



Operator/Service Manual

SMARTWELD 500 AIR



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MEA Product Registration Form

**THIS FORM MUST BE COMPLETED AND
RETURNED WITHIN 30 DAYS OF INSTALLATION
OR
WARRANTY WILL BE VOID**

MEA Product Warranty Registration Form

This form must be completed and returned to MEA at the time of Installation. Warranty will be void if this form is not received by MEA within 30 days of installation.

MEA Dealer Information

Company Name: _____

City: _____ State: _____ Country: _____

MEA Installer Information

Company: _____

City: _____ State: _____ Country: _____

Installation Date: _____ / _____ / _____
Day Month Year

Owner Information

Company: _____

Address: _____

City: _____ State: _____ Country: _____

Postcode: _____ Phone #: _____

Product Information

MEA Serial Number: _____

Model: _____

SMARTWELD 500-AIR

Specifications

ALTERNATOR

Make	Leroy-Somer
Model	TAL-A42-E
Frequency	50hz
Rated Prime Power	38 KVA @ 415/240 Volts
Rated Amps	53.2/Phase
Standby Power	41.8 KVA @ 415/240 Volts
Standby Amps	58.5/Phase
Insulation	H Class
Power Factor	0.8
Phase	3 Phase

ENGINE

Make	Deutz
Model	BFM3C
Engine Speed	RPM 1500
Continues Power	40kW
Prime Power	45kW
Standby Power	50 kW
Fuel System	Electronic Control Pump
Displacement (L)	3.168
Bore/Stroke (mm)	98/105

CONTROLLER

Make	ComAp
Model	InteliLite MRS11

COMPRESSOR

Type	Oil Injected Rotary Screw
Model	5001-P0028
Air Flow	65 CFM
Pressure	150 PSI
Air Outlet	¾" BSP
Solenoid Unloader Voltage	12 Volt
Drive Type	Belt

STANDARD FEATURES

Fully programable generator controller with digital readout
4 Pole Battery Isolator Switch
Anderson Plug for jump start
On/Off Switches lockable
Lockable fuel filling door
1 x 50 Amp outlet
1 x 32 Amp outlet
2x 15 Amp outlet
Same Side Servicing
Emergency Stop
Compressor Load/Unload Switch
Compressor oil cooling by fully S/S water cooled plate heat exchanger
Hard Wire Terminal Box
Air Filter and Regulator
Low Coolant level shut down
Low fuel flashing orange light
Fully Bunded 150 litre Fuel Tank
Dimensions 1680L x 955W x 1260H
Weight 1100Kg
Noise Level 78 dba
Compliant to AS/NZS 3010:2017 Electrical Installations – Generating Sets
Compliant to AS 3000:2018 Wiring Rules for Generating Sets
2 x Fuel Senders, 1 to round fuel gauge, 1 to controller at 10% fuel level to initiate orange flashing light warning on canopy top, (NO shutdown on low fuel needed).
Air Filter and Regulator
Air Water Separator
Air Aftercooler

Optional Features

Breathing Air Filtration with CO2 Monitoring
Mine Spec

**THE NATIONAL BOARD
OF
BOILER & PRESSURE VESSEL INSPECTORS**

Certificate of Authorization



This is to certify that

R. Conrader Company

Nameplate Abbrev.: R. Conrader

749 East 18th St

Erie, PA 16503

UNITED STATES

*is authorized to apply the "NB" mark to specified **PRESSURE RELIEF DEVICES** in accordance with the provisions of the National Board. The scope of Authorization is limited to National Board Certified devices which have been manufactured, assembled and stamped with the following construction codes:*

ASME Section VIII, Division 1: "UV" Stamp

ISSUE DATE: September 4, 2013

EXPIRATION September 4, 2016



Executive Director



CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

R. Conrader Company
749 E. 18th St.
Erie, Pennsylvania 16503

SCOPE:

Manufacture of pressure vessel pressure relief valves at the above location only
(This authorization does not cover welding or brazing)

AUTHORIZED:

August 19, 2013

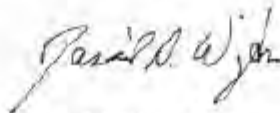
EXPIRES:

September 4, 2016

CERTIFICATE NUMBER: **34,454**



Vice President, Conformity Assessment



Director, Conformity Assessment

The American Society of Mechanical Engineers





Certificate

We, MEGA POWER SOLUTION CO., LTD., confirms our products are compliant to AS/NZS 3010:2017 Electrical Installations – Generating Sets and are wired to AS 3000:2018 Wiring Rules



MR. EDDIE YU / DIRECTOR

MEGA POWER SOLUTION CO., LTD.

ADD: NO. 363, XIHU ROAD, D-PARK, WUXI, JIANGSU PROVINCE, CHINA
TEL: +86-510-8241 5755 FAX: +86-510-8241 5725 [Http://www.megapowersolution.com](http://www.megapowersolution.com)

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INTRODUCTION

We appreciate your choice of our product for your application. Our number one priority is user safety which is best achieved by our joint efforts. We feel that you can make a major contribution to safety if you as the equipment users and operators:

Comply with OSHA, Federal, State, and Local Regulations.

Read, Understand, and Follow the instructions in this and other manuals supplied with this product.

Use Good, Safe Work Practices in a common-sense way.

Only have trained operators — directed by informed and knowledgeable supervision — operating this product.

If there is anything in this manual that is not clear or which you believe should be added, please send your comments to our company.



THE SAFETY ALERT SYMBOL IS USED TO ALERT YOU TO POTENTIAL PERSONAL INJURY HAZARDS. OBEY ALL SAFETY MESSAGES THAT FOLLOW THIS SYMBOL TO AVOID POSSIBLE INJURY OR DEATH.

1. DESCRIPTION OF EQUIPMENT

The engine/generator/compressor assembly consists of a diesel engine combined with an electrical generator and an air compressor. This assembly is firmly bolted together to form an integral unit and does not require anything other than routine maintenance.

The engine is equipped with a 12-volt starter and can be wired for remote starting capability at the control panel. A dry-element air cleaner is standard equipment to ensure a clean air supply, and a fuel/water separator is included for additional fuel system protection.

A governor on the engine provides a stable operating speed under varying load conditions, and the generator is equipped with a solid-state voltage regulator to stabilize the output voltage under these same conditions. Figures and schematics of both the governor and regulator are provided in the **ENGINE and GENERATOR OPERATOR'S MANUALS**.

SMARTWELD 500 AIR incorporates a V90 compressor systems to produce 65 CFM volume of air at maximum system pressure of 150 PSI. Driven by a serpentine belt, the compressor system can be used with the generator running simultaneously.

An automatic shutdown system is incorporated in the generator set to sense low oil pressure and/or high coolant temperature, and in either case the engine/generator assembly will automatically cease operation. The compressor system also has over temperature and overpressure sensors that will shut down the engine.

A diesel fuel tank is incorporated within the base of the unit to ensure an uninterrupted operating cycle under full load. The engine/generator assembly is mounted to the base using high durometer vibration isolators.

The enclosure for the generator set is constructed from 12 or 14-gauge sheet metal to ensure maximum rigidity and is bolted together to allow easy access to major components if necessary. Four lockable, hinged access doors are provided for routine operation and maintenance.

The enclosure on the SMARTWELD 500 AIR is specifically designed for a high degree of sound attenuation. This allows the generator set to be operated in noise-sensitive environments. The interior of the enclosure is coated with sound dampening polymer foam that is highly effective in noise suppression and is impervious to water, fuel, and oil.

A high ambient temperature radiator is contained within the enclosure as standard equipment.

Fork lift points have been manufactured into the base frame of the SMARTWELD 500 AIR to facilitate lifting with slings the unit is also marked with a COG label for lifting purposes.

2. GENERAL SAFETY

HAZARD CLASSIFICATION

A multi-tier hazard classification system is used to communicate potential personal injury hazards. The following signal words used with the safety alert symbol indicate a specific level of severity of the potential hazard. Signal words used without the safety alert symbol relate to property damage and protection only. All are used as attention getting devices throughout this manual as well as on decals and labels fixed to the machinery to assist in potential hazard recognition and prevention.

DANGER

Red - Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Orange - Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury`

CAUTION

Yellow with safety alert symbol - Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

Yellow without safety alert symbol - Indicates a situation which, if not avoided, may result in property or equipment damage.

NOTICE

Green - Indicates important installation, operation or maintenance information.



Hazardous voltage. Will cause serious injury or death.

Hot exhaust. Can contain carbon monoxide. Will cause serious injury or death.

Read all manuals that shipped with your equipment. Maintenance is done more easily and safely when you know what you're doing.

Keep all guards in place.

Wear hearing protection when you are near this equipment.

Lockout and Tagout. Equipment may be energized. Lockout and tagout all energy sources prior to performing maintenance adjustments.

GENERAL SAFETY - Continued



ACCIDENT PREVENTION



Use protective clothing and safety equipment. Always wear approved safety equipment such as gloves, safety boots, safety hard hat, goggles, ear protection, and dust masks when necessary. Wear protective clothing that is snug and belted where required.



UNAUTHORIZED WELDING UNAUTHORIZED WELDING CAN CAUSE STRUCTURAL FAILURE OR PERSONAL INJURY.



Any unauthorized welding or repair procedure will void the warranty.

DO NOT weld on any structural member.



FUELING

- **ALWAYS** handle fuel with care. It is highly flammable.
- **ALWAYS** stop engine before refuelling. Fill fuel tank outdoors.
- **DO NOT** replace fuel lines with materials different from those supplied as original equipment.
- **FIRES CAN CAUSE SEVERE PERSONAL INJURY OR MACHINE DAMAGE.**
Prevent fires by keeping the generator and its surrounding area clean.

GENERAL SAFETY - *Continued*

- **DO NOT** refuel while smoking or when near open flame or sparks.
- **DO NOT** refuel the engine when it is hot. Allow to cool for several minutes before refuelling.
- **DO NOT** spill fuel inside the engine compartment. If fuel has leaked, wipe it up and have leak repaired before next use.
- **ALWAYS** Have a fire extinguisher nearby. Be sure the extinguisher is properly maintained and be familiar with its use. Extinguishers rated ABC by the NFPA are appropriate for all applications
- **EXHAUST GASES ARE TOXIC. DO NOT USE INDOORS UNLESS PROPERLY VENTILATED AND EXHAUST SCRUBBER IS USED.**
- Check exhaust system regularly for leaks and ensure that the exhaust manifolds are secure and not warped. Make sure the unit is well ventilated.



ELECTRICAL SAFETY THIS EQUIPMENT USES HIGH VOLTAGE CIRCUITS CAPABLE OF CAUSING SERIOUS INJURY OR DEATH. EXERCISE EXTREME CAUTION AROUND ANY ELECTRICAL COMPONENT WHILE OPERATING THIS UNIT.

- Beware of cut or damaged power cords. Have a qualified electrician replace any damaged cords immediately.
- **DO NOT TOUCH HOT PARTS.** The exhaust manifold and tail pipe are very hot. Parts of the engine are also hot. Use protective gloves when handling hot parts.



COMPRESSOR/COMPRESSED AIR

Care is required when working with an air compressor or compressed air. Compressed air is just one of the many way's energy can be stored. Releasing the stored energy in an uncontrolled manner can result in catastrophic consequences. Death and permanent disability are possibilities that can occur. The following are suggested as minimum requirements to be followed when operating the MEA Stuffit system. It is important that each work site shall perform a risk analysis and produce a procedure to eliminate or control the hazardous condition to minimise the risk to personnel and equipment. Health and Safety Regulations necessitate that this is a compulsory process to be carried out on each site. These, together with site specific safety procedures will help to minimize the risk to accidents, personnel injury and loss of life. It is the responsibility of the employer to ensure that the work site is safe for all employees and that the safety procedures are followed by all employees.

SAFETY WHEN OPERATING AN AIR COMPRESSOR

- Do not bypass or disable the oil temperature and pressure sensors – unless planning on running to failure (**MEA does not recommend the practice**).
- Do not expose the tank or compressor to extreme heat.
- Do not perform any service or repairs until the system has been completely relieved of air pressure.

GENERAL SAFETY – *Continued*

- **DO NOT** refuel while smoking or when near open flame or sparks.
- Maintenance and repairs on the system should only be done by qualified personnel.
- Do not tamper with the pressure relief valve.
- Follow safe work practice, wear the appropriate personal protective equipment (PPE) when operating air-powered equipment, particularly eye and hearing protection.
- Avoid contact with rotating components, ensure all safety guards are in place.
- Avoid all contact with pressurized air. If it penetrates the skin, it can enter blood stream and cause death.
- Vaporized oil propelled by high pressure is an explosive mixture. To prevent compressor explosion or fire, make sure that the air entering the compressor is free of flammable vapours.
- Do not breathe the compressor air, vaporized oil is a respiratory hazard.
- Stay clear of all moving parts when the system is operating.
- Follow safety procedures for operations as set by the authority



BATTERY HAZARDS LEAD ACID BATTERIES CAN BE DANGER-OUS. THE SULFURIC ACID IN THE BATTERY CAN CAUSE SEVERE SKIN AND EYE BURNS. THE HYDROGEN GAS EMITTED DURING CHARGING CAN EXPLODE IF AN ARC OR FLAME IS PRESENT.

- **DO NOT** smoke while servicing the battery.
- **DISCONNECT** the negative terminal of the battery when working on the engine or other parts to prevent accidental arcing. Disconnect the negative cable at the end away from the battery.
- **DO NOT** removes the vent caps when charging the battery.
- Always wear eye protection when servicing the battery.
- If acid gets on skin or eyes, immediately flush under running water and obtain medical attention.
- **KEEP ALL BODY PARTS AND CLOTHING AWAY FROM MOVING PARTS**
- Loose jackets, shirts, sleeves, jewellery and especially neckties should not be worn while working on or running the unit.
- Only remove guards or protective devices from unit temporarily to gain access for maintenance. Always replace guards immediately after servicing. Never remove guards while unit is operating.
- Keep your hands away from moving parts, particularly clear of the radiator fan and alternator belts when the engine is running.
- **NEVER CLIMB ON TOP OF THE CABINET**
- **A SAFETY LEVER TYPE RADIATOR CAP HAS BEEN SUPPLIED TO VENT THE RADIATOR BEFORE OPENING**

GENERAL SAFETY - *Continued*

- Check the oil level in the engine crankcase and add as required.
- **USE CLASS API, CC OR CD GRADE ENGINE OIL. REFER TO ENGINE MANUAL FOR VISCOSITY AND QUANTITY.**
- If the battery is not a maintenance free battery, check the electrolyte level in the battery and add distilled water if necessary.
- Check fuel/water separator for water in the fuel system. Drain water from separator if necessary.
- Check fuel level in the fuel tank and add as required. Check to ensure the fuel tank vent is “open” and not clogged.

USE DIESEL FUEL ONLY

- Verify that the generator main circuit breaker is in the “**OFF**” position.
- **THIS GENERATOR SET PRODUCES VOLTAGES THAT CAN CAUSE SEVERE SHOCK OR DEATH! ONLY QUALIFIED ELECTRICIANS SHOULD PERFORM ELECTRICAL WORK.**

4. GENERAL DESCRIPTION

4.1 GENERATING SET DESCRIPTION AND IDENTIFICATION

Our Generating Set has been designed as a complete package to provide superior performance and reliability. Figure 1.1 identifies the major components. This figure is of a typical generating set. However, every set will be slightly different due to the size and configuration of the major components. This section briefly describes the parts of the generating set. Further information is provided in later sections of the manual.

4.2 MAJOR COMPONENTS

- **ENGINE:** Deutz BFM3C
- **ALTERNATOR:** Leroy-Somer TAL-A42-E
- **COMPRESSOR:** Oil Injected Rotary Screw
- **CONTROLLER:** ComAp MRS11

4.3 DIESEL ENGINE

The diesel engine powering the generating set has been chosen for its reliability and the fact that it has been specifically designed for powering generating sets. The engine is of the heavy-duty industrial type with 4 stroke compression ignition and is fitted with all accessories to provide a reliable power supply.

These accessories include, among others, a cartridge type dry air filter (item 7) and a mechanical or an electronic engine speed governor.

4.4 ENGINE ELECTRICAL SYSTEM

The engine, electrical system is 12 volts, negative ground/earth. This system includes an electric engine starter, a battery and a battery charging (item 9) alternator (item 3). For 12 volts electrical system one battery is given.

4.5 COOLING SYSTEM

The engine cooling system is either air cooled, or water cooled. The air-cooled system consists of a high capacity fan to pull cool air across the engine to cool it. The water-cooled system is comprised of a radiator (item 8), a pusher fan and a thermostat. The alternator has its own internal fan to cool the alternator components. The compressor cooling system is integrated into the engine cooling circuit.

4.6 ALTERNATOR

The output electrical power is normally produced by a screen protected and drip-proof, self-exciting, self-regulating, brushless alternator (item 4) fine-tuned to the output of this generating set. Mounted on

GENERAL DESCRIPTION - *Continued*

4.7. FUEL TANK AND BASEFRAME

The engine and alternator are coupled together and mounted on a heavy-duty steel base frame. This base frame includes a fuel tank with a capacity of approximately 8 hours operation at full load.

4.8. VIBRATION ISOLATION

The generating set is fitted with vibration isolators which are designed to reduce engine vibration being transmitted to the foundation on which the generating set is mounted. These isolators are fitted between the engine/alternator feet and the base frame.

4.9. SILENCER AND EXHAUST SYSTEM

An exhaust silencer is provided on top of canopy for the generating set. The silencer and exhaust system reduce the noise emission from the engine. The exhaust system is provided with guards on the manifold and silencer to reduce the possibility of contact and burns.

4.10. CONTROL SYSTEM

A ComAp MRS11 controller is fitted to control the operation and output of the set and to protect the set from possible malfunctions.

5. INSTALLATION, HANLING AND STORAGE

5.1 GENERAL

Once the size of the generating set and any associated control systems or switchgear have been established, plans for installation can be prepared. This section discusses factors important in the effective and safe installation of the generation set.

5.2 CANOPY

- All canopy parts are designed with modular principles without welding assembly.
- All metal canopy parts are painted by electrostatic polyester powder paint.
- Exhaust silencer is protected against environmental influence and an emergency stop push button is installed on canopy.
- Canopy enables easy lifting, maintenance and operation. It also protects the genset from unauthorized usage and environmental influences.

5.3 MOVING THE GENERATING SET

The generating set base frame is specifically designed for ease of moving the set. Improper handling can seriously damage components.

Using a forklift, the generating set can be lifted or carefully pushed/pulled by the base frame. If pushing, do not push the base frame directly with fork. Always use wood between forks and the base frame to spread the load and prevent damage.

WARNING

! Ensure all lifting equipment certified in date and rated for the load before attempting any lift.

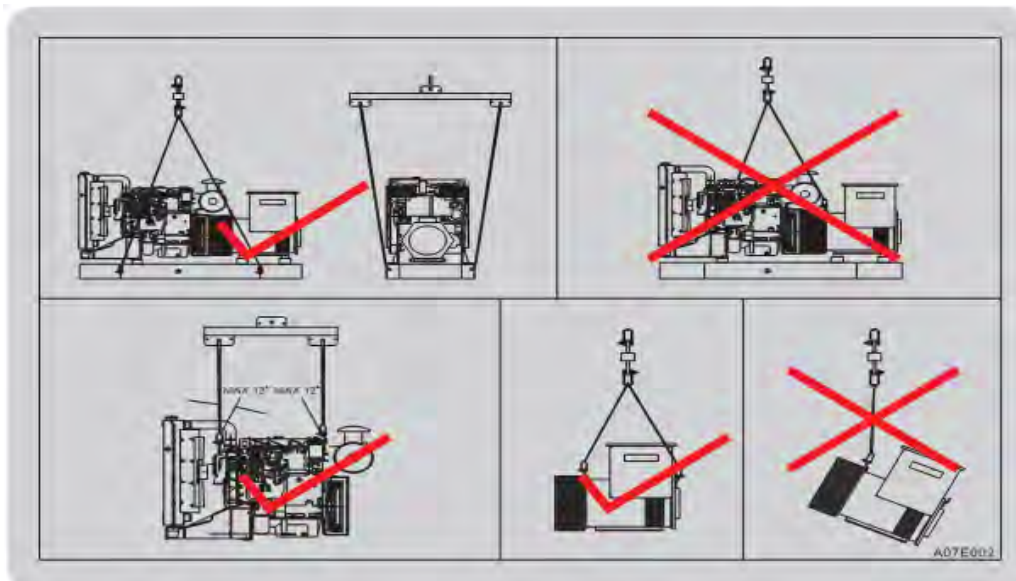
! take note of COG label when setting up for a lift.

! All lifting must be done through the fork lift slots on base frame and lifted as below.

! Never lift unit from wrung on top panel.

! Never lift the generating set by attaching to the engine or alternator lifting lugs.

! Keep all personnel away from the generating set when it is suspended.



INSTALLATION, HANLING AND STORAGE - Continued

5.4 Installation Checklist

The following factors must be considered before commencing the installation

- level, weight load and vibration transmission characters of the foundation
- sufficient cooling air
- sufficient fresh air intake
- cooling air exhaust
- engine emission exhaust
- electric connection
- operation and maintenance space
- noise standard
- vibration isolator

5.4.1 Maintenance Space

There must be enough space around the genset to allow maintenance operations. Each side of the genset, except where the radiator is located, this area should be at least 1.5m away from the wall. The genset has been designed to allow single side servicing of the engine and compressor. The height of the genset room is usually over 4.5m with the ceiling being 1.5m or further away from the genset top. This is the minimum special requirement for ventilation.

5.4.2 Mechanical Connection of the Genset

6. Fuel System

The fuel system is to provide adequate good quality diesel to the diesel engine. The diesel must be clean, less than 60 °C, containing no water.

7. Cooling and Ventilation System

Cooling and ventilation system are extremely important for the SMARTWELD. There must be enough air flowing through the canopy for cooling. To allow the engine to work at its best, the temperature rise in the room shall be between 10-15°C with the ambient temperature in the room being no higher than 40°C.

7.1 Engine mounted (standard) radiator

Our generator set is usually provided with an engine mounted radiator. The genset must be placed in a room with good ventilation where the fan draws in the air across the radiator and discharge it outdoors

8. Genset Electric Connection

Only qualified electricians can conduct connection work, they must be tested and verified before starting. All connections, cap sizing and layout must comply with relevant electric codes.

8.1 Battery Connection

- The battery can only be connected after all other processes so that the genset would not be mistakenly started during installation. When connecting the battery, be sure that the (—) polarity be connected at last to reduce the risk of electric arc.
- The start system is powered by 12-volt battery. Ensure that the positive and negative polarities are linked correctly.
- Don't put tools or metal objects on the top of the battery neither let them fall on it. Try to use tools with an insulated handle.
- When disconnecting the battery, disconnect the ground terminal first.

9. OPERATING INSTRUCTIONS

STARTING THE ENGINE/ GENERATOR SET

NEVER ATTEMPT TO START THE GENERATOR SET WITH ANY OF THE CIRCUIT BREAKERS "ON". THESE BREAKERS ARE LOCATED ON THE DISTRIBUTION PANEL. STARTING WITH THE BREAKERS "ON" CAN CAUSE DAMAGE TO THE GENERATOR.

Once setup procedures are completed, the generator set is ready to be started. Start the unit according to the following steps:

- Turn battery isolator switch to **ON**
- Place the **POWER** toggle switch in **ON** position. ComAp display will now be active, ensure start mode is **MANUAL**. If mode is in **AUTOMATIC** press the **RIGHT** arrow button **(2)** to scroll to **MANUAL** mode.
- Press the **GREEN I BUTTON (9)** on the ComAp Controller. The unit will start automatically with a timing sequence. After the timing sequence the engine will attempt to start.
- The generator will only make 3 attempts at starting before it must be reset with the switch.
- Now that the generator set is running, allow five minutes for warm-up time.
- Listen for any unusual sounds or excess vibrations that could signal problems and require immediate shutdown of the unit. Should unusual sounds be detected, shut the unit down, and contact your service agent.
- Once the engine has been started and running smoothly. The following gauges should be monitored. All gauges will be displayed on the LCD screen on the control panel.
- To scroll through ComAp menu to access the different functions and gauges press the **UP** and **DOWN** arrow buttons **(5 & 7)**

Oil Pressure Gauge -This gauge should read 30 psi or higher.

Coolant Temperature Gauge -This temperature should read between 70 - 95 degrees C

DC Voltmeter -This gauge should read at least 12 volts DC to indicate the diesel engine's alternator is charging properly.

AC Voltmeter -This gauge should reflect the proper voltage selected for this operation.

AC Ammeter -The reading on this gauge should be zero since the main breaker is in the "OFF" position. Once a load is applied to the generator, the ammeter will produce an appropriate reading.

kW Readings- The reading on this gauge should be zero since the main breaker is in the "OFF" position. Once a load is applied to the generator, the ammeter will produce an appropriate reading.

OPERATING INSTRUCTIONS - *Continued*

9.1 LOADING INSTRUCTIONS

If all readings are correct, an electrical hook-up can be made to the generator set. To make the electrical hook-up to the generator set, observe the following set of procedures:

- Shut down the generator set.
- Connect the desired electrical apparatus to the generator set, while making sure no other power source is connected to the same apparatus.
- Restart the engine and monitor the gauges as outlined in the "Operating Instructions" section under "Starting the Engine/Generator Set".
- Wait till engine RPM increase to **1540 RPM**, listen for main contactor activation.
- once contactor is engaged the **G** generator status indicator (**12**) is illuminated.
- Press the white **I/O** button (**11**) to power the compressor and power outlets
- Turn on the **COMPRESSOR** toggle switch to activate compressor and use air
- Turn the required generator circuit breakers to the "ON" position to use power outlets
- Monitor the AC Ammeter when switching outlets on. If the needle deflects severely to the right and stays there, immediately turn the required generator circuit breakers to the "OFF" position and investigate cause of fault.

SEVERE DEFLECTION OF THE AMMETER INDICATES A WIRING PROBLEM OR AN OVERLOAD PROBLEM. CONTINUED OPERATION UNDER THIS CONDITION WILL CAUSE DAMAGE TO THE GENERATOR AND/OR CONNECTED APPARATUS.



THIS GENERATOR SET PRODUCES VOLTAGES THAT CAN CAUSE SEVERE SHOCK OR DEATH! ONLY QUALIFIED ELECTRICIANS SHOULD PERFORM ELECTRICAL WORK. THIS EQUIPMENT USES HIGH VOLTAGE CIRCUITS CAPABLE OF CAUSING SERIOUS INJURY OR DEATH! EXERCISE EXTREME CAUTION AROUND ANY ELECTRICAL COMPONENT WHEN OPERATING THIS UNIT.

DO NOT OPERATE THE UNIT UNLESS VOLTAGE HAS BEEN CHECKED AT DISTRIBUTION LUGS AND RECEPTACLES. CALL THE SERVICE IF YOU HAVE ANY QUESTIONS. INSTALLATION AND ANY WORK PERFORMED ON THIS UNIT SHOULD BE DONE ONLY BY A QUALIFIED ELECTRICIAN.



DO NOT REMOVE OR COVER ORIGINAL SAFETY AND OPERATION DECALS. REPLACE ANY DAMAGED DECALS BEFORE USING THIS EQUIPMENT!

SIMULTANIOUS WELDING AND POWER LOADS GOUGING WITH AIR

WELD AMPS	1 OR 3 PHASE
0	30400 W
100	25600W
200	20800W
300	15600W
400	10800W
500	6400W

9.1.1. Control System Introduction and Operation Explanation

Electricity parameter, electric energy quality monitoring, engine working condition, over-limit alarm and engine working conditions are all displayed by liquid crystal display on the ComAp unit mounted on the SMARTWELD.

OPERATING INSTRUCTIONS - Continued













9.2 MRS11 Series Automatic Control

Module for Option

1.MRS11 Panel Indicators

(Refer to control button description on Page 18)



Control buttons		
Position	Picture	Description
1		LEFT button. Use this button to move left or to change the mode. The button can change the mode only if the main screen with the indicator of currently selected mode is displayed. Note: This button will not change the mode if the controller mode is forced by one of binary inputs listed in the Reference Guide– “Operating modes” chapter.
2		RIGHT button. Use this button to move right or to change the mode. The button can change the mode only if the main screen with the indicator of currently selected mode is displayed. Note: This button will not change the mode if the controller mode is forced by one of binary inputs listed in the Reference Guide– “Operating modes” chapter.
3		HORN RESET button. Use this button to deactivate the horn output without Acknowledging the alarms.
4		FAULT RESET button. Use this button to acknowledge alarms and deactivate the Horn output. Inactive alarms will disappear immediately, and status of active alarms will be changed to “confirmed” so they will disappear as soon as their reasons dismiss.
5		UP button. Use this button to move up or increase value.
6		PAGE button. Use this button to switch over display pages.
7		DOWN button. Use this button to move down or decrease value.
8		ENTER button. Use this button to finish editing a set point or moving right in the history page.
9		START button. Works in MAN mode only. Press this button to initiate the start sequence of the engine.
10		STOP button. Works in MAN mode only. Press this button to initiate the stop Sequence of the gen-set. Repeated pressing of button will cancel current phase of Stop sequence (like cooling) and next phase will continue.
11		Press I/O button to energised Pin 7 and send output signal to compressor circuit. Then flip the compressor switch to “ON” to start the compressor.
12		GENERATOR status indicator. There are two states -Genset OK (indicator is green) and Genset failure (indicator is red). Green LED is on if the generator voltage is present and within limits. Red LED starts flashing when gen-set failure occurs. After FAULT RESET button is pressed, goes to steady light (if an alarm is still active) or is off (if no alarm is active).
13		GCB ON . Green LED is on if GCB is closed. It is driven by GCB CLOSE/OPEN output or by GCB feedback signal.
14		LOAD . Green LED is ON if load is supplied by generator. It means, that Gen-set is OK and circuit breaker is closed.
15		Graphic B/W display, 132x64pixels

10. MAINTENANCE

ISOLATION PROCEDURE

The following lock-out process needs to be followed before any maintenance is carried out on the plant:

- Shut down the machinery and equipment
- Identify all energy sources and other hazards.
- Electrical from generator.
- Pneumatic pressure from compressor.
- Heat exposure from engine, exhaust and oil.
- Identify all isolation points. Isolation involves identifying the isolation points or single point of isolation for the system or circuit.
- Battery isolator switch below right of control panel.
- Emergency Stop button depressed.
- Isolate all energy sources. In the case of electrical equipment '**whole current isolation**', such as the main isolator, should be used instead of 'control isolation' by way of the stop button on a control panel
- Control or de-energise all stored energy. Generator discharged electrically.
- Pneumatic pressure drained out of system
- Lock-out all isolation points, using padlocks, multi- padlock hasps and danger tags
- Danger Tag machinery controls, energy sources and other hazards.

Test that the isolation is effective by 'trying' to reactivate the plant without exposing the tester or others to risk.

Failure to reactivate the plant means that the isolation procedure is effective and that all stored energies have dissipated.

Every person working on isolated equipment should fit their own lock and/or danger tag.

Alternatively, another management approved system that achieves an equivalent level of safety may be used.

- Tags should be dated and signed
- Locks should be accompanied by a corresponding tag to identify who has locked out the plant
- Tags and locks should only be removed by the person who applied them or by the supervisor after consultation with the signatory of the danger tag.
- If the person who applied the danger tag is unavailable, their tag or lock may only be removed in accordance with a management approved procedure
- Danger Tags and/or locks should be fitted to all isolation points.

Out-of-service tags:

Out-of-service tags are to be securely fixed to the operating control power isolator with the appropriate details completed on the tag (explaining the reason for the machine being 'out of service').

The out-of-service tag should not be removed until the equipment is safe to be returned to service, or the reason for the out-of-service tag no longer exists.

The out-of-service tag may **only** be removed by:

- The person who attached it
- The supervisor responsible for the operation or repair of the equipment
- The maintenance person who carried out the repairs.

10.1 MINIMUM MAINTENANCE PROCEDURES

The following maintenance intervals are only suggested by generator factory. You should always check your engine owner's manual for specific information. Should you find any discrepancies between this Manual and the Engine Manufacturer's Manual always follow the Engine Manufacturer's Manual.

EXPLOSION HAZARD. NEVER ADD FUEL TO THE UNIT WHILE IT IS RUNNING. THIS CONSTITUTES A SEVERE FIRE HAZARD THAT CAN CAUSE DAMAGE TO THE UNIT AND INJURY TO THE OPERATOR.

BURN HAZARD: NEVER REMOVE THE RADIATOR CAP OR CHECK ELECTROLYTE LEVELS ON A HOT UNIT. THIS COULD RESULT IN SEVERE BURNS TO THE OPERATOR.

Every 8 Hours of Operation:

- Check the crankcase oil and fill as required.
- Check the fuel tank level and fill as required.

DAILY

- Check the engine and generator for any loose bolts, connections, and fittings.
- Oil Level and Condition, Oil Leakage Oil Pressure Warning Lamp
- Fuel Leakage Check
- Drain Water from Fuel Filter
- Coolant Level and Condition, Coolant Temperature Reading
- Coolant Leakage Check
- Radiator Filler Cap
- Fan Belt Tension Check
- Preheating Condition Check
- Engine Vibration and Noise Levels
- Exhaust Smoke Condition
- Battery Cleaning
- Battery Charge Condition
- Ammeter Reading
- Charge Warning Lamp

FIRST 50 HOURS

- Check system for oil and/or air leaks
- Check engine/compressor mounts fastener torque
- Check belt and pulleys for signs of wear – note that belts normally give off particles until it runs in.
- Change Oil and Filter

250 HOURS

- Change Oil and Filters

500 HOURS

- Change Oil and Fuel Filter
- Replace Fuel Filter
- Injection Nozzle Check
- Clean Radiator Surface
- Check the coolant levels and fill as required
- Check the fuel/water separator for the presence of water contamination. Drain as required.

WATER CONTAMINATED FUEL WILL CAUSE SEVERE DAMAGE TO THE INJECTION AND FUEL PUMPS.

MAINTENANCE - Continued

750 HOURS

- Replace Engine Oil and Oil Filter

1000 HOURS

- Change Oil and Filter
- Replace Fuel Filter
- Injection Nozzle Check
- Coolant System Circuit Cleaning
- Starter and Alternator Check and Cleaning
- Cylinder Compression Pressure
- Valve Clearance Check
- Feed Pump Strainer Cleaning
- Clean Radiator Surface

1250 HOURS

- Replace Engine Oil
- Water Pump Grease Change
- Coolant System Circuit Cleaning
- Starter and Alternator Check and Cleaning

1500 HOURS

- Change Oil and Filter
- Replace Fuel Filter
- Injection Nozzle Check
- Clean Radiator Surface
- Positive Crankcase Ventilation Valve Cleaning

Note: Use a 50% solution of water and antifreeze for the engine coolant. Refer to your engine manufacturer's maintenance manual for specific antifreeze information.

10.2 MAINTENANCE SCHEDULE (V90 AIR END)

Maintenance schedule for the compressor is given as per manufacturer's standards under normal operating conditions. If the operating conditions deviate from standards (such as severe environmental conditions; dusty environment), it is necessary to take steps for the affected areas to be maintained at shorter intervals.

PERIODICALLY DURING OPERATION

- Observe all gauge readings. Note any change from the normal readings and determine the cause. Have the necessary repairs made?
- (Note: "Normal" is the usual gauge reading when operating at similar conditions on a day to day basis.)

MAINTENANCE - Continued

EVERY (10) HOURS OR DAILY

- Check the compressor oil level
- Check air filters/s and connecting hose and clamps
- Check for oil and air system, including hoses, for leaks

EVERY (25) HOURS OR MONTHLY

- Drain water from tank and check compressor oil level

EVERY (100) HOURS

- Check compressor oil level
- Clean air cleaner element
- Check engine/compressor/generator mounts for excessive wear and fastener torque

EVERY (400) HOURS OF OPERATION OR (9) MONTHS

- Change compressor oil approx..4L
- Change compressor oil filter
- Change compressor air filter
- Check belt and pulleys for signs of wear
- Check belt clearance

(800) HOURS / (18) MONTHS

- Change compressor coalescing filter

10.3 CLEANING

The Generators employ various electronic controls that may be damaged by liquid spray washing or high pressure washing. Follow these procedures to prevent any damage to these components.

DO NOT SPRAY WATER INTO THE UNIT WHILE IT IS RUNNING. THIS MAY RESULT IN INJURY OR DEATH BY ELECTRIC SHOCK.

Exterior Cleaning:

The exterior housing may be washed by most conventional cleaners and methods. The exterior housing may be waxed using any conventional automotive wax.

Interior Cleaning:

Using a damp cloth covered with a mild soap, carefully clean around any electric controls, generator, and thermostats. The base and housing foam may be cleaned with a damp cloth covered with mild soap.

10.4 CARE AND SERVICING AIR FILTERS

A common belief in air filtration is that new clean filters are the best. In reality, a filter is the least efficient it will ever be when it is first installed. Filter paper is specially designed paper that is woven with a series of small openings that allows air to pass through it and dust to be stopped. As small particles of dust are trapped in the paper, the holes become smaller and the efficiency increases.

MAINTENANCE - Continued

Engine air filtration systems using staged pre-cleaners, keep large particles of dust from the air stream, which would bridge across the element and cause premature filter failure. The most common cause of engine failure due to dust ingestion is over servicing.

DO NOT USE VISUAL INSPECTION TO DETERMINE FILTER FAILURE.

Use a dust load indicator (vacuum gauge) to determine when the filter should be changed. These are available in many configurations but should trigger when 10-15 inches of water column over the clean element is reached. When you remove a filter from the canister, the seal is broken, and loose particles of dust can fall into the outlet and be drawn into the engine the next time it starts. Leave the inner (safety) element installed, as this will protect against loose debris entering the engine.

General cleaning of cartridges should be accomplished by either a light brushing or mild air pressure application.

NEVER DIRECT A HIGH-PRESSURE AIR STREAM DIRECTLY INTO A FILTER PACK AS IT MAY RESULT IN MEDIA BREAKDOWN. NEVER TAP A FILTER TO REMOVE DIRT AS THIS COULD DAMAGE THE SEALING SUR-FACES.

Carefully remove any loose dust from the canister using a vacuum and then wipe with a damp cloth.

NEVER BLOW AIR INTO THE CANISTER AS IT MAY FORCE DIRT INTO THE ENGINE.

Make sure the sealing areas of the canister and the element is clean and free of defect before installing the element. The safety element should be changed sparingly (every three or four filter changes) and extreme care should be taken to not allow dirt to enter the engine when the safety element is removed.

NEVER WASH THE CANISTER WITH HIGH PRESSURE WATER AS IT COULD DAMAGE OR BREAK THE PRECLEANER ROTOR.

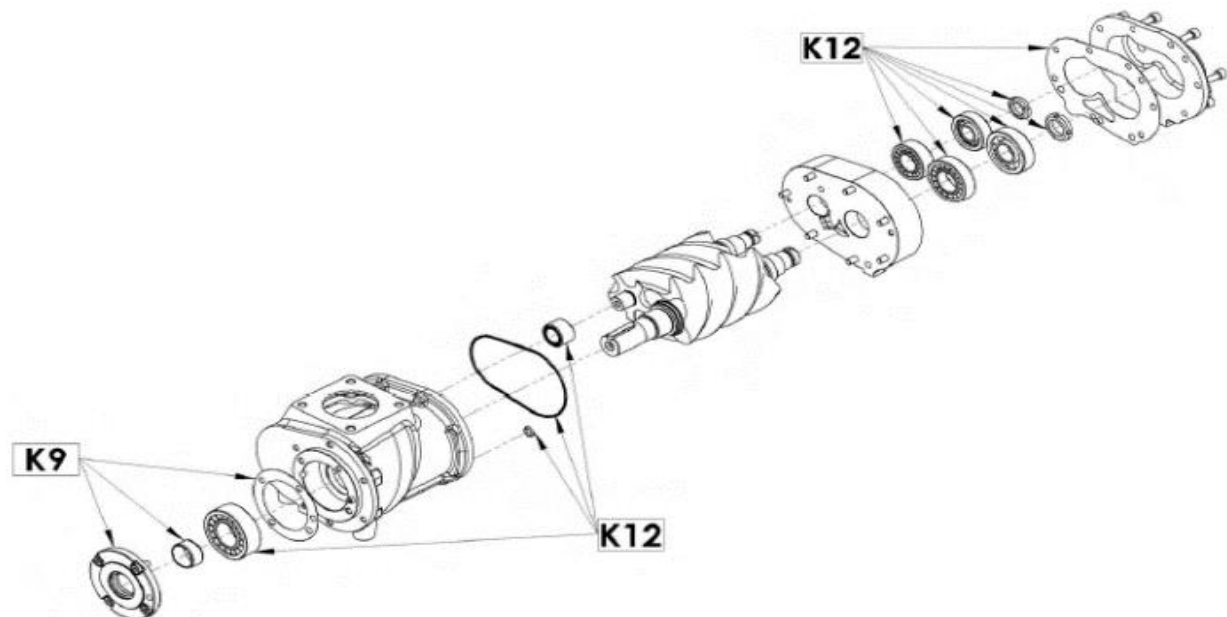
11. SPARE PARTS

11.1 ENGINE

10001-P0087	Fuel injection pump
10001-P0088	Fuel injectors
10001-P0089	Water pump (incl. gasket)
10001-P0091	Starter motor
10001-P0092	Alternator 12volt dc (battery charging)
10001-PK0093	Radiator including intercool radiator
10001-PK0094	Radiator hose kit
10007-P0027	Radiator hose elbow
10001-P0095	Cooling fan
10001-P0096	Head Gasket
10001-P0097	Rocker Cover gasket
10001-P0098	Sump gasket
10004-P0105	Belt A section SPA1250 (Engine)
10004-P0178	Belt drive 6PK1675 (Compressor)
10008-P0175	Air filter to suit Deutz 38kva SLG38DE3L
10008-P0176	Fuel filter BF7648-SMARTWELD
10008-P0177	Oil filter B7469 SMARTWELD
7501-K0001	Engine 250 hrs Service Kit
7501-K0002	Minor Service Kit
7501-K0003	Major Service Kit

11.2 COMPRESSOR

K9-910.0249 Shaft seal spare parts kit



K12-910.0248 Bearing spare parts kit

11.3 OTHERS

10008-P0024	Air filter
10008-P0045	Coalescing filter
10008-P0041	Oil filter
10019-K0005	Compressor Oil 5L (incl. container)

***Contact MEA sales department for required spare parts.**

12. TROUBLESHOOTING GUIDE

The engine/generator set is tested and set at the factory for proper operation in the field. These units should never require additional adjustments in the field. If needed, adjustments should only be made by a qualified service technician; otherwise the manufacturer's warranty may become void.

12.1 Engine

Fault Type	Fault Description and Reason	Remedy
Diesel engine cannot start	<input type="checkbox"/> Fuel system failure: The diesel engine doesn't ignite when rotated by the electric motor and there is no fuel in the fuel return pipe.	
	• air in the fuel system	Check whether the fuel pipe joints are loosened; vent the air in the fuel. Unfasten the vent screw on the fuel injection pump and fuel filter; pump the fuel with the hand pump, until there are no air bubbles in the overflowing fuel; tighten the vent screw, continue pumping; when fuel flows into the return pipe, tighten the hand pump.
	• Fuel pipe clogged	Check and ensure that the fuel pipes are not clogged.
	• Fuel filter Clogged	Clean the filter or replace the filter insert
	• Fuel pump doesn't work or fails while working.	Check the fuel pump and the fuel intake pipe
	• Insufficient fuel injection, failed injection or fuel not atomized	Replace injector assembly
	• Injection pump speed governing lever placed in wrong position	When starting the engine, place the lever in such a position that the engine rotates at 600-800 r/min at no-load
	Electric starting system failure	
	• Misconnection of electric wires or inadequate grounding	Check that the electric wires are firmly and reliably connected
	• Insufficient battery capacity	Replace with a well-charged battery or use batteries in parallel.

Fault Type	Fault Description and Reason	Remedy
Diesel engine cannot start - <i>continued</i>	• Fuel pump rod rack choked	Open the peep hole on the pressure fuel pump and move the acting rack to see whether there is any obstruction. For pressure fuel pump equipped with electronic speed governor, if no rod rack gets choked, jump out Terminal 1# and 6# on the control panel. Meanwhile the speed actuator shall be in the "maximum fuel" position and click sounds shall be easily audible. This will help staff decide whether there is fault with the electronic speed governor control panel.
	• Electronic speed governor failure	Please follow the testing procedures specified in the handbook for the electronic speed governor (actuator, control panel, speed sensor) and find out the reason.
	• Fuel injection advance angle too earlier or too late, or even 180° apart. Engine not ignited or extinguished after brief ignition.	Check whether the scribed lines on the splicing tray of the fuel pump drive shaft are correct and secured. Adjust if necessary.
	Incorrect valve timing	Check the valve timing
	Long starting time or misfiring in cold environment	Use appropriate auxiliary starting devices as per required by the environment temperature to facilitate the starting of the engine.
Inadequate output power of the diesel engine	□ Fuel system fault: cannot increase rev and output power even when the throttle is increased	
	• Fuel pipe or filter is intruded by air or gets clogged.	Vent the air or replace fuel filter insert as aforementioned
	• Fuel supplied by the pump does not get atomized	Repair or replace assembly:
	• Inadequate atomization of the injector or injecting pressure too low	Check atomizing or adjust injection pressure. Check whether the injector assembly shall be replaced
	□ Air intake and exhaust systems fault: the exhaust smoke has a higher temperature and worse colour than normal.	

Fault Type	Fault Description and Reason	Remedy
Inadequate output power of the diesel engine - <i>continued</i>	• Air filter clogged	Wash the air filter element or wipe off the dust on it. Replace it if necessary. Check that the engine oil level is normal.
	• Exhaust pipes clogged or pipe joints too long, or elbows having a small bend radius or more elbows than necessary	Clean off the carbon deposits in the exhaust pipe, reinstalling the pipe, reduce the number of elbows, enlarge elbow bend radius.
	□ Engine block overheating; ambient temperature too high; oil and coolant temperature too high; exhaust temperature too high	Check the cooler and radiator, clear off furring; Check relevant piping to ensure there is no pipe that is too slim; If the ambient temperature is too high, improve room ventilation to cool it down.
Abnormal sounds when the diesel engine is running	□ Drive gear wearing, enlarged clearance: abnormal sounds from the front cover; collision noises heard when the engine suddenly slows down	Adjust gear clearance; replace the gear if it is worn out
	□ No oil between the rocker adjusting screw and the pushrod spherical seat: squeaks of dry friction heard from the cylinder head.	Remove the cylinder head case and add oil
	□ Enlarged intake and release valve clearance: rhythmic noises from the cylinder head.	Adjust valve clearance
Abnormal exhaust smoke colour	□ Black smoke:	
	• the engine overloaded	Reduce the load to rated level
	• Uneven fuel supply among the cylinders	Adjust fuel injection pump
	• Inappropriate valve clearance and/or bad seal results in gas leakage and incomplete combustion	Adjust valve clearance; check the conical seal surface and remove any defect
	□ White smoke:	
	• Inadequate atomization of the fuel, fuel liquid drops, injection pressure too low.	Check the injector assembly; reprocess or replace it; adjust the injection pressure to rated level

Fault Type	Fault Description and Reason	Remedy
Abnormal exhaust smoke colour - <i>continued</i>	<ul style="list-style-type: none"> • Incomplete combustion in individual cylinder (esp. in winter) when the engine is just started 	Increase engine speed and load by an appropriate extend and let the engine run for a prolonged period
	<ul style="list-style-type: none"> • Air filter clogged, obstructing air intake. 	Check and clean air filter element
	<ul style="list-style-type: none"> • Piston ring choked or excessive wear; reduced flexibility; piston ring chamfer installed in wrong location, causing oil intrusion into the combustion chamber 	Check piston ring and replace it if necessary
	<ul style="list-style-type: none"> • Engine constantly runs at low load (below 40% of rated output) : enlarged clearance between piston and cylinder jacket, causing oil intrusion into the combustion chamber 	Increase the load appropriately
	<ul style="list-style-type: none"> • Excessive amount of oil in the oil pan 	Reduce the amount of oil until the oil level drops down to rated level. Fill oil according to the markings on the dipstick.
Abnormal engine oil pressure	Engine oil pressure drops and cannot return to normal even through adjustment of the pressure control valve. Meanwhile, the readings on the pressure gauge fluctuates:	
	<ul style="list-style-type: none"> • Oil pipe leakage 	Check and repair, tighten screw nuts
	<ul style="list-style-type: none"> • Air intrusion into the oil pump; lack of oil in the oil pan 	Replace the oil after topping up the oil to rated level
	<ul style="list-style-type: none"> • Serious oil leakage in such locations as the crankshaft thrust bearing, oil seal of the flanged end of the crankshaft, camshaft bearing and connection rod axial bush 	Check all the parts and replace any if it is worn out
	<ul style="list-style-type: none"> • Rupture of the connecting oil pipe between rocker shafts; no oil injector is installed to lubricate the drive bearing or the oil injector is displaced from its fixed position. 	Check, repair or replace

Fault Type	Fault Description and Reason	Remedy
Abnormal engine oil pressure - <i>continued</i>	<ul style="list-style-type: none"> • oil cooler or oil filter clogged; rupture of cooler pipe; leakage on the seal gasket or gasket damaged. 	Clean, weld or replace the filter element. If aluminium bits are found in centrifugal oil filter, it means that the alloy layer on the connecting rod axial bush is ripped off. Check for the bush and replace it if necessary; check and replace seal gasket
	<ul style="list-style-type: none"> □ No oil pressure, the pointer of the oil pressure gauge is motionless: 	
	<ul style="list-style-type: none"> • Oil pressure gauge damaged 	Replace
	<ul style="list-style-type: none"> • Oil passage clogged 	Clean after check and repair
	<ul style="list-style-type: none"> • Oil pump severely damaged or choked because of unskilled installation 	Check and repair; adjust the clearance; test the pump for performance
	<ul style="list-style-type: none"> • Oil pressure control valve fails, the spring damaged 	Replace the spring; rub the seal surface of the control valve
Over high oil temperature and excessive fuel consumption	<ul style="list-style-type: none"> □ The reading on the oil temperature gauge is beyond rated value; it doesn't drop much even after enhanced cooling. Black smoke is seen from the exhaust. 	
	<ul style="list-style-type: none"> • Diesel engine overloaded 	Reduce load
	<ul style="list-style-type: none"> • Oil cooler or radiator clogged 	Wash cooler or radiator piping
	<ul style="list-style-type: none"> • Inadequate coolant or wind flow from the fan 	Ensure that the coolant flows unobstructed; adjust the tension of the V belt to let the water pump and fan reach rated speed.
	<ul style="list-style-type: none"> • Inadequate oil 	Top up the oil to rated level
	<ul style="list-style-type: none"> • The temperature gauge doesn't work rightly 	Check and adjust or replace
	<ul style="list-style-type: none"> □ Oil level in the oil pan drops quickly; the colour of the oil is dark; white smoke is seen from the oil refilling hole on the vent pipe and black smoke is seen from the exhaust pipe: 	

Fault Type	Fault Description and Reason	Remedy
Over high oil temperature and excessive fuel consumption - <i>continued</i>	• Oil of inappropriate grade is used	Chose the right grade of oil as specified by the genset producer
	• Piston ring gets stuck or worn out; cylinder jacket gets worn out so that oil intrudes into the combustion chamber, combusting gas intrudes into the crankshaft case	Replace piston ring; replace cylinder jacket if necessary
	• Oil return hole of the piston oil control ring gets clogged with carbon deposits	Clear off the carbon deposits
	• The elastic sealing of the turbocharger (if equipped) fails to function	Check the elastic air sealing for ability to continue function; replace if necessary
	• Engine operates at low load for long periods	Increase the load appropriately
Oil level in the oil pan rises	The coolant infiltrates into the engine oil; yellow bubble floats on the oil; water vapor condenses on the surface of the vent pipe filter element:	
	□ Cylinder jacket water tight gasket damaged, resulting in water leakage	Replace the water tight gasket
	□ Cylinder head gasket damaged, resulting in water leakage	Use new gasket
	□ For wet oil cooler, the cooler element damaged, resulting in the mixture of cooling water and oil	Check the cooler element, repair or replace
	□ Cooling water infiltrates from the fresh water pump into the oil pan	Check the water tight ring, repair or replace; rub the sealing surface
	• Leakage of water on the fresh water pump shaft and seal gasket	
	• Water tight rubber ring of the fresh water pump damaged	
Outlet water too hot	□ There is air in the water pipe: litter or no water flows through the outlet pipe, resulting in rising water temperature.	Unfasten the water temperature gauge joint on the water pipe, vent the air until water flows unobstructed. Then tighten all joints on the water piping.
	□ There isn't enough water being circulated. At high loads, the outlet water would become very hot and engine oil would also be too hot.	

Fault Type	Fault Description and Reason	Remedy
Outlet water too hot - <i>continued</i>	<ul style="list-style-type: none"> Fresh water pump or cooling fan doesn't rotate fast enough 	Adjust the tension of the V belt until it meets requirement.
	<ul style="list-style-type: none"> The rotor blades of the fresh water pump get damaged 	Replace
	<ul style="list-style-type: none"> The clearance is too wide between the rotor blade and the pump case. 	Adjust the clearance until it meets requirement
	<ul style="list-style-type: none"> In open circulation system, the water supply end is so low that the water pump is unable to suck up the water. 	Lift the water supply end.
	<ul style="list-style-type: none"> In closed circulation system, the radiator lacks water 	Add cooling water
	<ul style="list-style-type: none"> Water pipes get clogged 	Clean the pipes, clear off fouling
	<ul style="list-style-type: none"> In closed circulation system, the radiator surface is covered with dirt, affecting the heat emission. 	Clean the surface of the radiator
	<ul style="list-style-type: none"> Thermostat doesn't work. 	Replace
	<ul style="list-style-type: none"> Water temperature gauge doesn't work 	Repair or replace
	<ul style="list-style-type: none"> Cracks on the shoulder of the cylinder jacket: the cooling water in the radiator bubbles. 	Replace the cylinder jacket
Outlet water too cold	<input type="checkbox"/> In open circulation system, the raw water intrudes into the engine	Install a water mix tank
	<input type="checkbox"/> Thermostat doesn't work well or gets damaged	Replace
	<input type="checkbox"/> Ambient temperature is low, or the load is low	Increase the load properly
	<input type="checkbox"/> Water temperature gauge doesn't show correct data	Check or replace
Oil foul on the cooling water	The element of wet oil cooler gets damaged	Repair or replace

Fault Type	Fault Description and Reason	Remedy
Electric starting system	□ Starter motor doesn't work	
	• poor contact at electric connections	Clean and tighten electric connections
	• poor contact at brushes	Clean the commutator or replace the brush
	• starter motor short circuit	Eliminate short circuit
	• Inadequate charging of the battery or battery capacity too small	Charge the battery or use more batteries in parallel; replace battery if necessary
	• poor contact on electromagnetic switch contact points	Check the contact points and abrade them with sand paper
	□ Starter motor gear gets choked with the flywheel ring gear or starter motor gear can't be Disengaged:	
	• starter motor not in parallel to the centre of the flywheel ring gear	Reinstall the starter motor and parallel it to the flywheel ring gear centre
	• sintered electromagnetic switch contacts	Check the contacts; file, abrade and singe them
	□ Starter motor continues running after start button is released:	
	• the moving contacts of the electromagnetic switch sintered with the connection screw	Check and repair
	• starter motor governing screw not adjusted properly	Readjust the screw
	□ Abnormal noises with the alternator	
	• loose or broken bearings	Replace the bearings
	• collision between rotor and stator	Rub off the collision surface with a file
	□ Battery refuses charging; or unable to provide strong current while voltage drops sharply; white lead sulphate crystals appear on the plates:	Repair or replace the battery
	• loose or broken bearings	Replace the bearings
	• collision between rotor and stator	Rub off the collision surface with a file

Fault Type	Fault Description and Reason	Remedy
	<input type="checkbox"/> Battery refuses charging; or unable to provide strong current while voltage drops sharply; white lead sulphate crystals appear on the plates:	Repair or replace the battery
	<input type="checkbox"/> When charging, the battery temperature is high; the voltage is low; the electrolyte proportion is low; bubbles are too small towards the end of charging or come out too late; short circuit inside the battery.	If inside short circuit is caused by excessive deposits at the bottom of the battery, discharge the battery completely, pour out the electrolyte, rinse the battery several times and recharge it. If inside short circuit is caused by other reasons, dismantle the battery and have the separators/plates repaired or replaced

12.2 Alternator

Fault Description	Remedy	Result	Check/Reason
Without no-load voltage when started	Connect Terminal "E+" and "E-" to a 4-12V new battery and maintain it for 2-3 seconds. (Pay attention to polarities)	When the battery is removed, voltage reaches the rated level.	Magnet field loss
		When the battery is removed, voltage is established but doesn't reach rated level.	<input type="checkbox"/> Check AVR reference signal connection
			<input type="checkbox"/> Diode fault
			<input type="checkbox"/> Exciting armature short circuit
		When the battery is removed, no voltage is established.	<input type="checkbox"/> AVR fault
			<input type="checkbox"/> exciter field winding wiring open circuit (check the winding)
			<input type="checkbox"/> main rotor winding wiring open circuit (check the resistance)

Fault Description	Remedy	Result	Check/Reason
Voltage too low	Check the rev	The rev is correct	<input type="checkbox"/> Check AVR wiring (AVR might have failed)
			<input type="checkbox"/> Field winding wiring short circuit
			<input type="checkbox"/> rotating diode damaged
			<input type="checkbox"/> main rotor winding wiring open circuit (check the resistance)
		The rev is too low	Increase the rev (do not adjust the AVR voltage-potentiometer before the rev reaches rated level)
Voltage too high	Adjust AVR voltage - potentiometer	Adjustment fails	AVR failure
Voltage Oscillation	Adjust AVR steady-state potentiometer)	If the adjustment fails, try normal/fast mode (ST2)	<input type="checkbox"/> Check the rev: possibility of non-periodical oscillation
			<input type="checkbox"/> Loose connection
			<input type="checkbox"/> AVR failure
The voltage is correct at no load while too low at load.	Let the alternator run at no load, check the voltage between "E+" and "E-" on AVR	The direct current voltage between "E+" and "E-" SHUNT/PMG <10V	<input type="checkbox"/> Engine rev is too low at loads or LAN configuration too high
		The direct current voltage between "E+" and "E-" SHUNT/PMG >15V	<input type="checkbox"/> Check the rev (or LAN configuration too high)
			<input type="checkbox"/> Rotating diode failure
			<input type="checkbox"/> Main rotor short circuit, check resistance
			<input type="checkbox"/> Exciter armature failure, check resistance

Fault Description	Remedy	Result	Check/Reason
Voltage disappears during operation	Check AVR, varistor, and rotating diode; replace any failing components	Voltage does not return to rated level	<input type="checkbox"/> Exciter field winding wiring open circuit
			<input type="checkbox"/> Exciter rotor failure
			<input type="checkbox"/> AVR failure
			<input type="checkbox"/> Main rotor open circuit or short circuit.

IF YOU FEEL AN ELECTRIC SHOCK AT ANY TIME WHILE OPERATING THIS UNIT, SHUT IT DOWN IMMEDIATELY! HAVE THE UNIT INSPECTED BY A TRAINED ELECTRICIAN.

THIS ENGINE/GENERATOR SET IS FACTORY INSTALLED, TESTED, AND SET FOR FIELD OPERATION. ANY DAMAGE TO THE ENGINE OR GENERATOR UNITS OCCURRING AFTER ADJUSTMENTS ARE MADE IN THE FIELD BY UNAUTHORIZED PERSONNEL WILL NOT BE COVERED BY YOUR MANUFACTURER'S WARRANTY AND WILL ALSO VOID THE MANUFACTURER'S WARRANTY ON THIS PARTICULAR UNIT. IF YOU CAN NOT REACH YOUR LOCAL DEALER, CONTACT THE FACTORY.

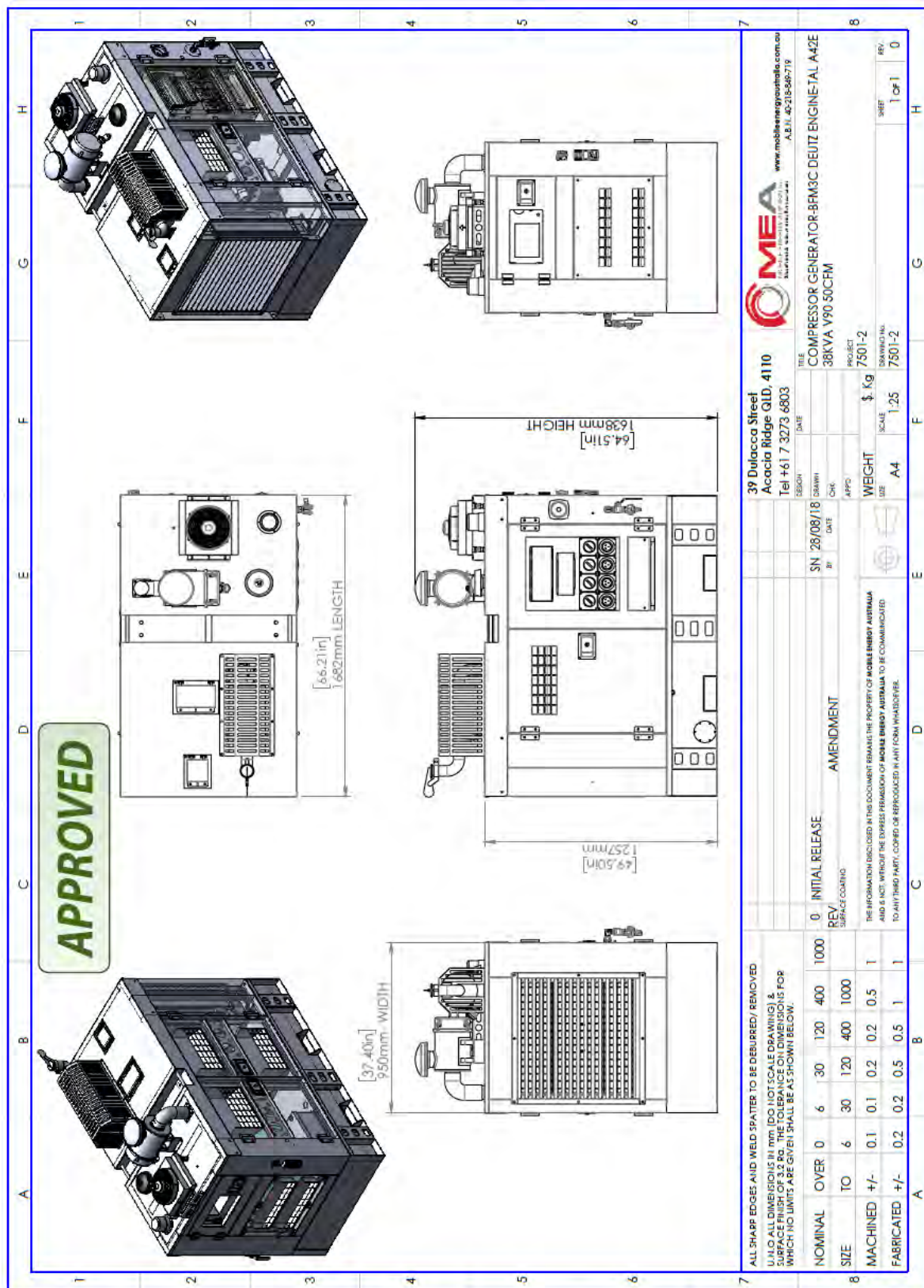
12.3 Compressor

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
The compressor does not load.	1-The intake valve remains closed.	1-Check the valve. If necessary, replace the damaged parts with the spare parts kit.
	2-The solenoid valve does not work accurately	2-Check the solenoid valve. If necessary, replace it.
	3-Losses on the pressure line.	3-Check pipes and cables. If necessary, replace them.
During idling phase, the compressor does not discharge pressure from separator tank	1-The solenoid valve does not work accurately.	1-Check the solenoid valve. If necessary, replace it.
	2-The calibrated nozzle is clogged.	2-Remove the calibrated nozzle. Clean or replace it.
Compressor capacity or pressure lower than usual standard.	1-The air filter is clogged.	1-Remove the air filter. Clean or replace it.
	2-The intake valve does not open.	2-Check the valve. If necessary, replace the damaged parts with the spare parts kit.
	3-Air loss from safety valve.	3-Replace the valve.
Compressor keeps on loading over working pressure: safety valve opens	1-The solenoid valve does not work accurately.	1-Check the solenoid valve. If necessary, replace it.
	2-Clogged separator filter.	2-Replace the separator filter.
Compressor overheating.	1-Insufficient cooling.	1-Check the cooling system. Check coolant level on tank.
	2-Dirty oil	2-Replace it with new oil.
	3-Oil level is too low.	3-Check coolant level on tank and if necessary, add oil.
	4-Clogged-up cooler or pipe connection	4-Clean cooler and pipes.
	5-The thermostatic valve does not work correctly.	5-Check the thermostatic valve. If necessary, replace the damaged parts with spare parts kit (Contact MEA for parts

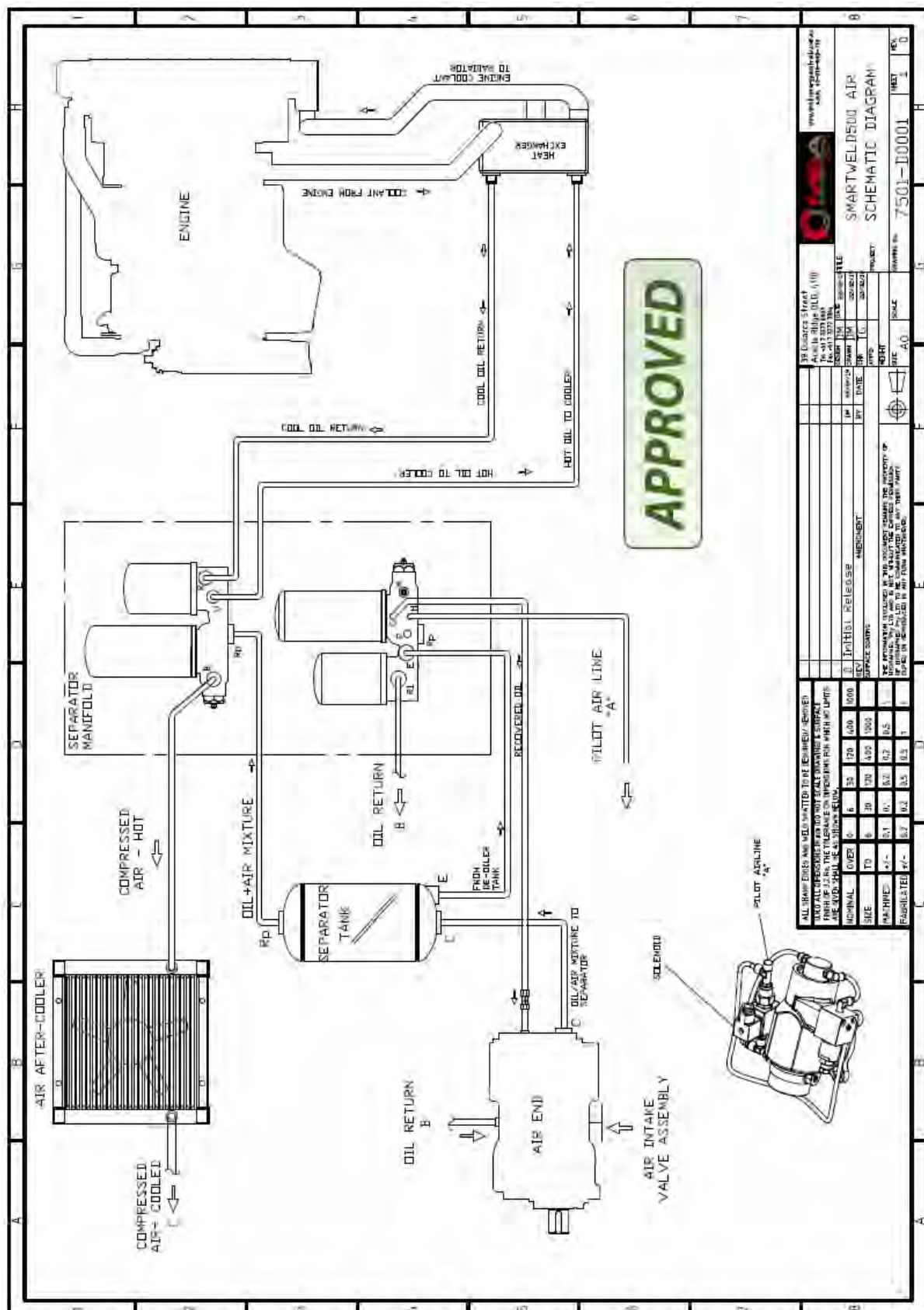
		required)
	6-Clogged oil filter	6-Replace the oil filter
During unloading phase, pressure increases up to safety valve opening	1-The intake valve remains open.	1-Check the valve. If necessary, replace the damaged parts with spare parts kit.
	2-The calibrated nozzle is clogged.	2-Remove the calibrated nozzle. Clean or replace it.
Oil leakage from intake valve only when the machine is switched off: oil soaked-up air filter	1-The intake valve does not work properly (does not close)	1-Check the valve. If necessary, replace the damaged parts with spare parts kit.
	2-The no-return valve of intake valve does not work correctly.	2-Check it and clean it.
Oil soaked-up air filter during unloading phase	1-Too high level of oil in the tank	1-Check oil level on separator tank.
	2- Clogged separator filter	2- Replace the separator filter.
	3-The recovery oil viewer is dirty or does not work appropriately.	3 -Clean it or if necessary, replace the damaged parts with spare parts kit. If separator filter is clogged up, replace it.
The compressor remains under loading phase.	1-The intake valve does not work properly (does not close)	1-Check the valve. If necessary, replace the damaged parts with spare parts kit.
Rotor seizure	1-Unknown particles inside.	1-Call MEA technical support.
	2-Insufficient lubrication.	2-Call MEA technical support.
Presence of oil in the outlet of minimum pressure valve	1-Separator filter damaged.	1-Replace the separator filter.
	2-Oil recovery viewer obstructed.	2-Clean the oil recovery viewer.
	3-Separator nipple with O-rings damaged.	3-Replace spare parts kit.

APPENDIX: A DRAWINGS AND ILLUSTRATIONS

1. GENERAL ARRANGEMENT DRAWING

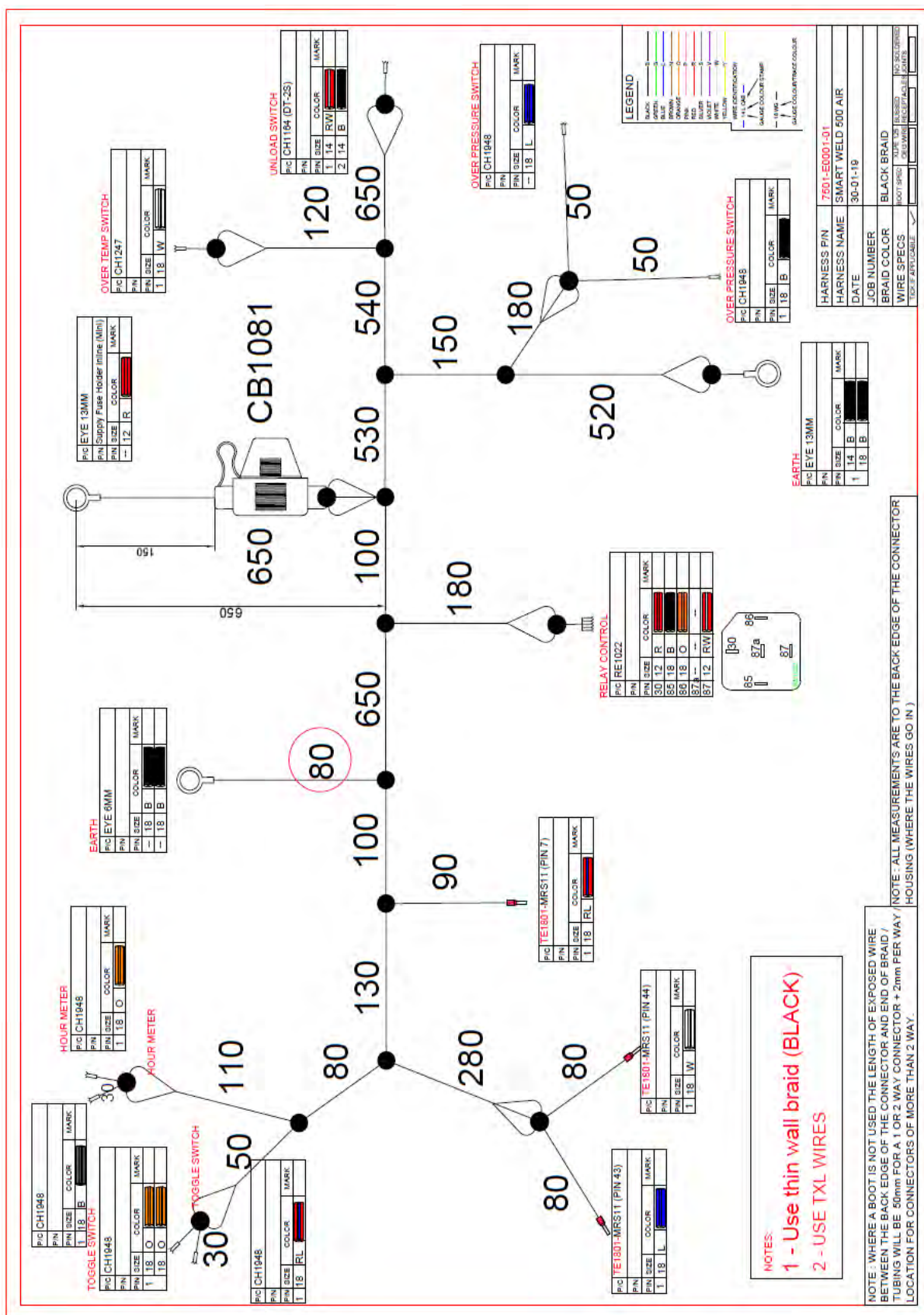


2. HYDRAULIC/PNEUMATIC DIAGRAM (COMPRESSOR SYSTEM)



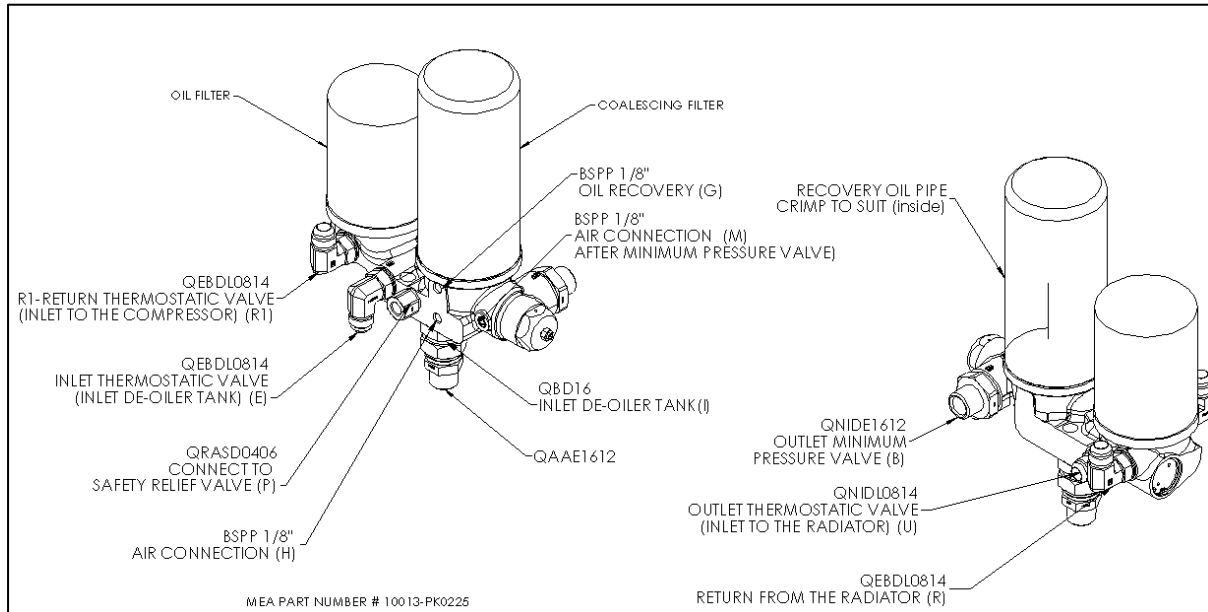


5. ELECTRICAL WIRING LOOM (COMPRESSOR SYSTEM)

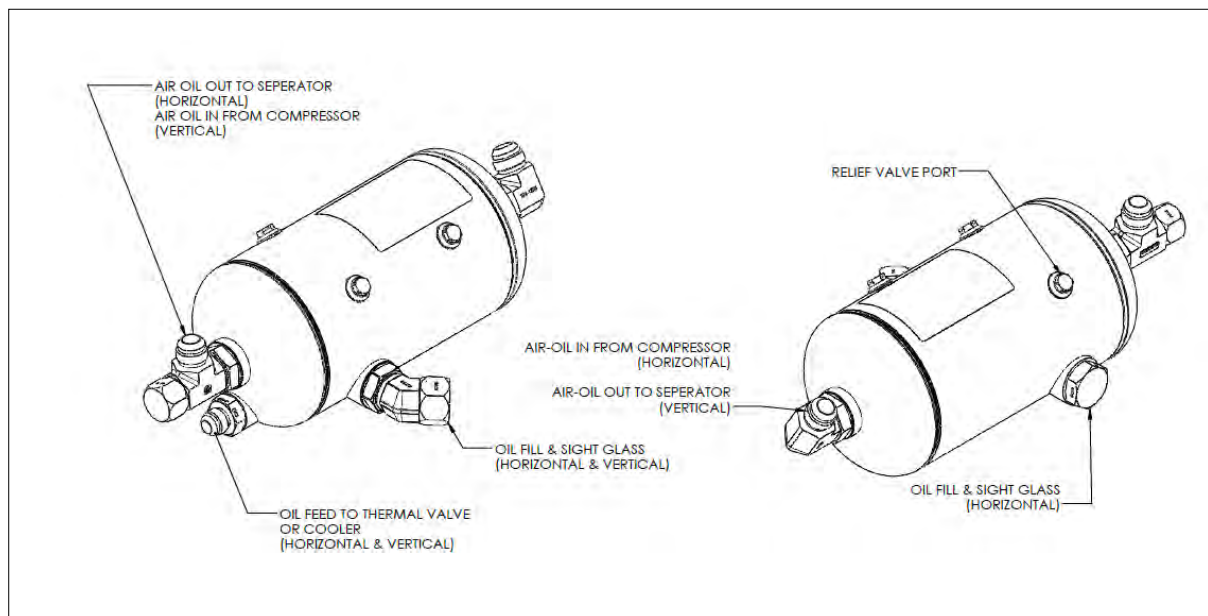


7. COMPRESSOR SYSTEM COMPONENTS

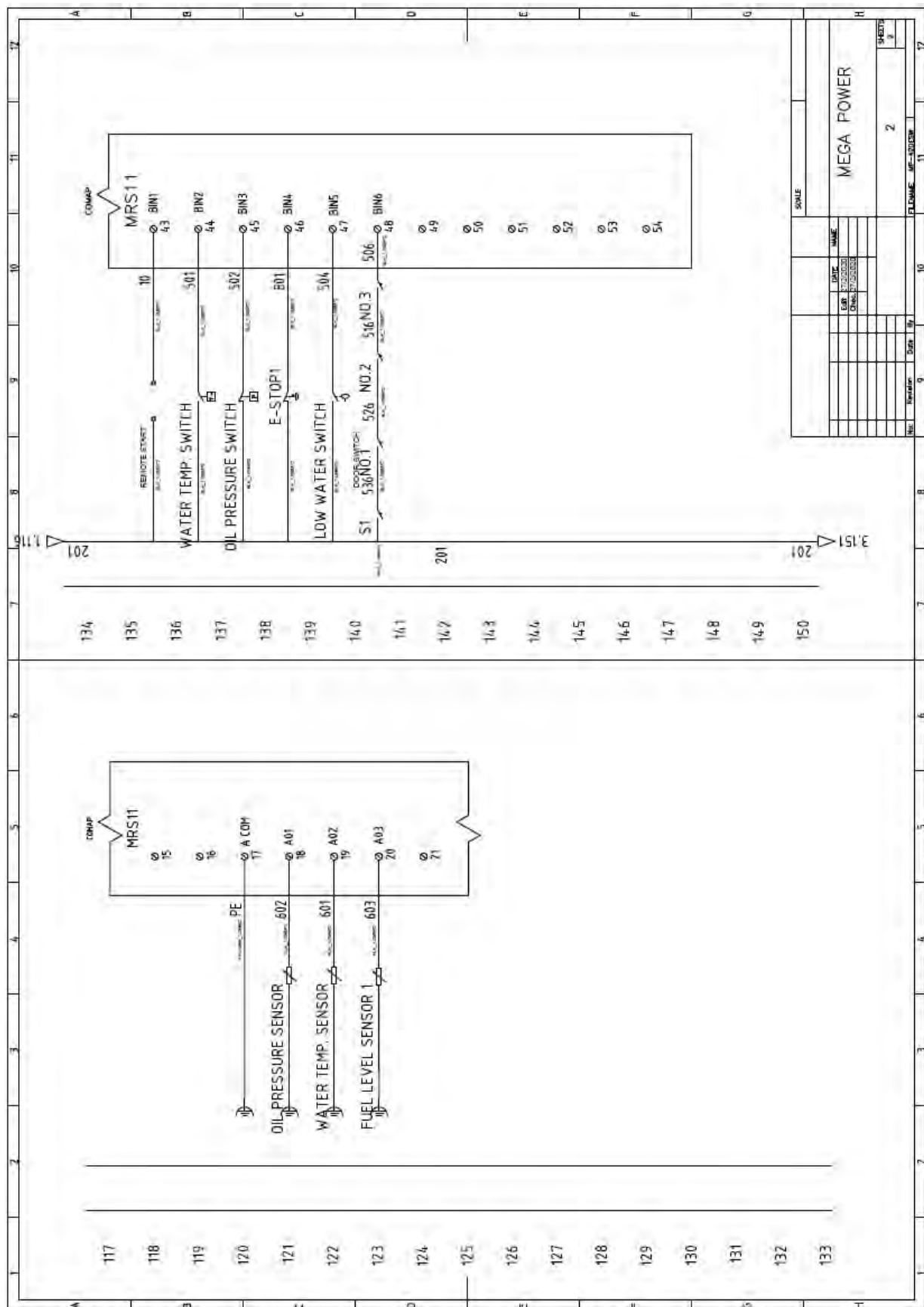
AIR-OIL SEPARATION MANIFOLD



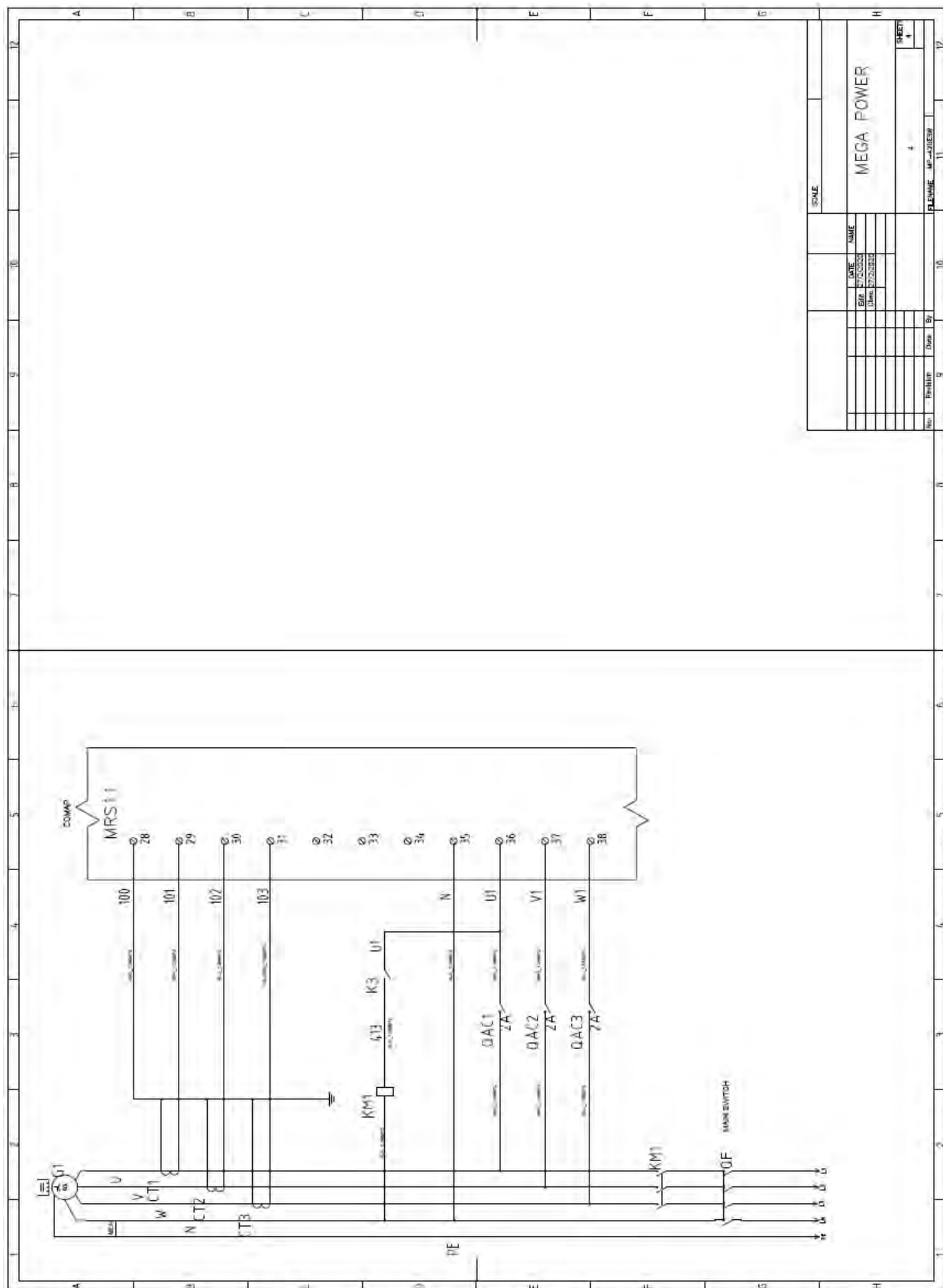
AIR-OIL SEPARATOR TANK (OIL FILL PORT)



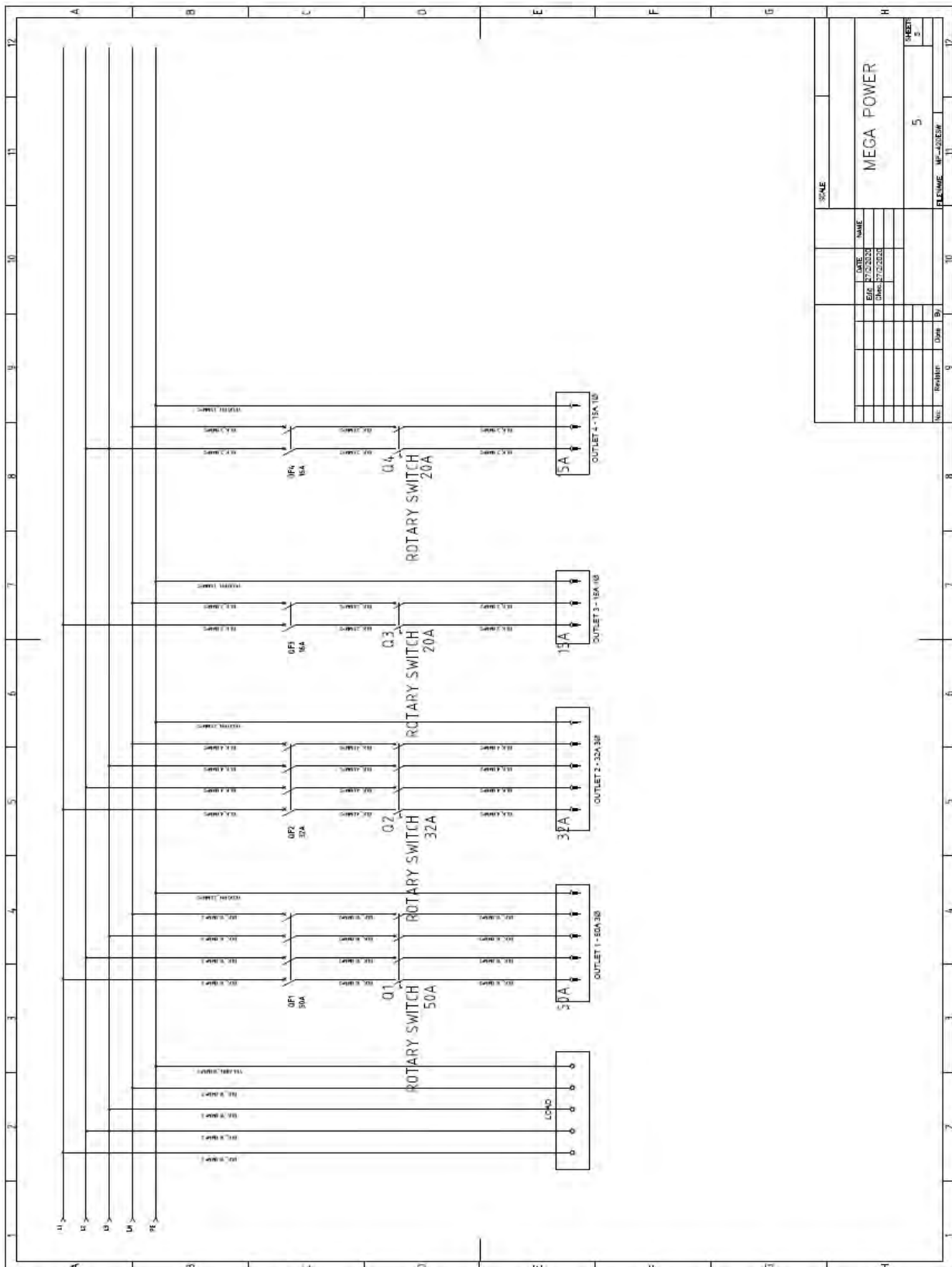
Wiring Diagram for MP-42-DESW Cont.



Wiring Diagram for MP-42-DESW Cont.



Wiring Diagram for MP-42-DESW Cont.



Welder

FEATURES BENEFITS OF WARRIOR™ 500i CC/CV

Multi-Process:

Includes MIG, Flux-Cored, Stick, Live TIG Start and Arc Gouging gives you the flexibility at work:

- Flux-Cored and Solid wire, 0.8 -1.6 mm.
- Carbon Arc Gouging up to 9.5 mm (3/8 in.).
- 6010 (cellulosic) capability

High Duty cycle: For long runs and various applications giving high productivity.

Durable and rugged: IP23 rating for outdoor and indoor use in rough environment.

Easy to use: Simple and clear user interface for everyone to get started quickly

Robust and ergonomic

Handles: Also, for mechanical lifting

Sun friendly display: Easy to read outdoor.

Inverter technology: Smaller, lighter and less energy cost, gives you value for money.

Generator compatible: For flexible use in different job sites.

Automatic Hot Start/

Variable Arc Control: To support your different demands.

Wide input voltage

Range: 342V to 456V to accommodate variation in the power grid or generators.

QUALITY AND ENVIRONMENT APPLICATIONS

IP23 rated - Withstands rain with the fan on. • Fabrication • Construction • Pipeline • Mobile Machinery • Outstanding Gouging Capability • Ship Building • Energy Generation • Repair & Maintenance • Rental Air tunnel design - Clean and dirty side in the machine to ensure long-term reliability. Auto fan - Reduces energy consumption and dirt intake.

3 years warranty.

TECHNICAL DATA OF WARRIOR™ 500i CC/CV

Mains Supply, 3 phase 50/60HZ	380-400-415 +/-10%
Mains cable, Ø mm ²	4 x 6
Fuse, Motor Start Type or Circuit Breaker Type C, A	32
Maximum load at:	
100% duty cycle A/V, 3phase 6	400/36
0% duty cycle A/V, 3phase	500/40
Setting range, A	
MIG/FCAW	16-500
Stick (MMAW)	16-500
TIG	5-500
Open circuit voltage, V	78
Open circuit voltage (VRD ON), V	<35
Idle Power, W	120
Efficiency at max. current %	88
Power factor at max current	0.92
Enclosure class	IP23
Dimensions (l x w x h mm)	712x326x470
with cooling unit (l x w x h mm)	712x325x700
Weight, kg	52
With cooling unit excl coolant, kg	67
Operating Temperature, °C	-10 to +40
Application class	S

STANDARDS

The warrior complies with the requirements of EN 60974-1 and IEC 974-1, as well as IEC/EN 60974-1/-2 and EN60974-10.

FEATURES BENEFITS WARRIOR™ 500i CC/CV

Multi-Process

Includes MIG, Flux-Cored, Stick, Live TIG Start and Arc Gouging gives you the flexibility at work: Flux-Cored and Solid wire, 0.8 -1.6 mm.

Carbon Arc Gouging up to 9.5 mm (3/8 in.).

6010 (cellulosic) capability. High Duty cycle for long runs and various applications giving high productivity.

Durable and rugged IP23 rating for outdoor and indoor use in rough environment.

Easy to use Simple and clear user interface for everyone to get started quickly.

Robust and ergonomic handles Also for mechanical lifting. Sun friendly display Easy to read outdoor.

Inverter technology Smaller, lighter and less energy cost, gives you value for money.

Generator compatible for flexible use in different job sites.

Automatic Hot Start/Variable Arc Control To support your different demands.

Wide input voltage range 342V to 456V to accommodate variation in the power grid or generators.

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IP23 rated - Withstands rain with the fan on.

Fabrication

Construction

Pipeline

Mobile Machinery

Outstanding Gouging Capability

Ship Building

Energy Generation

Repair & Maintenance

Rental Air tunnel design - Clean and dirty side in the machine to ensure long-term reliability.

Auto fan - Reduces energy consumption and dirt intake. 3 years warranty.

TECHNICAL DATA WARRIOR™ 500i CC/CV

Mains Supply, 3 phase 50/60HZ

Mains cable, Ø mm² Fuse,

Motor Start Type or Circuit Breaker Type C, A

Maximum load at: 100% duty cycle A/V, 3ph 60% duty cycle A/V, 3 phase Setting range

A MIG/FCAW Stick (MMAW) TIG Open circuit voltage, V Open circuit voltage (VRD ON), V Idle

Power, W Efficiency at max. current % Power factor at max current Enclosure class

Dimensions

(l x w x h mm) with cooling unit (l x w x h mm)

Weight, kg with cooling unit excl coolant, kg Operating Temperature, °C Application class

TECHNICAL DATA, WARRIOR™ FEED 304

Power supply, VAC Wire spool capacity, kg Max. spool diameter, mm Wire feed speed, m/min

Dimension incl. bobbin cover (l x w x h mm) Weight incl. bobbin cover, kg Wire dimensions:

Steel Stainless steel Aluminum Cored wire Enclosure class

TECHNICAL DATA, WATER COOLING UNIT

Power supply, from power source Coolant flow capacity, l/min Cooling power, kW Max pressure, bar Max pressure height to torch, m Weight / incl. coolant, kg Dimensions incl. filler tube l x w x h mm Enclosure class

WARRIOR™ 500i CC/CV, 380-415V Supplied with 3m mains cable

10. WARRANTY

1. GENERAL PROVISIONS AND LIMITATIONS

- 1.1 Mobile Energy Australia (hereafter "MEA") warrants to each original retail purchaser (hereafter "Buyer") that such product(s) are, at the time of delivery to the buyer, free of manufacturing defects in material and workmanship.

2. NO WARRANTY IS MADE WITH RESPECT TO

- 2.1 Any product(s) which in the judgment of MEA has been subject to negligence, accident, improper storage, improper installation, improper application, improper operation or maintenance or has been repaired or altered by others without the written authority of MEA.
- 2.2 Components or accessories manufactured, warranted and serviced by others.
- 2.3 Damages caused by the lack of normal maintenance, service and repairs such as the replacement and service of filters and seals.
- 2.4 Damages caused by the lack of normal minimum action, such as adjustments and inspections, replacement of items, such as service filters, seals and service kits.
- 2.5 Consequential damages caused by product(s) failure.
- 2.6 Any product(s) if other than MEA's genuine components are used in the product(s).
- 2.7 Normal wear and tear of product(s).

3. WARRANTY PERIOD

- 3.1 The warranty period will commence upon installation of the product(s). The returned registration form marks the date of installation. If the registration form is not received, the warranty period will be deemed to commence 30 days from date of shipment from MEA.
- 3.2 The Product(s) is warranted against manufacturer defects in materials and workmanship for a period of 12 months.
- 3.3 The compressor air end is warranted to be free from defects in material and workmanship for a period of two (2) years from the date of installation.
- 3.4 Components supplied under warranty shall be warranted for the remainder of the original warranty period.
- 3.5 MEA factory rebuilt components shall be warranted for a period of 6 months from date of shipment.

4. MEA OBLIGATIONS

- 4.1 The obligation of MEA is limited to repairing or replacing parts, during normal business hours, at an authorized service facility, any component, that in the judgment of MEA are defective.
- 4.2 The obligation of MEA is limited to replacement of faulty parts. No liability is accepted for any freight costs, consequential damages, injuries or expenses directly or indirectly related to the Product(s) failure.

WARRANTY (continued)

5. BUYER OBLIGATIONS

- 5.1 Buyer shall notify MEA of the alleged defect within 10 days of initial discovery and return the allegedly defective component(s) within 30 days of initial discovery.
- 5.2 The Buyer must prepay all costs associated with the warranty.
- 5.3 The Buyer must return components claimed under this warranty to a facility designated by MEA for evaluation, to establish a claim under this warranty.
- 5.4 Buyer shall maintain and service MEA Product(s) in accordance with the MEA Product(s) Owner's Manual.

6. WARRANTY REGISTRATION VALIDATION

- 6.1 A registration form is provided to the Buyer with the product(s). The form must be fully completed by the Buyer and returned to MEA upon completion of the installation of the product(s) in order to validate the warranty. No warranty claims will be processed unless MEA has received a fully completed warranty registration form.

7. DISCLAIMER AND WARRANTY SERVICE

- 7.1 Any labor costs claimed in excess of MEA's set rate and/or times are not provided by this warranty. If applicable, any labour costs in excess of MEA rate schedules caused by, but not limited to, location or inaccessibility of the equipment, travel time or labour provided by unauthorized service personnel are not provided by this warranty.
- 7.2 This warranty is in lieu of all other warranties or obligations expressed or implied. MEA expressly disclaims all implied warranties of merchantability or fitness for a particular purpose.
- 7.3 Warranty claims must be pre-authorized by MEA, and the components returned via prepaid freight using the designated "Returned Merchandise Authorization" number and form.

PLEASE NOTE:

Both the MEA Product Registration Form and the Kubota Engine Warranty Registration Form **MUST** be returned to MEA.

WARNING!!!

Failure to return PRODUCT WARRANTY REGISTRATION FORMS detailed above may result in the delayed processing of warranty claims.

MOBILE ENERGY AUSTRALIA - CONTACTS

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