

Sr. No. \_\_\_\_\_



**OPERATION CUM MAINTENANCE MANUAL  
AND SPARE PARTS LIST FOR INVERTER BASED  
MMA/ MIG WELDING OUTFIT**

## **CHAMP VERSA 800**

COMPLYING TO EN/IEC 60974-1



### **PLANT**

**ADOR WELDING LIMITED  
(FORMERLY ADVANI - OERLIKON LTD.)  
EQUIPMENT PLANT  
SURVEY NO. 147/2B, AKURDI  
NEAR KHANDOBA MANDIR  
P.B.NO. 9, AKURDI  
CHINCHWAD, PUNE-411 019  
TEL: +91 20 4070 6000  
FAX: +91 20 4070 6001**

### **REGISTERED & CORPORATE OFFICE**

**ADOR WELDING LIMITED  
ADOR HOUSE  
6K, DUBHASH MARG  
FORT, MUMBAI - 400 001, INDIA  
TEL: +91 22 6623 9300 / 2284 2525  
FAX: +91 22 2287 3083**

**HELPLINE NUMBER – 1800 233 1071  
(FOR WELDING & CUTTING EQUIPMENT, SERVICES & SPARES)**

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## **1.0 SAFETY:**



### **IMPORTANT SAFETY INFORMATION!!!**

Read the following instructions carefully before installation, use or servicing of this unit. Pay close attention to the safety rules and contact your distributor if you do not understand some or all of the points covered in these instructions.

### **INTRODUCTION:**

All people authorized to use this machine should read the following instructions manual before using or servicing this unit.



### **A REMINDER: YOUR SAFETY DEPENDS ON YOU!!!**

Always follow all safety regulations and instructions when using this machine. It is your responsibility to protect yourself and others against the risks related to the operation of this welding machine. The operator must be familiar with and observe all the safety rules regarding the safe operation and maintenance of this welding machine

### **GENERAL PRECAUTIONS**



#### **1.1 Fire (WELDING SPARKS can cause fire or explosion):**

- Avoid causing fires due to sparks, slag, hot metal and spatter which are produced during normal welding operations. If this is not possible, cover them to prevent the welding sparks from starting a fire.
- Make sure that a suitable fire extinguisher is located near the welding sight.
- Remove all flammable material within 35 feet(10m) of the welding area.
- Do not weld containers (tanks or drums) containing flammable material, even when they are empty.
- Vent hollow castings or containers before heating, cutting or welding. They may explode
- Allow the welded metal to cool down before touching it or putting it into contact with flammable material.
- Do not weld structures with hollow spaces containing flammable substances.
- Do not work in conditions where there are high concentrations of combustible vapours, gases, or flammable dust.
- Always monitor the work area half an hour after welding so as to make sure that no fire has started.
- Do not keep any flammable material such as lighters or matches in your pockets while using this equipment.
- Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situation.
- To protect from sparks and spatter Wear oil free protective garments such as leather gloves, welding apron, safety shoes and a cap over your head. Wear ear plugs during welding . Always wear safety glasses with side shields when in a welding area..
- Connect Earthing cable to the work piece near to welding surface. Earthing cables connected to the building framework or other locations away from the work piece may 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.



#### **1.2 Fumes/ Gases (FUMES AND GASES can be dangerous):**

Welding operations produce harmful fumes and metal dusts which may be hazardous to your health; therefore:

- Work in well-ventilated areas.
- Do not inhale fumes. If ventilation is inadequate, use an approved respiratory set.
- In closed areas, use a fume exhaust system, preferably placed under the welding area if possible.
- Make sure that person using welding equipment, as well as air-supplied respiration devices, are qualified and trained for proper use of such equipment.
- Remove all coatings and solvents from the metal before welding.
- Consult with a local expert to implement a site plan to make sure air quality is safe.



### **WARNING: NEVER USE OXYGEN FOR VENTILATION.**

- Gas leaks in welding area should be avoided. Leaked gas in large quantities can dangerously alter oxygen levels in the air surrounding the weld site.
- Do not place gas cylinders in confined spaces.
- **DO NOT WELD** where solvent vapors can be drawn into the welding shield atmosphere or where arc rays can come into contact with even minute quantities of flammable gases.
- Shielding gases used for arc welding can displace air and cause health issues. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.



### **Burns**

- Welding fumes can burn eyes and skin.
- Protect your entire body by wearing fire-retardant clothing. This will protect your skin against burns caused by: ultraviolet radiation given off by the arc, sparks and molten slag.
- The protective clothing should include: gloves, a hat, and safety shoes.
- Wear a helmet equipped with the appropriate lens shade and a clear glass cover plate. This is imperative when welding, cutting, and chipping to protect your eyes from ultra-violet arc rays and molten spatter. Replace the glass cover plate when cracked or covered with spatter etc.
- Do not wear clothing spotted with oil or grease as a spark may set them on fire.
- Hot metal, electrode stubs and work pieces, should never be handled without gloves.
- Ear plugs should be worn when working in the overhead position or in confined spaces. Safety helmet should be worn when others are working overhead.
- Flammable hair sprays and gels should not be used by those persons intending to weld.



### **1.3 Explosions**

- Do not weld above or near containers under pressure.
- Do not weld in environments containing explosive dusts, gases or vapors. Precautions must be taken when transporting, handling, and connecting gas cylinders.



### **A) GAS CYLINDERS**

- **NEVER DEFACE** or alter the name, number, or other markings on a cylinder. It is illegal and dangerous!
- Do not use cylinders whose contents are not clearly identified.
- Do not directly connect cylinder to the unit without using a pressure regulator.
- Handle and use pressure cylinders with care and in conformity with local safety standards.
- Do not use damaged cylinders.
- Never use a cylinder that is not upright and secured in place
- Do not transport or move cylinders without the protection of the installed valve and protective valve cap.
- Do not lift cylinders off the ground by: their valves or caps, by chains, by slings, or by magnets.
- Never try to mix gases in a cylinder.
- Never lubricate the cylinder valve with oil or grease.
- Never allow an electrode to touch a cylinder!
- Do not expose cylinders to excessive heat, sparks, molten slag or flames.
- Do not tamper with the cylinder valve.
- Do not try to loosen tight valves by means of a hammer, a wrench, or any other object

### **B) PRESSURE REGULATORS**

- Keep pressure regulators in good condition. Damaged regulators may cause damages or accidents. They should be repaired by skilled personnel only.
- Do not use regulators for gases other than those for which they were manufactured.
- Never use a damaged or non-calibrated regulator.
- Never lubricate regulators with oil or grease.
- Do not use regulators for gases other than those for which they were manufactured.

### C) HOSES

- Replace hoses which appear to be damaged.
- Keep hoses unwound in order to prevent kinks.
- Keep the excess hose neatly wound and out of the working area in order to avoid damage.
- Cylinder fittings should never be modified or exchanged.



#### **1.3 Electric shock (ELECTRIC SHOCK CAN KILL)**

- Do not touch live electrical parts.
- Insulate yourself from the work piece and the ground by wearing insulated gloves and clothing.
- Keep garments (gloves, shoes, hats and clothing) and body dry.
- Do not work in humid or wet areas.
- If you are welding near a body of water take precautions to ensure that the machine cannot fall into the water.
- Avoid touching or holding the work piece by hand.
- Stop welding immediately if you should feel even the slightest sensation of electric shock. After this do not use the machine until the problem is identified and corrected.
- Often inspect the mains input cable.
- Disconnect the power input cable from the mains supply before replacing cables or before removing the unit covers.
- Do not use the unit without protection covers.
- Always replace any damaged parts with SPARE PARTS with the help of service engineer or trained person.
- Provide a disconnect switch close to the power supply with properly rated fuses. This switch allows the operator to turn off the power supply quickly in an emergency situation.
- Inspect and replace any worn or damaged torch leads.
- When making input connections, attach a proper grounding conductor first.



#### **1.4 Radiation**

Ultra-violet radiation emitted by arc rays may damage your eyes and burn your skin. Therefore:

- Wear proper clothing and helmet.
- Do not use contact lenses!! The intense heat created by the arc may cause them to stick to the cornea.
- Use a mask or helmet equipped with suitable lens shades.

Arc current	Minimum protective shade number (ANSI Z49.1:2012)	Suggested shade number for comfort (ANSI Z49.1:2012)	OSHA 29CFR 1910.133(a)(5)	Europe EN168:2002
Less than 40 A	5	5	8	9
41 A to 60 A	6	6	8	9
61 A to 80 A	8	8	8	9
81 A to 125 A	8	9	8	9
126 A to 150 A	8	9	8	10
151 A to 175 A	8	9	8	11
176 A to 250 A	8	9	8	12
251 A to 300 A	8	9	8	13
301 A to 400 A	9	12	9	13
401 A to 800 A	10	14	10	N/A

- Warn people in the surrounding area where welding should be done. Remember: the arc may dazzle or damage the eyes. It is considered dangerous up to a distance of 50 feet(15 meter).
- Do not look at an arc with the naked eye.
- Prepare the welding area so as to reduce the reflection and transmission of ultra-violet radiation: paint walls and exposed surfaces in black to reduce reflection.
- Replace protective lenses whenever damaged or broken.

### **1.5 EMF (electric and magnetic fields) Information**

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). EMF may also interfere with medical implants, e.g. pacemakers. Protective measures for persons with medical implants shall be taken. For example, access restrictions for passers-by or individual risk-evaluations for welders. All welders should use the following procedures in order to minimize the risk associated with exposure to EMF from the welding circuit:

- Do not coil or drape cables around your body.
- Do not place your body between welding cables. Arrange cables to one side and away from the operator
- Keep head and trunk as far away from the equipment in the welding circuit as possible
- connect the return cable to the work piece as close as possible to the area being welded
- do not work next to, sit or lean on the welding power source
- do not weld whilst carrying the welding power source or wire feeder



First-aid equipment and a qualified first-aid person should always be available when welding, unless medical facilities are in the immediate vicinity, to treat flash burns of the eyes and skin burns.



Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet and follow your employer's safety practices



### **STATIC ELECTRICITY CAN DAMAGE PRINTED CIRCUIT BOARDS**

Use proper precautions when handling printed circuit boards:

- Store printed circuit boards in anti-static containers.

Wear a grounded wrist strap when handling printed circuit boards



### **1.6 DISPOSAL OF ELECTRICAL AND ELECTRONIC EQUIPMENT**

Do not dispose of electrical equipment together with normal waste! In observance of European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative. By applying this European Directive you will improve the environment and human health!

## **2.0 ELECTROMAGNETIC COMPATIBILITY**

### **Introduction:**

All our CE-marked equipment are built in compliance with standard EN60974-10. The equipment should be installed and used in accordance with the information below to achieve electromagnetic compatibility. The limits required by EN60974-10 may not be adequate to completely eliminate interference when the affected equipment is in close proximity or has a high degree of sensitivity. In such cases it may be necessary to use other measures to reduce further interference. This welding equipment is designed for use only in an industrial environment.

### **Installation and use:**

The user is responsible for installing and using the MMA equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing to the welding circuit, see Earthing of the work piece. In other cases, it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases, electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

### **Assessment of area:**

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

- a. Other supply cables, control cables, signaling 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 equipment, for example guarding of industrial equipment.
- e. Health of the people around, for example the use of pacemakers and hearing aids.
- f. Equipment used for calibration or measurement.
- g. Immunity of other equipment in the environment. User shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures.
- h. Time of day that welding is 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 must 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 of the mains. 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 mains supply so that good electrical contact is maintained between the conduit and the welding power source enclosure.

#### **Maintenance of Welding equipment:**

The welding equipment must be routinely maintained according to the manufacturer's recommendations. All access 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 as set forth in and in accordance with the manufacturer's written instructions.

**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 workpiece 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, for example, ship's hull or building steel work, a connection bonding the work piece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the work piece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the work piece to earth should be made by a direct connection to the workpiece.

**Screening and shielding:**

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference.

**National and local codes:**

National and local codes governing plumbing and electrical installation shall take precedence over any instructions contained in this manual. In no event Ador shall be liable for injury to persons or property damage by reason of any code violation or poor work practices.



### 3.0 INTRODUCTION:

This instruction manual provides information on installation, operation and maintenance of the Inverter based DC welding power source CHAMP VERSA 800.

CHAMP VERSA 800 is an Inverter based Power Sources suitable for MMA/GOUGING and MIG/MAG application.

It has constant current characteristic achieved by High frequency Pulse width modulating circuit by switching IGBT, Main Power Transformer. This switching output of Main Power Transformer is rectified by the secondary Diode Rectifier. Set output current is constant against input supply variations of +15 % and -10 %.

Power source is protected against single phasing, under voltage, over voltage, short circuit and temperature rise.

### 4.0 PROTECTIONS:

The Equipment is provided with following protections:

- **Under Voltage:** TRIP LED (Red) glows if supply voltage goes low (< 340VAC.)
- **Over Voltage:** TRIP LED (Red) glows if supply voltage goes high (>470 VAC).
- **Over Temperature:** TRIP LED (Red) glows if the temperature of the main power components is over the safety limits.
- **Single phasing protection:** If any one of the three phases (R, Y or B) is absent welding will stop and TRIP LED (Red) will glow.



Welding current wouldn't be available when TRIP LED (Red) glows.



In all protection cases machine will be auto reset and start functioning once the abnormal condition is eliminated.

SR.NO	ERROR CODE	ERROR	DESCRIPTION
1	Err 001	UNDER VOLTAGE ERROR	Error occurs when supply voltage goes low (< 340VAC.)
2	Err 002	OVER VOLTAGE ERROR	Error occurs when supply voltage goes high (>470 VAC).
3	Err 003	THERMAL TRIP ERROR	Error occurs when the temperature of the main power components is over the safety limit
4	Err 004	NO CURRENT ERROR	Error occurs when torch switch is pressed for more than 4sec and welding current is not flowing
5	Err 008	COMMUNICATION ERROR	Error occurs when interconnection cable from the wire feeder is not connected to power source
6	Err 010	CURRENT IMBALANCE ERROR	Error occurs when there is difference in current flowing between upper & lower section of power source

## **5.0 FEATURES:**

- Indigenously developed Inverter based digitally controlled MMA/GOUGING and GMAW outfit.
- Advanced digital control algorithms enable superior arc characteristics.
- Synergic mode of operation for single point control that allows Automatic parameter selection (Synergic) in MMA, MIG mode
- Digital pulse feedback from wire feeding motor for accurate control of wire speed.
- Dual 7 segments LED display for actual current/ wire speed and voltage display.
- Wire Feeder with digital console for remote parameter setting.
- For MIG Mode: Available with detachable wire feeder with standard 5 meter interconnection cable and optional 10 meter interconnection cable.
- For MMA Mode: Available with standard 10 meter long remote control & optional 50 meter long remote control
- High efficiency (>85%)
- Protections against over and under input supply voltage, Single-phasing and Overheating of power components

## 6.0 TECHNICAL SPECIFICATIONS: (CHAMP VERSA 800 COMPLYING TO IEC60974-1)

Sr. No.	Parameter	Unit	Value
1	Normal input voltage	V <sub>AC</sub>	415 V
2	Input voltage range	V <sub>AC</sub>	415 +15% -10%
3	Phase	No.	3
4	Frequency	Hz	50 / 60
5	Input Power @ 415V <sub>AC</sub> in MMA Mode		
	@ 100 % Duty Cycle	KVA	36 max
	@ 60 % Duty Cycle	KVA	46 max
	@ No load	KVA	0.2
6	Input Supply Current @ 415V <sub>AC</sub>		
	@100%Duty Cycle	A	50
	@60% Duty cycle	A	64
	@ No Load	A	0.24
7	Efficiency	%	> 85
8	Power Factor	λ	0.84 Max
9	Open circuit voltage @ 415V Input Supply	V <sub>DC</sub>	89 V(+/-5V)
10	Welding current range		
	In MMA mode	A	100 – 800
	In MIG mode	A	100 – 600
11	Welding current (at 40°C and 10 minute cycle)		
	@ 100 % duty cycle (MMA / MIG)	A	600
	@ 60 % duty cycle (10minute cycle) (MMA)	A	800
12	Welding electrode sizes (Diameter) (MMA)	mm	3.2,4,5,6.3
13	Gouging Electrode sizes (Diameter) (MMA)	mm	Up to 9mm
14	Suitable wire size (MIG)	mm	1.2, 1.6 mm Diameter
15	Remote controller ( for MMA mode )	10 meter	Provided for current setting.
16	Front Panel functions	-	1) Mains ON 'Green' color indication
			2) MMA / GOUGING 'Red' color indication
			3) MIG 'Red' color indication
			4) REMOTE ON 'Red' color indication
			5) Trip 'Red' color LED for indication of machine is under protection mode.
			6) DPM for display of current/ wire speed & voltage with LED indication
			7) Current/ wire speed adjustment encoder
			8) Power ON/OFF switch
17	Protections (AUTO Resettable)	-	7) Remote Connector
			1) Over voltage, Under voltage, Single-phase protection.
			2) Over temperature protection
18	Cooling	Type	Forced air
19	Class of Insulation	-	H
20	Degree of protection	-	IP23 (S)
21	Dimensions: Length X Width x Height	mm	805 mm X 470 mm X 895 mm(with handle)
22	Weight (Approx.)	KG.	93

- **WIRE FEEDER SPECIFICATIONS:**

**Model: REACHFEED 40**

Sr. No.	Parameter	Unit	Value
01	Suitable for Wire Sizes	mm	0.8,1.0,1.2,1.6
02	Wire feed Speed	Mtr/min	2.0-22
03	Wire Roll Drive	Type	4 Roll
04	Wire Drive Motor	Type	Permanent Magnet D.C. 42 V, 80 Watts
05	Dimensions:		
	Length	mm	655
	Width	mm	227
	Height	mm	400
06	Weight (Approx.) Without spool & cable assembly	Kg	13

- Available in suitcase type & light weight modular design, which is easy to carry.
- Detachable interconnection cable
- Wire Feeder with digital console for remote parameter setting
- Gas Flow meter provided on wire feeder to monitor the gas flow remotely.
- Separate connector is provided on front panel of wire feeder for connecting it to JOB. **Connection from wire feeder to JOB is not required for Champ Versa 800. This connection should be left open.**

## 7.0 **INSTALLATION AND COMMISSIONING:**



**Read the manufacturers' instruction manual before installing the equipment.**

The user is responsible for installing and using the arc welding equipment in accordance with the manufacturer's instructions. If electromagnetic disturbances are detected, then it shall be the responsibility of the user of the arc welding equipment to resolve the situation with the technical assistance of the manufacturer.

- **Unpacking and Inspection:**

After receipt of equipment, unpack the equipment and check for external damage. In case of any external damage, open top and side covers and inspect for any damaged components, loose wires, and loose parts. Get help from our nearest area office if required. If no damage is observed, reinstall the covers.

- **Installation:**

- i) **Location:**

Before installing arc welding equipment, the user shall make an assessment of potential electromagnetic interferences in the surrounding area.

The following shall be taken into account:

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

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

The unit should be placed in dry, clean and well-ventilated place where there is free circulation of clean air. It should not be kept with side covers or back covers touching the walls. Otherwise because of insufficient air circulation, it will result into temperature trip condition.

Ensure that it is not placed in the vicinity of grinding, filing operation where metallic particles dirt, dust etc. enters into the equipment along with air and result into failure of equipment.

**Location of gas cylinders:** Care shall be taken to prevent gas cylinders in the vicinity of the work piece becoming part of the welding circuit

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

**Selection of supply cables:** Supply cables for welding equipment and their overload protection, if not provided, select in accordance with the information given in following table.

Maximum effective supply current	Range of cross - sectional area of conductor (mm <sup>2</sup> )
10	1.5 - 2.5
16	1.5 - 4.0
25	2.5 - 6.0
35	4.0 - 10.0
50	6.0 - 16.0
63	10.0 - 25.0
80	16.0 - 35.0
100	25.0 - 50.0
125	35.0 - 70.0
160	50.0 - 95.0
200	70.0 - 120.0
250	95.0 - 150.0
315	120.0 - 240.0
400	150.0 - 300.0

Supply cables shall be placed, so that they cannot be damaged in use. If that cannot be achieved, a sensitive residual current circuit breaker, capable of operating at a leakage current not exceeding 30 mA

**Supply disconnecting device:** The installer shall ensure that a supply disconnecting device is fitted at the point of supply

**Emergency stopping device:** When welding is carried out in an environment with increased hazard of electric shock, means for electrically disconnecting the welding power source or the welding circuit quickly shall be provided within easy access

The following precautions shall be taken to reduce the risk of an electric shock from the voltage between the welding electrode and earth:

- a) if possible, the welding power source shall not be taken into the environment with increased hazard of electric shock. If not possible, the welding power source shall be supplied by an insulating transformer;
- b) Keep the welding power source out of normal reach of the operator during welding. Additional protection against a shock from current from the mains supply under fault conditions may be provided by the use of a residual current circuit breaker that is capable of operating at a leakage current not exceeding 30 mA and feeds all mains powered equipment in the vicinity. The residual current circuit breaker shall be sensitive to all types of current;
- c) Use insulating platforms or mats

Preferably should be carried out by an electrician.

Switch off input ON/OFF switch of equipment as well as input isolator of mains output from where you are connecting power to equipment before making connections.

**Ensure that voltage, no. of phases and frequency of input supply is as specified in technical specification of this equipment. Also ensure that recommended switch fuse unit is used.**

Connect green colour or green-yellow lead of input supply cable to earth/ground connection. Other three wires to be connected to 3-phase supply.

Securely tighten the connections in order to get specified performance of the equipment. Loose connections will result into joint heating and finally breakdown of equipment.

Equipment nominal input supply is 415V, 3 phase, 50 / 60 Hz.

**iii) Output Connections:**

Two output connections +ve and –ve are provided on front cover of equipment for connecting Earthing cable and electrode holder cable. Adequate current capacity cables are to be connected to these terminals. Cable with electrode holder is used for holding electrode and cable with earth clamp is to be used for connecting to work piece. Ensure that connections are tightened properly to avoid overheating of terminals and also to get proper welding current.

Remote control unit is to be plugged into 4-pin socket provided on front cover so that you can set current remotely, while you are performing welding operations

**Welding Cables:** The welding cables shall be kept as short as possible and shall be positioned as close as possible to each other, running at or close to the floor level. The welding cables shall never be coiled.

Copper conductor welding cables shall be selected in accordance with duty cycle and national regulations or, when not existing, current rating given in following Table.

Nominal Cross-sectional area (mm <sup>2</sup> )	Current Ratings in Amps for specified duty cycles at ambient temperature of 25° C						
	100	100	100	101	106	118	158
10	100	100	100	101	106	118	158
16	135	136	136	139	150	174	243
25	180	182	183	190	213	254	366
35	225	229	231	243	279	338	497
50	285	293	296	316	371	457	681
70	355	367	373	403	482	602	908
95	430	448	456	498	606	765	1164
120	500	524	534	587	721	917	1404
150	580	610	622	689	853	1090	1676
185	665	702	717	797	995	1277	1971

Where long cable runs are involved, it may be necessary to choose the cable size on the basis of voltage drop, see the following table.

Nominal Cross-sectional area of conductor (mm <sup>2</sup> )	DC * Voltage drop / 100 A / 10 m of cable at various temperatures					
	Copper Conductors			Aluminium Conductors		
	20 C	60 C	85 C	20 C	60 C	85 C
10	1.950	2.260	2.450	-	-	-
16	1.240	1.430	1.560	-	-	-
25	0.795	0.920	0.998	1.248	1.450	1.580
35	0.565	0.654	0.709	0.886	1.030	1.120
50	0.393	0.455	0.493	0.616	0.715	0.778
70	0.277	0.321	0.348	0.440	0.511	0.555
95	0.210	0.243	0.264	0.326	0.379	0.411
120	0.164	0.190	0.206	0.254	0.295	0.321
150	0.132	0.153	0.166	0.208	0.242	0.263
185	0.108	0.125	0.136	-	-	-
* The corresponding values when AC may be much higher, depending on the configuration of the cables						

**Equipotential bonding:** Bonding of all metallic objects in the surrounding area should be considered for the purpose of reducing emissions. However, metallic objects bonded to the work piece will increase the risk that the operator could receive an electric shock by touching these metallic objects and the electrode at the same time. The operator shall be insulated from all such bonded metallic objects.

**Earthing of the work piece:** Where the work piece is not bonded to earth for electrical safety, a connection bonding the work piece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the work piece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the work piece to earth should be made by a direct connection to the work piece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected in accordance with national and local 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 area may be considered for special applications.

**Summation of no-load voltages:** If more than one welding power source is in use at the same time, their no-load voltages can be cumulative and could create an increased hazard of electric shock. Welding power sources shall be installed so as to minimize this risk.

**Connection between the welding power source and the work piece:**

- The electrical connection between the welding power source and the work pieces shall be made as direct as practicable by means of an insulated return cable having an adequate current carrying capacity;
- Extraneous conductive parts, such as metal rails, pipes and frames shall not be used as part of the welding circuit, unless they constitute the work piece itself;
- The return clamp shall be as near as practicable to the welding arc;
- Connection of the return cable to the work piece shall be ensured by the use of devices having suitable means for cable connection, a fastening system not liable to come loose accidentally, and good electrical contact. Magnetic devices only present a good electrical contact if the contact surfaces of the magnetic device and the contact area of the work piece are sufficiently large, even, conductive and clean (e.g. free from rust and primer) and if the contact area of the work piece is magnetic;
- Connection devices for non-stationary flexible welding cables in the welding circuit shall:
  - Have an adequate covering of insulating material to prevent inadvertent contact with live parts, when connected, with the exception of the return clamp at the work piece itself;
  - Be suitable for the sizes of cables used and the welding current;
  - Be effectively connected to the welding cables and in good electrical contact with them.

Both the welding cable and the connection device shall be used within their specified current rating. The connection device shall not be fitted with a cable smaller in diameter than specified by the manufacturer of the connection device.

### **INTERCONNECTIONS:**

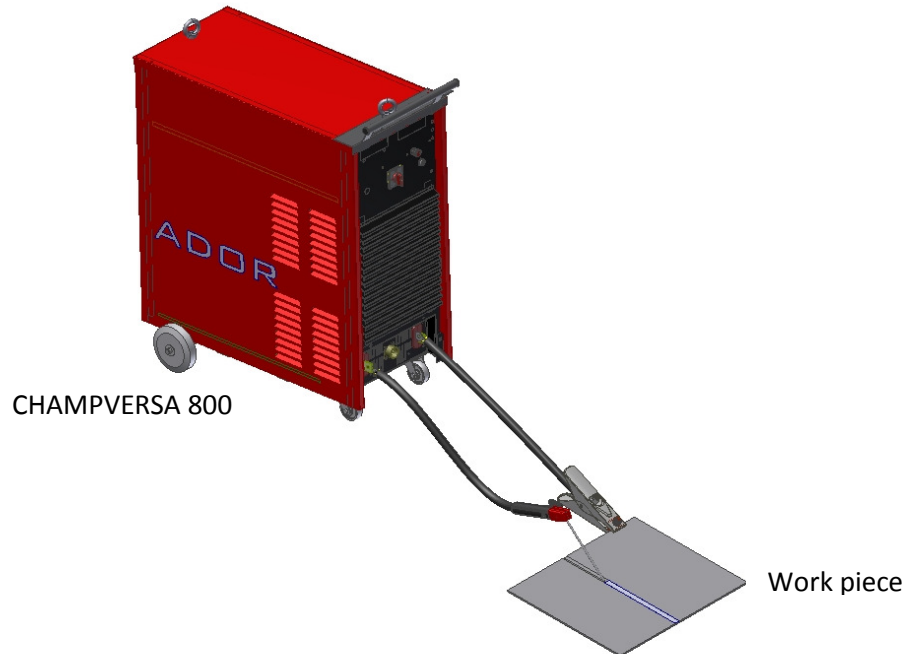
Make interconnections between power source, wire feeder, and torch, welding electrode holder cable, shielding gas pre-heater etc. depending on mode of operation, as shown in Circuit diagram. Ensure that connections are tight and firm. For satisfactory performance of machine, it is very important that all Interconnections are correct and they are firm and tight.

### **WELDING SETUP DETAILS:**

#### **A) MMA WELDING/ GAUGING:**

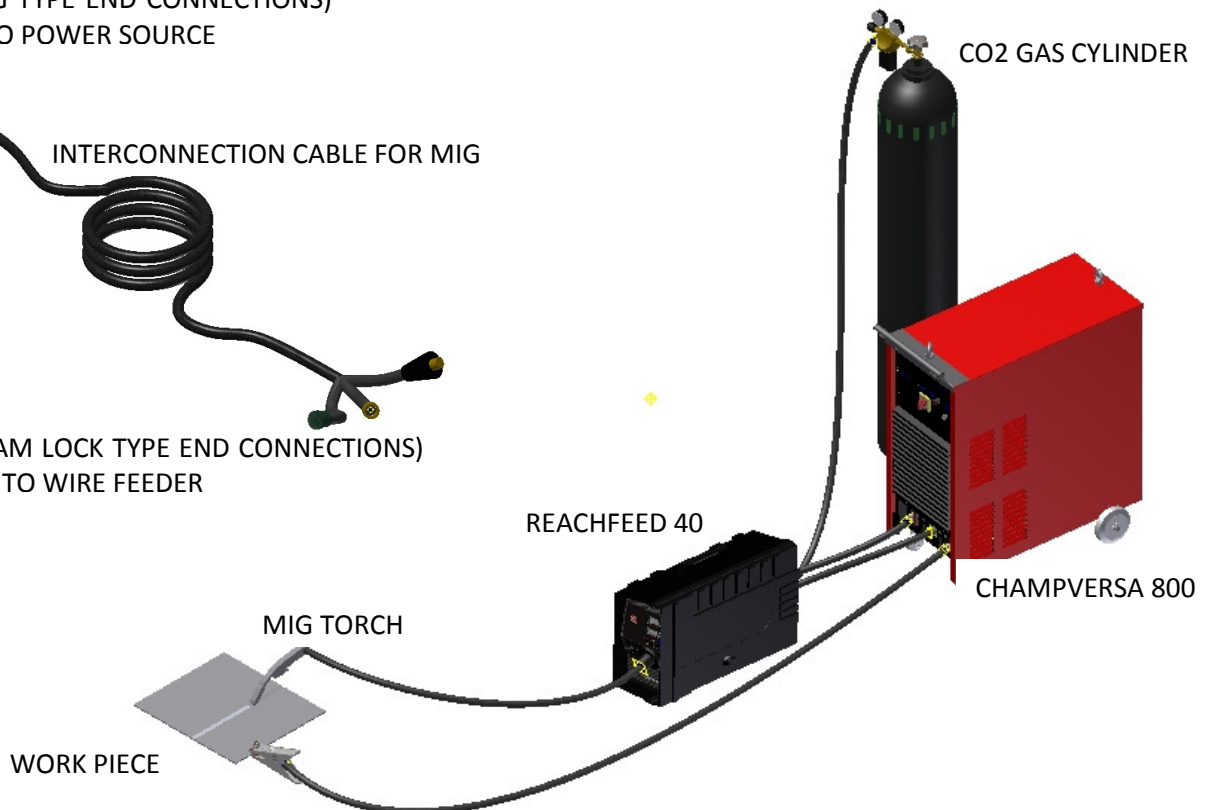
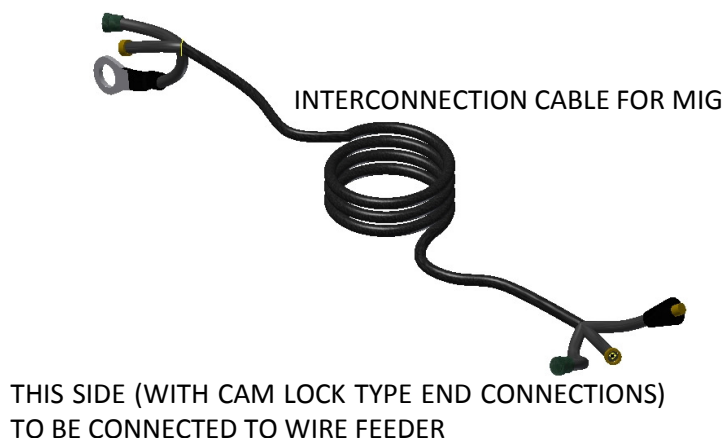
Note: Use polarity as per electrode selected for MMA welding

In case of Gauging, connect the gauging torch to +ve output terminal of power source.



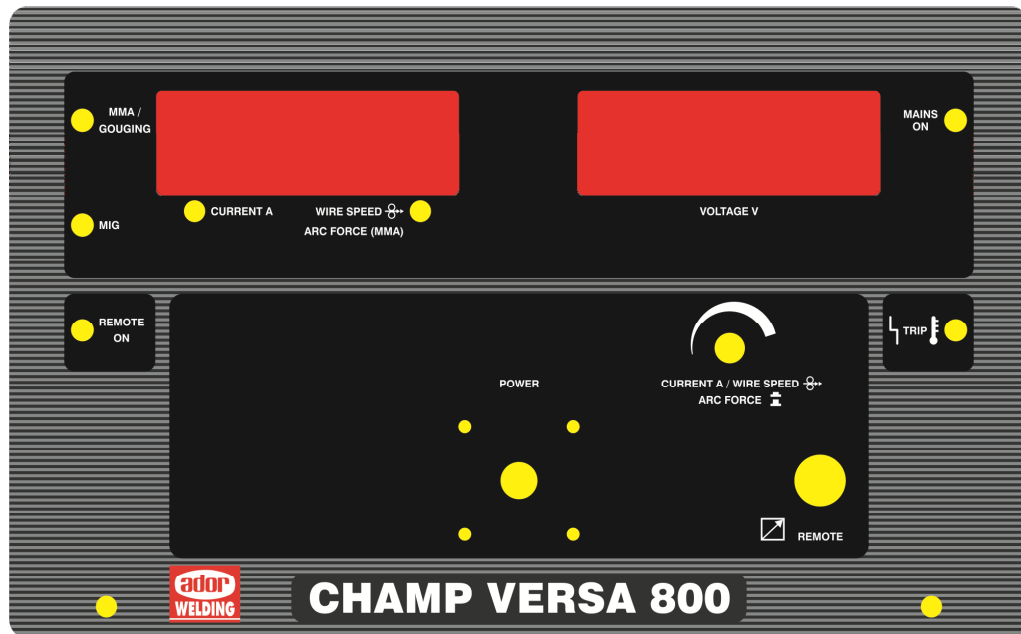
#### **B) MIG WELDING:**

THIS SIDE (WITH LUG TYPE END CONNECTIONS)  
TO BE CONNECTED TO POWER SOURCE





## 8.0 FRONT COVER CONTROLS AND INDICATIONS:



- **MAINS ON:** Mains Indication to indicate that machine is ready for use.
- **TRIP:** This LED glows in case any of the protections is activated. Welding current and output voltage is not available in this case.
- **Welding Current/Wire Speed Potentiometer:** For adjustment of welding current in MMA/ GOUGING mode when Remote is not connected and wire speed in MIG mode.
- **Socket for Remote Control:** Remote Control Unit can be connected to this socket.
- **Arc Force Adjustment:** When welding current encoder is pressed, arc force is displayed which can be set by the same encoder. After adjusting arc force, again press the encoder to set it & now display will show current & voltage. When minimum arc force is set, an output current characteristic is constant current. By increasing this pot, output current characteristics can be made drooping i.e. Arc Force can be increased.

**Arc force function is available in MMA mode for the current up to 200A.**

- **Digital Panel Meter:** Digital Panel Meter to display the set/ wire speed & actual current and other Panel Meter to display the actual voltage also.
- **CURRENT Indication:** This indication glows in case of MMA/ GOUGING mode & DPM shows current.
- **WIRESPEED INDICATION/ ARC FORCE INDICATION:** In case of MIG mode, this indication glows & DPM shows wire speed. In case of MMA mode, this indication glows only when arc force is set.
- **MMA/GOUGING Indication:** This LED will glow during MMA welding & GOUGING, When 14 pin connector is not connected to power source from wire feeder.
- **MIG Indication:** This LED will glow during MIG welding, When 14 pin connector is connected to power source from wire feeder.
- **Remote ON :** This LED will glow when Remote control unit is connected to remote connector on front panel of power source
- **Power ON/OFF Rotary Switch:** To switch ON/ OFF the machine

## 9.0 OPERATION OF EQUIPMENT:

After installing and commissioning of equipment, now it is ready for welding operation.

- Now you are also familiar with front cover controls and indications.
- Connect electrode holder cable with appropriate polarity for electrode you are using.
- Switch ON equipment by Mains ON switch (ON/OFF) provided on back cover and rotary ON/ OFF switch provided on front panel



**Allow the machine for 10 sec to perform internal calibration after switching it ON. Display will blink with “ADOR WELD” for this period.**

- Mains ON Green LED will be ON.
- Fan will start rotating which you will feel by air coming in from Back cover of Equipment.
- OCV will be available at output terminal in case of MMA/ GOUGING mode. And in MIG mode OCV will be available when the torch switch is pressed for welding operation.
- In case of MMA/ GOUGING, set welding current from panel using current potentiometer or Remote Control Unit required as per electrode and polarity you have connected.
- In case of MIG, set the wire speed from panel encoder / wire feeder & voltage from wire feeder.
- Strike the arc and perform the welding operation.
- Fine adjust the current/ voltage/ wire speed as per your requirement depending on mode of operation.

**Note: output –VE connection from wire feeder need not to connect in case of MIG. Earthing connection from power source to workpiece is required. Refer connection diagram.**

### 9.1 Recommended Currents for normally used electrodes:

Electrode	2.5 mm	3.15 mm	4.0 mm	5.0 mm	6.3 mm	Polarity
E-6013	80 A 60-90 A	125 A 100-130 A	170 A 140-180 A	220 A 180-240 A	275 A 230-310 A	Electrode -Ve
E-7018	80 A 60-90A	125 A 100-140 A	170A 150-200 A	200 A 200-240 A	275 A 270-360 A	Electrode + Ve
Plate Size	Up to 6.4 mm	Above 3.2 mm	Above 6.4 mm	Above 9.6 mm		

### 9.2 Recommended Parameters for gouging (Carbon Electrode Copper Coated):

Dia.	Current Amps	Polarity	Air Pressure Kg/cm2
6.0 mm	150-350	DC +	5.5 – 7
7.0 mm	175-400	DC+	5.5 – 7
8.0 mm	200-450	DC+	5.5 – 7
9.0 mm	300-600	DC+	5.5 – 7
12.0 mm	600-1000	DC+	5.5 – 7

## **10.0 INSPECTION AND MAINTENANCE:**

**Periodical inspection:** On installation, and periodically thereafter, an expert nominated for the task shall check that the welding equipment has been correctly selected and connected for the work to be carried out in accordance the manufacturer's instructions and that all connections are clean and tight and the welding equipment is in good condition

In addition, all protective earthing shall be checked for effectiveness. Any defects found shall be repaired

**Routine inspection:** The operator shall be instructed to check all external connections daily and each time a reconnection is made. Particular attention shall be paid to the installation of supply and welding cables, electrode holders and coupling devices. Any defects found shall be reported, and faulty equipment shall not be used until it has been repaired

The return clamp shall be connected directly to the work piece as close as practicable to the point of welding or to the welding bench on which the work piece is situated or to the work handling device.

For plasma cutting the no-load voltages are higher than with welding. This shall be considered during inspection and maintenance procedures. Particular attention shall be paid to the water cooling equipment to ensure that any leaks do not affect the insulation

**Disconnection of welding power sources and/or welding circuits:** If the supply cable or the welding cables are liable to damage when the welding power source is moved to another location, that power source, including its cables, shall be disconnected before it is moved.

When maintenance or repair work is carried out on the welding equipment, the input and output shall be disconnected.

**Guards:** Guards and removable parts of the enclosure shall be in position before the welding equipment is made live.

**Information for operators:** Operators and their assistants shall be trained in the safe use of equipment. Operators and persons working in the vicinity of the welding operation shall be warned of the hazards and informed about protective measures concerning arc processes.

The operator shall prevent gas cylinders in the vicinity of the work piece from becoming part of the welding circuit.

Maintenance of this equipment should be carried out preferably by a qualified electrician. He should be thoroughly familiar with operation of equipment.

All access and service doors and covers shall be closed and properly fastened when the arc welding equipment is in operation. The arc welding equipment shall not be modified in any way, except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilising devices shall be adjusted and maintained in accordance with the manufacturer's instructions

### **Protective measures:**

- 1) Extraneous conductive parts in the welding area:** With respect to extraneous conductive parts,
  - a) persons shall be aware of such parts;
  - b) care shall be taken to minimize the extent of such parts;
  - c) torches and electrode holders shall be kept insulated from extraneous conductive parts in the welding area.
- 2) Protection against electric shock:** The operator shall take precautions to be insulated from the electrode, the work piece and conductive parts in contact with earth in the vicinity. This can normally be achieved with dry gloves, clothing, head gear, footwear, dry boards and insulating mats or similar in good condition. An expert shall assess whether the proposed insulation method is suitable.

**Isolation of the welding circuit from the work piece and earth when not in use:** When not in use (e.g. during lunch or changing shift), electrode holders and torch circuits shall, where practicable, be switched off at the welding power source; if this is not possible, they shall be kept isolated and/or be insulated, without contact with the work piece or other conductive parts, especially the welding power source enclosures. Manual metal arc welding electrodes shall

be removed from the electrode holder when the welding operation has been completed. If applicable, shielding gas supply shall be closed.

The operator shall ensure that the return current clamp is either connected to the work piece or stored isolated from earth or any conductive part.

**Voltage between electrode holders or torches:** When working with several welding power sources on a single work piece or on conductively connected work pieces, a hazardous sum of no-load voltages may arise between two electrode holders or torches. This may reach twice the value of the admissible no-load voltage.

The instructed person who is co-ordinating the welding tasks shall ensure that a measuring device is used to determine whether there is a hazard.

Operators shall:

- a) be warned of this hazard;
- b) never touch two electrode holders or torches at the same time;
- c) work out of reach of each other, where practicable.

**Use of shoulder slings:** Welding shall not be carried out whilst carrying the welding power source, or wire feeder, e.g. by a shoulder sling. This is to prevent

- a) the risk of loss of balance if any connected cables or hoses are pulled;
- b) an increased risk of electric shock as the operator will be in contact with earth if using a class I welding power source whose enclosure is earthed by its protective earth conductor

**Welding at elevated positions:** Welding should not be carried out from elevated positions, where practicable, e.g. from a ladder, where even a minor electric shock may result in a fall.

Appropriate precautions shall be taken, e.g. by using a safe working platform

**Welding with suspended welding equipment:** For practical reasons, welding equipment may be suspended over the welding area. To avoid stray current, the hanging means shall be insulated. Precautions shall be taken to avoid the risk of falling objects (e.g. filler wire spool)

#### **General Maintenance:**

Working hours and surrounding environments should be considered while planning the maintenance of the equipment. Intended use and preventive maintenance will enhance the life of equipment.

#### **Cleaning:**

Machine should be disconnected from power supply before you carry out any type of maintenance.

Cleaning should be done at least once in three months if machine is used regularly. Dust accumulated in the machine, heat sink fins and other parts should be cleaned by low-pressure clean and dry air.

#### **Other electrical points to be checked are as follows:**

- Check tightness of power connections like supply, transformer, choke, Bridge Rectifier, IGBT etc.
- If you observe damaged power connections, it must be due to loose joint. Please rectify, clean and secure tightly.
- Check that connectors to electronic regulator are in place and firm.
- Check if any oil, water, metal particles are not in the machine. If you observe this, bring it to the notice of user and ask him to locate machine at proper place to avoid this. Observe condition of output power terminals and clean them thoroughly to get good electrical contact. If badly damaged, then replace with new terminals.
- See that equipment covers are in place and they are fitted when machine is in use.
- Ensure that user is using machine in properly ventilated area.

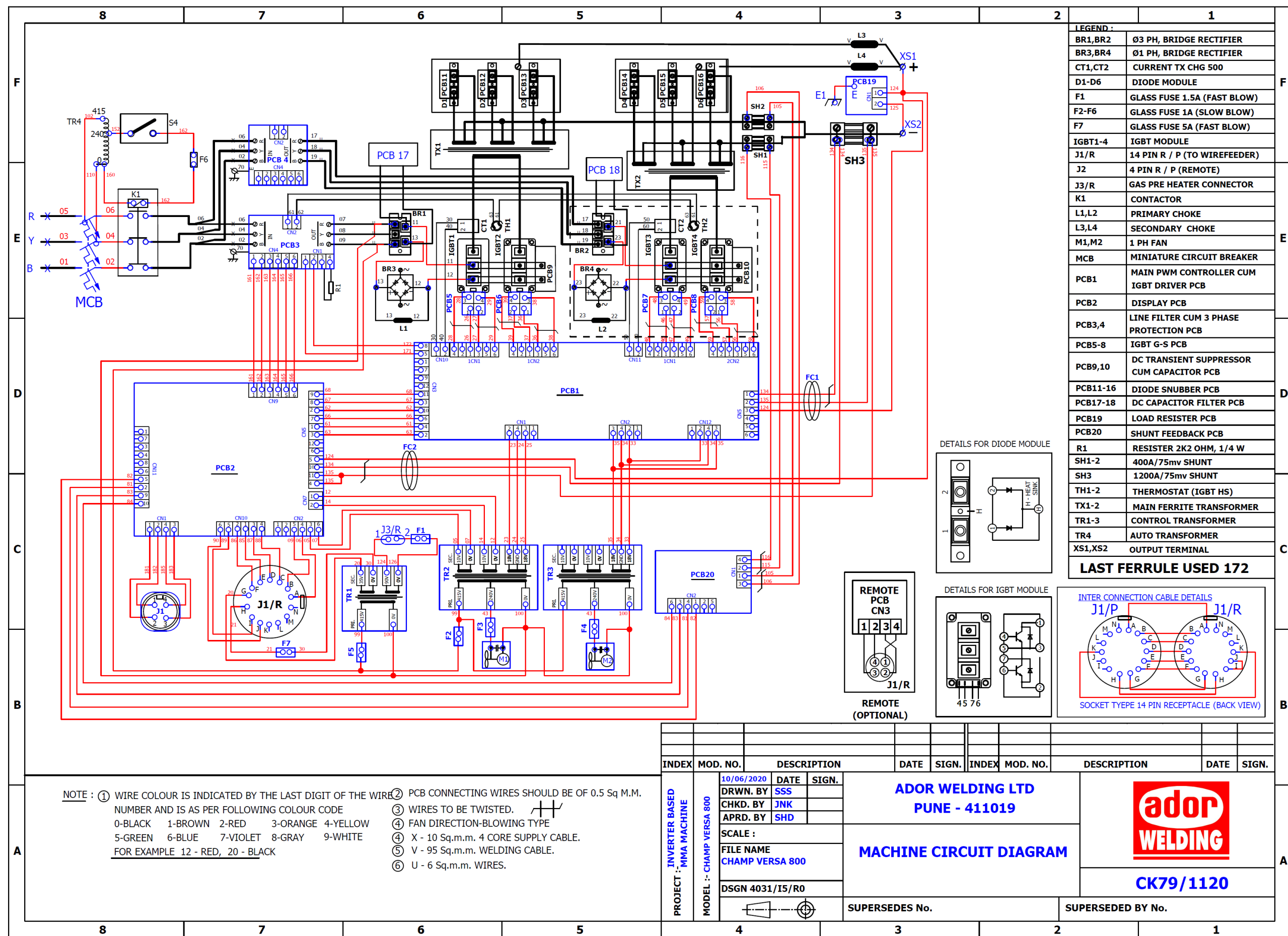
**Note: Spare parts list is enclosed in this manual. For spares, contact our area office.**

## 11.0 GUIDELINES FOR TROUBLESHOOTING: -

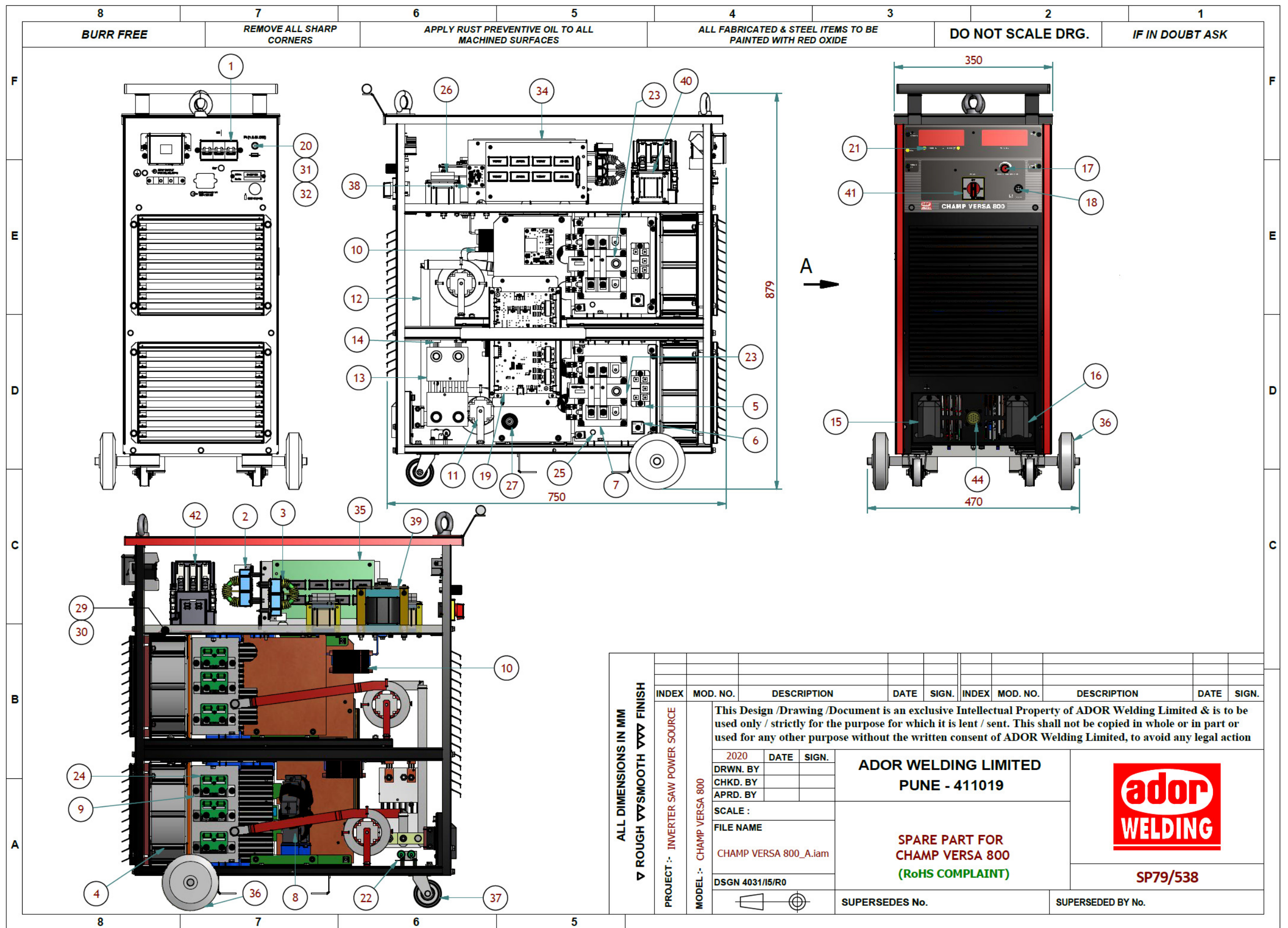
Complete outfit consists of power source and interconnecting cables so it is essential to know the area of trouble and to find out root cause. In case of difficulty, contact our nearest office for assistance.

It is essential that one must have knowledge of basic electrical circuit diagram reading and knowledge of electrical and electronic components.

No.	Problem	Cause	Corrective action
1	No output after switching 'ON' unit	* Faulty input supply	* Check input supply and supply fuse on the back cover of the machine
			* Check input voltage at ON/OFF switch of equipment.
			* All three phase should be available to the machine.
2	Working of Fan is abnormal when Switched ON.	Input supply may not be connected properly.	*Reconnect the power supply firmly
		Power line to fan may be loose.	*Reconnect power line of fan
		Line coil of fan may be burnt	*Replace the fan
3	No voltage & current display when m/c is Switched ON	Input supply to the Display PCB may not connected properly	*Check input supply 9.5V AC from auxiliary of Control Transformer TR1
4	O.C.V is not available at output terminal.	* Check fuse F provided on back cover.	* If found damaged, replace with same rating of fuse.
		* Check input AC supply to 3-phase bridge.	* Check input AC voltage at input of bridge.
		* Check input voltage at ON/OFF switch of equipment	* If found Faulty Replace It with the same Rating.
		*Check The Supply Voltage within the Range 350V- 460VAC	* If supply Voltage is Below 350V or Above 460V Then correct the supply voltage.
		* Main IGBT damaged.	* IGBT Faulty Replace With the same rating.
		*Faulty Rectifier Diode.	*Diode Faulty Replace with Same Rating.
		*Faulty control PCB.	*Replace Control Card.
		*Faulty IGBT driver P.C.B	*Replace IGBT driver P.C.B
5	Unstable Arc In MMA/ GOUGING Mode.	* Input supply connection loose	* Check and rectify.
		* Controller Feedback connection	* Check for loose connection.
		* Wrong polarity of electrode	* Check and correct the polarity.
		* Current setting not correct	* Correct the Voltage and current setting
		* Input supply voltage is low and unstable	* Use machine with stable input supply
6	Output welding current not controllable.	* Faulty current Pot for Current setting or faulty cable of remote Control.	* Check Pot and if found bad, replace it, check cable of remote unit
		*Check feedback wires / connection from shunt to controller.	* Check continuity by removing one end from shunt, clean shunt.









# ADOR WELDING LIMITED

## WELDING EQUIPMENT GROUP

### SPARE PART LIST

### MODEL: CHAMP VERSA 800

APPLICABLE FROM MACHINE SR. NO.:

Sr. No.	Spare Part Number	Description	Ckt. ref.	Qty. /m/c
1	S21.02.003.0573	Miniature Circuit Breaker	MCB	01
2	S17.01.008.0306	Line Filter Cum Three Phase Protection PCB (Upper Section)	PCB3	01
3	S17.01.008.0308	Line Filter Cum Three Phase Protection PCB (Lower Section)	PCB4	01
4	S21.08.005.0342	240Vac, Single Phase Fan	M1, M2	02
5	S22.74.071.0811	Three Phase Bridge Rectifier	BR1, BR2	02
6	S22.74.071.0048	Single Phase Bridge Rectifier	BR3, BR4	02
7	S17.01.001.2638	IGBT Module Unit Assembly for PWM cum Driver PCB	IGBT 1-4	04
8	S21.03.001.0885	Main Power Transformer	TX1, TX2	02
9	S22.06.050.0121	Diode Module	D1 – D6	06
10	S17.01.002.2372	Primary Choke	L1, L2	02
11	S17.01.002.2318	Secondary Choke (Bottom)	L3	01
12	S17.01.002.2317	Secondary Choke (Middle)	L4	01
13	S36.02.002.0331	Shunt (1200A)	SH3	01
14	S36.02.002.0343	Shunt (400A)	SH1, SH2	02
15	S01.01.024.0004	Output Terminal Strip (LH Side)	XS1	01
16	S01.01.024.0005	Output Terminal Strip (RH Side)	XS2	01
17	S12.30.002.0055	Knob with Cap Assembly for Potentiometer	-	01
18	S21.07.003.0189	Remote control connector on panel	J2	01
19	S17.01.008.0294	PWM cum IGBT Driver PCB	PCB1	01
20	S21.02.001.0191	Glass Fuse 1.5A Fast Blow (32X6.3MM)	F1	01
21	S17.01.008.0289	Front Panel Display PCB	PCB2	01
22	S21.01.007.1002	H.F. Bypass Cum Load Resistor PCB	PCB19	01
23	S17.01.008.0012	DC Transient Suppressor Cum Capacitor PCB	PCB9 &10	02
24	S17.01.002.0067	Diode Snubber PCB	PCB11-16	06
25	S21.02.002.0253	Thermostat (for IGBT HS)	TH1, TH2	02
26	S21.03.001.0888	Control Transformer	TR2, TR3	02
27	S11.01.015.0100	Toroidal Ferrite Bead	FC1, FC2	04
28	S17.01.001.2711	Remote Control Unit	-	01
29	S21.02.001.0140	Fuse (5mm X 20mm) 1A, Slow Blow	F2 – F6	05
30	S21.01.001.0218	Fuse holder	For F2 – F6	05
31	S21.01.001.0291	Fuse Holder (For Fuse Size 32 X 6.3MM)	For F1	01
32	S21.01.001.0292	Fuse Carrier (For Fuse Size 32 X 6.3MM)	For F1	01
33	S21.07.003.0188	Remote control Connector	-	01
34	S17.01.008.0307	Capacitor Filter PCB (Upper Section)	PCB17	01
35	S17.01.008.0309	Capacitor Filter PCB (Lower Section)	PCB18	01
36	S12.27.001.0754	Wheel (Back side)	-	02
37	S12.27.001.0753	Wheel (front side)	-	02
38	S17.01.008.0181	Double Shunt Feedback PCB	PCB20	01
39	S21.03.001.0988	Control Transformer for MIG	TR1	01
40	S21.03.001.0962	Auto Transformer for contactor	TR4	01
41	S21.02.004.0961	Rotary type Power ON/OFF Switch on front Panel	S4	01
42	S21.02.006.0829	3 Pole Contactor	K1	01
43	S21.02.001.0144	Fuse (5mm X 20mm) 5A, Fast Blow	F7	01
44	S21.07.003.0318	14 Pin Connector for connecting wire feeder on front panel	J1	01

**SL79/562**





# ADOR WELDING LIMITED

## WELDING EQUIPMENT GROUP

### TEST CERTIFICATE

### MIG/ MAG WELDING OUTFIT

SET SR. NO.:

MODEL	TICK (✓)
CHAMP VERSA 800	
*	

#### Specification:

#### **CONSTANT POTENTIAL RECTIFIER:**

Sr. No.	Parameter	<u>Unit</u>	<u>Value</u>
01	Normal input voltage	VAc	415 V ,3 Ph
02	Input voltage range	VAc	415 +15% - 10%
03	Phase	No.	3
04	Frequency	Hz	50-60
05	Open circuit voltage @415V, 3 Ph	Vdc	89V (+/-5V)
06	Welding current range	A	MMA 100 – 800
			MIG 100 – 600
07	Cooling	Type	Forced Air
08	Maximum continuous hand welding current @ 60 % D.C	A	800 (MMA)
09	Maximum automatic welding current @ 100% D.C	A	600 (MMA/ MIG)

#### **WIREFEEDER : (Model: REACHFEED 40)**

Sr. No.	Parameter	<u>Unit</u>	<u>Value</u>
02	Normal input voltage for Motor	VDc	42 V
03	Input voltage range for Motor	VDc	42 +/- 0.5%
04	Wire Feed Speed (maximum)	Mtr/Min	22

This set has been tested for following tests and found satisfactory.

- A) Insulation Resistance Test
- B) Dielectric Test
- C) No Load Test
- D) Load Test
- E) Supply Voltage Variation Test
- F) Welding Test
- G) Remote Control Operation

**Note:** ✓Tick mark as per order.

\* Mention other items/ codes

For ADOR WELDING LIMITED  
In-Charge (I&FIT-SW&CE)

WELDING DIVISION

TC79/638

WELDING DIVISION

OP 1073  
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# ADOR WELDING LIMITED

## WELDING EQUIPMENT GROUP

### PACKING SLIP FOR MIG/ MAG WLDING POWER SOURCE

SET SR. NO.:

MODEL	TICK (✓)
CHAMP VERSA 800	
*	

#### 1.0 STANDARD SCOPE OF SUPPLY:

SR. NO.	DESCRIPTION	QTY. M/C	TICK (✓) CKD			
1.	POWER SOURCE	1 NO.				
2.	EARTHING CABLE ASSLY WITH EARTHING CLAMP	1 NO.	5 MTR	10 MTR	*	*
3.	REMOTE CONTROL UNIT	1 NO.	10 MTR	50 MTR	*	*
4.	WIRE FEEDER (DETACHABLE TYPE)	1 NO.				
5.	INTERCONNECTION CABLE	1 NO.	5 MTR	10 MTR	*	*
6.	GAUGING TORCH	1 NO.				
7.	OPERATION-CUM-MAINTENANCE MANUAL	1 NO.				
8.	WARRANTY CARD	1 NO.				
9.	*					
10.	*					

#### 2.0 OPTIONAL ACCESSORIES:

SR. NO.	DESCRIPTION	QTY. M/C	TICK (✓) CKD			
1	WELDING CABLE ASSLY WITH HOLDER	1 NO.	10 MTR	15 MTR	*	*
2.	GAS PRE HEATER ASSEMBLY	1 NO.	5 MTR	10 MTR	*	*
3.	PRESSURE REGULATOR CUM FLOW METER	1 NO.	CO2		ARGON	
4.	IEC REWIRABLE INLET CONNECTOR	1 NO.				
5.	ANTISPATTER SPRAY	1 NO.				
6.	*					
7.	*					

Note: Any other length requirement other than this can be mentioned by FIT while giving packing slip

Note: ✓ Tick mark as per order.

\* Mention other items.

CHECKED BY:

DATE:

DESPATCHED BY:

DATE :

PS 922