LINCOLN ELECTRIC
THE WELDING EXPERTS℠

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OPERATING MANUAL

WELDANPOWER® 230+

PETROL - Part Number KA 1390 Code Nos. 70021 and below
DIESEL - Part Number KA 1409-1 Code Nos. 70027 and below

WELDANPOWER 230+ PETROL

WELDANPOWER 230+ DR

SAFETY DEPENDS ON YOU

Lincoln Electric welders are designed and built with safety in mind. However, your overall safety can be increased by proper installation and thoughtful operation on your part. Read and observe the general safety precautions on page 2 and follow specific installation and operating instructions included in this manual. Most importantly, think before you act and be careful.

THE LINCOLN ELECTRIC COMPANY
(AUSTRALIA) PTY. LTD. A.B.N. 36 000 040 308
SYDNEY. AUSTRALIA
A Subsidiary of
THE LINCOLN ELECTRIC CO. U.S.A.
Associated Subsidiaries in Australasia, Asia, Canada, Europe, North and South America.
THE WORLD'S LEADER IN WELDING AND CUTTING PRODUCTS

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. READ AND UNDERSTAND BOTH THE SPECIFIC INFORMATION GIVEN IN THE OPERATING MANUAL FOR THE WELDER AND/OR OTHER EQUIPMENT TO BE USED AS WELL AS THE FOLLOWING GENERAL INFORMATION.

ARC WELDING SAFETY PRECAUTIONS

ELECTRIC SHOCK can kill

1. a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
   b. In semi-automatic and automatic wire welding, the electrode, electrode reel, welding head and nozzle or semi-automatic welding gun are also electrically "hot".
   c. Insulate yourself from work and ground using dry insulation. When welding in damp locations, on metal framework such as floors, gratings or scaffolds, and when in positions such as sitting or Lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.
   d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
   e. Ground the work or metal to be welded to a good electrical (earth) ground.
   f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
   g. Never dip the electrode holder in water for cooling.
   h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
   i. When working above floor level, protect yourself from a fall should you get a shock.
   j. Also see items 4c and 6.

FUMES AND GASES can be dangerous

2. a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. When welding on galvanised, lead or cadmium plated steel and other metals which produce toxic fumes, even greater care must be taken.
   b. Do not weld in locations near chlorinated hydrocarbon vapours coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapours to form phosgene, a highly toxic gas, and other irritating products.
   c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to ensure breathing air is safe.
   d. Read and understand the manufacturer' s instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices.
   e. Also see Item 7b.

ARC RAYS can burn

3. a. 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 open arc welding. Headshield and filter lens should conform to AS 1674.2-1990 standards.
   b. Use suitable clothing made from durable flame resistant material to protect your skin and that of your helpers from the arc rays.
   c. Protect other nearby personnel with suitable non flammable screening and/or warn them not to watch the arc or expose themselves to the arc rays or to hot spatter or metal.

WELDING SPARKS can cause fire or explosion

4. a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Have a fire extinguisher readily available.
   b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to AS1674 Parts 1 & 2 "Safety in Welding and Allied Processes", WTIA Technical Note 7 "Health and Safety in Welding" and the operating information for the equipment being used.
   c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
   d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapours from substances inside. These can cause an explosion even though the vessel has been "cleaned". For information purchase AS 1674-1990.
   e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
   f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
   g. Connect the work cable to the work as close to the welding area as possible. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
   h. Also see Item 7c.

CYLINDER may explode if damaged

5. a. 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. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

   b. Always keep cylinders in an upright position and securely chained to an undercarriage or fixed support.

   c. Cylinders should be located :

      - Away from areas where they may be struck or subjected to physical damage.
      - A safe distance from arc welding or cutting operations and any other source of heat, sparks or flame.

   d. Never allow the electrode, electrode holder, or any other electrically "hot" parts to touch a cylinder.

   e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

   f. Valve protection caps should always be in place and hand-tight except when the cylinder is in use or connected for use.

   g. Read and follow the instructions on compressed gas cylinders and associated equipment, and AS 2030 Parts 1 & 2.

FOR ELECTRICALLY powered equipment

6. a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

   b. Install equipment in accordance with the SAA Wiring Rules, all local codes and the manufacturer's recommendations.

   c. Ground the equipment in accordance with the SAA Wiring Rules and the manufacturer's recommendations.

FOR ENGINE powered equipment

7. a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

b. Operate engines in open, well ventilated areas or vent the engine exhaust fumes outdoors.

c. Do not add fuel near an open flame, welding arc or when the engine is running. Stop the engine and allow it to cool before refuelling to prevent spilled fuel from vaporising on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

d. Keep all equipment, safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

g. To prevent accidentally starting petrol engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

h. To avoid scalding do not remove the radiator pressure cap when the engine is hot.

HAVE ALL INSTALLATIONS, OPERATION, MAINTENANCE AND REPAIR WORK PERFORMED BY QUALIFIED PEOPLE

For more detailed information it is strongly recommended that you purchase a copy of "Safety in Welding and Cutting - ANSI Standard Z 49.1" and WTIA Technical Note 7. All WTIA publications and ANSI/AWS Standards are available from the Welding Technology Institute of Australia, P.O. Box 6165, Silverwater NSW 2128. For copies of various Australian Standards contact your local S.A.A. office.

HOW TO ORDER REPLACEMENT PARTS

To ensure that you receive the correct replacement part the following procedure should be followed:

1. Quote Serial Number and Code Number.
2. Quote the Description, Item Number and Parts List Number of the desired part. When ordering parts for items carrying brand names of other companies, such as fan motors, drive shafts, etc., be sure to include the other company's name and part number and other relevant information.
3. Parts should be ordered from Lincoln, its offices or the nearest Authorised Field Service Shop. (The "Lincoln Service Directory" listing these shops geographically is available on request.)

Note: "Hardware" in the Lincoln Parts Lists are not Lincoln stock items but can be obtained via the Field Service Shop network.

Component parts of assemblies such as stator coils or armature coils, etc., which require electrical testing or locating fixtures are not considered replaceable items. This is to ensure that the customer receives parts which will keep the welder in the best operating condition.

BUY ONLY GENUINE REPAIR PARTS

WELDING, EMF & PACEMAKERS

All welders should follow safe practices that minimise their exposure to electric and magnetic fields (EMF).

For welders wearing implanted pacemakers, safe welding practices are particularly important and additional procedures should be followed by those who have decided to continue to weld. (Hopefully in keeping with a doctor's advice).

The following procedures will not eliminate exposure to EMF or the possibility of arc welding having an effect on a pacemaker, however if followed, they will significantly reduce exposure to electric and magnetic fields. Electric and magnetic fields are created any time electric current flows through a conductor, however it is not clear whether such exposure affects ones health.

Some researchers have reported that exposure to EMF may cause leukemia or other illnesses. These claims originally arose in relation to high voltage electric power lines and are very much in dispute in the medical and scientific arena, however the best advice is to minimise your exposure to EMF to protect your health should doctors eventually decide there is a risk.

There are four fundamental facts about EMF:

- With direct current (DC), the field strength is relatively constant and does not change.
- With alternating current (AC), the field strength constantly changes.
- The greater the current flow, i.e. the higher the amps, the stronger the field created by the current
- The closer the conductor or electrical device is to the body, the greater the exposure to the field.

Minimising exposure

All welders should use the following procedures to minimise EMF exposure.

- Route electrode or gun and work cables together. Secure them with tape if possible.
- Never coil the electrode lead around your body.
- Do not place your body between the electrode and work cables. If your electrode cable is on your right side the work cable should also be on your right side.
- Connect the work cable to the work piece as close as possible to the area being welded. (This is also a good practice to eliminate a common problem on welding - a poor work connection.
- Do not work next to the welding power source.

Welders with pacemakers

There is no question that the fields in arc welding can interfere with a pacemakers function. Generally the interference does not permanently damage the pacemaker. Once the wearer leaves the arc welding environment or stops welding, the pacemaker returns to normal functioning. The welding arc has little or no effect on the operation of some pacemakers, especially designs that are bi-polar or designed to filter out such interference.

For a welder or anyone working around electrical equipment the selection of a pacemaker is very important. Get a doctor's advice about which pacemaker is the least sensitive to interference from welding while still being medically suitable.

In addition to the normal safety precautions, the following additional procedures should be adopted by welders with pacemakers.

- Use gas welding when the application is suitable.
- Use the lowest current setting appropriate for the application. Do not exceed 400 amps. Low current (75-200 amps) direct current (DC) welding should be used if arc welding is necessary. Do not TIG weld with high frequency.
- Do not use repeated, short welds. Wait about ten seconds between stopping one weld and starting the next. When having difficulty starting an electrode, do not re-strike the rod repeatedly.
- If you feel light headed, dizzy or faint, immediately stop welding. Lay the electrode holder down so that it does not contact the work and move away from any welding being performed. Arrange your work in advance so that, if you become dizzy and drop the electrode holder, the electrode holder will not fall on your body or strike the work.
- Do not work on a ladder or other elevated position or in a cramped, confined place.
- Do not work alone. Work only in the presence of an individual who understands these precautions and the possible effect welding may have on your pacemaker.
- Do not work near spot welding equipment.
- If you have a pacemaker and wish to continue arc welding, discuss this and any other questions you may have with your physician and follow his or her advice. The doctor may wish to contact the pacemaker manufacturer for a recommendation. As mentioned before, the design of the pacemaker significantly affects the degree to which it is subject to interference from a welding circuit. Do not rely on the fact that you know another welder with a pacemaker who has welded for years without experiencing a problem. That welder and his or her pacemaker may be quite different from you and your pacemaker.

WARNING

This welding machine must be used by trained operators only. Read this manual carefully before attempting to use the welding machine.

Conformance

Products displaying the C-Tick mark are in conformity with Australian/New Zealand requirements for Electromagnetic Compatibility (EMC). They are:

- manufactured in conformity with Australian/New Zealand Standard (Emission):- AS/NZS 3652 'Electromagnetic Compatibility - Arc Welding Equipment' (Identical to and reproduced from British Standard EN 50199)
- for using with other Lincoln Electric/LiquidArc equipment.
- designed for industrial and professional use.

Introduction

All electrical equipment generates small amounts of electromanetic 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 effect many kinds of electrical equipment: other nearby welding equipment, radio and TV transmitters and receivers, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

Installation and Use

The purchaser/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 purchaser/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 below). In other cases it could involve constructing an electro-magnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnet-ic 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 according to national codes. Changing the earthing arrangements should only be authorised by a person who is competent to assess whether the changes increase the risk of injury, eg. by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

Assessment of Area

Before installing welding equipment the purchaser/user shall make an assessment of potential problems in the surrounding area.

The following shall be taken into account:

a. Other supply cables, control cables, signalling and telephone cables above, below and adjacent to the welding equipment;

b. Radio and television transmitters and receivers;

c. Computer and other control equipment;

d. Safety critical safety equipment, eg. guarding of industrial equipment;

e. The health of people around, eg. the use of pacemakers and hearing aids;

f. Equipment used for calibration or measurement;

g. The immunity of other equipment in the environment. The purchaser/user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

h. The time of the 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

Mains Supply

Welding equipment should be connected to the mains supply according to the manufacturer's recommendations.If interference occurs, it may be necessary to take additional precautions such as filtering the mains supply. 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 adjustment covered in the manufacturer's instructions. In particular, the spark gaps of arc initiation and stabilising 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 the 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, nor connected to earth because of its size and position, eg. ship's 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 work pieces 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 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.*

* Portions of the preceding text are contained in AS/NZS3652: 'Electromagnetic Compatibility - Arc Welding Equipment'.

GENERAL DESCRIPTION

The Weldanpower 230+ is a twin-cylinder, petrol or diesel driven, multi-process arc welder and AC power generator. It is built in a heavy gauge steel case for durability on the job site.

SPECIFICATIONS

Weldanpower 230+

Ordering Information	Description	Welding Output	Auxiliary Power	Dimensions & Weight (L x W x H)
KA 1390 (Petrol) KA1409-1 (Diesel)	Multi-purpose Arc Welder with 8,000 watts of auxiliary power	AC Constant Current 230A/25V/100% DC Constant Current 210A/25V/100% DC Constant Voltage 200A/20V/100%	8000 Watts 50/55Hz AC 33 Amps @ 240V	1073 x 475 x 765mm Approx. 215 kg. (Petrol) 1260 x 490 x 767mm Approx. 275 kg. (Diesel)

Engine - Petrol

Model	Description	Horsepower	Operating Speeds	Displacement	Capacities
Briggs & Stratton	2 Cylinder 4 Cycle Air Cooled Petrol Engine Aluminium Alloy with Cast Iron Liners, Electrical Ignition	13 kW @ 3300 RPM	Full Load: 3200 RPM High Idle 3300 RPM Low Idle: 2200 RPM	570cc	Fuel: 34L Lubricating Oil:1.7L

Engine - Diesel

Model	Description	Horsepower	Operating Speeds	Displacement	Capacities
Ruggerini RD 211	2 Cylinder 4 Cycle Air Cooled Diesel with Direct Injection Diecast Aluminium Crankcase	13.3 kW @ 3300 RPM	Full Load: 3200 RPM High Idle: 3300 RPM Low Idle: 2200 RPM	851cc	Fuel: 34 L Oil: 3 L

DESIGN FEATURES

AC/DC Stick Welding

(Constant Current)

- AC: 30 - 230 Amps
- DC: 30 - 210 Amps
- 100% Duty Cycle on All Settings
- Output Selector with 6 Ranges
- Output Control for Fine Current Adjustment
- Use with a broad range of AC & DC Electrodes Including Fleetweld® 5P

DC Semi-automatic Wire Feed Welding

(Constant Voltage)

- CV Tap Setting for 40-200 Amps.
- 100% Duty Cycle
- Excellent Performance with 1.7mm NR®- 211-MP Innershield® Electrode.
- Limited MIG Welding with L-54 & L-56 Ultra using blended Argon Shielding Gas.
- The recommended Wire Feeder is the LN-25, but can also be used with the LN-22 Wire Feeder.

AC/DC TIG Welding (Constant Current)

- AC & DC TIG welding can be done at all constant current output range settings.

Auxiliary Power

- 8000 Watt AC 240 Volt 50/55 Hz. Generator.
- Operates AC Power Tools.
- Powers Battery Chargers.
- Powers a 1.5 kW Motor (If started under no load).
- Lights eighty (80) 100 watt incandescent bulbs.
- Can be used for stand-by power.

OTHER FEATURES

- Bottom mounted 34 litre fuel tank with a convenient top fill and fuel gauge.
- Polarity switch for selecting DC+, DC-, or AC welding output.
- K930-2 high frequency kit available.
- Remote control receptacle kit available.
- Electronic engine idler. Engine automatically goes to low idle 10 to 14 seconds after welding or use of auxiliary power ceases. Includes high idle switch.

- Electric starting.
- Factory installed engine hour meter.
- Built-in feet for easy mounting to truck bed or trailer.
- All copper alternator windings and high quality insulation for long life and dependability.
- Powder painted case and base for outstanding corrosion protection.

ENGINE

Petrol

Briggs & Stratton 18HP V - twin Vanguard®* features:-

- Air cooled, twin-cylinder.
- Cast aluminium alloy crankcase with integral cast iron cylinder liners.
- Electric start with solid state battery charging module.
- Solid state breakerless ignition.
- Spin on oil filter
- Low oil pressure shutdown protection
- Battery charging ammeter.
- Engine protection shuts engine down in the event of low oil pressure.
- Quiet muffler with reversible exhaust feature; either right or left side of machine.

* The trademark is the property of Briggs & Stratton

Diesel

Ruggerini - RD211 features:-

- Air cooled, twin cylinder.
- Direct injection.
- Crankcase in diecast aluminium.
- Forced lubrication with oil pump.
- Spin on oil filter.
- Centrifugal speed governor.
- Automatic mechanical fuel supplement.

OPTIONAL EQUIPMENT (Field Installed)

Lead Kit (KIT1400) - Includes 6m 25mm2 electrode cable and 4.5m 25mm2 work cable with one lug fitted to each.

Accessory Kit (KIT300) - Includes electrode holder, ground clamp, Flip-front headshield, Supervisibility lens, non-spatter lens, wire brush and chipping hammer.

Remote Control Receptacle Kit (K892-1) - Includes a 6-pin MS-type (Amphenol) receptacle and a local- remote toggle switch that mounts in the case front. Requires a Remote Control Option.

Remote Control (K857) - Consists of a control box with 8.5m of four conductor cable. Permits remote adjustment of output. (Requires K892-1 Remote Control Receptacle Kit to be mounted in machine).

TIG WELDING OPTIONS/ACCESSORIES

K930-2 TIG Module - Provides high frequency and shielding gas control for AC and DC GTAW (TIG) welding applications. Its compact case is designed for easy carrying, complete with a handle. High frequency bypass is built in. The K938-1 Contactor Kit must be field installed in the TIG Module when used with a Weldanpower 230+. Additionally, the K936-3 control cable is required if remote control is used. If remote control is not used the K936-4 control cable is required.

The TIG Module is supplied without accessories. Arc Start switches, amptrols, cables, torches and mounting brackets must be purchased separately.

K892-1 Remote Control Receptacle Kit - Required when using a K930-2 TIG Module with an optional amptrol.

K939-1 Docking Kit - For mounting the K930-2 TIG Module on top of the Weldanpower 230+.

K936-3 Remote Control Cable - Control cable for connecting the K930-2 TIG Module to a Weldanpower 230+ equipped with a K892-1 Remote Kit. 9-pin socket to a grounded 115V plug and a 6-pin MS-connector. (Contains circuits 2, 4, 31, 32, 75, 76, 77 and ground).

K936-4 Remote Control Cable - Control cable for connecting the K930-2 TIG Module to a Weldanpower 230+ not equipped with a K892-1 Remote Kit. 9-pin socket to a grounded 115V plug and a 6-pin MS-connector. (Contains circuits 31, 32 and ground).

K814 Arc Start Switch - A remote start switch used in conjunction with the K930-2 TIG Module to energise the Weldanpower 230+ output terminals via the TIG module.

K963 Hand Amptrol - Remote output control on Weldanpower 230+.

K870 Foot Amptrol - Remote output control on Weldanpower 230+.

RECOMMENDED EQUIPMENT

Stick:

Accessory Kit (KIT1400) and Lead Kit (KIT300) which include:

- Electrode Holder & Cable
- Work Clamp & Cable
- Headshield and other necessary accessories.

Remote Control Receptacle Kit (K892-1), and Remote Control Kit (K857) are optional for remote current control.

Tig:

Magnum™ TIG Torch

Magnum Parts Kit and Argon Gas

High Frequency Unit (K930-2) - (Limited Output Range)

(240 to 115V, 150VA, transformer is also required).

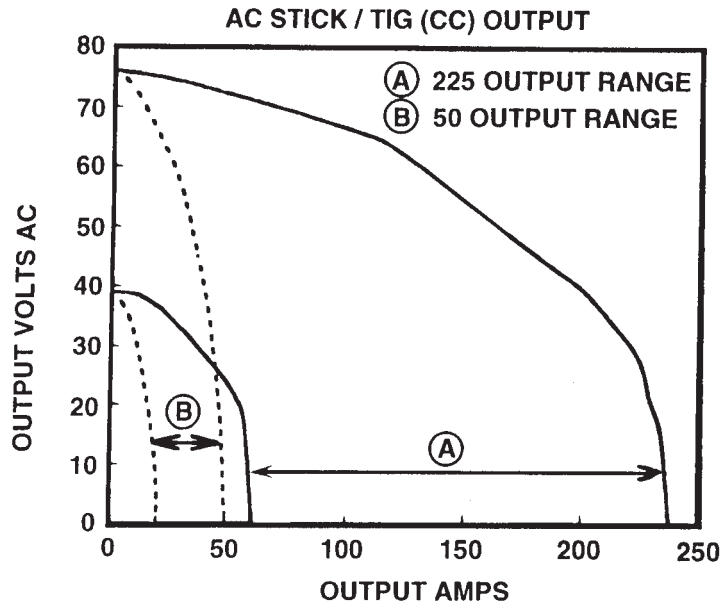
Optional:

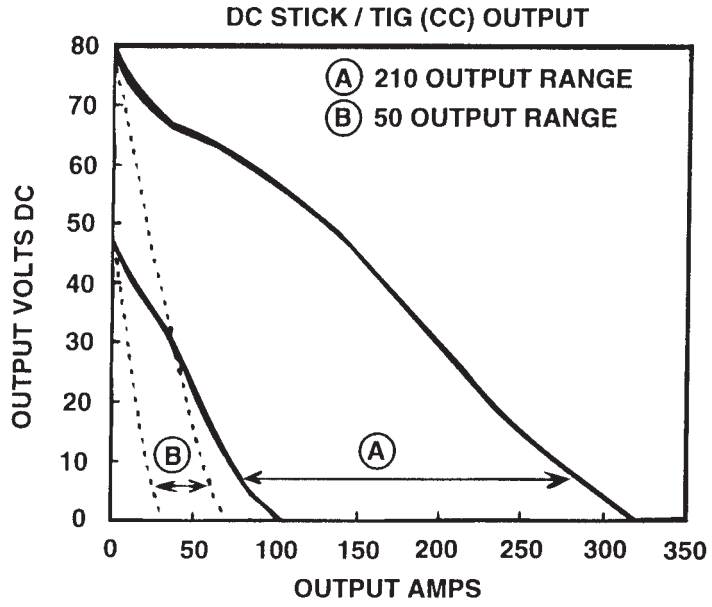
- High Frequency Mounting Bracket (K939-1)
- Hand Amptrol® (K963)
- Foot Amptrol (K870)
- Remote Control Receptacle Kit (K892-1)
- Adaptor Cable (K936-3 or -4)
- Arc Start (K814)

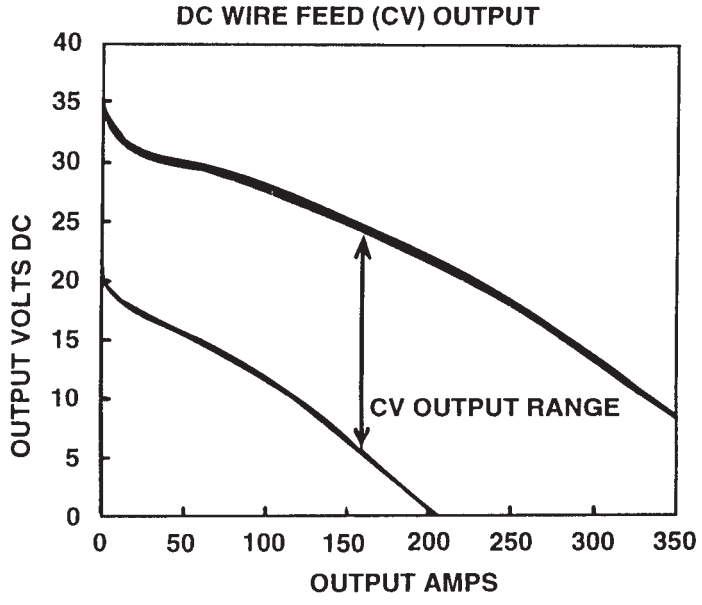
Semi-Automatic:

LN-25 (K449) - Includes internal contactor for across the arc operation (no control cable). Provides “cold” electrode until gun trigger is pressed. Includes gas solenoid. Remote control Receptacle Kit (K892-1) and Remote Voltage Control Kit (K444-1) are required for voltage control at the feeder.

SPECIFICATIONS







INSTALLATION INSTRUCTIONS

Safety Precautions

WARNING

Do not attempt to use this equipment until you have thoroughly read the engine manufacturer's manual supplied with your welder. It includes important safety precautions, detailed engine starting, operating and maintenance instructions, and parts lists.

ELECTRIC SHOCK can kill

- **Do not touch electrically live parts or electrode with skin or wet clothing.**
- **Insulate yourself from work and ground**
- **Always wear dry insulating gloves.**

ENGINE EXHAUST can kill

- **Use in open, well ventilated areas or vent exhaust outside.**

MOVING PARTS can injure

- **Do not operate with doors open or guards off.**
- **Stop engine before servicing.**
- **Keep away from moving parts.**

See additional warning information at front of this operators manual.

Trailers

Use KA1450-1 trailer for off highway use. The KA1450-1 trailer is 2 wheel sprung with mudguards and has a 50mm ball coupling with a jockey wheel.

If fitting the Weldanpower 230+ to a non Lincoln trailer, 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.

Pre-Operation Service

CAUTION

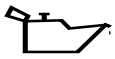
READ the engine operating and maintenance instructions supplied with this machine.

WARNING

Petrol and Diesel fuel can cause fire or explosion.

- Stop engine while fuelling
- Do not smoke when fuelling
- Do not over-fill tank.
- Keep sparks and flame away from tank.
- Wipe up spilled fuel and allow fumes to clear before starting engine.

Oil:



The Weldanpower 230+ is shipped with the engine crankcase filled with oil. 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. make certain that the oil filler cap is tightened securely. Refer to the engine Owner's Manual for specific oil recommendations.

Fuel:

Fill the fuel tank with clean, fresh, fuel. Observe fuel gauge while filling to prevent over-filling.

Air Cleaner:

Make sure cleaner and air intake parts are tight and properly installed to prevent unfiltered air from entering the engine.

Petrol Engine - Ensure air cleaner element is clean - refer to engine manual.

Diesel Engine - Ensure oil bath air cleaner is filled with clean oil - refer to engine manual.

Battery :

This welder is shipped with a dry charged battery.

Battery Safety, Commissioning and Recharging Instructions.

Safety Warnings.

- Battery electrolyte contains sulphuric acid which is corrosive to skin and clothing.
- Batteries also contain explosive gases.
- When charging, provide adequate ventilation to allow the safe escape of explosive gases.
- Do not do anything to cause sparks near a battery. Keep naked flames and cigarettes away from batteries.
- If acid contacts eyes or skin flush immediately with large quantities of clean drinking water.
- In cases of acid contacting the eyes, consult a doctor immediately.
- After use, wash out empty electrolyte bottles with water and dispose of carefully. Do not use empty electrolyte bottles for any other purpose.
- Always keep batteries and electrolyte out of reach of children.
- Dispose of old batteries carefully.

Battery Conditioning.

1. Remove the battery from the machine before filling or recharging.
2. Remove and retain vent plugs.
3. Fill each cell of the battery to the top of the separators with the correct grade electrolyte (i.e 1.260 specific gravity). Using higher or lower specific gravity electrolyte than recommended can impair the battery performance.
4. Boost charge the battery at 15 amps until the specific gravity is 1.250 or higher and the electrolyte temperature is at least 15.5˚C. Both conditions must be met. If the electrolyte bubbles violently while charging, reduce the charging rate until the excessive bubbling action subsides, then continue until both the above conditions are achieved. **If the ambient temperature is 10˚C or less, it is imperative that the above instructions be followed.**
5. After boost charge, check the level of electrolyte in all cells. Add additional electrolyte to bring the level to that shown on the labelling. **Do not overfill.** Once the battery has been in service, add only approved water. **Do not add acid**.

NB. Depending on the age of the dry charged battery, correct activation may take up to 48 hours.

6. Disconnect the battery from the charging source and refit the vent plugs ensuring they are screwed or pushed all the way home.
7. Wash away any spilt electrolyte with water and dry the battery completely before installing it into the machine.

Installation

1. Inspect the battery tray and remove any foreign objects that may be present.
2. Place the battery in the tray.
3. Connect the positive battery lead (marked with a red, boot), then connect the negative lead.

   NB. Always connect the negative lead last when installing a battery and disconnect it first when removing the battery from the machine.
4. Refit the battery hold-down assembly. Do not over tighten this assembly as battery case damage is possible.

Battery Maintenance Procedure

1. Keep the electrolyte levels at about 6mm above the plates and separators.
2. Keep terminal posts free of corrosion.
3. Keep battery clean and dry.
4. Do not fast charge any battery over 18 months old.
5. Never add acid to a battery unless replacing acid lost through spillage.

Battery charging.

The battery is maintained at its proper state of charge by the battery charger. The Weldanpower should not be operated with the battery disconnected.

When replacing, jumping or otherwise connecting the battery to

CAUTION

Failure to observe the proper polarity could result in damage to the charging circuit. The positive battery cable has a red boot and the negative cable is black.

the battery cables, the proper polarity must be observed.

Petrol Engine

The ammeter is the best indicator of the condition of the battery and charging circuit. The charging current will normally be high just after starting the engine. If the ammeter shows a discharging current to the extreme (-) area with the engine stopped, the charging circuit is faulty and requires service.

If the battery is in a poor state of charge, the charging current will read high for as long as it takes to bring the battery up to full charge.

Diesel Engine

The battery charge light indicates the correct functioning of the battery charger circuit. If the light glows when the engine is running at high speed the charger is faulty (refer to engine manual).

Welding Output Cables

With the engine off, connect the electrode and work cables to the studs provided. These connections should be checked periodically and tightened if necessary. Loose connections will result in overheating of the output studs.

When welding at a considerable distance from the welder, be sure you use ample size welding cables. Listed below are copper cable sizes recommended for the rated current and duty cycle. Lengths stipulated are the distance from the welder to work and back to the welder again. Cable sizes are increased for greater lengths primarily for the purpose of minimising cable voltage drop.

TOTAL COMBINED LENGTH OF ELECTRODE AND WORK CABLES		
	230 Amps 40% Duty Cycle	**230 Amps 100% Duty Cycle**
0 - 15m	25 mm^2	35 mm^2
15 - 30m	35 mm^2	35 mm^2
30 - 45m	35 mm^2	50 mm^2
45 - 60m	50 mm^2	50 mm^2
60 - 75m	50 mm^2	50 mm^2

Angle of Operation

Internal combustion engines are designed to run in a level condition which is where the optimum performance is achieved. The maximum angle of operation for the engine is 15 degrees from horizontal in any direction. If the engine is to be operated at an angle, provisions must be made for checking and maintaining the oil at the normal (FULL) oil capacity in the crankcase in a level condition.

When operating at an angle, the effective fuel capacity will be slightly less than the specified 34 litres.

High Altitude Operation (Petrol Engine only):

If the Weldanpower 230+ will be consistently operated at altitudes above 1500m, a carburettor jet designed for high altitudes should be installed. This will result in better fuel economy, cleaner exhaust, and longer spark plug life. It will not give increased power, which is decreased at higher altitudes.

CAUTION

Do not operate a Weldanpower 230+ with a high altitude jet installed at altitudes below 1500m. This will result in the engine running too lean and result in higher engine operating temperatures which can shorten engine life.

High altitude jet kits are available from Briggs & Stratton parts dealers.

Muffler Relocation (Petrol Engine only):

The exhaust can be changed to the opposite side by removing the two screws that hold the exhaust port cover in place and installing

WARNING

Shut off welder and allow muffler to cool before touching muffler.

the cover on the opposite side. (Operating the Weldanpower 230+ without the cover in place will result in a higher noise level and no increase in machine output).

Location / Ventilation:

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

WARNING

- **Damage to the fuel tank may cause fire or explosion. Do not drill holes in, or weld to the base of the Weldanpower 230+.**

Connection of Lincoln Electric Wire Feeders:

WARNING

Shut off welder before making any electrical connections.

Wire Feed (Constant Voltage)

Connection of the LN-22 and LN-25 to the Weldanpower 230+

a. Shut the welder off

b. Connect the electrode cable from the LN-22 or LN-25 to the "ELECTRODE" terminal of the welder. Connect the work cable to the "TO WORK" terminal of the welder.

c. Position the welder "Polarity" switch to the desired polarity, either DC (-) or DC (+).

d. Position the "RANGE" switch to the "WIRE FEED" position (extreme clockwise).

e. Attach the single lead from the LN-22 or LN-25 control box to the work using the spring clip on the end of the lead - it carries no welding current.

f. Place the idler switch in the "AUTO" position.

g. Adjust wire feed speed at the LN-22 or LN-25 and adjust the welding voltage with the output "CONTROL" at the welder.

Note: The welding electrode is energised at all times, unless an LN-25 with built-in contactor is used. If the output "CONTROL" is set below "3", the LN-25 contactor may not pull in.

High Frequency Generator for TIG Welding Applications: (Requires 240 - 115V, 150VA, Transformer).

K930-2 TIG Module - Provides high frequency and shielding gas control for AC and DC GTAW (TIG) welding applications. Its compact case is designed for easy carrying, complete with a handle. High frequency bypass is built in. The K938-1 Contactor Kit must be field installed in the TIG Module when used with a Weldanpower 230+. Additionally, the K936-3 control cable is required if remote control is used. If remote control is not used the K936-4 control cable is required.

The TIG Module is supplied without accessories. Arc Start switches, amptrols, cables, torches and mounting brackets must be purchased separately.

OPERATING INSTRUCTIONS

Additional Safety Precautions

Always operate the welder with the roof and case sides in place as this provides maximum protection from moving parts and assures proper cooling air flow.

Read and understand all Safety Precautions before operating this machine. Always follow these and any other safety procedures included on the machine, in this manual and in the Engine Owner's Manual.

Welder Operation

- Maximum Open Circuit Voltage at 3300 RPM is 80 volts RMS.
- Duty Cycle: 100% for both welding and auxiliary power.

Weldanpower 230+	
Constant Current	230 Amps AC @ 25 Volts 210 Amps DC @ 25 Volts
Constant Voltage	200Amps DC @ 20 Volts

Welder Controls - Function and Operation

"Stop/Run" Switch & "Start" Button - Petrol Engine only

Place the 'Stop/Run" Switch in the "Run" position, then press the "Start" button. The starter motor is energised to crank the engine. Hold in the "Start" button to crank the engine; release as the engine starts. Do not depress the "Start" button while the engine is running as this can cause damage to the ring gear and/or starter motor.

To stop the machine, place the "Stop/Run" switch in the "Stop" position.

"Start" Button - Diesel Engine only

The push button start switch is pressed and held to engage the starter motor. Once engine starts, release the button.

Notes:

- **Do not press start button while engine is running.**
- **(Petrol & Diesel engines) - Do not crank the engine for longer than 20 seconds. If the engine does not start, allow at least 1 minute between crank periods to avoid damage to electrical components.**

"Stop" Cable - Diesel Engine only

Stop the engine by pulling the stop cable and hold it "out" until the engine has stopped.

CAUTION

Never change the "Polarity" switch setting while welding. This will damage the switch.

"Polarity" Switch

" Range" Switch

CAUTION

Never change the "RANGE" Switch setting while welding. This will damage the switch.

Process	Maximum Current on each setting
Stick/TIG - CC 6 Range Settings	50, 70, 90 125, 175, 210 DC/230 AC
Wire Feed - CV 1 Range Setting	 200

	Briggs & Stratton 13kW Vanguard	Ruggerini RD201
Low Idle - No Load 2200 RPM	0.9L/hr	0.8L/hr
High Idle - No Load 3300 RPM	2.0L/hr	1.3L/hr
AC CC Weld Output 225 Amps @ 25 Volts	5.1L/hr	3.2L/hr
DC CC Weld Output 200Amps @ 20 Volts	5.4L/hr	3.3L/hr
Auxiliary Power 8000 Watts	5.3L/hr	3.2L/hr

WP230+ Typical Fuel Consumption

" Control" Switch:

Provides a fine welding current adjustment within the Range Switch settings in the STICK/TIG mode and welding voltage control with the Range switch set in the wire feed mode.

"Idler" Switch

The idler switch has two positions, "HIGH" and "AUTO".

When in "HIGH" position, the engine will run continuously at high idle.

When in "AUTO" idle position, the idler operates as follows:-

a. Welding:

When the electrode touches the work, the welding arc is initiated and the engine accelerates to full speed

After welding ceases (and no auxiliary power is being drawn), the engine will return to low idle after approximately 10 to 14 seconds.

b. Auxiliary Power:

With the engine running at low idle and auxiliary power for lights or tools is drawn (approximately 100-150 watts or greater) from the receptacles, the engine will accelerate to high speed. If no power is being drawn from the receptacles (and not welding) for 10-14 seconds, the idler reduces the engine speed to low idle.

WARNING

Starting / Shutdown Instructions

- Do not touch electrically live parts of electrode with skin or wet clothing.

- Keep flammable material away.

- Insulate yourself from work and ground.

Wear eye, ear and body protection.

-Keep your head out of the fumes.

-Use ventilation of exhaust to remove fumes from breathing zone.

Starting the Engine

Be sure all Pre-Operation Maintenance has been performed. Also, read the Engine Owner's Manual.

Remove all loads connected to the AC power receptacles.

To start the engine, set the "Idler Control" Switch in the AUTOMATIC position.

Petrol: Use the choke if the engine is cold or warm. The choke is not required when the engine is hot. Hold the "Engine" switch in the "Start" position. Release the toggle switch when the engine starts. After the engine has started, slowly return the choke control to the full "in" position (choke open).

Diesel: The 'push button' start switch is pressed and held to engage the starter motor, once engine starts release button.

Note: (Petrol and Diesel engines)

Do not depress the "Start" button while the engine is running since this can cause damage to the ring gear and/or starter motor.

Do not crank the engine for longer than 20 seconds if the engine does not start. Allow at least 1 minute between cranking periods to avoid damage to electrical components.

After running at high engine speed for 8-12 seconds, the engine will go to low idle.

Allow the engine to warm up by letting it run at low idle for a few minutes.

Stopping the Engine:

Remove all welding and auxiliary power loads and allow engine to run at low idle speed for a few minutes to cool the engine.

Petrol: Stop the engine by placing the "Engine" switch in the "STOP" position.

Diesel: Stop the engine by pulling the stop cable and hold it 'out' until engine has stopped.

A fuel shut off valve is not required on the Weldanpower 230+ because the fuel tank is mounted below the engine.

'Running-in' Period

Petrol: It is normal for any engine to use a greater amount of oil until the "running in" is accomplished. Check the oil level twice a day during the running-in period (approximately 50 running hours).

Important: In order to accomplish this running-in, the unit should be subjected to moderate loads, within the rating of the machine. Avoid long idle running periods. Remove loads and allow engine to cool before shutdown.

The engine manufacturer's recommendation for the running time until the first oil change is 8 hours. The oil filter is to be changed at the second oil change. Refer to the Engine owner's Manual for more information.

Important note about 'running-in' your diesel engine

Diesel:

All diesel engines require some additional care during running-in for about the first 50 hours. Care should be taken that the engine is not run at very light loads (say less than 2.4 kVA, or a 10 amp radiator) for extended periods as this can lead to glazing of the cylinder bores. On the other hand, it is wise not to exceed 70% of the maximum output of the engine for the same period while bearing surfaces are bedding in. Cylinder glazing can lead to excessive oil consumption and smoky exhaust, while overloading of the engine during the first few hours can lead to excessive wear and shorten the life of the engine.

OPERATION AS A WELDER

Stick (Constant Current) Welding

Connect welding cables to the “TO WORK” and “ELECTRODE” studs. Start the engine. Set the “Polarity” switch to the desired polarity. Set the “RANGE” switch to a setting that is equal to or slightly greater than the desired welding current. (The “RANGE” dial marking indicates the maximum current for that range). Fine adjustment of the welding current is made by adjusting the output “CONTROL” or remote control. **For best arc stability, use settings 5 through 10.**

The Weldanpower 230+ can be used with a broad range of AC and DC stick electrodes.

TIG (Constant Current) Welding - Requires 240 - 115V (150VA) Transformer.

The K930-2 TIG Module installed on a Weldanpower 230+ provides high frequency and shielding gas control for AC and DC GTAW (TIG) welding processes. The TIG Module allows full range output control. Afterflow time is adjustable from 0 to 55 seconds.

When using the Weldanpower 230+ for AC TIG welding of aluminium, the following settings and electrodes are

Settings for 1% Zirconisted Tungsten		
Tungsten Diameter	**Range Switch Settings**	**Approximate Current Range**
3.2 mm 2.4 mm 1.6 mm	70, 90 or 125 50, 70 or 90 50 or 70	75 - 150 Amps 50 - 90 Amps 25 - 55 Amps

Settings for 1% Thoriated Tungsten		
Tungsten Diameter	**Range Switch Settings**	**Approximate Current Range**
3.2 mm 2.4 mm 1.6 mm	70, 90,125 or 175 50, 70, 90 or 125 50, 70 or 90	170 - 300 Amps 100 - 230 Amps 50 - 120 Amps

recommended:

The K930-2 TIG Module should be used with the Weldanpower 230+ on high idle to maintain satisfactory operation. It can be used in the AUTO position but the delay going to low idle after welding is ceased will be increased if the AFTERFLOW CONTROL is set above 10 seconds.

WARNING

Health aspects of the use of thoriated tungsten electrodes.

Thorium oxides are found in thoriated tungsten electrodes up to 4.2%. Thorium is radioactive and may present hazards by external exposure. If alternatives are technically feasible, they should be used, however several studies carried out on thoriated electrodes have shown that due to the type of radiation generated, external radiation risks - during storage, welding and disposal of residues - are negligible under normal conditions of use.

On the contrary, **during grinding of electrode tips there is generation of radioactive dust, with the risk of internal exposure.** It is therefore necessary to use local exhaust ventilation to control the dust at its source, complimented if necessary with respiratory protective equipment. The risk of internal exposure during welding is considered negligible since the electrode is consumed at a very slow rate.

Precautions must also be taken to control any risk of exposure during the disposal of dust from any grinding devices.

Wire Feed Welding Processes

(Constant Voltage)

The only Innershield® electrode recommended for use with the Weldanpower 230+ is NR®-211-MP. The electrode sizes and welding ranges that can be used with the Weldanpower 230+ are shown in the following table:

Diameter (mm)	Wire Speed Range in/min.	Approximate Current Range
0.9	80 - 110	75A to 120A
1.2	70 - 130	120A to 170A
1.7	40 - 90	125A to 210A

Innershield NR-211 MP Procedures

The Weldanpower 230+ is recommended for limited “MIG” welding (GMAW - Gas Metal Arc Welding). The recommended electrodes are L-54 and L56 Ultra. They must be used with a blended shielding gas such as 75% Argon - 25% CO2. The

Diameter (mm)	Wire Speed Range in/min.	Approximate Current Range
0.8	80 - 110	75A to 120A
0.9	70 - 130	120A to 170A

welding ranges that can be used with the Weldanpower 230+ are shown in the following table:

Summary of Welding Processes

Process	Control Cable Used	Idle Mode	Electrode When Not Welding	To Start Welding
Stick	No	Auto	Hot	Touch electrode to work. Welding starts immediately and engine goes to high idle.
TIG/K930-2/K892-1/K938-1 /K936-1 (with Amptrol)	Yes	High	Cold	Press Amptrol, welding starts immediately.
Wire Feed, LN-25 with Internal Contactor	No	Auto	Cold	Press gun trigger, LN-25 Contactor closes. Welding starts immediately and engine goes to high idle. NOTE: Output Control must be set above ”3”
Wire Feed, LN-22 or LN25 without internal contactor	No	High	Hot	Press gun trigger, Welding starts immediately.

OPERATION AS AN AC POWER

ELECTRIC SHOCK can kill

SOURCE

General: The Weldanpower 230+ is a single phase 50/55 Hz. auxiliary power generator with a total maximum output of 8kVA-8000 watts at unity power factor, or 6400 watts at 0.8 power factor. It is suitable for long term primary power, and temporary standby, or emergency power, using engine manufacturer's recommended maintenance schedule.

Start the engine and allow it to warm up. Voltage is now at the receptacles for auxiliary power.

The total auxiliary power output capability is available when the “output control” is set at “10”.

The current rating of any plug used must be at least equal to the current load through the associated receptacle. **Do not attempt to connect power receptacles in parallel.**

When using the 240 volt auxiliary power, each single receptacle has a maximum rating of 15 amps. The total current that can be drawn from all three receptacles at one time is 33 amps.

Most 1 kW motors can be started if there is no load on the motor or other load connected to the Weldanpower, since the full load current rating of a 240 volt, 1 kW motor is approximately 10 amperes. The motor may be run at full load when plugged into one of the receptacles. Larger motors up to 1.5 kW can be run provided the receptacle rating as previously stated is not exceeded.

The above auxiliary power rating is with no welding load. Simultaneous welding and power loads are permitted by following the Table below. The permissible currents assume that the fine output control is set at 10. A lower setting of the fine output control will decrease the available auxiliary power.

Short circuit protection of the auxiliary power circuits is provided by three 15 amp circuit breakers.

Simultaneous Welding and Power		
Output Selector Setting	Permissible Power Watts (Unity Power Factor)	Permissible Auxiliary Current in Amperes(240 V)
Max Stick or Wire Feed Setting	None	0
175 Stick Setting	2100	8
125 Stick Setting	3800	15
90 Stick Setting	5000	20
70 Stick Setting	5600	22
50 Stick Setting	6300	25
No Welding	8000	33

Connection of appliances

In line with current practice, a floating auxiliary power system is used.

Machines with three pin outlets for auxiliary supply have, at each outlet, isolated active and neutral sockets and an earth socket. Only the earth socket is bonded to the frame of the machine and earth leakage protection is not required (refer AS2790-1989, Cl.6-1.9(a) and Comment 1).

For your safety, all auxiliary equipment, extension cords, appliance cords, plugs, plug sockets, and appliances should be in good condition and correctly wired and connected. All earthing wires, where used, must be continuous. Extension cords with three wires should be used except for double insulated appliances.

The frame of the unit should not be connected to the general mass of earth by an earth spike or by any other means, but should be isolated from earth.

Connection for use as a standby power unit

The Weldanpower 230+ may be permanently, or temporarily, installed as a stand by power unit for a 240 volt. 50/55 Hz. AC supply.

To avoid the possibility of electric shock and /or damage to the welding machine or connected apparatus, all connections and alterations must be made by a licensed electrician, who can determine how the machine should be adapted to the particular installation so as to comply with the local Supply Authority regulations and any relevant requirements.

It is important than an adequately rated and properly connected isolation switch be used to ensure that the Weldanpower and the Authority’s supply cannot be connected in parallel.

Maintenance

WARNING

Safety Precautions:

- **Have qualified personnel do maintenance and troubleshooting work.**
- **Turn the engine off before working inside the machine.**
- **Remove guards only when necessary to perform maintenance, and replace them when the maintenance requiring their removal is complete.**
- **If guards are missing from a machine, obtain replacements from a Lincoln Distributor. (See Operating manual Parts List.)**

Read the Safety Precautions in the front of this manual and the engine instruction manual before working on this machine.

Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from gears, fans and all other moving parts when starting, operating or repairing the equipment.

Routine Maintenance:

1. At the end of each day's use, refill the fuel tank to minimise moisture condensation in the tank. Running out of fuel tends to draw dirt into the fuel system. Also check the crankcase oil level and add oil if indicated.

CAUTION

Make certain that the oil filler cap is securely tightened after checking or adding oil. If the cap is not tight, oil consumption can increase significantly which may be evidenced by white smoke coming from the exhaust.

2. Oil - Maintenance schedule for changing the oil and oil filter after running-in can be found in the Engine Manual. More frequent oil changes are required with dusty, high temperature and other severe operating conditions. Refer to the maintenance section of the Engine Owner's Manual for more information.

   Note: Engine life will be reduced if the oil and oil filter are not changed according to the manufacturer's recommendations.

3. **Air Cleaner - Petrol engine** - With normal operating conditions, the maintenance schedule for cleaning and re-oiling the foam pre-filter is every 25 hours and replacement of the air cleaner filter, every 100 hours. More frequent servicing is required with dusty operating conditions. Refer to the maintenance section of the Engine Owner's Manual for more information.

   Diesel engine - with normal operating conditions check the oil level in the air cleaner daily. Refer to engine manual for other service and oil changing intervals.

4. Refer to the maintenance section of the Engine Owner's Manual for the maintenance schedule, spark plug servicing (petrol engine), cooling system servicing and fuel filter replacement.

5. Blow out the machine with low pressure air periodically. In particularly dirty locations, this may be required once a week.

See page 18 for Ground Test Procedure.

Engine Adjustments:

WARNING

Overspeed is hazardous: The maximum allowable high idle speed for this machine is 3400 RPM, no load. DO NOT tamper with governor components or setting or make any other adjustments to increase the maximum speed. Severe personal injury and damage to the machine can result if operated at speeds above maximum.

Adjustments to the engine are to be made only by a Lincoln Service Centre or an authorised Field Service Shop.

Slip Rings:

A slight amount of darkening and wear of the slip rings and brushes is normal. Brushes should be inspected when a general overhaul is necessary. If brushes are to be replaced, clean slip rings with a fine emery paper.

Before fitting replacement brushes, twist the brush pigtail at its entrance to the brush until the strands are tightly packed and no part of the pigtail protrudes beyond the brush surface in the pigtail slot. When the brush is placed in the holder, clear the pigtail from the side of the holder to allow free radial movement of the brush. Sand new brushes by placing a piece of sandpaper between the brushes and the slip ring with the abrasive side against the brushes. With light finger pressure on the brushes, pull the sandpaper around the circumference of the rings only until brushes are properly seated. Stone the slip rings with a 320 grit sanding stone. Slip rings must be clean and free from oil and grease.

CAUTION

Do not attempt to polish slip rings while engine is running

Battery:

WARNING

Gases from battery can explode

- Keep sparks, flame and cigarettes away from battery.

To prevent Explosion when:

Installing a new battery - disconnect negative cable from old battery first and connect to new battery last.

Connecting a Battery Charger - Remove battery from welder by disconnecting negative cable first then positive cable and battery clamp. When reinstalling, connect negative cable last.

Using a Booster - connect positive lead to battery first then connect negative lead to engine foot.

Also see page 9 for other battery information.

WARNING

Battery acid can burn eyes and skin:

Wear gloves and eye protection and be careful when working near battery. Follow instructions printed on battery.

1 When replacing, jumping, or otherwise connecting the battery to the battery cables, the proper polarity must be observed. Failure to observe the proper polarity could result in damage to the charging circuit. The positive (+) battery cable has a red boot on the cable.

2. If the battery requires charging from an external charger, disconnect the negative battery cable first and then the positive battery cable before attaching the charger leads. Failure to do so can result in damage to the internal charger components. When reconnecting the cables, connect the positive cable first and the negative cable last.

Hardware

Both English and Metric fasteners are used in this welder.

Engine Maintenance Parts

	Briggs & Stratton 18hp Vanguard	Ruggerini RD201
Oil Filter	Briggs & Stratton 492932	Ruggerini 17524
Air Filter Element	Briggs & Stratton 394018	
Air Filter Pre-Cleaner	Briggs & Stratton 272490	
Fuel Filter	Briggs & Stratton 493629	Ruggerini 17519
Spark Plugs (Resistor Type)	Briggs & Stratton 491055	
	Champion RC12YC	

HOW TO ORDER REPLACEMENT PARTS

To ensure that you receive the correct replacement part the following procedure should be followed:

1. Quote Serial Number and Code Number.
2. Quote the Description, Item Number and Parts List Number of the desired part. When ordering parts for items carrying brand names of other companies, such as fan motors, drive shafts, etc., be sure to include the other company's name and part number and other relevant information.
3. Parts should be ordered from Lincoln, its offices or the nearest Authorised Field Service Shop. (The "Lincoln Service Directory" listing these shops geographically is available on request.)

* "Hardware" in the Lincoln Parts Lists are not Lincoln stock items but can be obtained via the Field Service Shop network.

Component parts of assemblies such as stator coils or armature coils, etc., which require electrical testing or locating fixtures are not considered replaceable items. This is to ensure that the customer receives parts which will keep the welder in the best operating condition.

BUY ONLY GENUINE REPAIR PARTS

TROUBLESHOOTING

CAUTION

ELECTRIC SHOCK can kill

- Do not operate with panels open.
- Disconnect NEGATIVE (-) battery lead before servicing.
- Do not touch electrically live parts.

MOVING PARTS can injure

- Keep guards in place.
- Keep away from moving parts.
- Only qualified personnel should install, use or service this equipment.

TROUBLE	CAUSE	WHAT TO DO
A.No welder or output power.	1. Check for brush wear and proper contact with rotor.	1. Check brushes, replace or repeat as necessary.
	2. Open in miscellaneous leads.	2. Refer to wiring diagram and check related leads.
	3. Open lead in flashing or field circuit.	3. Refer to wiring diagram and check all related leads (200, 224, 200A, 200B, 201, 201A)
	4. Faulty rotor.	4. Remove leads 200A and 219 and check rotor resistance between slip rings. it should be approximately 4-5 ohms.
	5. Faulty Potentiometer (R1).	5. Replace with known good one.
	6. Faulty stator Field winding.	6. Disconnect lead #9 at D2 and check for continuity between leads #9 and #7.
	7. Faulty Field rectifier (D2).	7. Replace with known good one.
.	8. Faulty P.C. Board.	8. Replace with known good one.

TROUBLESHOOTING

TROUBLE	CAUSE	WHAT TO DO
B. Engine will not idle down to Low Speed. * Petrol unit only.	1. Idler switch on High Idle. 2.* Insufficient voltage present. between terminals #213 and #5E. (Voltage should be 12V DC). 3. External load on welder or auxiliary power. 4.* Faulty wiring in solenoid circuit. 5. Faulty idler solenoid. 6. Faulty PC Board(s).	1. Set switch on Automatic idler. 2. Check for proper connection of leads (#213, #5E, #215, #209, #209A, #224, #224A). 3. Remove all external loads and short circuits. 4. Check for broken leads #213 and #215. 5. Replace with known good one. 6. Replace PC Board(s) with known good one(s).
C. Engine will not go to high idle when attempting to weld.	1. Poor work lead connection to work. 2. No voltage signal from the current sensor. 3. No open circuit voltage on output studs. 4. Faulty PC Board(s). 5. Faulty Oil pressure switch.	1. Make certain work clamp is tightly connected to clean base metal. 2. Check for disconnected or broken leads in idler sensing circuit. 3. Check generator output. 4. Replace PC Board(s) with known good one(s). 5. Replace.
D. Engine will not go to high idle when using auxiliary power.	1. No voltage signal from the current sensor. 2. Auxiliary power load less than 100 to 150 watts. 3. Faulty PC Board(s). 4. Faulty Oil pressure switch.	1. Check for disconnected or broken leads in idler sensing circuit. 2. Idler may not function with less than 100 to 150 watt load. Set idler switch to high idle. 3. Replace PC Board(s) with known good one(s). 4. Replace.
E. Engine will not crank or is hard to crank.	1. Battery will not hold a charge Faulty Battery. 2. No or insufficient charging current. 3. Loose battery cable connection(s).	1. Replace with known good one. 2. Check the connections of the lead from the voltage regulator on the engine to the charging ammeter and the battery. 3. Check and tighten connections at battery, at starter, at engine foot, or at frame.
F. Engine shuts down.	1. Out of fuel. 2. Low oil level (Petrol only).	1. Add fuel. 2. Check oil level and add oil as required.
G. Engine does not develop full power.	1. Fuel filter clogged. 2. Air filter clogged.	1. Replace. 2. Replace.
H. Engine is hard to start.	1. Spark plugs do not have specified gap. (Petrol only). 2. Spark plugs are fouled (Petrol only). 3. Dirt or moisture in fuel system (Diesel only).	1. Adjust to specified gap. 2. Replace spark plugs (See Engine Owner's Manual). 3. Bleed fuel system (refer to Engine Owners Manual).

GROUND TEST PROCEDURE

WARNING

This procedure is only suitable for applications using DC mega testers up to 500V.

Note: This procedure is for 'machines as built' many modifications could have taken place over the life of a particular machine, so details of this procedure may need to be 'adjusted' to suit these modifications.

For prompt service contact your local authorised Lincoln field service shop.

The insulation resistance values listed below are from Australian Standard AS1966.2.

1. Ensure engine is stopped.
2. Remove welding leads and disconnect any auxiliary equipment cables.
3. Disconnect the battery leads from the battery and unplug battery voltage regulator plug (if fitted).
4. Place jumpers across all four (4) terminals of each o the field bridge rectifier [D2] and the welding output bridge rectifier [D1] (ie. positive, negative and 2off A terminals).
5. Unplug PCB connectors (x2), jumper leads No. 200B, 201A 75, 76 and 77 together in the PCB plug.

   Unplug leads from idler solenoid PCB.
6. Ensure all leads and clips are isolated from each other and the machine frame.
7. Place switch 'S3' in STOP position (petrol only) and 'S4' in HIGH position.
8. **Field circuit test:** Connect one lead of the mega tester to the front panel ground stud and the other lead to lead No. 200A at rectifier [D2]. Apply the test. (Min. resistance 1MΩ)
9. **Auxiliary circuit test:** Connect one lead of the mega tester to the front panel ground stud and the other lead to the 'active' terminal of one of the 240V auxiliary outlets. Apply the test. (Min. resistance 1MΩ)
10. **Welding circuit test:** Connect one lead of the mega tester to the front panel ground stud and the other lead to the electrode output stud. Apply the test. (Min. resistance 1MΩ)
11. **Auxiliary circuit to welding circuit test:** Connect one lead of the mega tester to the 'active' terminal of one of the 240V auxiliary outlets and the other to the electrode output stud. Apply the test. (Min. resistance 10MΩ)
12. **Auxiliary circuit to field circuit test:** Connect one lead of the mega tester to lead No. 200A at rectifier [D2] and the other to 'active' terminal of one of the 240V auxiliary outlets. Apply the test. (Min. resistance 1MΩ)
13. **Welding circuit to field circuit test:** Connect one lead of the mega tester to lead No. 200A at rectifier [D2] and the other lead to the electrode output stud. Apply the test.(Min. resistance 1MΩ)
14. Remove all jumpers and reconnect all leads.

Weldanpower 230+ LN-22 and LN-25 Across the arc connection diagram

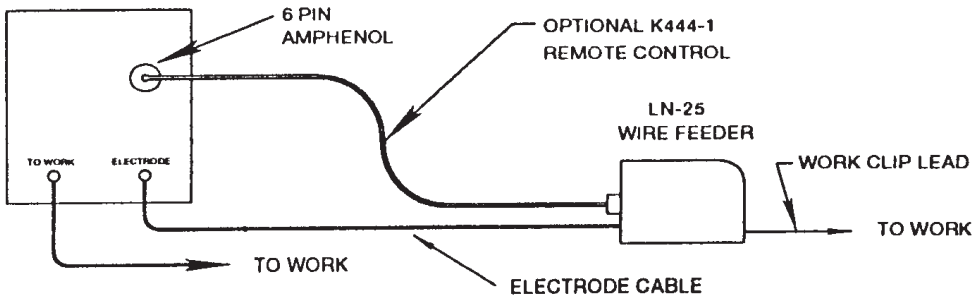
WARNING

ELECTRIC SHOCK can kill

- Do not operate with panels open.
- Disconnect NEGATIVE (-) battery lead before servicing.
- Do not touch electrically live parts.

MOVING PARTS can injure

- Keep guards in place.
- Keep away from moving parts.
- Only qualified personnel should install, use or service this equipment.



N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

N.B. USE POLARITY SWITCH TO SET FOR DESIRED ELECTRODE POLARITY, POSITION THE OUTPUT SELECTOR SWITCH TO THE WIRE FEED (CV) POSITION.

N.C. IF OPTIONAL REMOTE OUTPUT CONTROL IS USED, PLACE OUTPUT CONTROL SWITCH IN "OUTPUT CONTROL REMOTE" POSITION.

N.D. SET IDLE CONTROL SWITCH TO HIGH IDLE FOR LN-22 AND LN-25 WITHOUT CONTACTOR, SET TO AUTO FOR LN-25 WITH INTERNAL CONTACTOR.

WELDANPOWER 230+
KA1390 Petrol
Codes 70021 & below

Model Index

NUMBERS IN THE TABLE BELOW INDICATE WHICH COLUMN TO USE IN EACH PARTS LIST FOR EACH INDIVIDUAL CODE NUMBER.

DO NOT attempt to use this Parts List for machine if its code number is not listed. Contact the Service Department for any code numbers not listed. (Only those suffixes which require distinction from the basic codes are shown.)

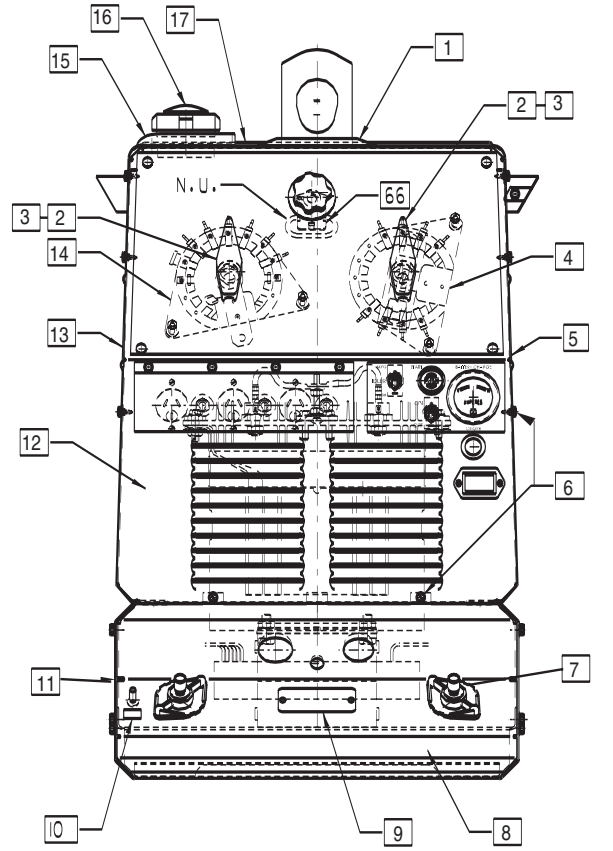
PARTS LIST TITLES	General Assembly	Front Panel Assmbly	Wiring Diagram								
PARTS LIST NO. →	AP-229-C	AP-229-D									
CODE NO ↓											
1421	1	1	AM3421-1								
1436	2	2	AM3421-1								
1530	2	3	AM3421-4								
1530 (above SN A19808000260)	2	3	AM3421A4								
1591 (Onan)	2	3	AM3421-7								
1707 (Onan)	2	3	AM3421-7								
70016	2	3	AM3421B4								
70021	2	3	AM3421B4								

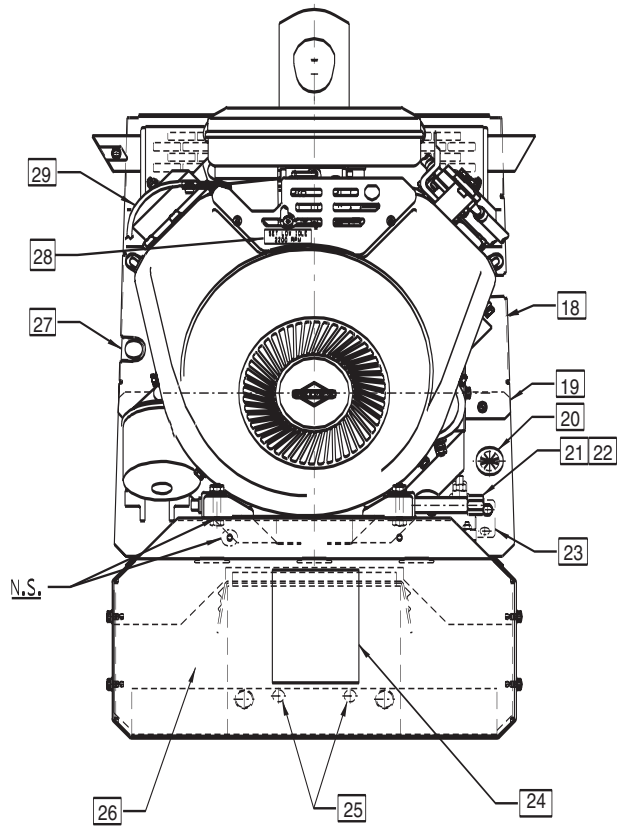
Operating Manual IMA572F

# Indicates a change this printing

Weldanpower 230+ Petrol
General Assembly

AP-229C
Operative: 18/12/03
Supercedes: 1/6/99





Shown Ref: AG1368A
(A2.9.98M)
for Code 1530

When ordering parts quote Parts List No., Part No., Description, Machine Code and Serial Numbers

Weldanpower 230+ Petrol General Assembly

AP-229C1
Operative: 18/12/03
Supercedes: 1/6/99

# Indicates a change this printing.
* Items not illustrated.

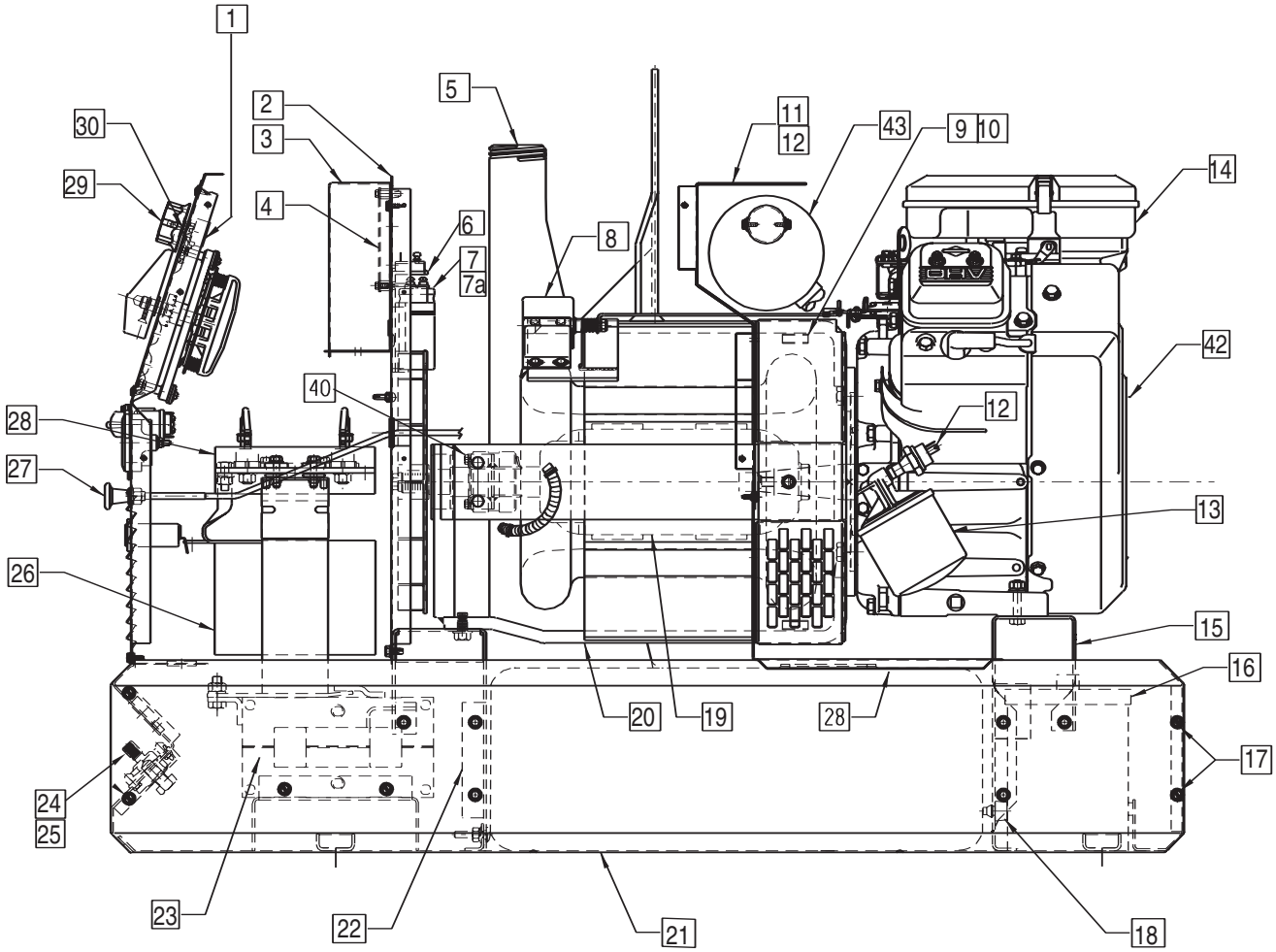
Recommended Spare Parts are highlighted in bold

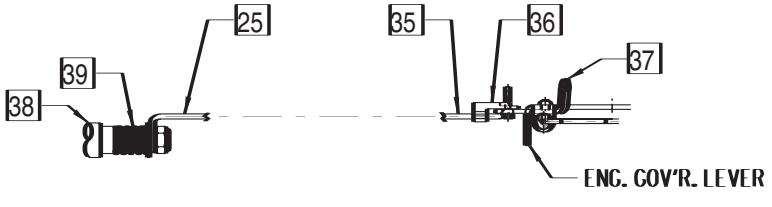
Use only the parts marked “X” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Cover Seal	S12934-1	1	x	x							
2	Handle	M16493	2	x	x							
3	S/T Screw (Mounts Handle)	S8025-78	2	x	x							
4	Arc Polarity Switch Assy	M17014	1	x	x							
5	Case Side - Left	G2541	1	x	x							
6	S/T Hex Hd. Screw	S8025-91	24	x	x							
7	Output Stud	M13900	2	x	x							
*	Flange Nut (Output Stud)	T3960	2	x	x							
8	Lower Case Front Assy	AM3429	1	x	x							
9	Code & Serial No. Decal	NSS	1	x	x							
10	Earth Ground Decal	T13260-4	1	x	x							
11	Base Assembly	L9027	1	x	x							
12	Upper Case Front Assy	(Ref AP229D)	1	x	-							
	Upper Case Front Assy	(Ref AP229D)	1	-	x							
13	Case Side - Left	G2542	1	x	x							
14	Selector Switch Assy	M17013	1	x	x							
15	Fuel Trough	M16533	1	x	x							
16	Fuel Cap	S19568	1	x	x							
17	Roof	G2534	1	x	x							
18	Upper Case Back	AG1351	1	x	x							
19	Lower Case Rear & Cover Assy	AM3424	1	x	x							
20	Bushing	T14614-1	1	x	x							
21	Pipe Cap	T14426-3	1	x	x							
22	Oil Drain Pipe	T9959-5	1	x	x							
23	Starter Solenoid 12V	M15835	1	x	x							
24	Battery Warning Decal	S17851	1	x	x							
25	Rubber Bumper	T14882	2	x	x							
26	Rear Base Panel	L9014	1	x	x							
27	Cable Crommet	S18543-3	1	x	x							
28	Idle Speed Decal	AS4283-4	1	x	x							
29	Choke Cable	AT2626-6	1	x	x							

Weldanpower 230+ Petrol
General Assembly

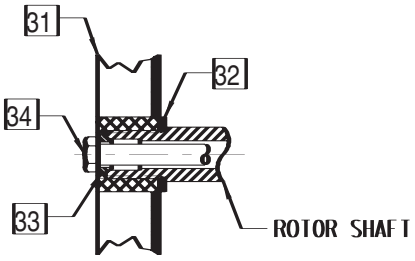
AP-229C2
Operative: 18/12/03
Supercedes: 1/6/99





PULL WIRE TO SOLENOID DETAILS

PULL WIRE TO ENGINE LEVER DETAILS



ROTOR ATTACHMENT DETAILS

Ref. AG1368-3
for Code 1421, 1436

Weldanpower 230+ Petrol General Assembly

AP-229C1
Operative: 18/12/03
Supercedes: 1/6/99

# Indicates a change this printing.
* Items not illustrated.

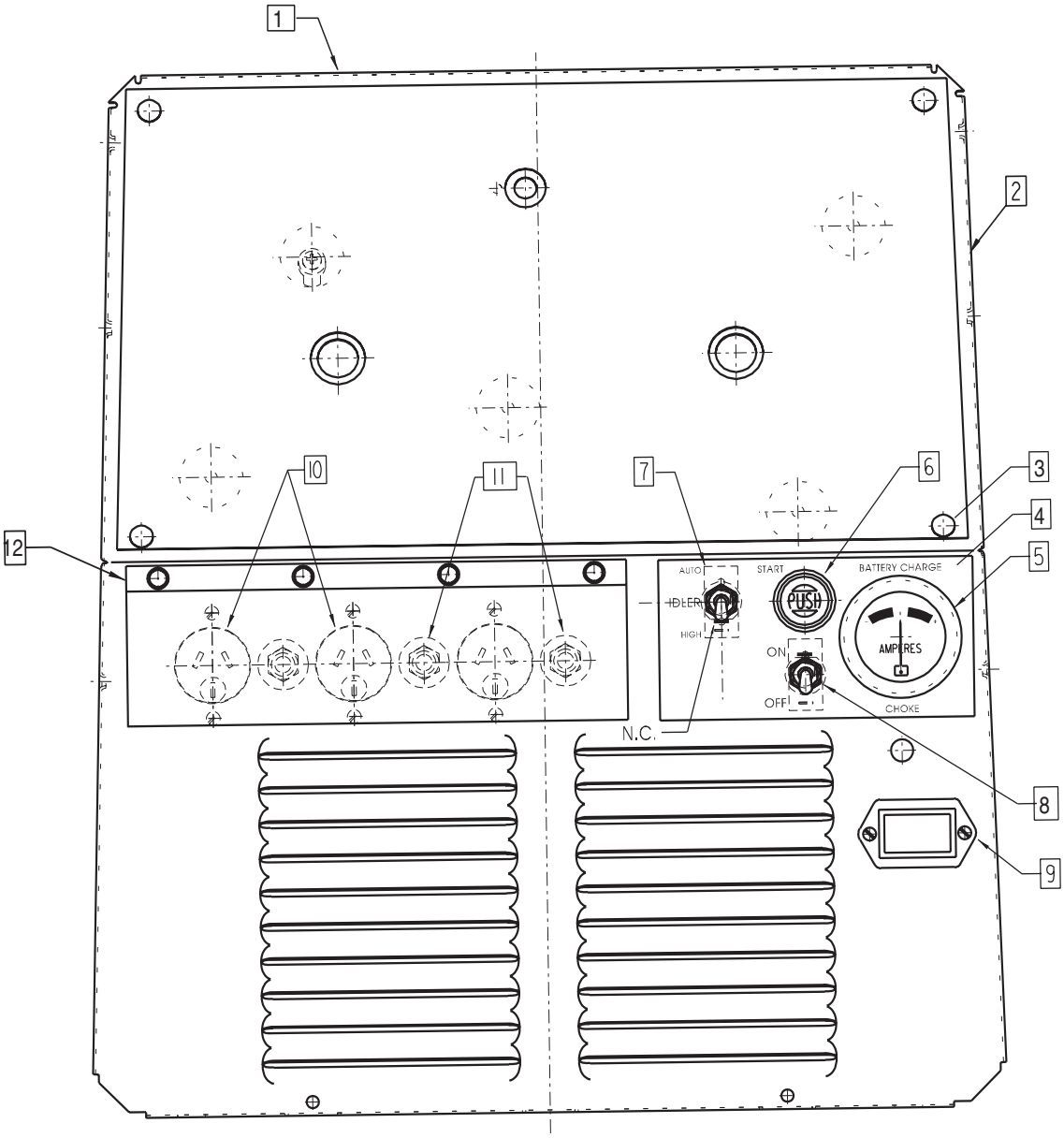
Use only the parts marked “X” in the column under the heading number called for in the model index page.

Recommended Spare Parts are highlighted in bold

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Potentiometer	T10812-112	1	x	x							
	Potentiometer Spacer	S18280	1	x	x							
2	Baffle Assy	AL2518-1	1	x	-							
	Baffle Assy	AL2518-2	1	-	X							
3	PC Board Cover	L9293	1	x	x							
4	Control PC Board Assy	L8484-3	1	x	x							
7	Capacitor	S13490-114	1	x	x							
7a	Capacitor Bracket	L9250	1	x	x							
8	Idler Solenoid Assy	S20752	1	x	x							
8	Diode-Bridge	T13637-1	1	x	x							
9	Stator Cover & Clip Assy Upper	AM3418-1	1	x	x							
10	Stator Cover & Clip Assy Lower	AM3418-2	1	x	x							
11	Upper Case Back	AG1351	1	x	x							
12	Lower Case Rear & Cover Assy	AM3424	1	x	x							
12	Oil Pressure Switch (upgrade kit) (below code 70016)	AS4841	1	x								
	Oil Pressure Switch (code 70016 & above)	AS4677-1	1	-	x	x						
13	Oil Filter	492932										
14	Air Filter Element	394018										
15	Engine Support	AL2515	2	x	x							
16	Rubber Buffer	AS4404	2	x	x							
16	Battery (wet)	AS3706-2										
17	S/T Hex Hd. Screw		4	x	x							
19	Rotor Assembly	AL2506	1	x	x							
*	Tolerance Ring	S18044-5	1	x	x							
*	Bearing	M9300-85	1	x	x							
20	Stator Assembly	AT4100-6	1	x	x							
21	Base Assembly	L9027	1	x	x							
23	Reactor Assy	L9095	1	x	x							
24	Output Stud	M13900	2	x	x							
25	Flange Nut (Output Stud)	T3960	2	x	x							
26	Choke Coil & Lamination Assy	L9036-1	1	x	x							
27	Choke Cable	AT2626-6	1	x	x							
28	Rectifier Assy	L9050-1	1	x	x							
29	Knob	T10491-1	1	x	x							
30	‘O’ Ring	T13483-7	1	x	x							
31	Blower	L9033	1	x	x							
32	Flatwasher	S9262-149	1	x	x							
34	Hex Hd. Bolt H/T 3/8 unf x 14.88”	T14843-4	1	x	x							
33	Centering Washer	AS4508Z	1	x	x							
27	Fuel Tank & Gauge Assy	G2635	1	x	x							
35	Pull Wire	AS4501-1	1	x	x							
36	Linkage Retaining Bush	S21015	1	x	x							
37	Pull Wire Connector Bracket	AS4502	1	x	x							
38	Solenoid Plunger	S21020	1	x	x							
39	Spring	T6778	1	x	x							
40	Brusholder & Brush Assembly includes:	M16158	1	x	x							
	Brusholder Cartridge	G2114	1	x	x							
	Brush Assembly	S19480	2	x	x							
	Brush Assembly Retainer	M16157	1	x	x							
41*	Battery Positive Terminal Cover	S20191	1	x	x							
42	Vanguard 18hp Engine	AM3131-4	1	x	x							
43	Muffler Assy	G2644	1	x	x							
*	Wiring Harness	AG1363-1	1	x	-							
*	Wiring Harness	AG1363-2	1	-	x							
*	Fuel Warning Decal	T13086-27	1	x	x							
*	Side Decal (Mounts on side panel)	AG1362-1	1	x	x							
*	Side Decal (Mounts on side panel)	AG1362-2	1	x	x							
*	Warning Decal	AS4244	1	x	x							
*	Engine Wiring Harness	AG1364	1	x	-							
*	Engine Wiring Harness	AG1364-1	1	-	x							
*	Relay	AT3632-2	1	-	x							
*	Diode	AT3834-1	1	-	x							
*	Tag Strip	T10358	1	-	x							
*	Sleeving (Magneto Terminal)		1	x	x							

Weldanpower 230+ Petrol
Front Panel Assembly

AP-229D
Operative: 18/12/03
Supercedes: 1/6/99



Shown Ref: AL2514-3 (A20.1.99M)
for Code 1530 and above

Ref: AL2514-1 (A13.12.95)
for Codes 1421, 1436

Weldanpower 230+ Petrol Front Panel Assembly

AP-229D1
Operative: 18/12/03
Supercedes: 1/6/99

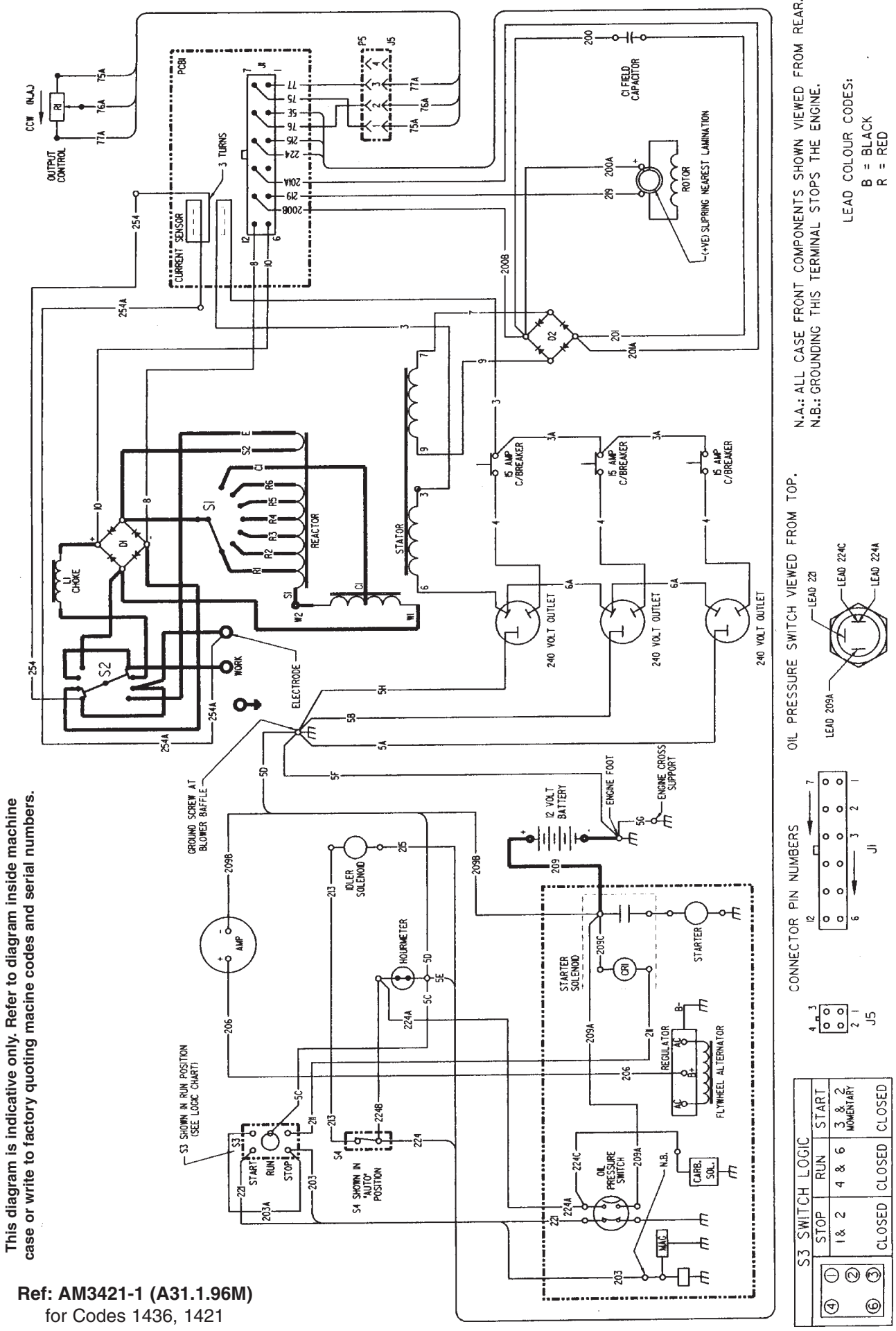
# Indicates a change this printing.
* Items not illustrated.

Recommended Spare Parts are highlighted in bold

Use only the parts marked “X” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Upper case front	AG1354	1	x	-	-						
	Upper case front	AG1354-1	1	-	x	-						
	Upper case front	AG1354-4	1	-	-	x						
2	Nameplate	AM3420	1	x	x	x						
3	Fastener button	T14659-1	4	x	x	x						
4	Engine control nameplate	AS4497	1	x	x	-						
	Engine control nameplate	AS4497-2	1	-	-	x						
5	Ammeter (6-0-6)	S7514-8	1	x	x	x						
6	Engine toggle switch - DPDT	T10800-25	1	x	x	-						
	Engine toggle switch - DPDT	S13146-1	1	-	-	x						
7	Idler toggle switch - SPST	T10800-20	1	x	x	x						
8	Toggle Switch DPDT	T10800-36	1	x	-	-						
	Toggle Switch SPDT	T13562	1	-	x	x						
9	Miniature hourmeter	S17475-3	1	x	x	x						
10	Plug Base Ω(240V / 10 amp Duplex)	AT3204	2	x	-	-						
	Plug Base (240V / 15 amp)	AT1875-5	3	-	x	x						
11	Circuit breaker (20 amp)	T12287-26	2	x	-	-						
	Circuit breaker (15 amp)	T12287-22	3	-	x	x						
12	Outlet Rain Flap Strip	AS4587	1	-	-	x						
	Outlet Rain Flap	AS4588	1	-	-	x						

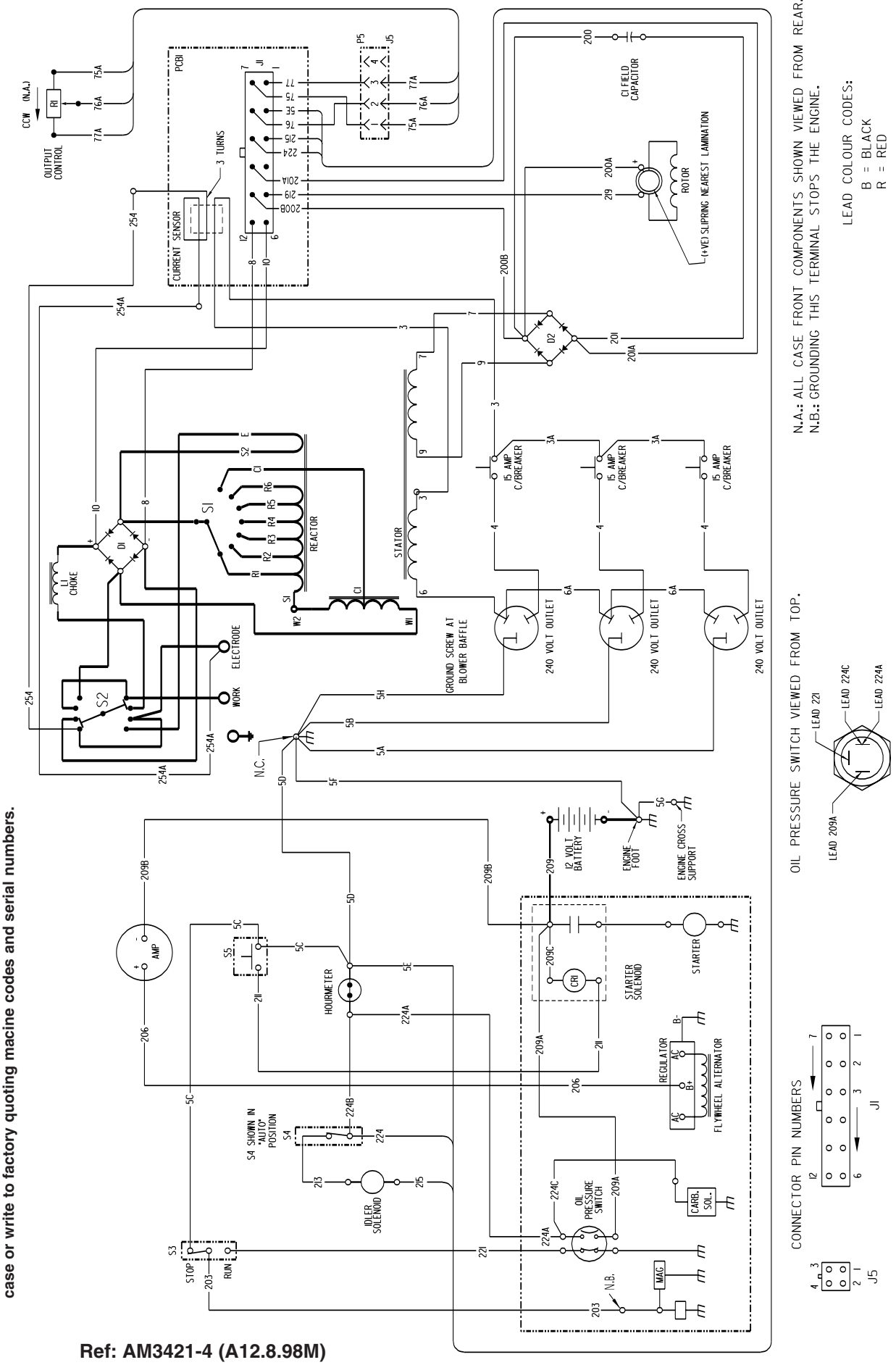
WELDANPOWER 230+ WIRING DIAGRAM - PETROL ENGINE



This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

Ref: AM3421-1 (A31.1.96M)
for Codes 1436, 1421

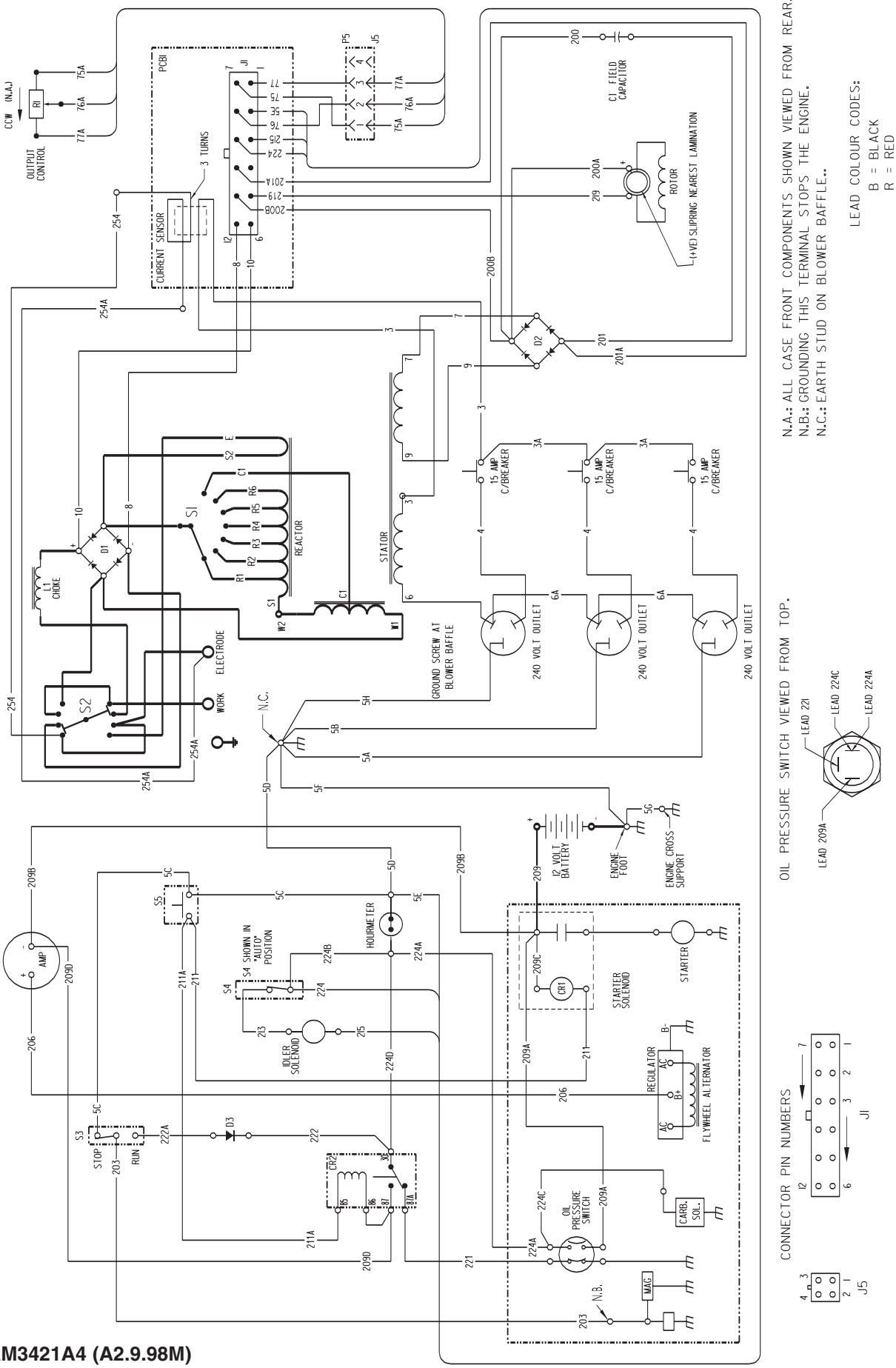
WELDANPOWER 230+ WIRING DIAGRAM - PETROL ENGINE



This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

Ref: AM3421-4 (A12.8.98M)
for Code 1530 up to S/N A1980800260

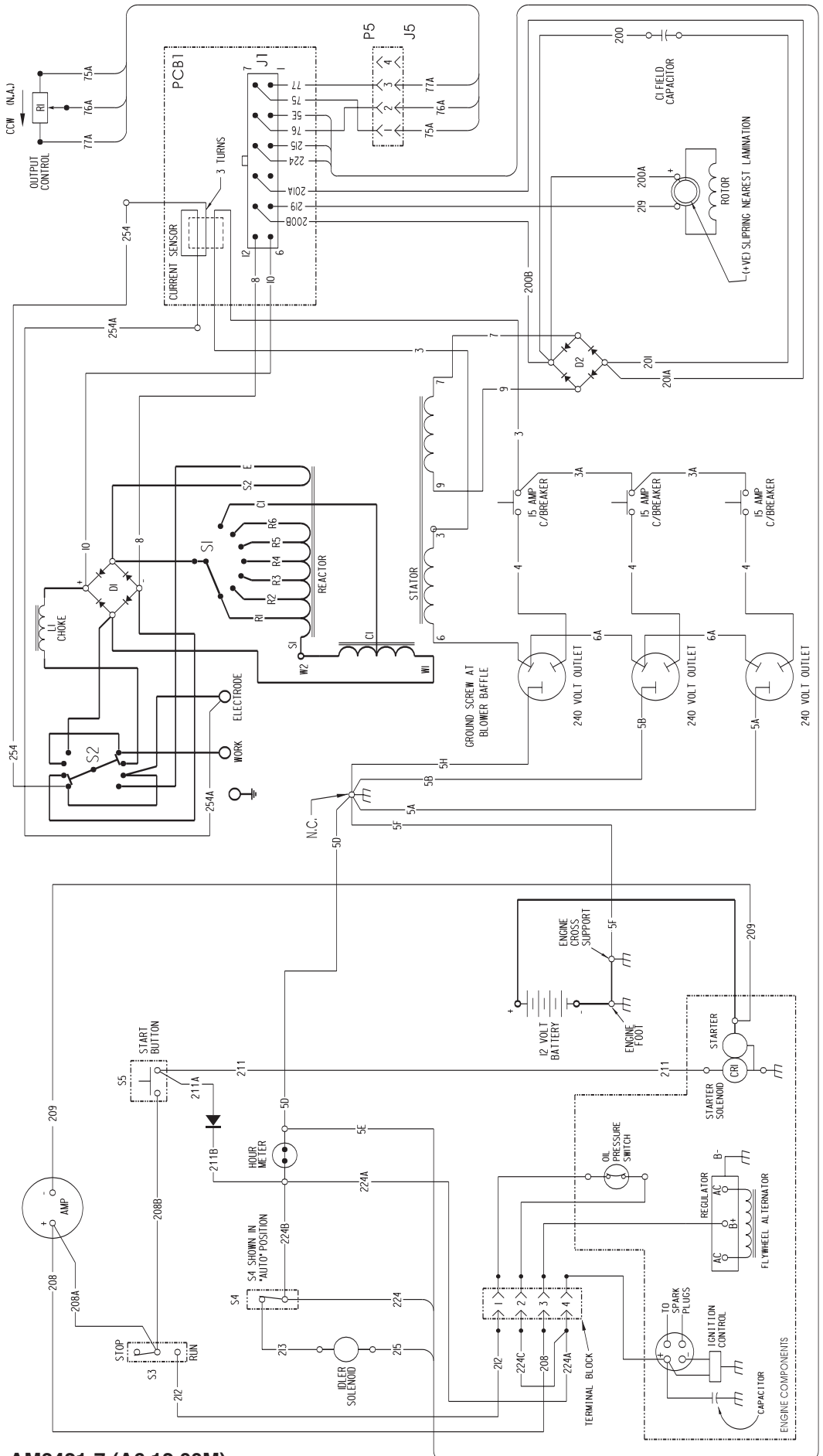
WELDANPOWER 230+ WIRING DIAGRAM - PETROL ENGINE



This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

Ref: AM3421A4 (A2.9.98M)
for Code 1530
Above SN A1980800260

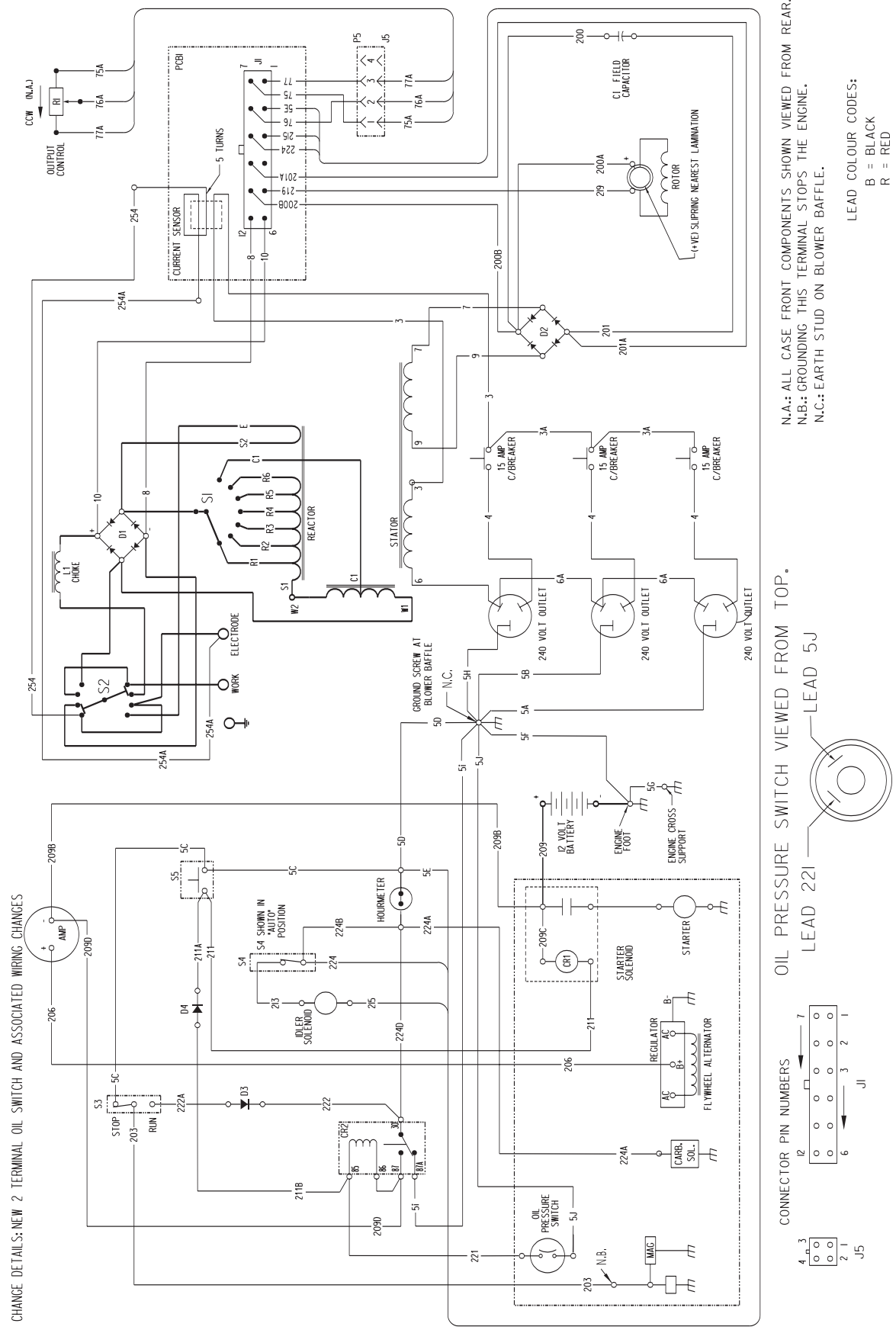
WELDANPOWER 230+ WIRING DIAGRAM - PETROL ENGINE



This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

Ref: AM3421-7 (A6.12.00M)
for Codes 1591

WELDANPOWER 230+ WIRING DIAGRAM - PETROL ENGINE



This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

Ref: AM3421B4 (A08-10-03M)
for Codes 70016 & 70021

WELDANPOWER 230+

KA1409 DIESEL For Code: 1494 & 1531
KA1409-1 DIESEL For Code: 70027 & below

Model Index

NUMBERS IN THE TABLE BELOW INDICATE WHICH COLUMN TO USE IN EACH PARTS LIST FOR EACH INDIVIDUAL CODE NUMBER.

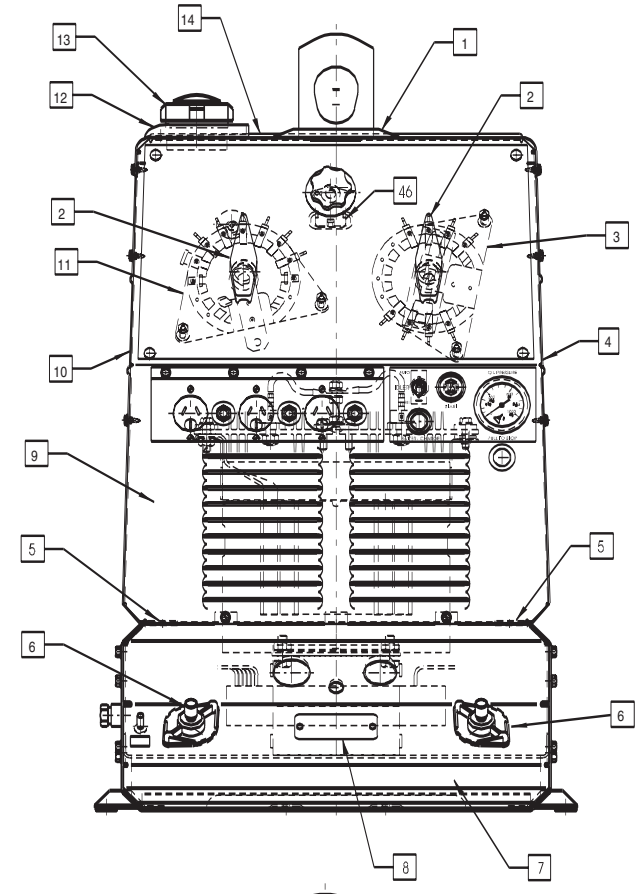
DO NOT attempt to use this Parts List for machine if its code number is not listed. Contact the Service Department for any code numbers not listed. (Only those suffixes which require distinction from the basic codes are shown.)

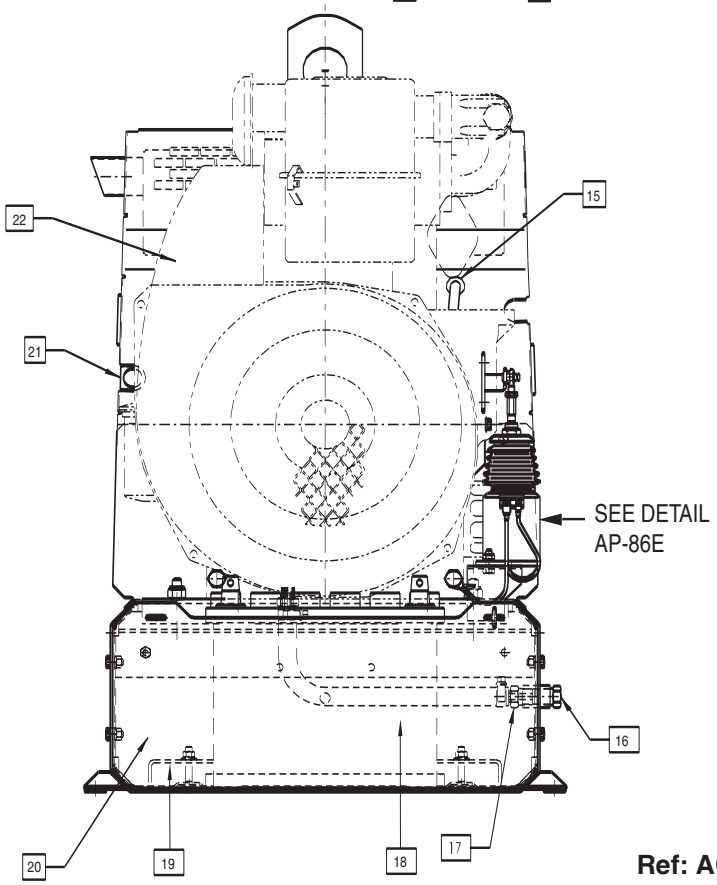
PARTS LIST TITLES	General Assembly	Front Panel Assmbly	Wiring Diagram	Miscellaneous Details							
PARTS LIST NO. →	AP-86C	AP-86D		AP-86D							
CODE NO ↓											
1494 (Diesel)	1	1	AM3421-2	1							
1531 (Diesel)	2	2	AM3421-2	2							
1562 (Diesel)	2	2	AM3421-6	3							
1684	3		AM3421-6	3							
70000	3		AM3421-6	4							
70027	3		AM3421-9	4							

Operating Manual IMA572F

# Indicates a change this printing

Weldanpower 230+ Diesel
General Assembly





Ref: AG1368-6 (A16.5.99M)
for Code 1562

Weldanpower 230+ Diesel General Assembly

AP-86C1
Operative: 18/12/03
Supercedes: 1/6/99

# Indicates a change this printing.
* Items not illustrated.

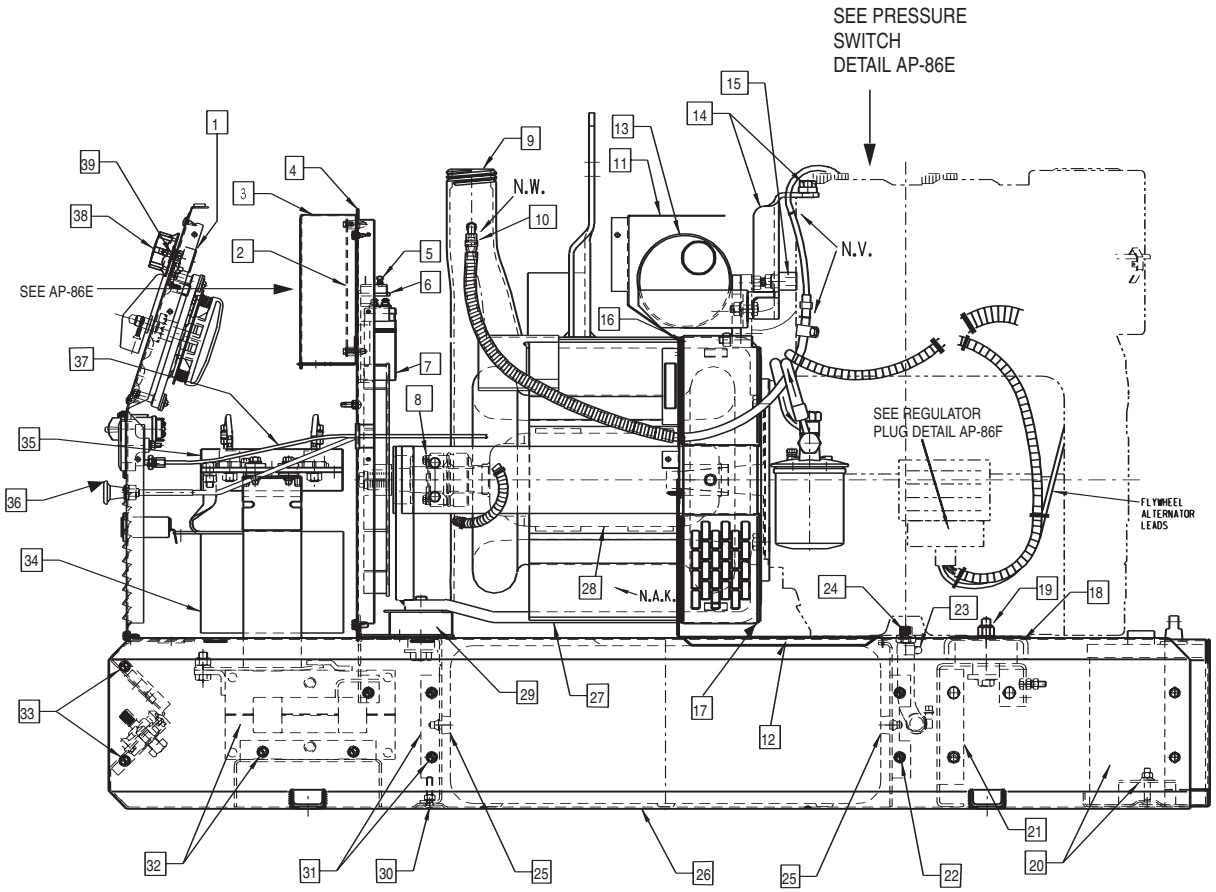
Recommended Spare Parts are highlighted in bold

Use only the parts marked “X” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Liftbale Cover Seal	S12934-1	1	x	x	x						
2	Handle	M16493	1	x	x	x						
3	Arc Polarity Switch Assembly	M17014	1	x	x	x						
4	Case Side - Right	G2541	1	x	x	x						
5	Cable Grommet	S18543-1	2	x	x	x						
6	Output Stud	M13900	2	x	x	x						
7	Lower Case Front Assembly	AM3429	1	x	x	x						
8	Code & Serial No. Decal	NSS	1		x	x	x					
9	Upper Case Front Assembly	AL2514-2	1	x	x	x						
10	Case Side - Left	G2542	1	x	x	x						
11	Selector Switch Assembly	M17013	1	x	x	x						
12	Fuel Trough	M16533	1	x	x	x						
13	Fuel Cap (Diesel)	S19568-1	1	x	x	x						
14	Roof	G2534	1	x	x	x						
15	Rubber Grommet	AS3086-3	2	-	x	x						
16	3/8” NPT Hex Hd Plug	NSS	1	-	-	x						
17	3/8” NPT Barn Tail	NSS	1	-	-	x						
18	Battery 12V (wet)	AS3553-2	1	x	x	x						
19	Battery Clamp 1/4”	AT3563-3	2	x	x	x						
20	Rear Base Panel	AL2569	1	x	x	-						
	Rear Base Panel Assembly	AM3588	1	-	-	x						
21	‘D’ Grommet	S18543-3	2	x	x	-						
22	Ruggerini RD201 Diesel Engine (below code 1689)	AS4224-1	1	x	x	-						
	Ruggerini RD211 Diesel Engine (above Code 1684)	AS4224-3		-	-	x						

Weldanpower 230+ Diesel General Assembly

Operative: 18/12/03
Supercedes: 1/6/99



Ref: AG1368-6 (A16.5.99M)
for Code 1562

Weldanpower 230+ Diesel General Assembly

AP-86C2
Operative: 18/12/03
Supercedes: 1/6/99

# Indicates a change this printing.
* Items not illustrated.

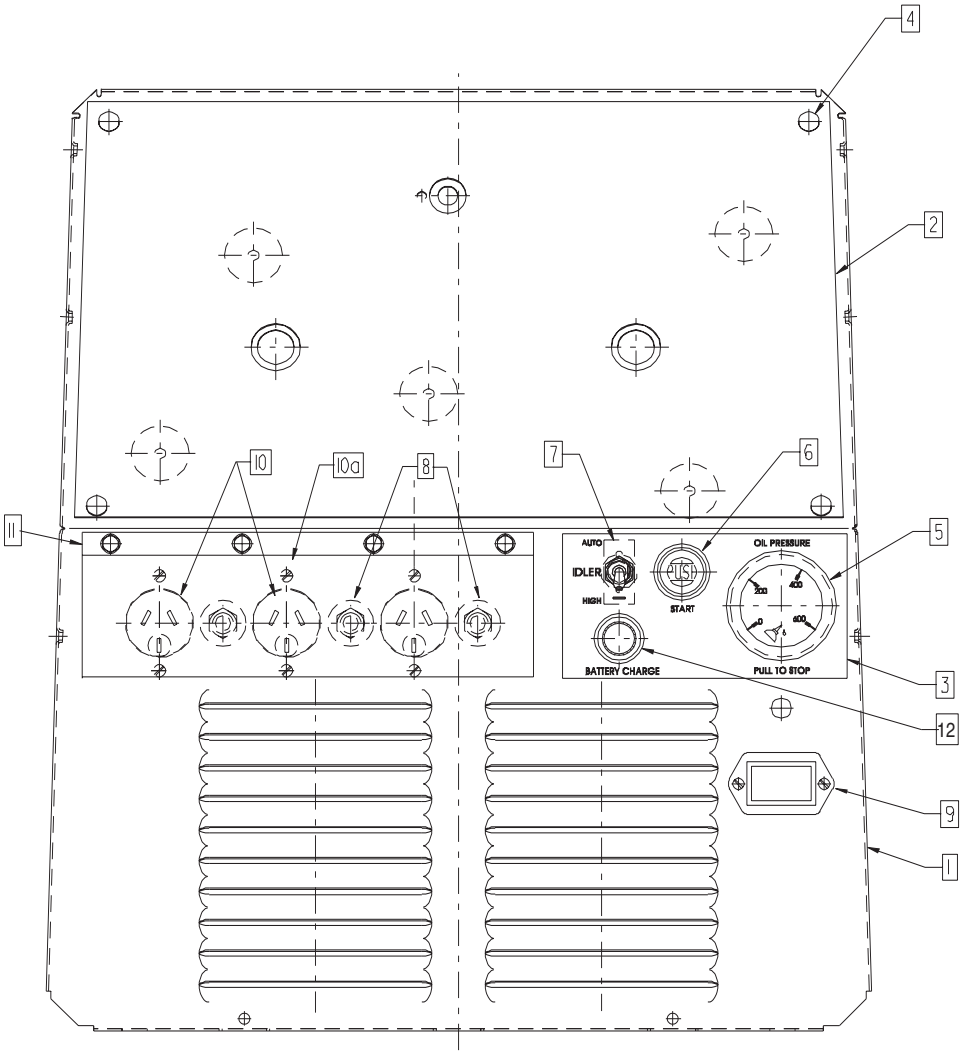
Recommended Spare Parts are highlighted in bold

Use only the parts marked "X" in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Potentiometer	T10812-112	1	x	x	-						
	Potentiometer Spacer	S18280	1	x	x	x						
2	Control PC Board Assembly	L8484-2	1	x	x	-						
	Control PC Board Assembly	L8484-3	1	-	-	x						
	Expansion Nut	S14020-3	4	x	x	x						
3	PC Board Cover	L9293	1	x	x	x						
4	Baffle Assembly	AL2518-1	1	x	-	-						
	Baffle Assembly	AL2518-2	1	-	x	x						
5	Diode Bridge	T13637-1	1	x	x	x						
7	Capacitor	S13490-114	1	x	x	x						
	Capacitor Bracket	L9250	1	x	x	x						
8	Brusholder and Brush Assembly includes:	M16158	1	x	x	x						
8a	brush holder Cartridge	G2114	1	x	x	x						
8b	Brush Assembly	S19480	2	x	x	x						
8c	Brush Assembly Retainer	M16157	1	x	x	x						
9	Fuel Tank & Gauge Assembly	AG1400	1	x	x	-						
	Fuel Tank & Gauge Assembly	AM3497	1	-	-	x						
10	Hose Clamp	T13777-6	1	-	x	x						
11	Upper Case Back	AG1351-1	1	x	x	x						
12	Lower Case Rear & Cover Assy	AM3424-1	1	x	-x	-						
	Lower Case Rear & Cover Assy	AG1350-2	1	-	x	x						
13	Muffler Assembly	AG1398	1	x	x	-						
	Muffler & Bracket Assembly	AM3586	1	-	-	x						
14	Muffler Support Bracket Assy	AL2660	1	-	-	x						
15	Muffler Spacer	AS4688	1	-	-	x						
16	Stator Cover & Clip Assembly	AM3418-1	1	x	x	x						
17	Stator Cover & Clip Assembly	AM3418-2	1	x	x	x						
18	Engine Mounting Channel	AM3456	1	x	-	-						
	Engine Mounting Channel	AM3456-1	1	-	x	-						
	Engine Channel & Bracket Assy	AM3558	1	-	-	x						
19	Rubber Mount - Engine End	AT4023	2	x	x	x						
	Rebound Washer	AT2943Z	2	x	x	x						
	Steel Tube	AT3831	2	x	x	x						
	3/8" UNC x 2 3/4" H/T Hex Hd Screw	NSS	2	x	x	x						
	3/8" UNC Nyloc Nut	NSS	2	x	x	x						
	3/8" Lockwasher	NSS	2	x	x	x						
20	Battery Clamp	AT3563-3	2	x	x	x						
	Carriage Bolt	T11827-24	2	x	x	x						
21	Chassis Engine Mount	AL2617-2	1	x	x	-						
	Chassis Engine Mount Assy	AL2617-3	1	-	-	x						
22	Chassis Cross Gusset	AL2568	1	x	-	-						
	Chassis Cross Gusset	AL2568-1	1	-	x	x						
23	Hose Clamp	AT3061-7	2	-	-	x						
24	Oil Drain Barb Fitting	AS4663	1	-	-	x						
25	Rubber Buffer	AS4044	3	-	x	x						
26	Base Assembly	AL2570	1	x	x	-						
	Chassis Assembly	AL2570-2	1	-	-	x						
27	Stator Assembly	AT4100-6	1	x	x	-						
28	Rotor Assembly	AL2506	1	x	x	x						
	Tolerance Ring	S18044-5	1	x	x	x						
	Bearing	M9300-85	1	x	x	x						
29	Rubber Mount	AT4023	1	x	x	x						
	Distribution Washer Reworked	AS4538	1	x	x	x						
	Rebound Washer	AT4025	1	x	x	x						
	Steel Tube	AT4024-4	1	x	x	x						
	1/2" UNF x 2 1/2" H/T Hex Hd. Bolt		1	x	x	x						
30	Carriage Bolt	T11827-23	2	x	x	x						
31	Stator Support Bracket	AL2567	1	x	x	-						
	Stator Support Bracket	AL2567-1	1	-	-	x						
32	Reactor Assembly	L9095	1	x	x	x						
33	Lower Case Front Assembly	AM3429	1	x	x	x						
34	Choke Coil & Lamination Assembly	L9036-1	1	x	x	x						
35	Rectifier Assembly	L9050-1	1	x	x	x						
36	Stop Cable	AT2626-6	1	x	x	-						
	Stop Cable	AT2626-7	1	-	-	x						
37	Nylon Tubing (Oil Gauge Line)	AE1096-3	1.65m	-	-	x						
	Olive	AT4122	2	-	-	x						
38	Knob	T10491-1	1	x	x	x						
39	Grommet Strip (Mounts in Item 31)	T13483-7	1	x	x	-						
	'O' Ring	T13483-7	1	-	-	x						

Weldanpower 230+ Diesel
Front Panel Assembly

AP-86D
Operative: 18/12/03
Supercedes: 14/2/97



Ref: AL2514-2 (7/19/96G)

Weldanpower 230+ Diesel
Front Panel Assembly

Operative: 18/12/03
Supercedes: 14/2/97

# Indicates a change this printing.
* Items not illustrated.

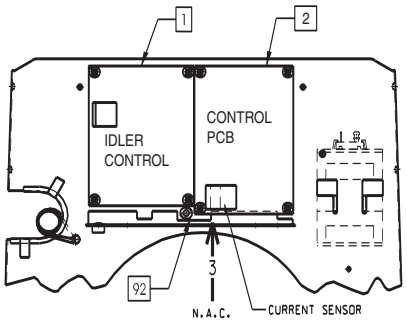
Recommended Spare Parts are highlighted in bold

Use only the parts marked “X” in the column under the heading number called for in the model index page.

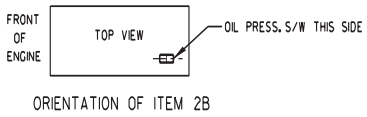
ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Upper Case Front	AG1354-2	1	x	-							
	Upper Case Front	AG1354-4	1	-	x							
2	Nameplate	AM3420	1	x	x							
3	Engine Control Nameplate	AS4497-1	1	x	x							
4	Fastener Button	T14659-1	4	x	x							
5	Oil Pressure Gauge	AT3002-1	1	x	x							
6	Start Button	S13146-1	1	x	x							
7	Toggle Switch (SPST)	T10800-55	1	x	x							
8	Circuit Breaker 15 amp)	T12287-22	3	x	x							
9	Miniature Hourmeter	S17475-3	1	x	x							
10	Plug Base 240V / 15amp	AT1875-5	3	x	x							
11	Outlet Rain Flap Strip	AS4587	1	x	x							
	Outlet Rain Flap	AS4588	1	x	x							
12	Battery Charge (Light)	AT2996-2	1	x	x							
	Edison Screw Globe 12V, 2.2W	AT2997-2	1	x	x							

Weldanpower 230+ Diesel Miscellaneous Details

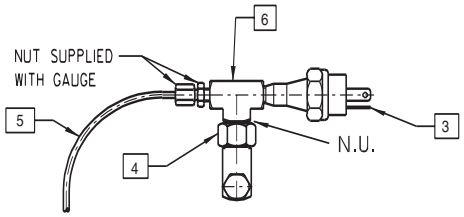
Operative: 18/12/03
Supercedes: 1/6/99



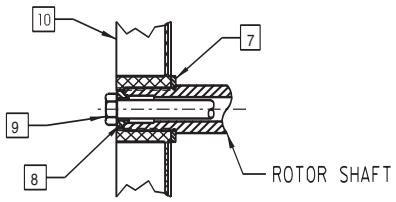
CONTROL BOX ASSEMBLY DETAIL



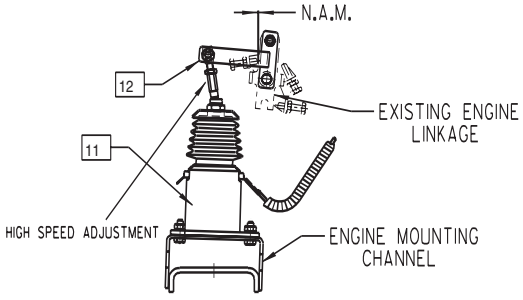
ORIENTATION OF ITEM 2B



ENGINE OIL PRESSURE SWITCH DETAIL



ROTOR & BLOWER ATTACHMENT DETAIL



SOLENOID ATTACHMENT DETAIL

Weldanpower 230+ Diesel Miscellaneous Details

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* Items not illustrated.

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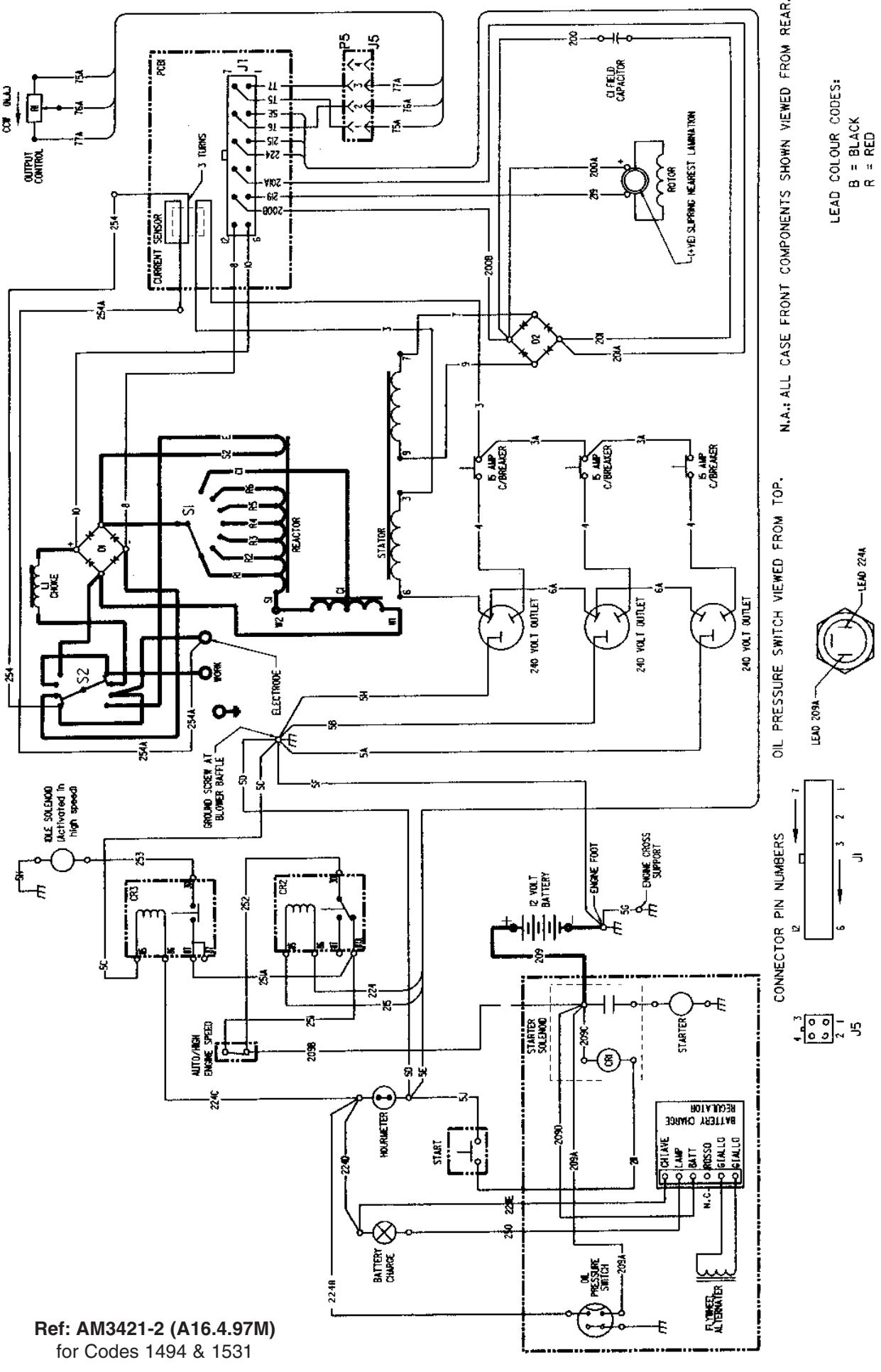
Use only the parts marked “X” in the column under the heading number called for in the model index page.

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Solenoid Driver PCB Assembly (AL2647 obsolete)	Use AS4842	1	-	-	x	-					
	Idler Driver Kit	AS4842	1	-	-	x	-					
	Idler Driver Assy	AS4844	4	-	-	-	x					
2	Control PC Board Assembly	L8484-3	1	-	-	x`	x					
	Expansion Nut	S14020-3	4	x	x	x	x					
3	Oil Pressure Switch	AS4677-1	1	x	x	x	x					
4	Oil Fitting Adaptor Nipple	AS4584	1	x	x	x	x					
5	Sleeving (oil Gauge Line)		1	-	x	-	x					
	Cable Tie		3	-	x	-	x					
	Nylon Tubing (Oil Gauge Line)	AE1096-3	1.65m	-	-	x	x					
	Olive	AT4122	2	-	-	x	x					
6	Female Tee Fitting	AS4581	1	x	x	x	x					
7	7/16” Flatwasher	S9262-149	1	x	x	x	x					
8	Centering Washer	AS4508Z	1	x	x	x	x					
9	H/T Hex. Hd. Bolt 3/8” unf x 14.88”	T14843-4	1	x	x	x	x					
10	Blower	L9033	1	x	x	x	x					

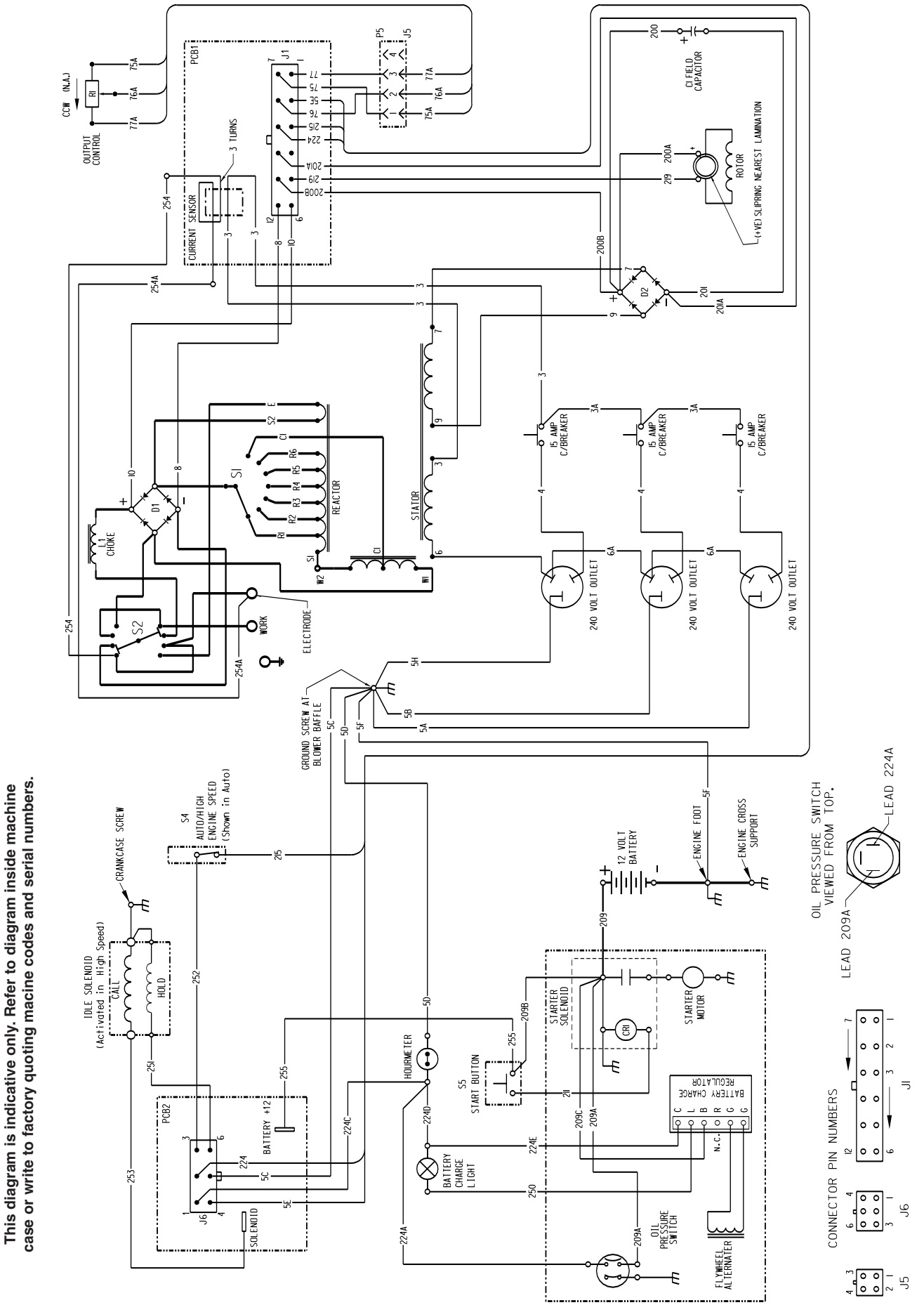
WELDANPOWER 230+ WIRING DIAGRAM - DIESEL ENGINE



This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

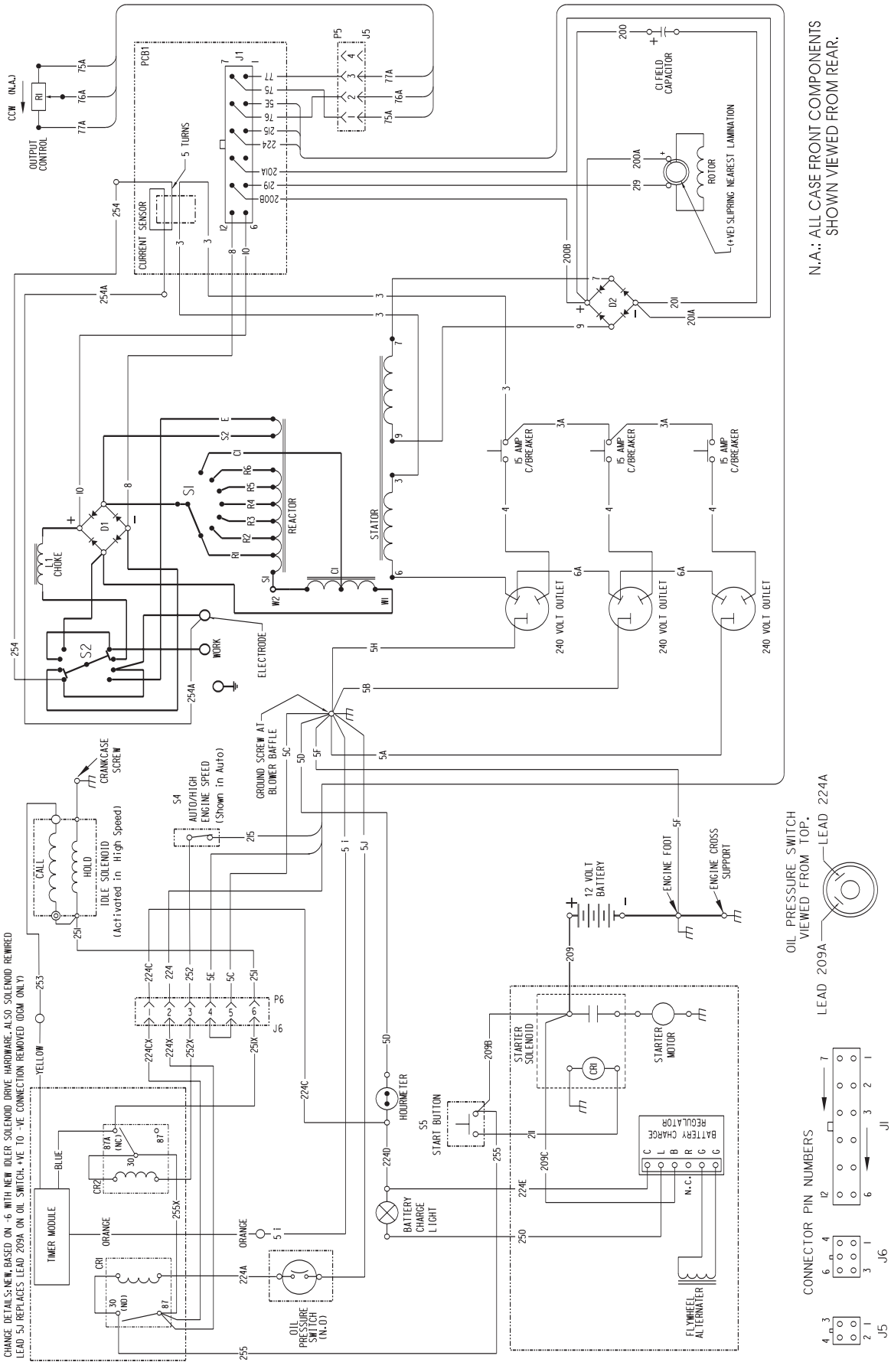
Ref: AM3421-2 (A16.4.97M)
for Codes 1494 & 1531

WELDANPOWER 230+ WIRING DIAGRAM - DIESEL ENGINE



Ref: AM3421-6 (A17.3.99)
for Code 1562

WELDANPOWER 230+ WIRING DIAGRAM - DIESEL ENGINE



Ref: AM3421-9 (A28-01-04M)
for Code 700027

This diagram is indicative only. Refer to diagram inside machine case or write to factory quoting macine codes and serial numbers.

NOTES

LIMITED WARRANTY

IMAWS1 (11/05)

STATEMENT OF LIMITED WARRANTY

The Lincoln Electric Company (Australia) Pty Limited ("Lincoln") warrants all new machinery and equipment ("goods") manufactured by Lincoln against defects in workmanship and material subject to certain limitations hereinafter provided.

This warranty is void if Lincoln or its Authorised Service Facility finds that the equipment has been subjected to improper installation, improper care or abnormal operations.

PERIOD OF WARRANTY "LINCOLN BRANDED GOODS"

The period from the commencement of the warranty in respect of goods covered by this warranty shall be as follows:

Three Years
All Lincoln welding machines, wire feeders and plasma cutting machines unless listed below.

Two Years
All Weldanpowers, Rangers, Invertec V140-S, V145-S, V160-S, V160-T, V160-TP, V205-T, V270S & TP, V305T, Pro-Cut 25.

One Year
Invertec PC100, PC60.
- All water coolers (internal and external).
- Arc welding and cutting robots and robotic controllers.
- All stick electrodes, welding wires and fluxes.
- All Environmental Systems equipment, including portable units, central units and accessories. (Does not include consumable items listed under 30-day warranty).
- All welding and cutting accessories including wire feed modules, undercarriages, field installed options that are sold separately, unattached options, welding supplies, standard accessory sets, replacement parts. (Does not include expendable parts and guns/torches listed under 90 and 30 day warranties)
- All “Pro Torch” TIG torches.

90 Days
- All Gun and Cable Assemblies (manufactured by Lincoln) and Spool guns.
- All MIG, TIG and Plasma Torches

30 Days
- All consumable items that may be used with the environmental systems described above. This includes hoses, filters, belts and hose adapters.
- Expendable Parts - Lincoln is not responsible for the replacement of any expendable part that is required due to normal wear.

ENGINE WARRANTY

To the extent permitted by law Lincoln shall be entitled to in its absolute discretion repair all engines and engine accessories however Lincoln shall not be held responsible for any such repair which shall be the sole responsibility of the engine manufacturer which provides for warranties for the period and subject to any limitations provided for by those manufacturers of the respective engines and engine accessories.

Three Years*

Deutz 912 Engine and Accessories (Warranty service can only be carried out an authorised Deutz service dealer) — *Subject to conditions imposed by Deutz.

Cummins B3.3 Engine and Accessories (Warranty service can only be carried out an authorised Cummins service dealer) — *Subject to conditions imposed by Cummins

Two Years

Perkins Engines and Accessories (The Perkins Distributor Organisation provides all warranty service (accessories included) for the Perkins Engines powering goods manufactured by Lincoln. — *Subject to conditions imposed by Perkins

Briggs & Stratton Vanguard Engines and Accessories. (Warranty service can only be carried out by an authorised Briggs & Stratton service dealer). — *The Magnetron ignition system is warranted by Briggs & Stratton for 5 years.

Kubota Engines and Accessories (Warranty service can only be carried out an authorised Kubota service dealer) — *Subject to conditions imposed by Kubota.

One Year*

Ruggerini Engines and Accessories (Warranty service can only be carried out by authorised Lincoln Field Service Shop or the engine distributors authorised by the Lincoln branch office).

BATTERY WARRANTY

Lincoln supplies certain batteries in connection with its supply of goods and the purchaser acknowledges that any such battery is warranted by its manufacturer and any claim in respect of such a battery whether as to a defect in the battery or as to damage consequential upon a defect in a battery shall be made by the purchaser to the manufacturer of the battery and the purchaser shall not hold Lincoln in any way liable for the operation, non-operation or malfunction of any such battery.

CONDITION OF WARRANTY

TO OBTAIN WARRANTY COVERAGE:
The purchaser must contact Lincoln or Lincoln’s Authorised Service Facility about any defect claimed under Lincoln’s warranty.

Determination of warranty on welding and cutting equipment will be made by Lincoln or Lincoln’s Authorised Service Facility.

WARRANTY REPAIR
If Lincoln or Lincoln’s Authorised Service Facility confirms the existence of a defect covered by this warranty, the defect will be corrected by repair or replacement at Lincoln’s option.

At Lincoln’s request, the purchaser must return, to Lincoln or its Authorised Service Facility, any "Goods" claimed defective under Lincoln’s warranty.

FREIGHT COSTS
The purchaser is responsible for shipment to and from the Lincoln Authorised Service Facility.

WARRANTY LIMITATIONS
Certain conditions warranties and obligations are implied by law (for example under the Trade Practices Act 1974) and cannot be excluded or modified ("the statutory warranties").

Where the statutory warranties do apply then any express warranties given by Lincoln (the "express warranties") are given in addition and without derogation from the statutory warranties. Apart from the express warranties and (in cases where they apply by law but not otherwise) the statutory warranties Lincoln gives no warranties whether express or implied by operation of law or otherwise in respect of any goods manufactured or supplied by Lincoln or by its authorised distributor.

Any warranty whether express or statutory and the term of any such warranty as set out herein commences on the date Lincoln or Lincoln’s authorised distributorship forwards the goods from the premises of Lincoln or Lincoln’s authorised distributor to the purchaser.

In respect of any claim under the warranty herein provided a purchaser must furnish Lincoln with written notice of any claim under the warranty within the time period of the warranty as further specified herein.

The extent of Lincoln’s warranty whether express or statutory is limited to a liability to repair, replace or pay to the purchaser an amount equal to:

a) The cost of replacing the goods;
b) The cost of obtaining equivalent goods; or
c) The cost of having the goods repaired whichever remedy in its absolute discretion Lincoln chooses.

Upon request by Lincoln the purchaser must permit Lincoln to inspect the goods the subject of any claim under this warranty and Lincoln may at its absolute discretion repair or replace the goods F.O.B. at its own premises or at such other premises as Lincoln may designate provided that all freight charges to and from Lincoln’s premises or such other premises as Lincoln may designate shall be paid by the purchaser.

Subject to the express and statutory warranties hereinbefore provided Lincoln provides no other warranties in respect of the manufacture or sale of goods and in particular Lincoln shall have no responsibility or liability in respect of:

a) Repairs done to Lincoln’s goods and undertaken by the purchaser outside Lincoln’s premises without written authority from Lincoln obtained prior to any such repair;

b) Any damage or failure of the goods as a result of normal wear and tear or the neglect misuse abuse or failure to properly service goods by any purchaser.

The liability of Lincoln is limited as hereinbefore provided and Lincoln shall not be liable for any incidental special or consequential damage suffered by a purchaser whether or not arising out of circumstances known or foreseeable known by Lincoln and in particular arising out of the supply of goods to a purchaser or the use of goods by a purchaser whether based on breach of contract negligence or tort.

CUSTOMER ASSISTANCE POLICY
The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer’s particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying this type of fabrication methods and service requirements.

LINCOLN® ELECTRIC

THE WELDING EXPERTS℠

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