

**SVM 3135**  
Rev.00 02-2021

# OUTBACK<sup>®</sup> 200 CE

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*For use with machines having code number: 50573*



## SERVICE MANUAL



LINCOLN ELECTRIC EUROPE  
[www.lincolnelectric.eu](http://www.lincolnelectric.eu)

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# TECHNICAL SPECIFICATIONS

## OUTBACK®200 (CE) (K14294-1)

INPUT – PETROL ENGINE						
Make/Model	Description	Horse power @3.000 RPM	Operating Speed (RPM)	Displacement Cu. In. (ltrs.) Bore x Stroke Inch (mm)	Starting system	Capacities
K14294-1 Honda*	Gasoline 4-stroke OHV/Air	11,1HP 8,2KW	3.000 RPM	1/389cm3	Manual recoil	Fuel: 6,1 liters Oil: 1,1 liters
	RATED OUTPUT @ 40°C - WELDER					
Welding Process		Welding Output Current/Voltage/Duty Cycle			Output Range	Max. Weld OCV@Rated Load RPM
DC Constant Current		170A@60% 150A@100%			20 TO 170 AMPS	70V
RATED OUTPUT @ 40°C - GENERATOR						
Auxiliary Power						
3,3KVA/230V/13,3A-50HZ - 2,1KVA/110V/19A-50HZ max 3KVA/230V/13A-50HZ - 1,8KVA/110V/16,4A-50HZ continuous						

ENGINE			
LUBRIFICATION	EMISSIONS	FUEL SYSTEM	GOVERNOR
Full Pressure with Full Flow Filter	Stage V	Carburator	Mechanical Electronic
AIR CLEANER	ENGINE IDLER	MUFFLER	ENGINE PROTECTION
Single Element	Not present	Low noise Muffler with spark arrestor	Shutdown on low oil level
ENGINE WARRANTY: 2 years complete (parts and labor) 3 <sup>rd</sup> . year major components (parts and labor)			
PHYSICAL DIMENSIONS			
Height	Width	Length	Weight
630mm**	490 mm	540 mm	70 kg

MACHINE SPECIFICATIONS		
RECEPTACLES	AUXILIARY POWER CIRCUIT BREAKER	OTHER CIRCUIT BREAKERS
(1) 115V Euro Style (1) 230V Euro Style	Electronic controlled via inverter	
	1 Phase, 15AMP x 1 for 230V 16AMP x 1 for 115V	
MISCELLANEOUS		
HARMONIC CONTENT	EMC CLASSIFICATION	
3% THF.	THF < 3% : OUTBACK® 200 CE IS CLASSIFIED AS A CLASS A MACHINE	
MACHINE AMBIENT OPERATING CONDITIONS		
TEMPERATURE	ALTITUDE	MAX ANGLE OF OPERATION
-10°C)TO + 40°C	1828m*	10° ALL DIRECTIONS
* For use above 1828m, contact Authorized Field Service Shop.		
TRANSPORTATION & STORAGE TEMPERATURES		
-25°C TO +55°C NOT EXCEEDING 70°C FOR 24 HOURS		

# Electromagnetic Compatibility (EMC)

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## Conformance

Products displaying the CE mark are in conformity with European Community Council Directive of 15 Dec 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility, Directive 2014/30/EU. It was manufactured in conformity with a national standard that implements a harmonized standard: EN 60974-10 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

## Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc.

### WARNING

This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electro-magnetic compatibility in those locations, due to conducted as well as radiated disturbances.



## Installation and Use

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions.

If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

**Note:** The welding circuit may or may not be earthed for safety reasons. Follow your local and national standards for installation and use. Changing the earthing arrangements should only be authorized by a person who is competent to access whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

## Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
- radio and television transmitters and receivers;
- computer and other control equipment;
- safety critical equipment, e.g., guarding of industrial equipment;
- the health of the people around, e.g., the use of pacemakers and hearing aids;
- equipment used for calibration or measurement
- the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- the time of day that welding or other activities are to be carried out.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

## Methods of Reducing Emissions

### Public Supply System

Welding equipment should be connected to the public supply system according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the system. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

### Maintenance of the Welding Equipment

The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The

welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

#### **Welding Cables**

The welding cables should be kept as short as possible and should be positioned close together, running at or close to floor level.

#### **Equipotential Bonding**

Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

#### **Earthing of the Workpiece**

Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

#### **Screening and Shielding**

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications<sup>1</sup>.




<sup>1</sup> Portions of the preceding text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."



## WARNING

This equipment must be used by qualified personnel. Be sure that all installation, operation, maintenance and repair procedures are performed only by qualified person. Read and understand this manual before operating this equipment. Failure to follow the instructions in this manual could cause serious personal injury, loss of life, or damage to this equipment. Read and understand the following explanations of the warning symbols. Lincoln Electric is not responsible for damages caused by improper installation, improper care or abnormal operation.

	<b>WARNING:</b> This symbol indicates that instructions must be followed to avoid serious personal injury, loss of life, or damage to this equipment. Protect yourself and others from possible serious injury or death.
	<b>READ AND UNDERSTAND INSTRUCTIONS:</b> Read and understand this manual before operating this equipment. Arc welding can be hazardous. Failure to follow the instructions in this manual could cause serious personal injury, loss of life, or damage to this equipment.
	<b>ELECTRIC SHOCK CAN KILL:</b> Welding equipment generates high voltages. Do not touch the electrode, work clamp, or connected work pieces when this equipment is on. Insulate yourself from the electrode, work clamp, and connected work pieces.
	<b>ELECTRICALLY POWERED EQUIPMENT:</b> Turn off input power using the disconnect switch at the fuse box before working on this equipment. Ground this equipment in accordance with local electrical regulations.
	<b>ELECTRICALLY POWERED EQUIPMENT:</b> Regularly inspect the input, electrode, and work clamp cables. If any insulation damage exists replace the cable immediately. Do not place the electrode holder directly on the welding table or any other surface in contact with the work clamp to avoid the risk of accidental arc ignition.
	<b>ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS:</b> Electric current flowing through any conductor creates electric and magnetic fields (EMF). EMF fields may interfere with some pacemakers, and welders having a pacemaker shall consult their physician before operating this equipment.
	<b>CE COMPLIANCE:</b> This equipment complies with the European Community Directives.
	<b>ARTIFICIAL OPTICAL RADIATION:</b> According with the requirements in 2006/25/EC Directive and EN 12198 Standard, the equipment is a category 2. It makes mandatory the adoption of Personal Protective Equipments (PPE) having filter with a protection degree up to a maximum of 15, as required by EN169 Standard.
	<b>FUMES AND GASES CAN BE DANGEROUS:</b> Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. To avoid these dangers the operator must use enough ventilation or exhaust to keep fumes and gases away from the breathing zone.
	<b>ARC RAYS CAN BURN:</b> Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing. Use suitable clothing made from durable flame-resistant material to protect you skin and that of your helpers. Protect other nearby personnel with suitable, non-flammable screening and warn them not to watch the arc nor expose themselves to the arc.
	<b>WELDING SPARKS CAN CAUSE FIRE OR EXPLOSION:</b> Remove fire hazards from the welding area and have a fire extinguisher readily available. Welding sparks and hot materials from the welding process can easily go through small cracks and openings to adjacent areas. Do not weld on any tanks, drums, containers, or material until the proper steps have been taken to insure that no flammable or toxic vapors will be present. Never operate this equipment when flammable gases, vapors or liquid combustibles are present.
	<b>WELDED MATERIALS CAN BURN:</b> Welding generates a large amount of heat. Hot surfaces and materials in work area can cause serious burns. Use gloves and pliers when touching or moving materials in the work area.

	<b>SAFETY MARK:</b> This equipment is suitable for supplying power for welding operations carried out in an environment with increased hazard of electric shock.
	<b>CYLINDER MAY EXPLODE IF DAMAGED:</b> Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. Always keep cylinders in an upright position securely chained to a fixed support. Do not move or transport gas cylinders with the protection cap removed. Do not allow the electrode, electrode holder, work clamp or any other electrically live part to touch a gas cylinder. Gas cylinders must be located away from areas where they may be subjected to physical damage or the welding process including sparks and heat sources.
	<b>EQUIPMENT WEIGHT OVER 30kg:</b> Move this equipment with care and with the help of another person. Lifting may be dangerous for your physical health.

The manufacturer reserves the right to make changes and/or improvements in design without upgrade at the same time the operator's manual.

## INSTALLATION AND OPERATOR INSTRUCTION

Read this entire section before installation or operation of the machine.

### General Description

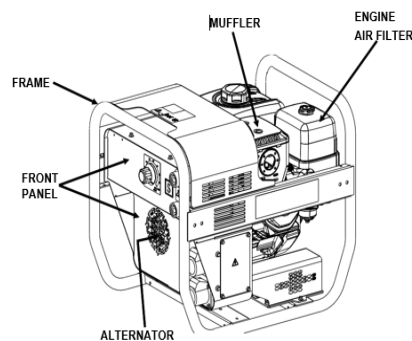
The OUTBACK 200 CE is a petrol engine powered DC stick welding power source and 230 / 110 volt AC power generator. The engine drives a generator that supplies single phase power for the DC welding circuit, single phase power for the AC auxiliary outlets.

The OUTBACK 200 CE engine driven welder is a unit which ensures the dual function as:

- a current source for are welding
- current generator for generating auxiliary

Unit meant for industrial and professional use. Powered by an endothermic engine; it is composed of various parts such as: engine, alternator, electric and electronic controls, the fairing at a protective structure.

The assembling is made on a steel structure, on which are provided elastic support which must damp the vibrations and also eliminate sounds which would produce noise



### Location and Ventilation

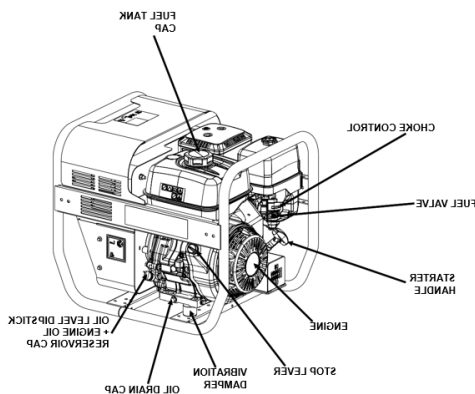
The welder should be located to provide an unrestricted flow of clean, cool air to the cooling air inlets and to avoid restricting the cooling air outlets. Also, locate the welder so that the engine exhaust fumes are properly vented to an outside area.

### Stacking

OUTBACK 200 CE machines cannot be stacked.

### Lifting

The OUTBACK 200 CE weighs approximately 76Kg with a full tank of fuel (70Kg without fuel). Lift bars are mounted to the machine and should always be used when lifting the machine.



### WARNING



#### Falling equipment can cause injury.

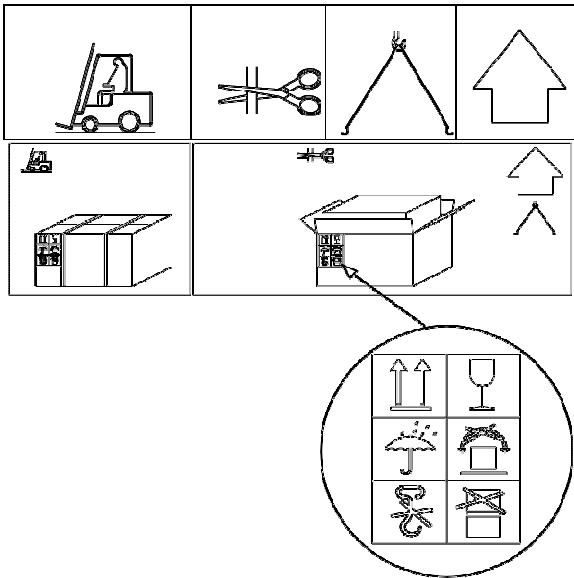
- Lift only with equipment of adequate lifting capacity.
- Be sure machine is stable when lifting.
- Do not lift this machine using lift bars if it is equipped with a heavy accessory such as trailer
- Do not lift machine if lift bars are damaged.
- Do not operate machine while suspended from lift bail.

Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conforms to local rules and regulations.

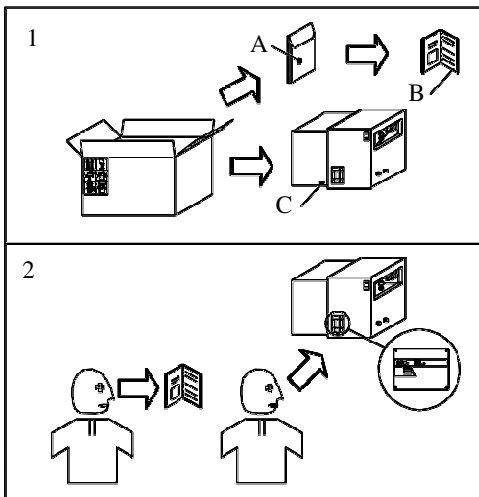
When receiving the goods make sure that the product has not suffered damage during the transport, that there has not been rough handling or taking away of parts contained inside the packing or in the set.

In case you find damages, rough handling or absence of parts (envelopes, manuals, etc.), we advise you to inform immediately our Technical Service.

For eliminating the packing materials, the User must keep to the norms in force in his country.



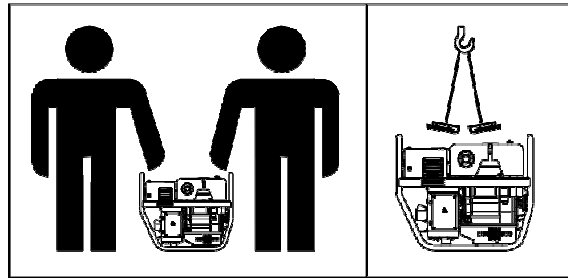
- 1) Take the machine (C) out of the shipment packing. Take out of the envelope (A) the user's manual (B).
- 2) Fit the handle as shown in the instructions (fitting: screws and spanner are supplied).
- 3 ) Read: the user's manual (B), the plates fixed on the machine, the data plate.



In case you should transport or move the machine, keep

to the instructions as per the figures.

Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conform to local rules and regulations. Only authorized persons involved in the transport of the machine should be in the area of movement.



Transportation must always take place with the engine off, electrical cables and starting battery disconnected and fuel tank empty. Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conform to local rules and regulations.



Only authorized persons involved in the transport of the machine should be in the area of movement.

This equipment is built in compliance with standard IEC-EN60974-10.

The equipment should be installed and used in accordance with the information below to achieve electromagnetic compatibility. The limits required by IEC-EN60974-10 may not be adequate to completely eliminate interference when the affected equipment is in close proximity or has a high degree of sensitivity. In such cases it may be necessary to use other measures to further reduce interference

**This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility in those locations, due to conducted as well as radiated disturbances.**

The user is responsible for installing and using the arc welding equipment according to the manufacturer's instructions.

If electromagnetic disturbances are detected, then it shall be the responsibility of the user resolve the situation with the technical assistance of the manufacturer.

In some cases this remedial action may be as simple as earthing the welding circuit (see note). In other cases, it could involve constructing an electromagnetic screen

enclosing the welding power source and the work complete with associated filters.  
In all cases electromagnetic disturbances shall be reduced to the point where they are no longer troublesome.

**NOTE :** The welding circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, for example, by allowing parallel welding current return paths, which may damage the earth circuits of other equipment. Further guidance is given in IEC/TS 620812.

## High Temperature Operation

At temperatures above 40°C, Welder output derating is necessary. For maximum output ratings, derate the welder output 2 volts for every 10°C above 40°C.

## Towing

Use a recommended trailer for use with this equipment for road, in-plant and yard towing by a vehicle<sup>(1)</sup>. If the user adapts a non-Lincoln trailer, he must assume responsibility that the method of attachment and usage does not result in a safety hazard or damage the welding equipment. Some of the factors to be considered are as follows:

1. Design capacity of trailer vs. weight of Lincoln equipment and likely additional attachments.
2. Proper support of, and attachment to, the base of the welding equipment so there will be no undue stress to the framework.
3. Proper placement of the equipment on the trailer to insure stability side to side and front to back when being moved and when standing by itself while being operated or serviced.
4. Typical conditions of use, i.e., travel speed; roughness of surface on which the trailer will be operated; environmental conditions; like maintenance.
5. Conformance with federal, state and local laws <sup>(1)</sup>

<sup>(1)</sup>Consult applicable federal, state and local laws regarding specific requirements for use on public highways.

## Vehicle Mounting



### WARNING

Improperly mounted concentrated loads may cause unstable vehicle handling and tires or other components to fail.

- Only transport this Equipment on serviceable vehicles which are rated and designed for such loads.
- Distribute, balance and secure loads so vehicle is stable under conditions of use.
- Do not exceed maximum rated loads for components such as suspension, axles and tires.
- Mount equipment base to metal bed or frame of vehicle.
- Follow vehicle manufacturer's instructions.

IT IS STRICTLY FORBIDDEN TO DRAG THE MACHINE MANUALLY OR TOW IT BY ANY VEHICLE

## Pre-Operation Engine Service

Read the engine operating and maintenance instructions supplied with this machine.



### WARNING

- Stop engine and allow to cool before fueling
- Do not smoke when fueling.
- Fill fuel tank at a moderate rate and do not over-fill.
- Wipe up spilled fuel and allow fumes to clear before starting engine.
- Keep sparks and flame away from tank.

## Oil



The OUTBACK 200 CE is shipped with the engine crankcase filled. Check the oil level before starting the engine. If it is not up to the full mark on the dip stick, add oil as required. Check the oil level every four hours of running time during the first 50 running hours. Refer to the engine Operator's Manual for specific oil recommendations and break-in information. The oil change interval is dependent on the quality of the oil and the operating environment. Refer to the Engine Operator's Manual for more details on the proper service and maintenance intervals.

## Fuel



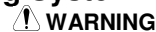
PETROL FUEL ONLY-.



### WARNING

Fill the fuel tank with clean, fresh fuel. The capacity of the tank is 6,1 liters .

## Engine Cooling System



### WARNING

Air to cool the engine is drawn in the side and exhausted through radiator & case back. It is important that the intake and exhaust air is not restricted. Allow a minimum clearance of 0.6m from the case back and 406mm from either side of the base to a vertical surface.

## Spark Arrester

Local regulations may require that gasoline or diesel engines be equipped with exhaust spark arresters when they are operated in certain locations where unarrested sparks may present a fire hazard. The standard muffler included with this welder has a spark arrester mounted to the muffler outlet. This device also enables the machine to conform to the sound power requirements of the European Union and should not be removed unless of cleaning. Please note: compliance to CE sound power is achieved with spark arrester installed.



### WARNING

An incorrect spark arrester may lead to damage to the engine or adversely affect performance.

## Electrical Connections Machine Grounding



Because this portable engine driven welder creates its own power, it is not necessary to connect its frame to an earth ground, unless the machine is connected to premises wiring (home, shop, etc.).


### **WARNING**

To prevent dangerous electric shock, other equipment to which this engine driven welder supplies power must:

- Be grounded to the frame of the welder using a grounded type plug or be double insulated.
- Be double insulated.
- Do not ground the machine to a pipe that carries explosive or combustible material.

When this welder is mounted on a truck or trailer, its frame must be electrically bonded to the metal frame of the vehicle. When this engine driven welder is connected to premises wiring such as that in a home or shop, its frame must be connected to the system earth ground. See further connection instructions in the section entitled "Standby Power Connections" as well as the article on grounding in the latest National Electrical Code and the local code.

In general, if the machine is to be grounded, it should be connected with a #8 or larger copper wire to a solid earth ground such as a metal water pipe going into the ground for at least ten feet and having no insulated joints, or to the metal framework of a building which has been effectively grounded.

The National Electrical Code lists a number of alternate means of grounding electrical equipment. A machine grounding stud marked with the symbol  is provided on the front of the welder.

### **Welding Output Cables**

With the engine off connect the electrode and work cables to the output studs. The welding process dictates the polarity of the electrode cable. These connections should be checked periodically and tightened with a 19mm wrench.

Table below lists recommended cable sizes and lengths for rated current and duty cycle. Length refers to the distance from the welder to the work and back to the welder. Cable diameters are increased for long cable lengths to reduce voltage drops.

<b>Combined Length and sizes of cables</b>	
<b>Cable Length</b>	<b>Cable Size for 170 A @ 60%Duty Cycle</b>
0-30 meters	25mmq
30-46 meters	25mmq
46-61 meters	35mmq

### **Cable Installation**

Install the welding cables to your OUTBACK 200 CE as follows:

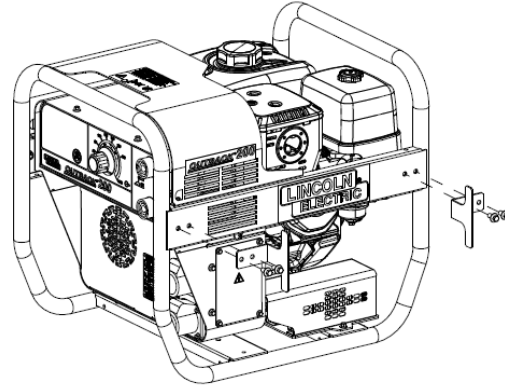
1. The engine must be OFF to install welding cables.
2. Connect the electrode holder and work cables to the weld output terminals. The terminals are identified on the case front.
3. Tighten the flanged nuts securely.
4. Be certain that the metal piece you are welding (the "work") is properly connected to the work clamp and cable.
5. Check and tighten the connections periodically.

### **WARNING**

- Loose connections will cause the output terminals to overheat. The terminals may eventually melt.
- Do not cross the welding cables at the output terminal connection. Keep the cables isolated and separate from one another.

### **Installation of metal brackets dedicated to the welding cables management**

To facilitate the management of the welding cables take the four metal brackets from the endowment present in the packaging and fix them to the generator using the supplied screws as indicated in the below picture



### **Auxiliary Power**

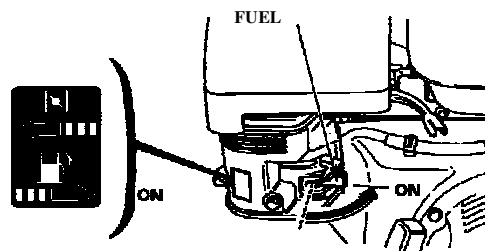
The auxiliary power capacity is :

- 3.300W Peak, 3000W continuous of 50Hz at 230Vac .
- 2.100W Peak , 1800W continuous of 50Hz at 110vac.

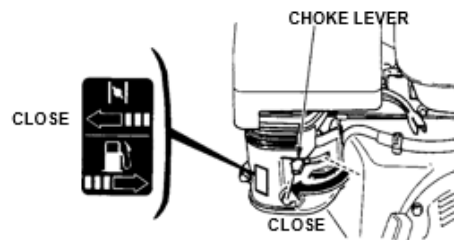
### **Starting and stopping the Engine**

#### **Starting:**

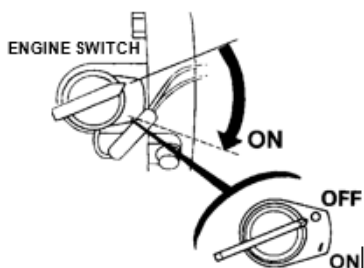
- 1- Turn the fuel cock to ON



- 2- Switch the choke control to CLOSE



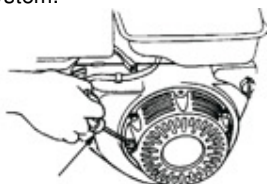
- 3- Turn the engine switch to the ON position



Lightly pull the start-up knob until meeting resistance, then pull decisively.

**ATTENTION:**

Allow the start-up knob to re-enter slowly, avoiding having it knock against the motor and thereby damaging the start-up system.



**STARTER GRIP**

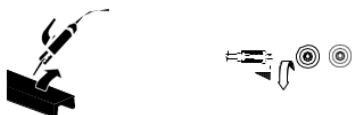
- 4- Once the engine is started, with the starter off, let it turn for a few minutes before drawing the load

**Stopping:**

to stop the engine in an emergency, simply turn the engine switch to the OFF position.

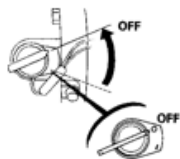
Under normal conditions, use the following procedure:

- 1) Interrupt welding

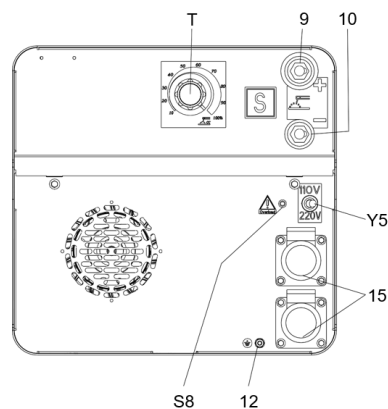
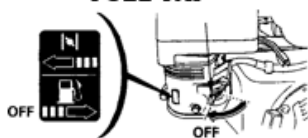


- 1) stop to draw single-phase current from the auxiliary sockets
- 2) Wait for a few minutes to allow the machine to cool off, take however into consideration the prescriptions given in the engine use manual
- 3) Turn the engine switch to the OFF position.
- 4) Shut the gasoline cock.

**ENGINE SWITCH**



**FUEL TAP**



Pos.	Description
9	Welding sockets (+)
10	Welding sockets (-)
12	Earth terminal
15	Socket
S8	Overload led
T	Welding current regulator
Y5	Voltage switch

## Use as a generator

### AUXILIARY GENERATION IN AC 115V/230V 50Hz

The auxiliary output is drawn by means of a 3 pole sockets, the two poles are live, phase and neutral, plus the earth for the machine.

The single phase generation of the machine was designed to supply small power tools (grinders, drills etc.) to assist the welding operations with a quick, safe connection without the need to connect to earth. In addition, supplying only one tool at a time, the protection against indirect contact is assured by "electrical separation".

Therefore, the machine **MUST NOT** be intentionally connected to earth, attaching cables must be of 3 wires and the electrical equipment on which it being used must have an extension length limited to 100-200 meters. This limitation of circuit extension length is fundamental for safety.

The cables must be **SUITED** to the environment in which they are to be used. Bear in mind that at temperatures below 5°C PVC cables become rigid and the PVC insulation tends to split at the first crease. Using double insulated equipment is advisable, this is identifiable by the symbol and for having no earth facility.

If the machine is designed to supply circuits which are particularly complex or in an area with potential electrical risk, it is required to interpose a complete electrical distribution panel, equipped with all electrical protections required, between the plug and loads.

For example: you can use a distribution system TN-S. In this case one of the phases, used as a neutral must be grounded; a bipolar 30mA differential switch (GFI) must be mounted inside the electrical box, before the sockets to which loads are connected; the terminal in the frontal

panel of the generating set near the socket is to be used as earth connection, wiring it to the ground of the electrical plant with which the machine is going to work.

**WARNING:** bound the neutral to frame BEFORE the GFI

### WORKING PRICIPLE

Working condition according to the position of voltage switch Y5

#### A) 110V Position

In this position output voltage is present only at the 110V socket

#### B) 230V Position

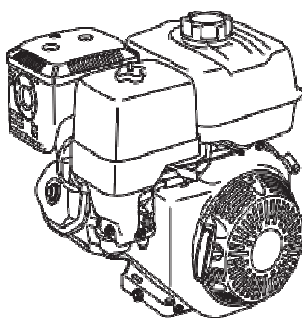
In this position output voltage is present only at the 230V socket.

C) It is possible to select the output voltage only when the machine is turned off. It is mandatory to select the output voltage before turning on the machine, plugs should be disconnected before turning on.

D) Don't leave the plug attached to the voltage socket selected.

## Engine Operation & Maintenance

Honda GX390



### ⚠ WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

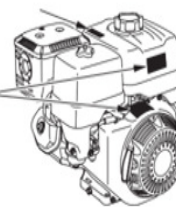
#### California Proposition 65

This product contains or emits chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

### SAFETY LABEL LOCATION

This label warns you of potential hazards that can cause serious injury. Read it carefully. If the label comes off or becomes hard to read, contact your Honda servicing dealer for replacement.

MUFFLER CAUTION LABEL



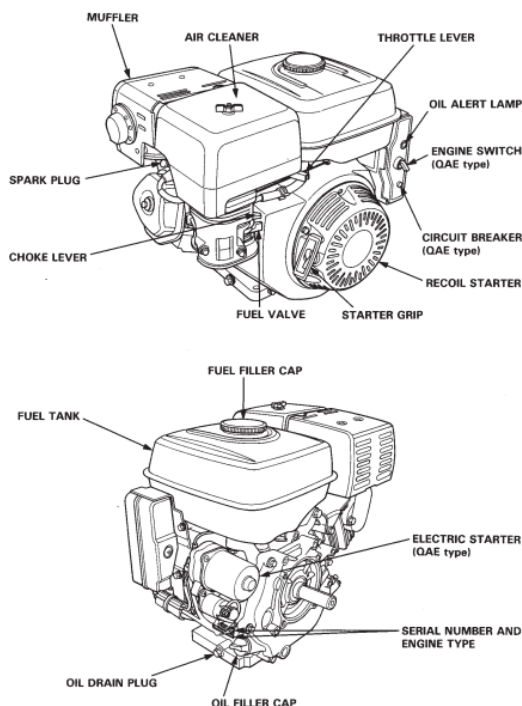
### WARNING LABEL

(The label should be located either on the fuel tank, fan cover or packaged loosely with the engine to be applied by the manufacture.)

WARNING LABEL	For EU	Except EU
	attached to product	supplied with product
	supplied with product	attached to product
	supplied with product	supplied with product
MUFFLER CAUTION LABEL	For EU	Except EU
	not included	supplied with product
	supplied with product	attached to product
	supplied with product	supplied with product

Gasoline is highly flammable and explosive.  
Stop the engine and let cool before refueling.  
The engine emits toxic poisonous carbon monoxide gas.  
Do not run in an enclosed area.  
Read Owner's Manual before operation.  
Hot muffler can burn you.  
Stay away if engine has been running.

## COMPONENT & CONTROL LOCATIONS



## FEATURES

OIL ALERT<sup>®</sup> SYSTEM (applicable types)

"Oil Alert is a registered trademark in the United States"

The Oil Alert system is designed to prevent engine damage caused by an insufficient amount of oil in the crankcase. Before the oil level in the crankcase can fall below a safe limit, the Oil Alert system will automatically stop the engine (the engine switch will remain in the ON position).

If the engine stops and will not restart, check the engine oil level (see page 9) before troubleshooting in other areas.

## BEFORE OPERATION CHECKS IS YOUR ENGINE READY TO GO?

For your safety, to ensure compliance with environmental regulations, and to maximize the service life of your equipment, it is very important to take a few moments before you operate the engine to check its condition. Be sure to take care of any problem you find, or have your servicing dealer correct it, before you operate the engine

### WARNING

Failure to properly maintain this engine, or failing to correct a problem before operation, could result in a significant malfunction.

Some malfunctions can seriously hurt or kill you.

Always perform a pre-operation inspection before each operation and correct any problems.

Before beginning your pre-operation checks, be sure the engine is level and the engine switch is in the OFF position.

Always check the following items before you start the engine:

## Check the General Condition of the Engine

- Look around and underneath the engine for signs of oil or gasoline leaks.
- Remove any excessive dirt or debris, especially around the muffler and recoil starter.
- Look for signs of damage.
- Check that all shields and covers are in place, and all nuts, bolts, and screws are tightened

## Check the Engine

- Check the fuel level (see page 8). Starting with a full tank will help to eliminate or reduce operating interruptions for refueling.
- Check the engine oil level (see page 9). Running the engine with a low oil level can cause engine damage. The Oil Alert system (applicable types) will automatically stop the engine before the oil level falls below safe limits. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.
- Check the reduction case oil level on applicable types (see page 9). Oil is essential to reduction case operation and long life.
- Check the air filter element (see page 10). A dirty air filter element will restrict air flow to the carburetor, reducing engine performance.
- Check the equipment powered by this engine. Review the instructions provided with the equipment powered by this engine for any precautions and procedures that should be followed before engine startup.

## OPERATION

### SAFE OPERATING PRECAUTIONS

Before operating the engine for the first time, please review the *SAFETY INFORMATION* section on page 2 and the *BEFORE OPERATION CHECKS* on page 4

**Carbon Monoxide Hazards.** For your safety, do not operate the engine in an enclosed area such as a garage. Your engine's exhaust contains poisonous carbon monoxide gas that can collect rapidly in an enclosed area and cause illness or death

### WARNING

Exhaust contains poisonous carbon monoxide gas that can build up to dangerous levels in closed areas.

Breathing carbon monoxide can cause unconsciousness or death.

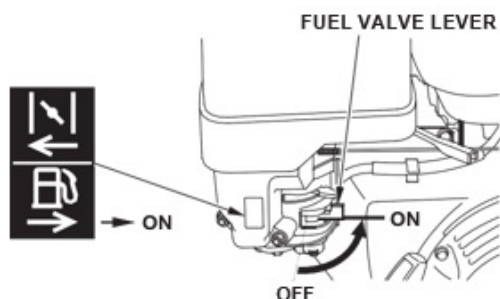
Review the instructions provided with the equipment powered by this engine for any safety precautions that should be observed with engine startup, shutdown or

operation.

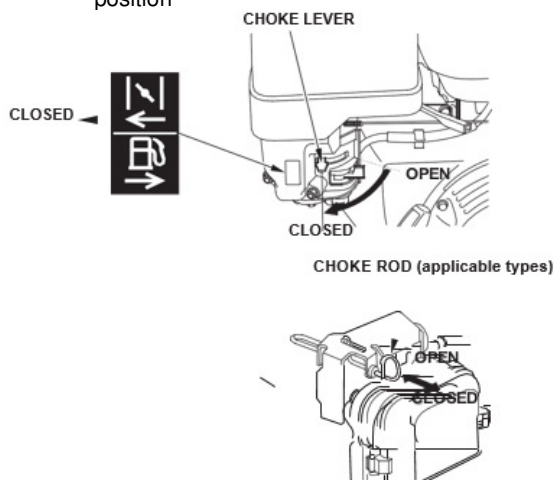
Do not operate the engine on slopes greater than 20° (36%).

## STARTING THE ENGINE

- 1- Move the fuel valve lever to the ON position



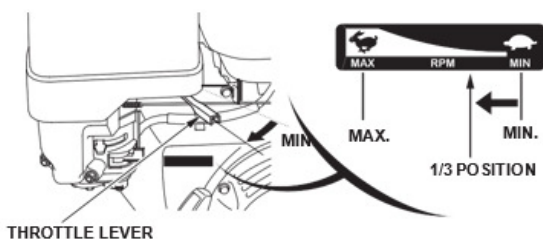
- 2- To start a cold engine, move the choke lever or choke rod (applicable types) to the CLOSED position



To restart a warm engine, leave the choke lever or choke rod in the OPEN position.

Some engine applications use a remote-mounted choke control rather than the engine-mounted choke lever shown on the previous page. Refer to the instructions provided by the equipment manufacturer

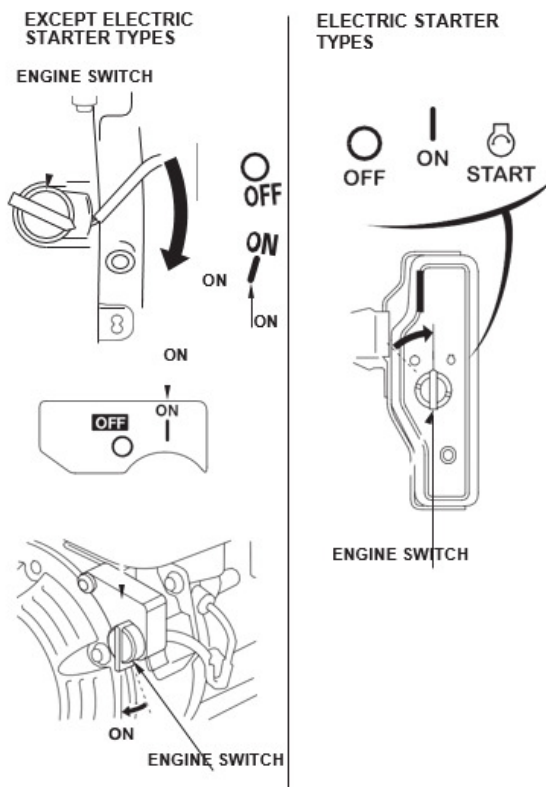
- 3- Move the throttle lever away from the MIN. position, about 1/3 of the way toward the MAX. position



Some engine applications use a remote-mounted throttle control rather than the engine-mounted throttle lever

shown here. Refer to the instructions provided by the equipment manufacturer

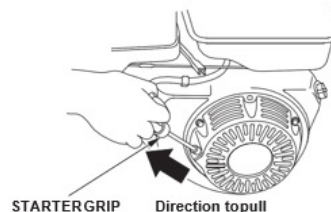
- 4- Turn the engine switch to the ON position



- 5- Operate the starter

### RECOIL STARTER

Pull the starter grip lightly until you feel resistance, then pull briskly in the direction of the arrow as shown below. Return the starter grip gently



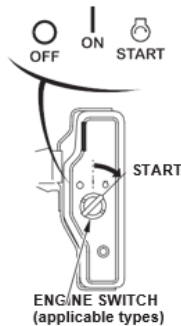
*Do not allow the starter grip to snap back against the engine.  
Return it gently to prevent damage to the starter*

### ELECTRIC STARTER (applicable types):

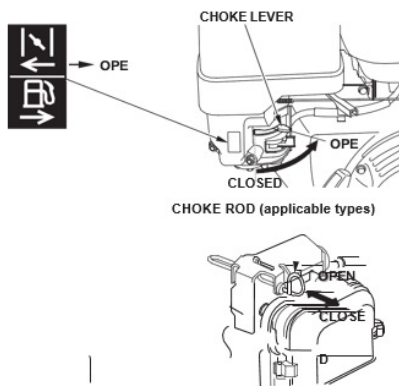
Turn the key to the START position, and hold it there until the engine starts.

If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before operating the starter again.

*Using the electric starter for more than 5 seconds at a time will overheat the starter motor and can damage it. When the engine starts, release the key, allowing it to return to the ON position.*



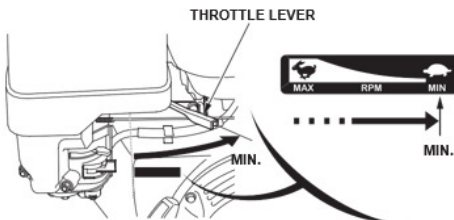
- 6- If the choke lever or choke rod (applicable types) was moved to the CLOSED position to start the engine, gradually move it to the OPEN position as the engine warms up.



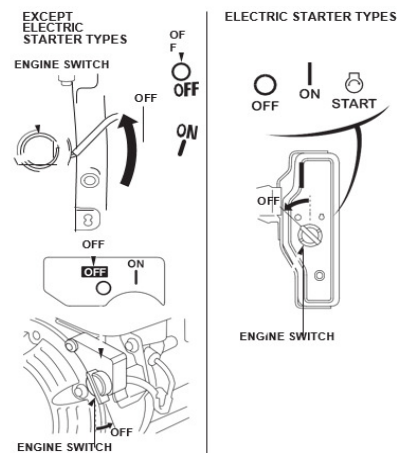
## STOPPING THE ENGINE

To stop the engine in an emergency, simply turn the engine switch to the OFF position. Under normal conditions, use the following procedure. Refer to the instructions provided by the equipment manufacturer.

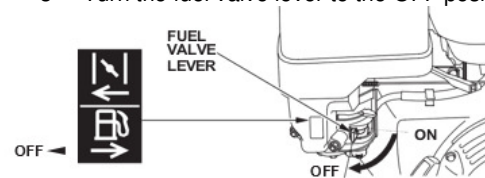
- 1- Move the throttle lever to the MIN. position. Some engine applications use a remote-mounted throttle control rather than the engine-mounted throttle lever shown here.



- 2- Turn the engine switch to the OFF position.

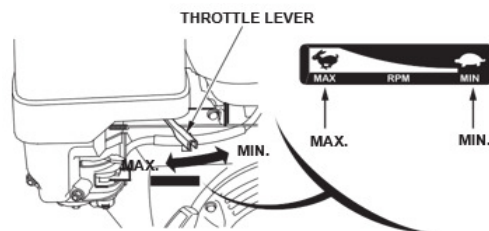


- 3- Turn the fuel valve lever to the OFF position.



## SETTING ENGINE SPEED

Position the throttle lever for the desired engine speed. Some engine applications use a remote-mounted throttle control rather than the engine-mounted throttle lever shown here. Refer to the instructions provided by the equipment manufacturer. For engine speed recommendations, refer to the instructions provided with the equipment powered by this engine.



## SERVICING YOUR ENGINE

### THE IMPORTANCE OF MAINTENANCE

Good maintenance is essential for safe, economical, and trouble-free operation. It will also help reduce pollution.

### ⚠ WARNING

Failure to properly maintain this engine, or failing to correct a problem before operation, could result in a significant malfunction.

Some malfunctions can seriously hurt or kill you.

Always follow the inspection and maintenance recommendations.

To help you properly care for your engine, the following pages include a maintenance schedule, routine inspection procedures, and simple maintenance procedures using basic hand tools. Other service tasks that are more difficult, or require special tools, are best handled by professionals and are normally performed by

a Honda technician or other qualified mechanic. The maintenance schedule applies to normal operating conditions. If you operate your engine under severe conditions, such as sustained high-load or high-temperature operation, or use in unusually wet or dusty conditions, consult your Honda servicing dealer for recommendations applicable to your individual needs and use.

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any engine repair establishment or individual, using parts that are "certified" to EPA standards.

### MAINTENANCE SAFETY

Some of the most important safety precautions follow. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you should perform a given task.

#### ⚠ WARNING

Improper maintenance can cause an unsafe condition.

Failure to properly follow maintenance instructions and precautions can cause you to be seriously hurt or killed.

Always follow the procedures and precautions in this owner's manual.

### SAFETY PRECAUTIONS

Make sure the engine is off before you begin any maintenance or repairs. To prevent unintentional startup, disconnect the spark plug cap. This will eliminate several potential hazards:

#### **Carbon monoxide poisoning from engine exhaust:**

Operate outside, away from open windows or doors.

#### **Burns from hot parts:**

Let the engine and exhaust system cool before touching.

#### **Injury from moving parts:**

Do not run the engine unless instructed to do so.

Read the instructions before you begin, and make sure you have the tools and skills required. Stay away from all fuel-related parts.

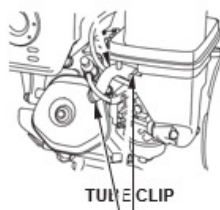
### MAINTENANCE SCHEDULED

REGULAR SERVICE PERIOD (3) Perform at every indicated month or operating hour interval, whichever comes first.		Each Use	First Month or 20 Hrs	Every 3 Months or 50 Hrs	Every 6 Months or 100 Hrs	Every Year or 300 Hrs
ITEM	Engine oil	Check level	○			
		Change		○	○	
Reduction case oil (applicable types)	Check level	○				
	Change		○		○	
Air cleaner	Check	○				
	Clean			(1)	*(1)	
	Replace					**
Sediment cup	Clean				○	
Spark plug	Check-adjust				○	
	Replace					○
Spark arrester (applicable types)	Clean				(4)	
Idle speed	Check-adjust					(2)
Valve clearance	Check-adjust					(2)
Combustion chamber	Clean	After every 1000 Hrs. (2)				
Fuel tank & filter	Clean				(2)	
Fuel tube	Check	Every 2 years (Replace if necessary) (2)				

- \* Internal vent carburetor with dual element type only.
- \* Cyclone type every 6 months or 150 hours.

INTERNAL VENT CARBURETOR TYPE

BREATHING TUBE



STANDARD TYPE

BREATHING TUBE



- \*\* Replace paper element type only.
- \* Cyclone type every 2 years or 600 hours.

- 1) Service more frequently when used in dusty areas.
- 2) These items should be serviced by your servicing dealer, unless you have the proper tools and are mechanically proficient. Refer to the Honda shop manual for service procedures.
- 3) For commercial use, long hours of operation to determine proper maintenance intervals.
- 4) In Europe and other countries where the machinery directive 2006/42/EC is enforced, this cleaning should be done by your servicing dealer.

Failure to follow this maintenance schedule could result in nonwarrantable failures.

## REFUELING

### Recommended Fuel

Unleaded gasoline		
	U.S.	Pump octane rating 86 or higher
	Except U.S.	Research octane rating 91 or higher
		Pump octane rating 86 or higher

This engine is certified to operate on unleaded gasoline with a pump octane rating of 86 or higher (a research octane rating of 91 or higher).

Refuel in a well ventilated area with the engine stopped. If the engine has been running, allow it to cool first. Never refuel the engine inside a building where gasoline fumes may reach flames or sparks.

You may use unleaded gasoline containing no more than 10% ethanol (E10) or 5% methanol by volume. In addition, methanol must contain cosolvents and corrosion inhibitors. Use of fuels with content of ethanol or methanol greater than shown above may cause starting and/or performance problems. It may also damage metal, rubber, and plastic parts of the fuel system. Engine damage or performance problems that result from using a fuel with percentages of ethanol or methanol greater than shown above are not covered under the Warranty

If your equipment will be used on an infrequent or intermittent basis, please refer to the fuel section of the **STORING YOUR ENGINE** chapter for additional information regarding fuel deterioration

Never use gasoline that is stale, contaminated, or mixed with oil. Avoid getting dirt or water in the fuel tank

### WARNING

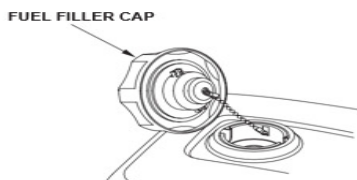
Gasoline is highly flammable and explosive, and you can be burned or seriously injured when handling fuel.

- Stop the engine and let it cool.
- Keep heat, sparks, and flame away.
- Refuel only outdoors.
- Wipe up spills immediately.

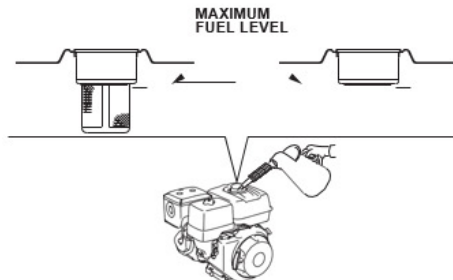
*Fuel can damage paint and some types of plastic. Be careful not to spill fuel when filling your fuel tank. Damage caused by spilled fuel is not covered under the Distributor's Limited Warranty*

For refueling, refer to the manufacturer's instructions provided with the equipment. See the following for a Honda supplied standard fuel tank refueling instruction

- 1- With the engine stopped and on a level surface, remove the fuel filler cap and check the fuel level. Refill the tank if the fuel level is low



- 2- Add fuel to the bottom of the maximum fuel level limit of the fuel tank. Do not overfill. Wipe up spilled fuel before starting the engine



- 3- Refuel carefully to avoid spilling fuel. Do not fill the fuel tank completely. It may be necessary to lower the fuel level depending on operating conditions. After refueling, tighten the fuel filler cap securely

Keep gasoline away from appliance pilot lights, barbecues, electric appliances, power tools, etc. Spilled fuel is not only a fire hazard, it causes environmental damage. Wipe up spills immediately

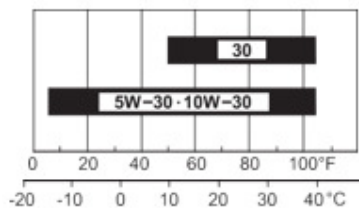
## ENGINE OIL

Oil is a major factor affecting performance and service life. Use 4-stroke automotive detergent oil

### Recommended oil

Use 4-stroke motor oil that meets or exceeds the requirements for API service category SJ or later (or equivalent).

Always check the API service label on the oil container to be sure it includes the letters SJ or later (or equivalent).



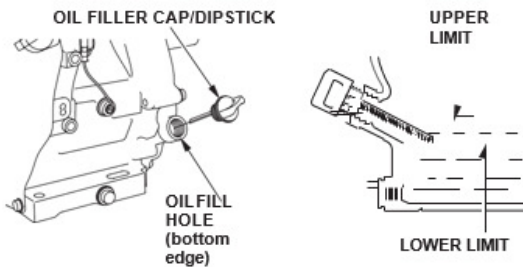
AMBIENT TEMPERATURE

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.

## Oil Level Check

Check the engine oil level with the engine stopped and in a level position

- 1- Remove the oil filler cap/dipstick and wipe it clean
- 2- Insert the oil filler cap/dipstick into the oil filler neck as shown, but do not screw it in, then remove it to check the oil level
- 3- If the oil level is near or below the lower limit mark on the dipstick, fill with the recommended oil (see page 8) to the upper limit mark (bottom edge of the oil fill hole). Do not overfill.
- 4- Reinstall the oil filler cap/dipstick



*Running the engine with a low oil level can cause engine damage. This type of damage is not covered by the Distributor's Limited Warranty*

The Oil Alert system (applicable types) will automatically stop the engine before the oil level falls below the safe limit. However, to avoid the inconvenience of an unexpected shutdown, always check the engine oil level before startup.

## Oil Change

Drain the used oil when the engine is warm. Warm oil drains quickly and completely

- 1- Place a suitable container below the engine to catch the used oil, then remove the oil filler cap/dipstick, oil drain plug and sealing washer
- 2- Allow the used oil to drain completely, then reinstall the oil drain plug and a new sealing washer, and tighten the oil drain plug securely.  
*Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash, pour it on the ground, or pour it down a drain*

**TORQUE:** 22.5 N·m (2.29 kgf·m, 17 lbf·ft)

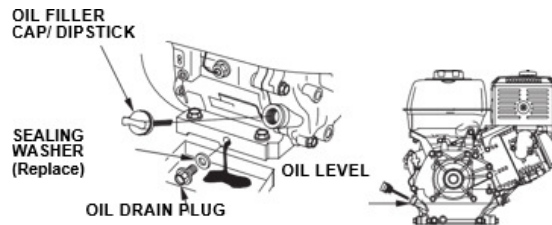
- 3- With the engine in a level position, fill with the recommended oil (see page 8) to the upper limit mark (bottom edge of the oil fill hole) on the dipstick.

Engine oil capacity: 1.1 L

Running the engine with a low oil level can cause engine damage. This type of damage is not covered by the Distributor's Limited Warranty.

The Oil Alert system (applicable types) will automatically stop the engine before the oil level falls below the safe limit. However, to avoid the inconvenience of an unexpected shutdown fill to the upper limit, and check the oil level regularly.

- 4- Install the oil filler cap/dipstick and tighten securely.



## REDUCTION CASE OIL (applicable types)

### Recommended oil

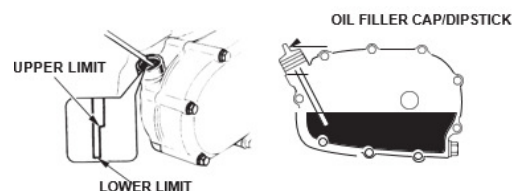
Use the same oil that is recommended for the engine

### Oil Level Check

Check the reduction case oil level with the engine stopped and in a level position

### 1/2 Reduction Case With Centrifugal Clutch

- 1- Remove the oil filler cap/dipstick and wipe it clean
- 2- Insert and remove the oil filler cap/dipstick without screwing it into the filler hole. Check the oil level shown on the oil filler cap/ dipstick
- 3- If the oil level is low, add the recommended oil to reach the upper limit mark on the dipstick
- 4- Screw in the oil filler cap/dipstick and tighten securely.



## Oil Change

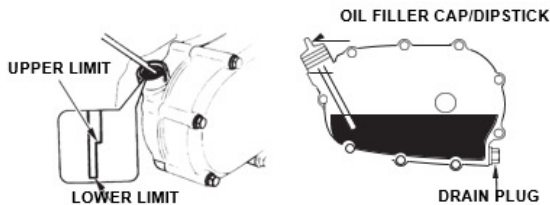
Drain the used oil while the engine is warm. Warm oil drains quickly and completely

- 1- Place a suitable container below the reduction case to catch the used oil, then remove the oil filler cap/dipstick, drain plug and washer
- 2- Allow the used oil to drain completely, then reinstall the drain plug and a new washer, and tighten the plug securely.  
*Please dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash or pour it on the ground or pour it down a drain*
- 3- With the engine in a level position, fill with the recommended oil to the upper limit mark on the dipstick. To check the oil level, insert and remove the dipstick without screwing it into the filler hole.

Reduction case oil capacity: 0.30 L

Running the engine with a low transmission oil level can cause transmission damage.

- 4- Screw in the oil filler cap/dipstick and tighten securely



## AIR CLEANER

A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more often than specified in the MAINTENANCE SCHEDULE

*Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by the Distributor's Limited Warranty*

### Inspection

Remove the air cleaner cover and inspect the filter elements. Clean or replace dirty filter elements. Always replace damaged filter elements. If equipped with an oil-bath air cleaner, also check the oil level

### Cleaning

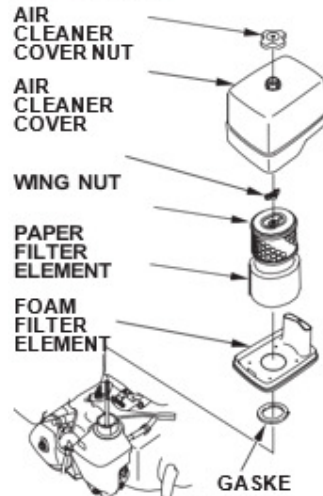
#### Dual-Filter Element Types

- 1- Remove the air cleaner cover nut from the air cleaner cover, and remove the cover
- 2- Remove the wing nut from the air filter, and

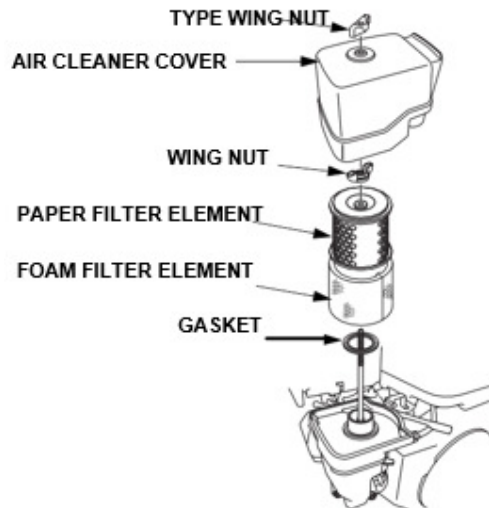
remove the filter

- 3- Remove the foam filter from the paper filter
- 4- Inspect both air filter elements, and replace them if they are damaged. Always replace the paper air filter element at the scheduled interval

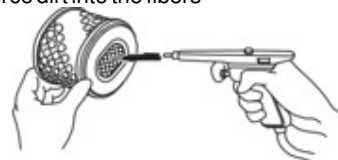
#### STANDARD DUAL-FILTER ELEMENT TYPE



#### CYCLONE DUAL-FILTER ELEMENT

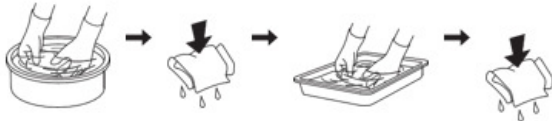


- 5- Clean the air filter elements if they are to be reused. Paper air filter element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air [not exceeding 207 kPa (2.1 kgf/cm<sup>2</sup>, 30 psi)] through the filter element from the inside. Never try to brush off dirt; brushing will force dirt into the fibers

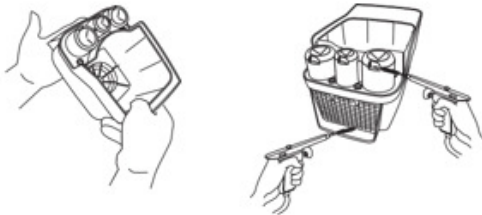


Foam air filter element: Clean in warm soapy water, rinse, and allow to dry thoroughly. Or clean in non-flammable solvent and allow to dry. Dip the filter

element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam



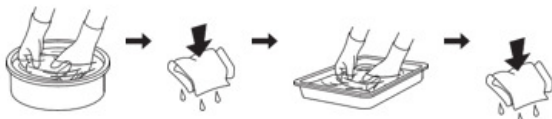
- 6- CYCLONE TYPE ONLY: Tap the air cleaner cover several times on a hard surface to remove dirt, or blow compressed air [not exceeding 207 kPa (2.1 kgf/cm<sup>2</sup>, 30 psi)] through the air cleaner cover from the outside



- 7- Wipe dirt from the inside of the air cleaner case and cover using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor
- 8- Place the foam air filter element over the paper element, and reinstall the assembled air filter. Be sure the gasket is in place beneath the air filter. Tighten the wing nut securely
- 9- Install the air cleaner cover, and tighten the nut securely

#### Oil-bath type

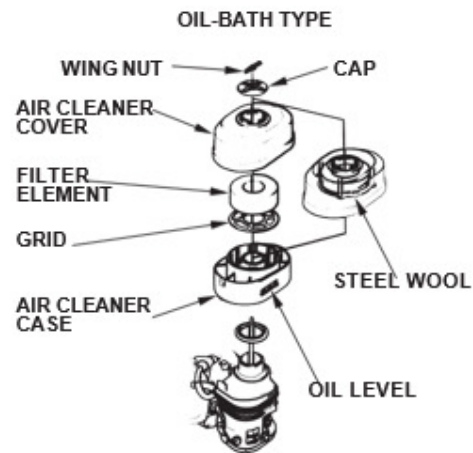
- 1- Remove the wing nut, and remove the air cleaner cap and cover
- 2- Remove the air filter element from the cover. Wash the cover and filter element in warm soapy water, rinse, and allow to dry thoroughly. Or clean in non-flammable solvent and allow to dry
- 3- Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke if too much oil is left in the foam



- 4- Empty the used oil from the air cleaner case, wash out any accumulated dirt with non-flammable solvent, and dry the case
- 5- Fill the air cleaner case to the OIL LEVEL mark with the same oil that is recommended for the engine

Oil capacities: GX390: 80 cm<sup>3</sup>

- 6- Reassemble the air cleaner, and tighten the wing nut securely



#### Low profile Types

- 1- Unsnap the air cleaner cover clips, remove the air cleaner cover, and remove the air filter element
- 2- Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in non-flammable or high flash point solvent. Allow the element to dry thoroughly
- 3- Soak the air filter element in clean engine oil and squeeze out the excess oil. The engine will smoke during initial startup if too much oil is left in the element



- 4- Reinstall the air filter element and the cover

## SEDIMENT CUP

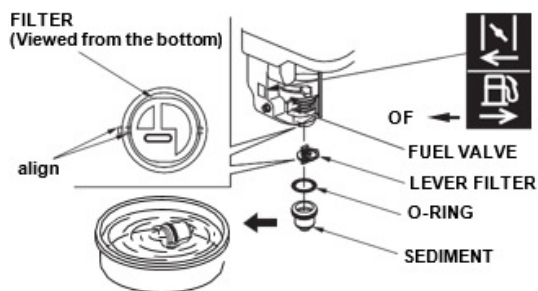
### Cleaning

#### WARNING

Gasoline is highly flammable and explosive, and you can be burned or seriously injured when handling fuel.

- Stop the engine and let it cool.
- Keep heat, sparks, and flame away.
- Refuel only outdoors.
- Wipe up spills immediately.

- 1- Move the fuel valve lever to the OFF position, and then remove the fuel sediment cup, filter and O-ring
- 2- Wash the sediment cup and filter in non-flammable solvent, and dry it thoroughly



- 3- Reinstall the filter, new O-ring, and the sediment cup. Tighten the sediment cup securely
- 4- Move the fuel valve lever to the ON position and check for leaks

## SPARK PLUGS

Spark plugs: BPR6ES (NGK)  
W20EPR-U (DENSO)

This spark plug has the correct heat range for normal engine operating temperatures

If the engine has been running, let it cool before servicing the spark plug

For good performance, the spark plug must be properly gapped and free of deposits

- 1- Disconnect the spark plug cap, and remove any dirt from around the spark plug area
- 2- Remove the spark plug with a 21 mm (13/16 in) spark plug wrench
- 3- Visually inspect the spark plug. Replace it if damaged or badly fouled, if the sealing washer is in poor condition, or if the electrode is worn
- 4- Measure the spark plug electrode gap with a wiretype feeler gauge. Correct the gap, if necessary, by carefully bending the side electrode
- 5- Install the spark plug carefully, by hand, to avoid cross-threading
- 6- After the spark plug is seated, tighten with a 21 mm (13/16 in) spark plug wrench to compress the sealing washer

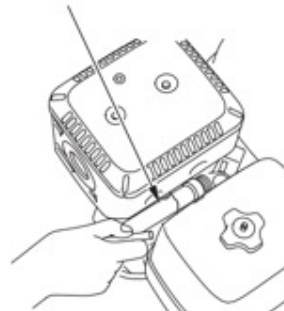
The gap should be: 0,7-0,8mm  
When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer

When reinstalling the original spark plug, tighten 1/8 – 1/4 turn after the spark plug seats to compress the washer

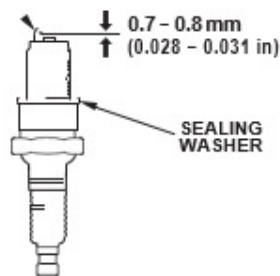
**TORQUE:** 18 N·m

- 7- Attach the spark plug cap to the spark plug

### SPARK PLUG WRENCH



### SIDE ELECTRODE



## SPARK ARRESTER

In Europe and other countries where the machinery directive 2006/42/EC is enforced, this cleaning should be done by your servicing dealer.

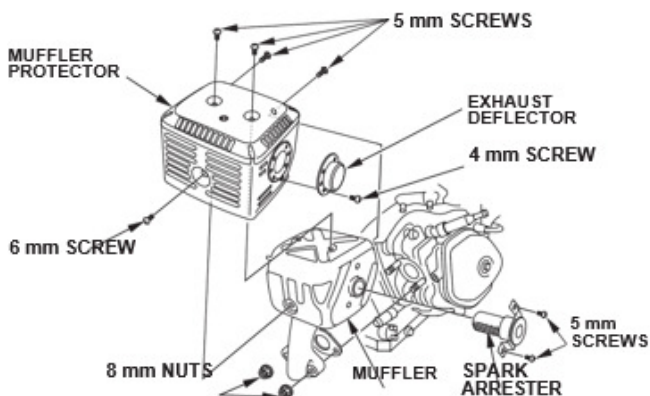
The spark arrester may be standard or an optional part, depending on the engine type. In some areas, it is illegal to operate an engine without a spark arrester. Check local laws and regulations. A spark arrester is available from authorized Honda servicing dealers.

The spark arrester must be serviced every 100 hours to keep it functioning as designed.

If the engine has been running, the muffler will be hot. Allow it to cool before servicing the spark arrester

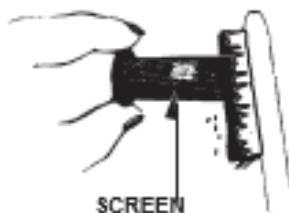
### Spark arrester removal

- 1- Remove the two 8 mm nuts and remove the muffler from the cylinder
- 2- Remove the three 4 mm screws from the exhaust deflector, and remove the deflector
- 3- Remove the 6 mm screw and four 5 mm screws from the muffler protector and remove the muffler protector
- 4- Remove the two 5 mm screws from the spark arrester, and remove the spark arrester from the muffler



### Spark Arrester Cleaning & Inspection

- 1- Use a brush to remove carbon deposits from the spark arrester screen. Be careful not to damage the screen. Replace the spark arrester if it has breaks or holes. Move the throttle lever to its minimum position



- 2- Install the spark arrester, muffler protector, exhaust deflector and muffler in the reverse order of disassembly

## IDLE SPEED

### Adjustment

- 1- Start the engine outdoors, and allow it to warm up to operating temperature
- 2- Move the throttle lever to its minimum position
- 3- Turn the throttle stop screw to obtain the standard idlespeed

Standard idle speed:  $1,400 \pm 150$  rpm



## Troubleshooting

### Engine will not start

Possible Cause	Correction
Fuel valve lever OFF.	Move lever to ON position.
Choke OPEN.	Move lever to CLOSED position unless the engine is warm.
Engine switch OFF.	Turn engine switch to ON position.
Engine oil level low (Oil Alert models).	Fill with the recommended oil to the proper level (p. 9).
Out of fuel.	Refuel (p. 8).
Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p. 14). Refuel with fresh gasoline (p. 8).
Spark plug faulty, fouled, or improperly gapped.	Gap or replace spark plug (p. 12).
Spark plug wet with fuel (flooded engine).	Dry and reinstall spark plug. Start engine with throttle lever in MAX. position.
Fuel filter restricted, carburetor malfunction, ignition malfunction, valves stuck, etc.	Take engine to your servicing dealer, or refer to shop manual.

### Engine lacks power

Possible Cause	Correction
Filter element(s) restricted.	Clean or replace filter element(s) (p. 10 -11).
Bad fuel; engine stored without treating or draining gasoline, or refueled with bad gasoline.	Drain fuel tank and carburetor (p. 14). Refuel with fresh gasoline (p. 8).
Fuel filter restricted, carburetor malfunction, ignition malfunction, valves stuck, etc.	Take engine to your servicing dealer, or refer to shop manual.

## GENERAL DESCRIPTION

The OUTBACK® 200 is designed for commercial use welder/generator applications. As a welder it provides 170 amps of DC constant current for welding with DC stick electrodes. A single dial lets you select a full range of welding output from 20 to 170 amps.

As a generator it can supply up to surge watts or continuous watts of 110 / 230 volt, single-phase AC power.

The machine is portable.

An engine Honda GX390 gasoline 4-stroke 11,1 hp- 8,2KW OHV/Air engine powers the welder / generator.

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# MAINTENANCE

## MAINTENANCE SCHEDULE

REGULAR SERVICE PERIOD (3) Perform at every indicated month or operating hour interval, whichever comes <u>first</u> ITEM		Each Use	First Month or 20 Hrs	Every 3 Months or 50 Hrs	Every 6 Months or 100 Hrs	Every Year or 300 Hrs
Engine oil	Check level	<input type="checkbox"/>				
	Change		<input type="checkbox"/>		<input type="checkbox"/>	
Reduction case oil (applicable types)	Check level	<input type="checkbox"/>				
	Change		<input type="checkbox"/>		<input type="checkbox"/>	
Air cleaner	Check	<input type="checkbox"/>				
	Clean			(1)	*(1)	
	Replace					**
Sediment cup	Clean				<input type="checkbox"/>	
Spark plug	Check-adjust				<input type="checkbox"/>	
	Replace					<input type="checkbox"/>
Spark arrester (applicable types)	Clean				(4)	
Idle speed	Check-adjust					(2)
Valve clearance	Check-adjust					(2)
Combustion chamber	Clean	After every 1000 Hrs. (2)				
Fuel tank & filter	Clean				(2)	
Fuel tube	Check	Every 2 years (Replace if necessary) (2)				

- \* • Internal vent carburetor with dual element type only.  
Cyclone type every 6 months or 150 hours.

## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	THE ENGINE RPM DOESN'T RISE AT LOAD		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
WELDING CONTROL BOARD NOT WORKING	Perform a test with the solenoid disconnected. In these conditions, the solenoid is not energized and, unless there are mechanical problems on the lever mechanism, the number of revolutions of the engine must be nominal	If the test result is that the engine runs at full speed and is maintained indefinitely in this conditions, it is confirmed that the problem does not affect neither the leverage nor the solenoid. <u>Continue the investigation with TEST 1.</u>	Replace the welding control board
	<b>TEST 1</b> - Test with sample control board	If the test sample card eliminates the fault it is confirmed that there is a problem on the welding control board. Before replacing perform a visual inspection	

PROBLEM →	THE ENGINE RPM DOESN'T RISE AT LOAD		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
FAILURE OF THE CURRENT SENSOR	<b>ATTENTION:</b> the hypothesis of failure of the Hall sensor is congruent only if are confirmed by the existence other anomalies in the regulation of the welding current. In particular there may be no signal from the sensor. This would result in the total absence of current control, while the auto-idle would work properly with the auxiliary generation. If symptoms are consistent with this scenario perform the next test. <b>TEST 2</b> - Test with the sample current sensor	If the welding control is recovered the problem resides in the Hall sensor	Replace the Hall sensor
		If the problem persists, restore the original sensor. Next step: <b>TEST 1.</b>	

## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	THE ENGINE RPM DOESN'T RISE AT LOAD		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
HARNESS DAMAGED	If the investigations on the possible causes of failure previously analyzed do not identify the source of the problem, consider the wiring as possible origin. Perform a careful inspection	Harness damaged	Repair or replace the harness
		No damages found on harness. <b>Repeat the investigation sequence.</b>	

### TEST 1 → WELDING BOARD SAMPLE TEST

Keep at your disposal a welding sample board, of which you are sure of the proper operation, as tool of troubleshooting.

Take extra care to use this board only after integrity and functionality chopper test, in order to avoid possible failure propagations from chopper Bridge

### TEST 2 → HALL SENSOR SAMPLE TEST

Keep at your disposal an Hall sensor sample, of which you are sure of proper operation, as tool of troubleshooting.

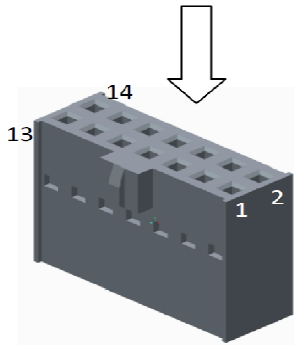
## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	<b>LACK OF WELDING VOLTAGE IN OPEN CIRCUIT</b>		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
HARNESS DAMAGED	Inspect the harness	Harness damaged	Repair or replace the harness
OPEN CIRCUIT FAILURE OF THE CHOPPER (RARE)	TEST 4 – Chopper integrity test	No damages found on harness Next step: test 4	
	TEST 5 - Chopper functionality test	If the test fails it is confirmed that the chopper is damaged. Remove the chopper and perform a visual inspection.	Replace the chopper and the welding control board
		If the test passes presumably this is a problem external to the chopper. Next step: test 5	
		If the test fails, check that the the ac voltage at the chopper input is correct (around 46V rms between each phase pair at no load and full speed of the engine). If so, consider replacing the chopper.	Replace the chopper and the welding control board.
		If the test passes presumably this is a problem external to the chopper. Next step: test 6	

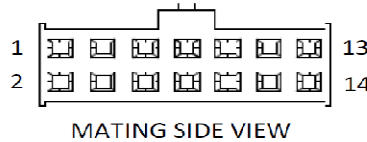
## TROUBLESHOOTING AND REPAIR SECTION

### TEST 4 → CHOPPER INTEGRITY TEST

(APPLICABLE TO THE CHOPPER TYPES PROVIDED WITH MOLEX C-GRID III 14 PIN CONNECTED DIRECTLY TO THE CONNECTOR P2 WDC)



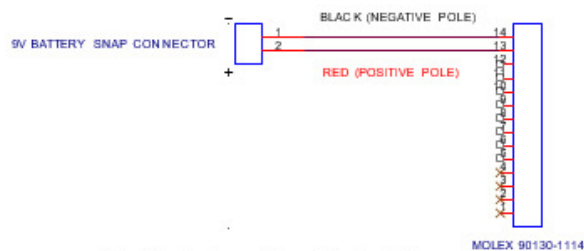
CHOPPER CONNECTOR



DISCONNECT THE CHOPPER CABLE FROM THE DRIVER BOARD AND CHECK ON THE CHOPPER CONNECTOR THE RESISTIVE VALUES MEASURED BETWEEN THE PIN PAIRS REPORTED IN THE FOLLOWING TABLE

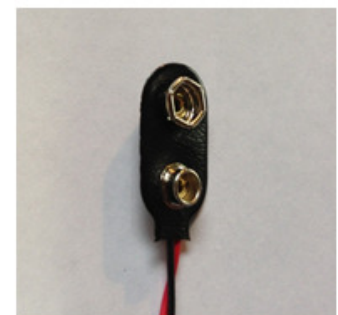
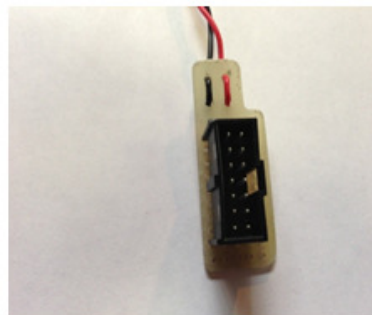
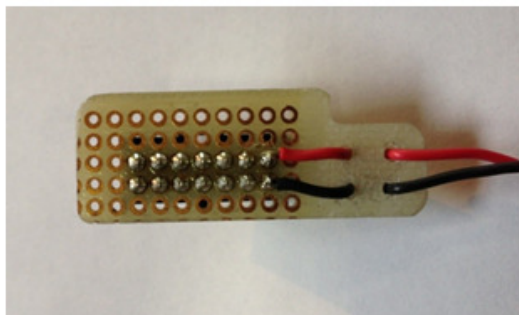
13-14	3.20 k $\Omega$ – 3.45 k $\Omega$	
11-12	3.20 k $\Omega$ – 3.45 k $\Omega$	
9-10	3.20 k $\Omega$ – 3.45 k $\Omega$	
7-8	3.20 k $\Omega$ – 3.45 k $\Omega$	NOTE: open circuit for the model with 3 section
5-6	3.20 k $\Omega$ – 3.45 k $\Omega$	NOTE: open circuit for the model with 3 / 4 section
3-4	Open circuit	
1-2	3.7 k $\Omega$ - 32 k $\Omega$	If measured temperatures between 0°C – 50°C (nom. 10 k $\Omega$ @ 25°C)

### TEST 5 → CHOPPER FUNCTIONALITY TEST



Electrical schematic of the test jig

CHOPPER TEST JIG



Pictures: Example of implementation

## TROUBLESHOOTING AND REPAIR SECTION

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### TEST 5 → CHOPPER FUNCTIONALITY TEST

Disconnect from the welding pcb the cable coming from the chopper. Start the welder engine leaving the welding circuit unloaded (i.e. in open circuit). Check that, in this condition, the voltage on the welding sockets is below 1V. This can be done either by means of a voltage meter.

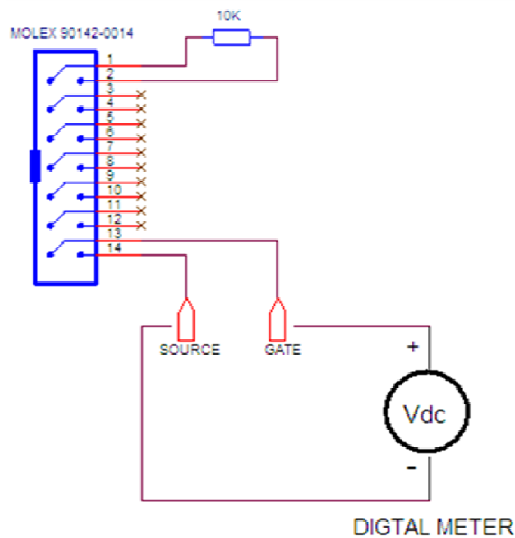
Should the voltage be greater than 1V but less than the nominal open circuit voltage, try to load the welding output with a resistor of a few  $k\Omega$  and check if the condition “welding voltage < 1V” is now satisfied. In case of positive result the first step of the check is passed.

Connect the cable coming from the chopper to the test jig. This can be done with the engine running, but paying attention that the welding circuit be kept unloaded, because there is no current control in this condition. Check that across the welding sockets there is a voltage approximately equal to the nominal open circuit voltage. In case of positive result also the second step is passed and it is possible to conclude that the chopper is very likely to be fully functional.

## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	LACK OF WELDING VOLTAGE IN OPEN CIRCUIT		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
LACK OF DRIVE SIGNAL FROM THE WELDING CONTROL BOARD	TEST 6 - Drive signal test.	in case of lack of the drive signal it is confirmed that the problem resides upstream of the chopper. Next step: <b>test 7</b>	
		The condition of having passed test 5 is inconsistent with the presence of a correct drive signal. Repeat <b>test 5</b>	
FAILURE OF THE CURRENT SENSOR	TEST 7 - Current sensor disconnection test	If the Hall sensor disconnection results in the presence of a correct value of the open circuit voltage at the output of the welder, this likely means that the sensor is failed.	Replace the Hall sensor
		If the removal of the Hall sensor does not change the situation of "no output voltage", the sensor is presumably ok. Next step: <b>test 1</b>	

### TEST 6 → WELDING PCB DRIVE SIGNAL TEST



The test requires a wired connector. The connector includes a standard test resistor of 10kohm between pins 1 and 2 that, in the specific case, is not needed. The cables connected to pins 13 and 14 are terminated on two test points. The test is performed using a standard digital multimeter.

Extract from connector CON 2 of the control board (14 pins) the cable coming from the chopper and insert in its place the test connector shown on the left.

Check, through a digital multimeter in VDC, that there is a drive voltage with an average value around 15Vdc.

If you find a correct drive signal but there is no open circuit voltage on the welding sockets, this means that there is a problem downstream of the control board (in the chopper or in the interconnection cabling)

### **TEST 7 → CURRENT SENSOR DISCONNECTING TEST**

Disconnect Hall Sensor cable from welding pcb on CON3 connector. Start the welder engine paying attention that the welding circuit be kept unloaded, as no current control is present in this condition.

Check that across the welding sockets there is a voltage approximately equal to the nominal open circuit voltage. In case of positive result it is possible conclude that the problem is the Hall sensor.

## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	<b>LACK OF WELDING VOLTAGE IN OPEN CIRCUIT</b>		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
<b>WELDING CONTROL BOARD NOT WORKING</b>	<b>TEST 1</b> - Test with the sample board (this test is not needed if the welding control board has been replaced as a consequence of test 1)	If the test sample card eliminates the fault it is confirmed that there is a problem on the welding control board. Before replacing perform a visual inspection.	Replace the welding control board
		If the test sample card eliminates the fault it is confirmed that there is a problem on the welding control board. Before replacing perform a visual inspection.	
<b>DAMAGED STATOR</b>	Check the presence of around 47Vac between each of the three phase couples on the welding winding, at no load and engine rated speed. Visually inspect the winding	The voltage values are incorrect, Visual inspection shows any damage. If there is one of these conditions replace the stator	Stator replacement
		If none of the above conditions is found: <u>Starting again with the investigation sequence.</u>	

## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	<b>LACK OF WELDING CURRENT CONTROL (NO CURRENT REGULATION)</b>		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
HARNESS DAMAGED	Inspect the harness	Harness damaged	Repair or replace the harness
		No damages found on harness <b>Next step: test 4</b>	
SHORT CIRCUIT FAILURE OF THE CHOPPER	<b>TEST 4 -</b> Chopper mosfet gate isolation (integrity) test.  <b>TEST5 -</b> Chopper functionality test	If the test fails it is confirmed that the chopper is damaged. Remove the chopper and perform a visual inspection.	Replace the chopper and the welding control board.
		If the test passes presumably this is a problem external to the chopper. <b>Next step: test 2</b>	
FAILURE OF THE CURRENT SENSOR	<b>TEST 2 -</b> Test with the sample current sensor.	If the welding control is recovered the problem resides in the Hall sensor	Replace the Hall sensor
		If the problem persists, restore the original sensor. <b>Next step: test 1</b>	

## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	<b>LACK OF WELDING CURRENT CONTROL (NO CURRENT REGULATION)</b>		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
<b>WELDING CONTROL BOARD NOT WORKING</b>	<b>TEST 1</b> - Test with the sample board (this test is not needed if the welding control board has been replaced as a consequence of test 4).	If the test sample card eliminates the fault it is confirmed that there is a problem on the welding control board. Before replacing perform a visual inspection.	Replace the welding control board
		If the sample control board does not solve the problem consider again a cause external to the board.	
<b>DAMAGE OF THE WELDING REGULATION POTENTIOMETER</b>	A damage to the potentiometer may result in irregular or absent variation of the current with the rotation of the knob. If the symptoms are of this type, check if the voltage between the central position of potentiometer and the ground side (black wire) varies regularly between a minimum that should be somewhere around 0.5V and a maximum around 4.5V.	In the case of voltage variation irregular or absent, apply the measure suggested	Replace the potentiometer
		If the test shows no defects of the potentiometer, continue the investigation <u>Repeat the investigation sequence.</u>	

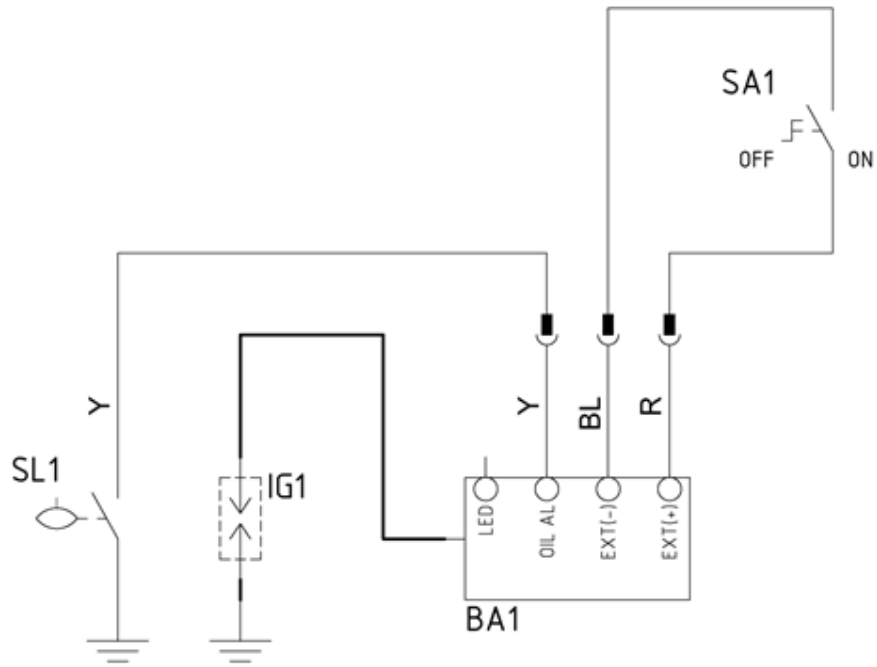
## TROUBLESHOOTING AND REPAIR SECTION

PROBLEM →	LACK OF AUXILIARY VOLTAGE		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
INVERTER DAMAGED	Check that the voltage at the inverter input is a about 420 Vdc (230V versions) or 210Vac (110V version), at no load with the engine at rated speed	If the input voltage of the inverter is correct but it does not provide any output voltage / power, proceed with the measure suggested	Replace the inverter
		If there is no voltage at the inverter input	Proceed with following checks
DAMAGED RECTIFIERS	Check that the input of each rectifier has a voltage of 148 Vac, with no load and the engine at rated speed. Check the rectifiers with a digital multi meter in diode test mode	Rectifiers damaged	Replace the rectifiers

PROBLEM →	LACK OF AUXILIARY VOLTAGE		
POSSIBLE CAUSE	VERIFICATIONS		WHAT TO DO
HARNESS DAMAGED	If the wiring is damaged, with particular reference to signs of overheating / overload on the auxiliary power wires, make sure about the integrity of: - Stator - Rectifiers - Welding control board - Fuse	Damages not caused by overheating	Replace the wiring
		Damages caused by overheating	Replace wiring after careful checking and replacement of all components that may have been damaged
DAMAGED STATOR	Check the presence of around 175Vac (about 87Vac for the 110V version) between each of the three phase couples on the auxiliary winding, at no load and engine rated speed. - Visually inspect the winding	The voltage values are incorrect Visual inspection shows any damage. If there is one of these conditions replace the stator	Stator replacement
		If none of the above conditions is found: <u>Starting again with the investigation sequence</u>	

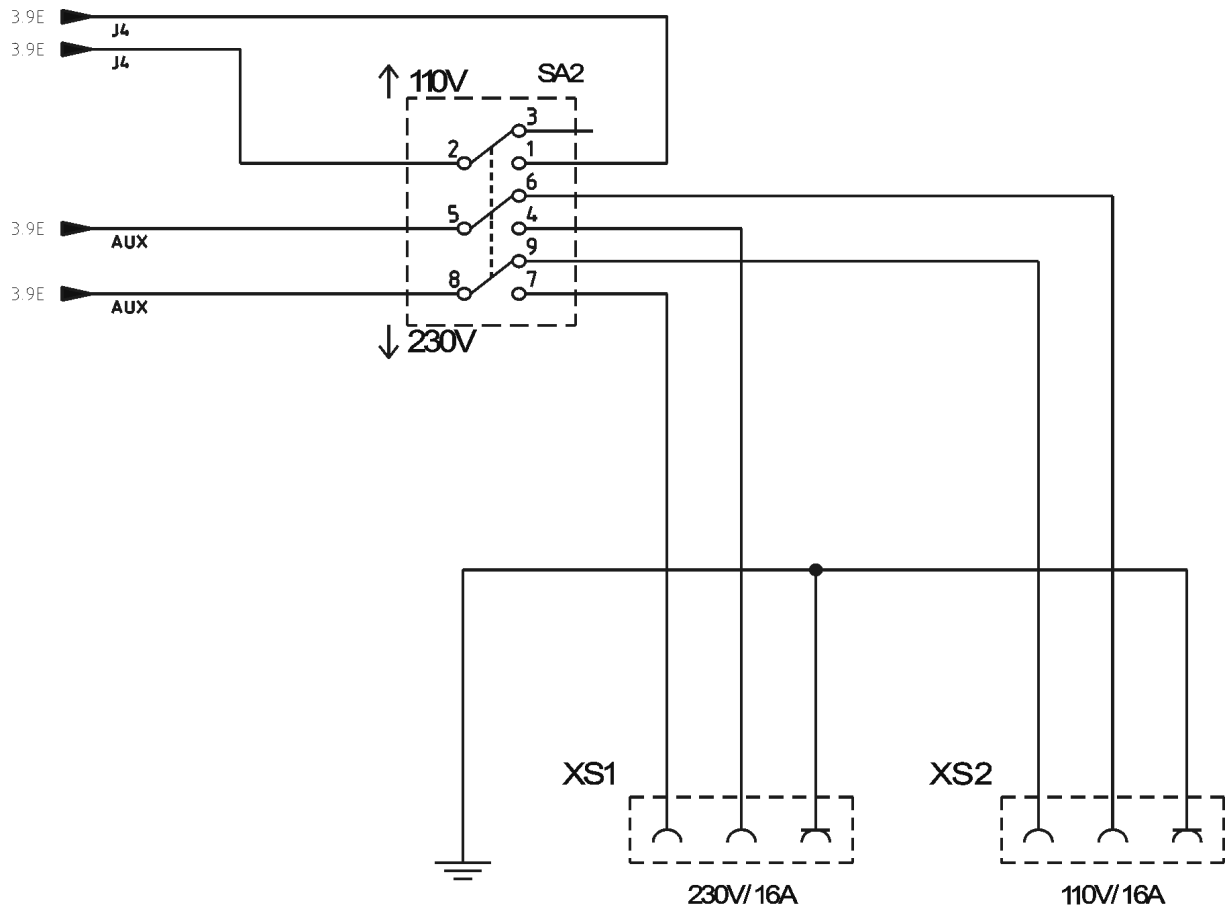
# ELECTRICAL SCHEMATICS

## MANUAL RECOIL STARTER HONDA ENGINE

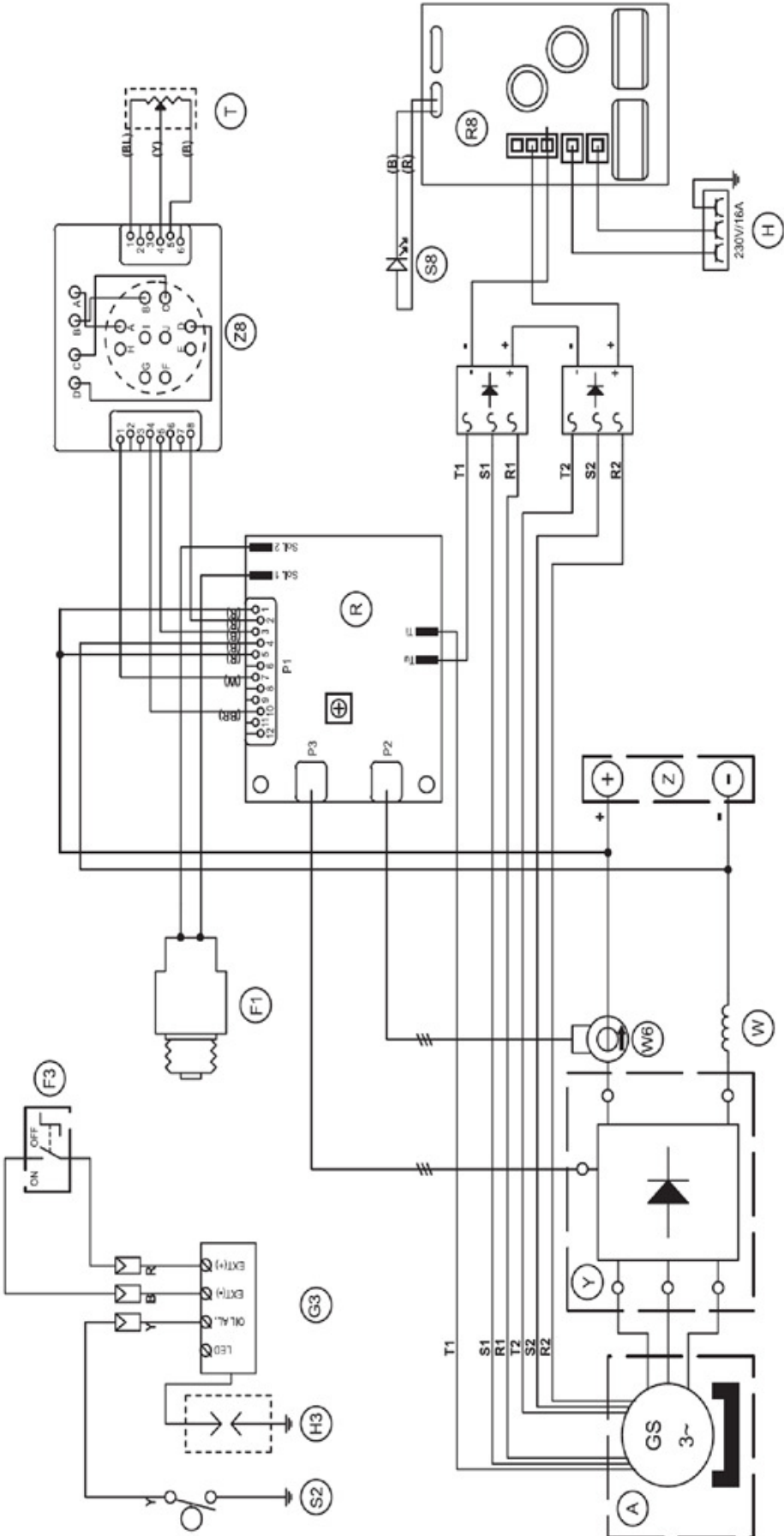


LEGENDA COLORI / KEY COLOR
(B)NERO/BLACK
(Y)GIALLO/YELLOW
(R)ROSSO/RED
(B)BLU/BLUE
(W)BIANCO/WHITE
(B)MARRONE/BROWN

# ELECTRICAL SCHEMATICS



A	ALTERNATOR
F1	ACCELERATION SOLENOID
F3	STOP PUSH BUTTON
G3	IGNITION
H	OUTPUT PLUG
H3	SPARK PLUG
R	WELDING CONTROL PCB
R8	INVERTER
S2	OIL LEVEL DETECTOR
S8	OVERLOAD LED
T	CURRENT REGULATOR KNOB
Z	WELDING SOCKETS
Z8	REMOTE CONTROL PCB
Y	WELDING DIODE BRIDGE
W	DC INDUCTOR
W6	HALL CURRENT SENSOR



**NOTE**

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