring	1
157	Idle adjusting screw	1
158	spring adjustment	2
159	adjusting screw L	1
160	adjusting screw H	1
161	valve	1
162	Valve spring	1
163	Lever	1
164	Pin	1
165	Kit screw	1
166	diaphragm seal	1
167	Kit diaphragm	1

168	Air Cleaning Kit	1
169	diaphragm cover	1
170	Screw Kit	4
327	throttle valve	1
328	Stop Plate	1
329	valve spring	1

11.5 IMPACT MECHANISM



Riference	Part identification	Quantity
171	complete carcass (Rif 171, 172, 173)	1
172	oil seal	1
173	bush	1
174	washer	4

175	washer	3
176	Screw	3
177	Screw	3
178	Screw	1
183	foot	1
188	Mechanism of impact (Rif 188, 189, 190)	1
189	Stop ring	1
190	O-ring	1
191	central shaft	1
192	Spring	1
193	complete hammer (Rif 193, 194, 196)	1
194	cam plate	1
195	Sphere	2
196	Top	4
199	clutch	2
200	bearing	1
201	spacer	1
202	thrust	1
203	gasket	1
204	Kit flangia (Rif 204, 205, 206, 207)	1
205	gasket oil	1
206	bearing	1
207	bearing	1
208	gasket	1
209	Kit gearbox casing (Rif 209, 210, 211, 214)	1
210	Oil support	1
211	bearing	1
212	bearing	1
213	ring	1

214	shaft	1
215	shaft	1
216	gear	1
217	ring	1
218	bearing	1
219	bearing	1
220	gear shift	1
221	gear	1
222	gear	1
223	Planetary pivot	1
224	spacer	1
225	Gear selector	1
226	Pin	1
227	O-ring	1
228	gear	1
229	Flange	1
230	Screw	3
231	washer	3
232	washer	1
233	Lever gear change	1
234	Spring	1
235	Sphere	1
236	washer	1
237	Screw	1
238	gasket	1
239	Pin	2
240	washer	6
241	Screw	6
242	Support flange (Rif 242,243,244,245,246,	1

	247)	
243	bearing	1
244	ring	1
245	bearing	1
246	ring	1
247	gasket	1
248	ring	1
249	ring	1
255	washer	4
256	Spring	4
257	Screw	4
351	Antivibration rubber covered	1
352	Support	1
353	Screw	4
354	washer	4
357	Support	1