

Transmig 650



**Please ensure that this
Instruction Manual
is made available
to the user
of the equipment.**



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WARNING

This welding equipment has been designed, manufactured and tested to the highest quality standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner and your attention is drawn to any maintenance instructions that are contained in this manual.

In general, all welding equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are small and the benefits in performance, reliability and safety are significant. Left alone, they can put the equipment, and you, at risk.

Have this equipment regularly inspected and maintained by an approved service centre.

WARNING

ARC WELDING/CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can Kill

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves, or wet clothing.
- Insulate yourself from earth and work.
- Ensure your working position is secure.

FUMES AND GASES - Can be Dangerous to Health

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and general area.

ARC RAYS - Can Injure Eyes and Burn Skin

- Protect your eyes and body. Use correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

**READ AND UNDERSTAND THIS INSTRUCTION MANUAL
BEFORE INSTALLING OR OPERATING AND SEE WMA PUBLICATION 237
'The arc welder at work' AVAILABLE FROM THE MANUFACTURER.**

PROTECT YOURSELF AND OTHERS

SAFETY

In any arc welding or gouging operation, it is the responsibility of the user to observe certain safety rules to ensure his personal safety and to protect those working near him.

Read all safety articles relevant to arc welding published by the WMA. Pay particular attention to any **CAUTION** or **WARNING** Notes included in this manual. **CAUTION** indicates possible equipment damage. **WARNING** indicates possible hazard to life.

⚠ WARNING ⚠

*The ON/OFF switch on this equipment does not isolate the unit from the mains electrical supply. **AC POWER IS PRESENT ON THE ON/OFF SWITCH TERMINALS.***

*The On/Off lamp is an indication that the supply is switched on and does not imply that the unit is isolated from the supply. **BEFORE REMOVING THE COVERS FOR MAINTENANCE, ISOLATE THE UNIT FROM THE MAINS ELECTRICAL SUPPLY.***

1. Electrical

- ⚠ Treat electricity with respect. Even the open circuit voltage of this equipment can be dangerous. Adjustments to the torch or replacement of torch parts should be undertaken with the mains supply isolated from the unit.
If damaged torch cables or torch components are found, the unit must be disconnected from mains and defective parts must be replaced using only Murex spare parts.
- ⚠ Do not work on live circuits or cables. Disconnect the main power supply before checking the machine or performing any maintenance operation.
- ⚠ Be sure the case of the welding machine is properly connected to a good electrical earth.
- ⚠ Have the wiring for the welding machine installed by a qualified electrician. All connections must be made according to specifications in force and to general safety standards.
- ⚠ Do not stand in water or on damp floors while using an arc welder or cutter. Do not use in the rain.
- ⚠ Do not operate with worn or poorly connected cables. Inspect all cables frequently for insulation failure, exposed wires and loose connections.
- ⚠ Do not overload cables or continue to operate with overheating cables. Cables which are too small for the current carried will overheat, causing rapid deterioration of the insulation.
- ⚠ Pay attention that live parts of the torch do not touch any metal which is connected to the earth cable. Fix an insulated hook to hang the torch on when it is not in use.

2. Ventilation

- ⚠ Do not weld or cut on containers which have held combustible or flammable materials, or materials which give off flammable or toxic vapours when heated, without proper cleaning.
- ⚠ Locate the welding/cutting operation far enough from any vapour-type degreaser using trichlorethylene or other chlorinated hydrocarbons as solvents. The ultraviolet light from the arc can decompose these vapours into toxic gases at a considerable distance from the arc, even though the concentration of the gases is low enough to be undetectable by smell.
- ⚠ Be sure to provide adequate ventilation for removal and dilution of fume and gases. Fume exhaust facilities near the arc, or a ventilated helmet should be used when cutting in confined spaces or on toxic material.

3. Glare

- ⚠ Never look at the arc without wearing eye protection.
- ⚠ Always use the proper protective clothing, filter glasses, and gloves. Be careful to avoid exposed skin areas. Do not use cracked or defective helmets or shields.
- ⚠ Never strike an arc when there is someone near who is not protected from the strong light of the arc.
- ⚠ Warn bystanders who are not aware of the dangers of ultra-violet light.

4. General

- ⚠ Take care when lifting the unit.
- ⚠ Ensure that cylinders are secured by chains.
- ⚠ Locate the unit so that there is adequate air flow to the ventilation louvres.
- ⚠ Always dress correctly to protect against glare, radiation and spatter.

5. Fire

- ⚠ Ensure that the correct type of fire extinguisher is available in the welding area.
- ⚠ Do not weld near flammable materials or liquids, in or near explosive atmospheres, or on pipes carrying explosive gases.

6. Vehicle Electrics

- ⚠ When working on motor vehicles, remove the battery and any circuitry which may be damaged by the arc.
- ⚠ Whilst welding be aware of the possibility of 'hidden wires' behind panels or bulkheads.

INTRODUCTION

The Murex Transmig 650 is a three phase fully thyristor controlled d.c. dual-slope power source for MIG/MAG/FCW or MMA welding. Rated at 650A at 100% duty cycle the 650 can also be used for Arc Carbon Arc Gouging or even Submerged Arc Welding using either constant voltage or constant current modes.

The unit is designed to operate from 220/380/415V 50 Hz supplies. From the factory it is connected for 415V use and is fitted with a suitable primary cable for this input voltage level.

The Transmig 650 can be used with any 42V Murex wire feed unit, Transmatic 2 x 2, 4 x 4, 4 x 4HD etc. or with the Transmatic Suitcase units.

Some special features of the Murex Transmig 650 are as follows:-

- Continuous control of welding voltage or welding current enabling precise setting and adjustment either from the front panel or a remote location *e.g.* the wire feed unit or a remote control device.
- Electronic feedback control system which maintains constant output against temperature drift, mains voltage variations etc.

- Both thermal overload and overcurrent sensors which automatically shut off the machine output when safe operating conditions are exceeded.
- Thermostatic fan control which minimises the quantity of dirt, dust etc. drawn into the machine by the fan. The fan is automatically energised when the welding contactor is on or when sensitive components in the machine require cooling.
- Sealed electronic control pcb compartment preventing dust and dirt from damaging sensitive components.
- Both constant voltage (CV) and constant current (CC) characteristic selections together with relevant inductance taps. The CV mode and low inductance tap are for MIG/MAG or FCW welding applications. The CC mode and high inductance selections are optimised for MMA welding or ACA gouging.
- Accurate volt and ammeter
- Provision for either single welding output cables for operation up to 400-500A at 60% duty or dual/parallel cables for use up to 650A at 100%.
- Solid state contactor function. The thyristors are used as the means of controlling both welding output and on-off welding contactor function.
- Full compliance with new British and IEC Standards covering such equipments. This means longer duty cycle operation, (10 minutes of 5), improved insulation and greater safety criteria.

SPECIFICATION

Transmig 650 Power Source

Output:

Rating	650A/44V	100% duty
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Range		
MIG/MAG/FCW	100A/17V	to 650A/44V (CV)
MMA/ACA	50A/20V	to 650A/44V (CC)

OCV	
MIG/MAG/FCW	15 to 56V (CV)
MMA/ACA	66V (CC)

Characteristics	See Fig. 1
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Inductances	2, one for MIG/MAG/FCW one for MMA/ACA
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Input:

Mains Voltage	220/380/415V
	(Note machine supplied set for 415V)
Input Current	113/65/60A
Frequency	50 Hz
Phase	3
Power Factor	0.83%
Efficiency	83%
Fuse Rating at 415V	60A slow

Auxillaries & Control Voltages:

Wire Feed Unit	42Vac/10A	} Available at Terminal Board on inside rear panel
Water Cooling Unit	220V/2A or 115V/5A	
CO ₂ heater	42V or 115V at 150W	
Remote Control	0 - 10Vdc	

Dimensions:

Length	1270mm	} including undergear
Width	500mm	
Height	950mm	
Weight	300kg (net)	

Standards:

BS 638 pt.10 1990
IEC 60974 - 1

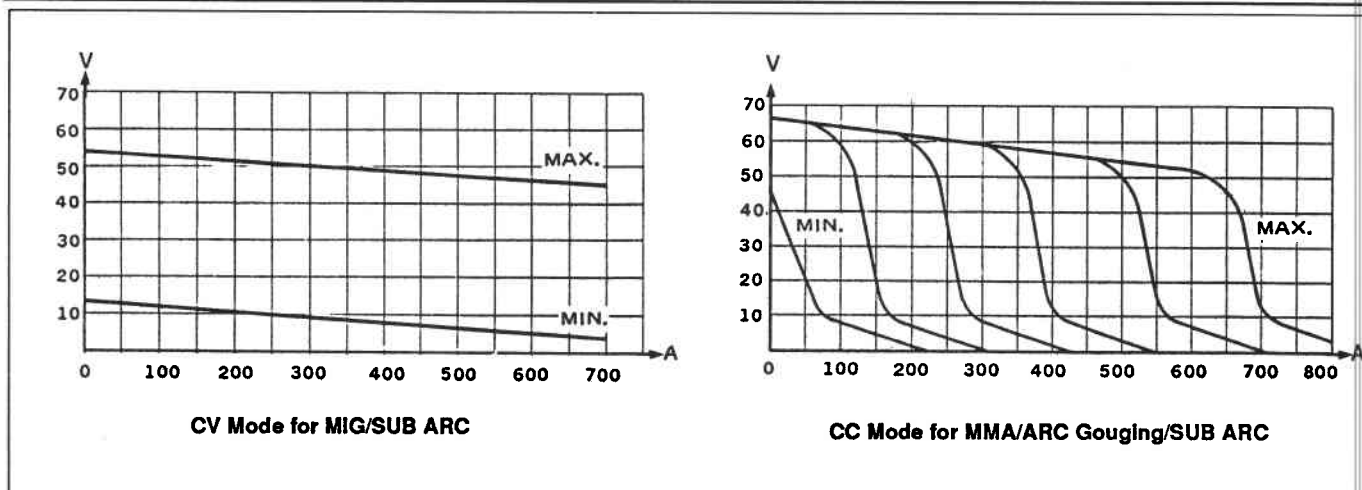


Fig. 1 Transmig 650 Volt Ampere Characteristics

INSTALLATION

WARNING

Installation should only be undertaken by a qualified electrician or trained individual.

Correct installation is important for the reliable and safe operation of the equipment. Before continuing carry out the following checks:

1. Having unpacked the power source, inspect for evidence of damage or missing parts. Notify the carrier or Murex immediately.
2. Check the air louvres in the front and rear panels for any packing materials that might obstruct the air flow.
3. Position the equipment in a safe area. Leave at least 0.5m clearance around the unit to allow air to circulate freely. The position should be free from dust, fumes and heat. See SAFETY at the front of this manual.

Connection to Mains Supply

WARNING

Before making electrical input connections to the unit, use 'machinery lockout procedures'. If the connection is to be made from a mains disconnect switch, the switch should be padlocked in the off position. If the connection is made from a fuse box, remove the fuses from the box and padlock the cover in the closed position. If locking facilities are not available, attach a red tag to the mains disconnect switch (or fuse) to warn others that the circuit is being worked on.

Placing the machine unit power switch in the 'Off' position does not shut off all power within the equipment.

Comply with local ordinances and electrical authorities.

The Murex Transmig 650 power source requires industrial 3 phase 50 Hz mains power of the proper voltage, 220, 380 or 415V, see SPECIFICATION section.

WARNING

From the factory the machine is set for 415V use and the fitted primary cable is suitable for use with 380 V or 415V supplies only.

Ensure the machine is connected for the correct supply voltage. Access to the primary reconnection panel, see Fig. 2, is via the hinged access door in the RHS panel.

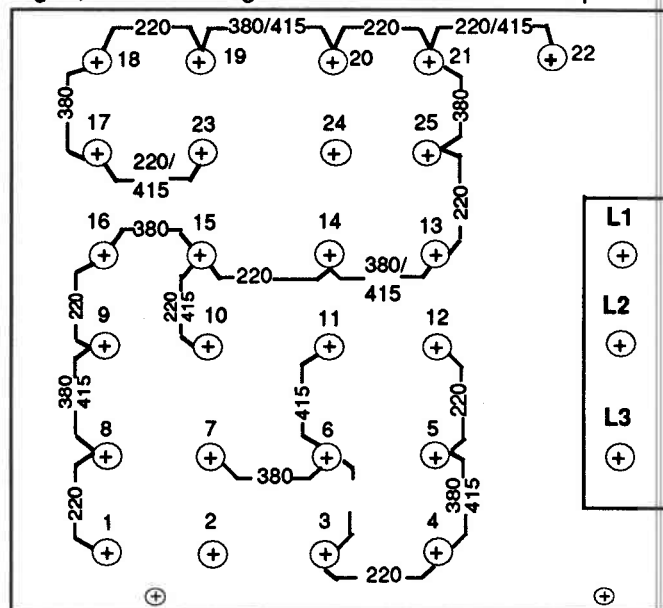


Fig. 2 Primary Reconnection Panel Position the links as shown for the appropriate mains input voltage

The power source should be connected to a separately fused circuit including a switched isolator. Fuse information is provided in the SPECIFICATION Section. Ensure the Green/Yellow ground cable is securely connected both to the supply ground system and the machine chassis.

Output Welding Connections

WARNING

Before making any connections to the power source output sockets ensure that all mains input power to the machine is off.

WARNING

If a gas cylinder is installed on the rear of the machine ensure the cylinder retaining chain is properly fitted.

Figure 3 illustrates the secondary welding circuit arrangement and connections to the power supply, wire feed unit and gas supply. It is essential that welding cables of the correct size are chosen relative to the maximum welding current being used. Figure 4 indicates the recommended welding cable sizes for various welding currents.

WARNING

The Transmig 650 utilises a unique dual output connection system. Each welding output power connection, positive low inductance, positive high inductance and negative are available at two alternative dinz sockets (70/95mm²), see Fig. 3, one above the other.

For currents up to 400-500A at up to 60% duty connections can be made by conventional single dinz plugs with appropriate cables (70/95mm²). For higher currents and duty cycles, up to 650A at 100%, dual cabling should be used with welding current being shared between two parallel cables/dinz connections.

The resistance of the welding cables and connections causes a voltage drop which is added to the arc voltage. Excessive cable resistance may result in overloading or reducing the maximum output current of which the power source is capable. In addition long cables, which can become coiled or wound around metal objects, may impair the welding characteristics of the machine.

Where long cables >15m, are to be used it is recommended that the cable size is increased relative to the current by one size (or more) and that 'go and return' cables are placed close together.

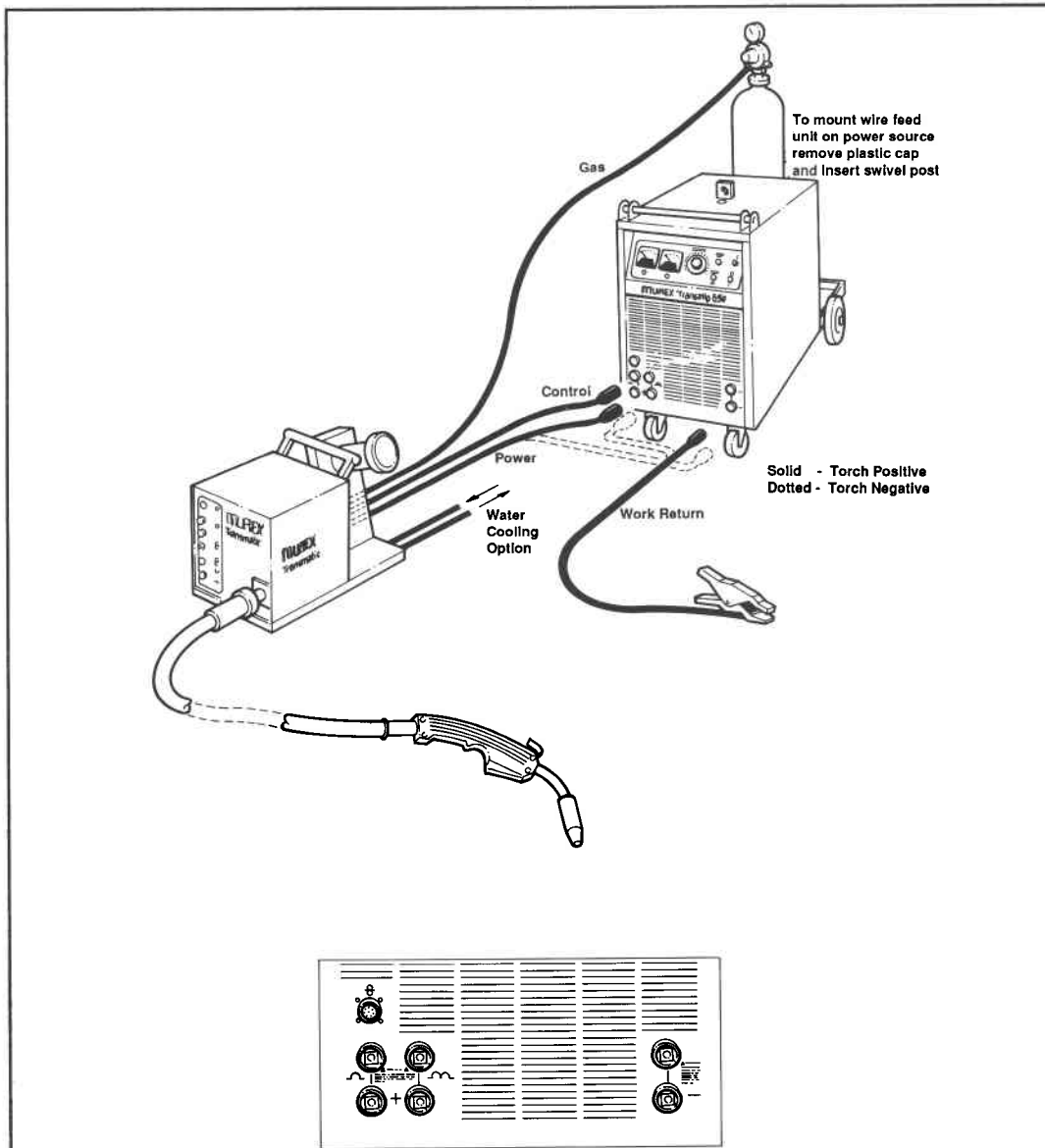


Fig. 3 Transmig 650 Secondary & Wire Feed Unit Connections

Copper Cable Size	60% duty * Ampere Rating	Voltage Drop per 10m length per 100A at 20°C
35mm ²	243A	0.565V
50mm ²	316A	0.393V
70mm ²	403A	0.277V
95mm ²	498A	0.210V
120mm ²	587A	0.164V
150mm ²	689A	0.132V

} TM 650

(* 10 minute repetitive cycle)

Fig. 4 Recommended Total Welding Cable Sizes

Fitting Optional Extras

A Terminal Board TB6 mounted on the inside rear panel provides a means of connection to the various auxiliary supplies available. Access to TB6 is via the hinged cover door in the RHS panel and blanked holes in the rear panel can be used to route the connection cables to the Terminal Board.

WARNING

Ensure suitable strain reliefs are fitted when routing cables through the rear panel.

TB6 provides 42V, 115V and 220V ac auxiliaries as well as a connection point for a cooling water flow switch or shielding gas pressure switch, see Fig. 5. The various auxiliaries are protected by resettable circuit breakers and fuses accessible on the rear panel.

WARNING

The 220V ac auxiliary is not isolated from the incoming mains and is for use with suitable torch water cooling units only.

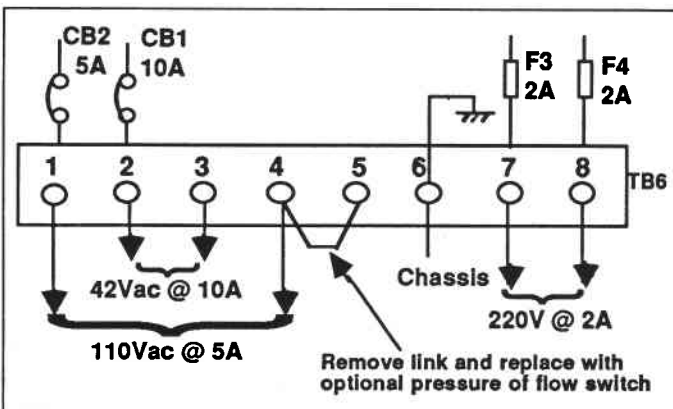


Fig. 5 Transmig 650 Rear Panel Terminal Board TB6

Remote Output Control

An 8 way amphenol connector J1 on the lower front panel is provided for connecting the 42V wire feed unit and/or a remote control device. Fig. 6 shows the pin allocation. The remote control may consist of a 10KΩ potentiometer or a 0-10V dc reference.

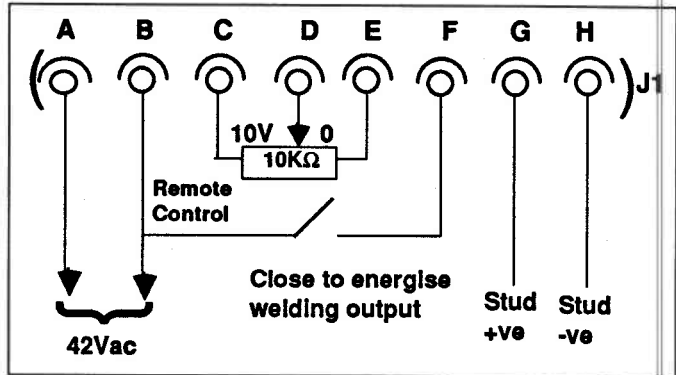


Fig. 6 Transmig 650 8 Pin Amphenol Socket

Inductance Selection

Two different inductances are available at the positive welding output connections.

1. The left hand LOW connection(s) is for use when MIG/MAG or FCW welding using the constant voltage mode.
2. The right hand HIGH connection(s) is for use when MMA welding or ACA gouging or Sub Arc Welding using the constant voltage mode.

CONTROLS

The front panel controls and facilities are illustrated in Fig. 7.

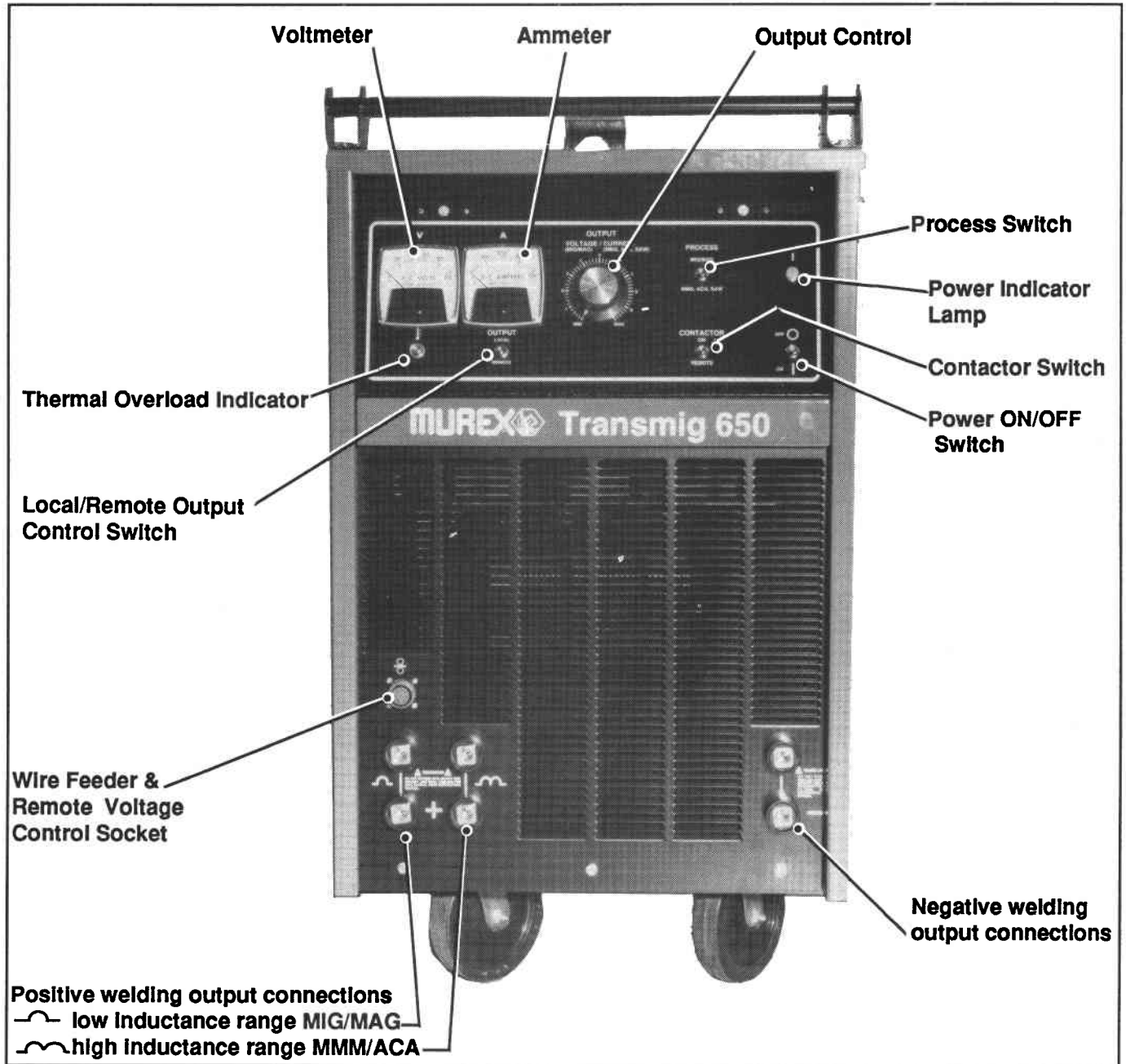


Fig. 7 Transmig 650 Front Panel Controls and Connections

1. Power ON/OFF Switch and Power Indicator Lamp. Placing the switch in the ON position energises the internal control circuitry and auxiliaries in the power source and closes the primary breaker supplying power to the main transformer. The white power indicator will light but the fan, which is thermostatically controlled, will not run (unless the machine was hot before switch on or the contactor switch is at ON).

WARNING

Placing the power ON/OFF switch in the ON position whilst the contactor switch, see below, is in its ON (up) position will mean open circuit voltage is immediately present at the output terminals.

2. Process Switch. In the MIG/MAG "up" position the Transmig 650 provides constant voltage characteristics, see Fig. 1, for MIG, MAG or FCW welding applications. In this mode the Output Control adjusts welding/open circuit voltage.

In the MMA/ACA/SAW "down" position the Transmig 650 provides constant current (steeply drooping) characteristics, see Fig. 1, suitable for MMA or SAW welding or Air Carbon Arc gouging. In this mode the Output Control sets the welding current.

3. Output Control and Local/Remote Switch. With the local/remote switch set to **LOCAL** welding output voltage in MIG/MAG process mode or current in MMA/ACA/SAW mode is continuously controlled by the front panel **OUTPUT** control over the full range. In the **REMOTE** position of the switch output control is transferred to a remote device connected to the front panel amphenol socket, see **Remote Output Control** under **INSTALLATION**

Note: If no remote control device is fitted and the local/remote switch is set to remote then the power source will produce minimum output voltage.

4. Contactor Switch. With the switch in the **REMOTE** "down" position the solid state welding contactor is energised by a signal from a torch mounted switch (via the wire

feed unit) at the front panel amphenol socket. In the **ON** "up" position the welding contactor is always energised and open circuit/welding output is constantly available. In general the **REMOTE** position is used for MIG/MAG welding and the **ON** position for MMA/ACA etc.

WARNING

Ensure the welding torch is held away from the work when operating the contactor switch. Open circuit voltage is present at the output connections when the switch is operated.

5. Thermal Overload Light. The amber light will illuminate and the power source output will be inhibited if the temperature of internal components becomes excessive. Should this occur, leave the power source to idle for a few minutes to cool down, do not switch the power source off as this will remove power from the cooling fan.

CAUTION

If the thermal overload warning light illuminates whilst the fan is not running switch off the power source and do not use until it has been checked by an approved service engineer.

MAINTENANCE

All welding equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used. Should this equipment fail to operate correctly, stop work immediately and have the problem investigated see TROUBLESHOOTING. Maintenance work must be performed by a trained person and electrical work by a qualified electrician.

WARNING

Switch off and disconnect the unit from the mains supply before undertaking any maintenance tasks.

Daily Tasks (Operator)

1. Check all welding and electrical cables for signs of damage, cracking or general deterioration. Have defective cables replaced.
2. Check that all electrical connections are in good condition. In particular inspect the work return to workpiece connections and check all welding connections at the power source output and the wire feed unit are secure.
3. Inspect the wire feed unit drive mechanism ensuring the drive rolls are in good condition and correct for the wire in use. Remove any dust or debris that may have collected around the rolls or drive stand. Ensure the wire reel is correctly fitted and its retaining nut is in place.

4. Check the welding torch for signs of damage. Replace any suspect part(s).

6 Monthly - (Maintenance Department)

WARNING

Switch off and disconnect the unit from the mains supply before undertaking any maintenance tasks.

1. Using a soft brush and/or a supply of clean dry compressed air clean out the inside of the power source. **Remember to wear suitable eye and mouth protection.**
2. Inspect the incoming chassis ground connection ensuring it is clean and tight.
3. Inspect the welding output dinse connections for signs of overheating or cracking. Replace if necessary

Annually - (Qualified Electrician or Approved Service Centre)

1. Carry out an insulation and continuity test.
2. Carry out a load and calibration check.

TROUBLESHOOTING

Symptom	Probable Cause
<p>1. Power Source Inoperative White light not on</p>	<ul style="list-style-type: none"> • No mains input supply • Defective power on/off switch • Internal fuses F1 or F2 failed
<p>2. No Output from Power Source White light on</p>	<ul style="list-style-type: none"> • Power Source overheated, check if fan is running and overload light is on. • Machine over current protection operated- Switch off power and then switch on again • Circuit Breaker CB2 (5A) tripped • Defective thermal switch(s) • Primary breaker K1 defective • Poor output connections • Control PCB defective or loose pcb connectors • Relay K2 defective or signal from torch switch missing. Confirm by pressing check OCV switch
<p>3. Output at Minimum (and not adjustable)</p>	<ul style="list-style-type: none"> • Local/Remote switch set to Remote with no remote control device connected • Missing incoming supply phase • Control PCB defective
<p>4. Output at Maximum (and not adjustable)</p>	<ul style="list-style-type: none"> • Defective Output control potentiometer or remote control device
<p>5. No 115Vac Auxilliary Output</p>	<ul style="list-style-type: none"> • Check CB2 (5A) on rear panel
<p>6. No 42Vac Auxilliary Output</p>	<ul style="list-style-type: none"> • Check CB1 (10A) on rear panel
<p>7. No 220Vac Auxilliary Output</p>	<ul style="list-style-type: none"> • Check Fuses F3 and F4 (2A) on rear panel
<p>8. Machine Casework gets hot (>40°C)</p>	<ul style="list-style-type: none"> • Check operation of fan thermostats, fan control relay and fan motor

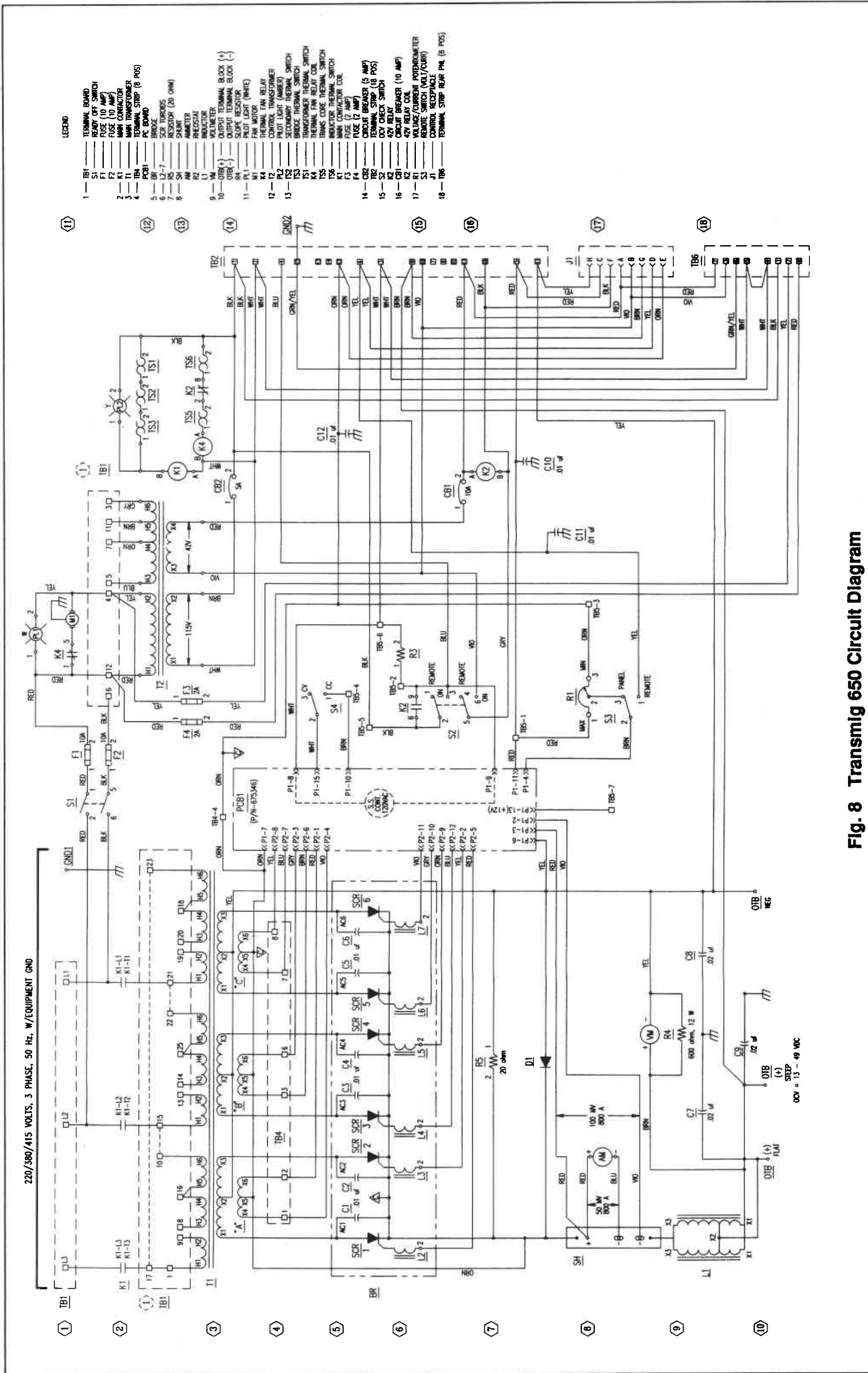
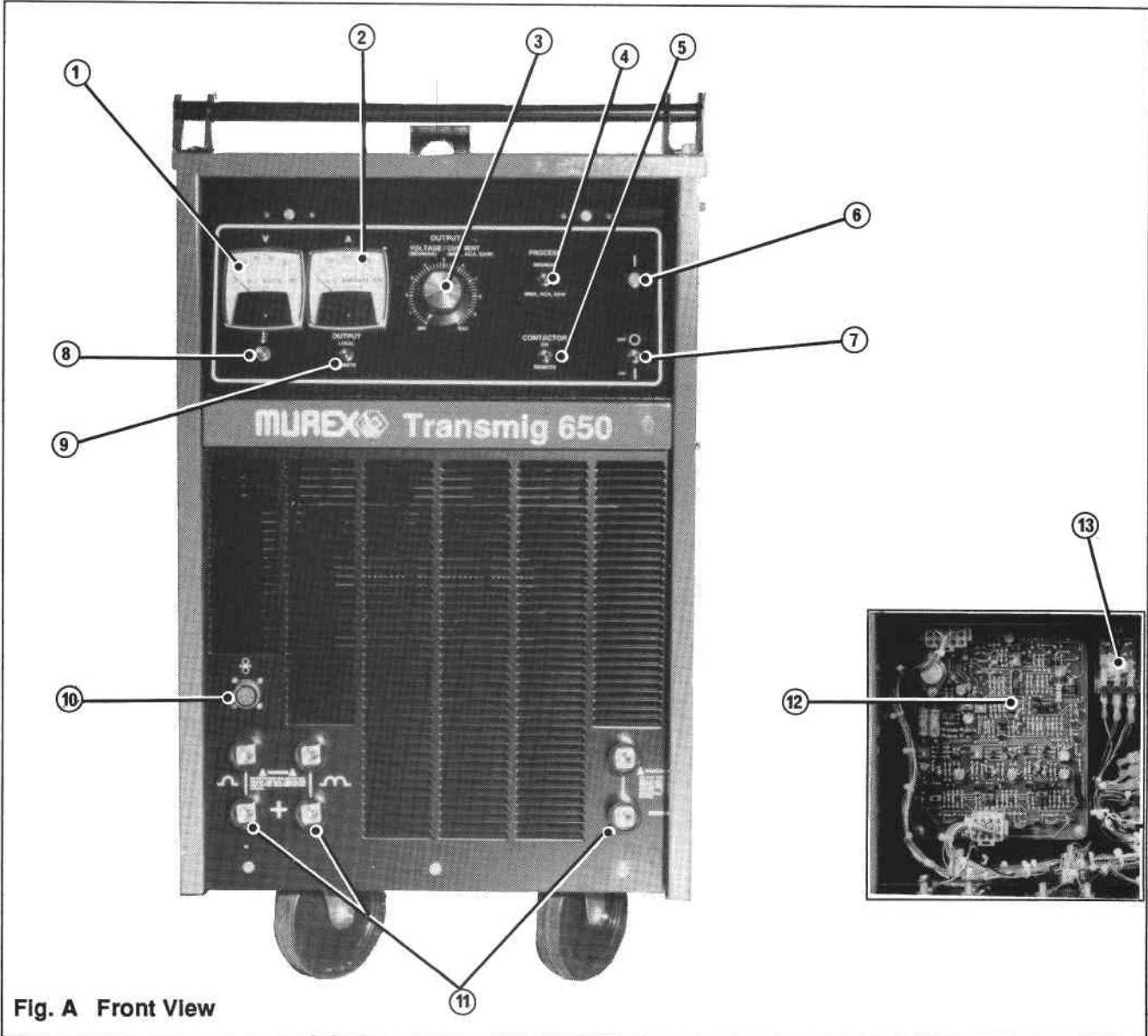


Fig. 8 Transmig 650 Circuit Diagram

Transmig 650 Parts List



Item	Part No.	Description	Ref.	Item	Part No.	Description	Ref.
1	1414890	Voltmeter 100Vdc	VM	10	1411754	8 way socket	J1
2	1414880	Ammeter 800Adc	AM	-	1411740	Plug for item 10	-
3	1407182	Potentiometer 10kΩ lin	R1	11	017242	Dinse socket	OTB
-	1414844	Knob for item 3	-	-	1380443	Plug for item 11 (70/95)	-
4	1411867	Switch SPST (Process)	S4			Inset	
5	1414601	Switch DPCO (Contactor)	S2	12	1414883	PCB control	PCB1
6	1413274	Lamp white	PL1	13	1413343	Relay 42Vac 3PDT	K2
7	1413343	Switch 3PST (Power)	S1				
8	1414842	Lamp yellow	PL2				
9	1411867	Switch SPST (Remote)	S3				

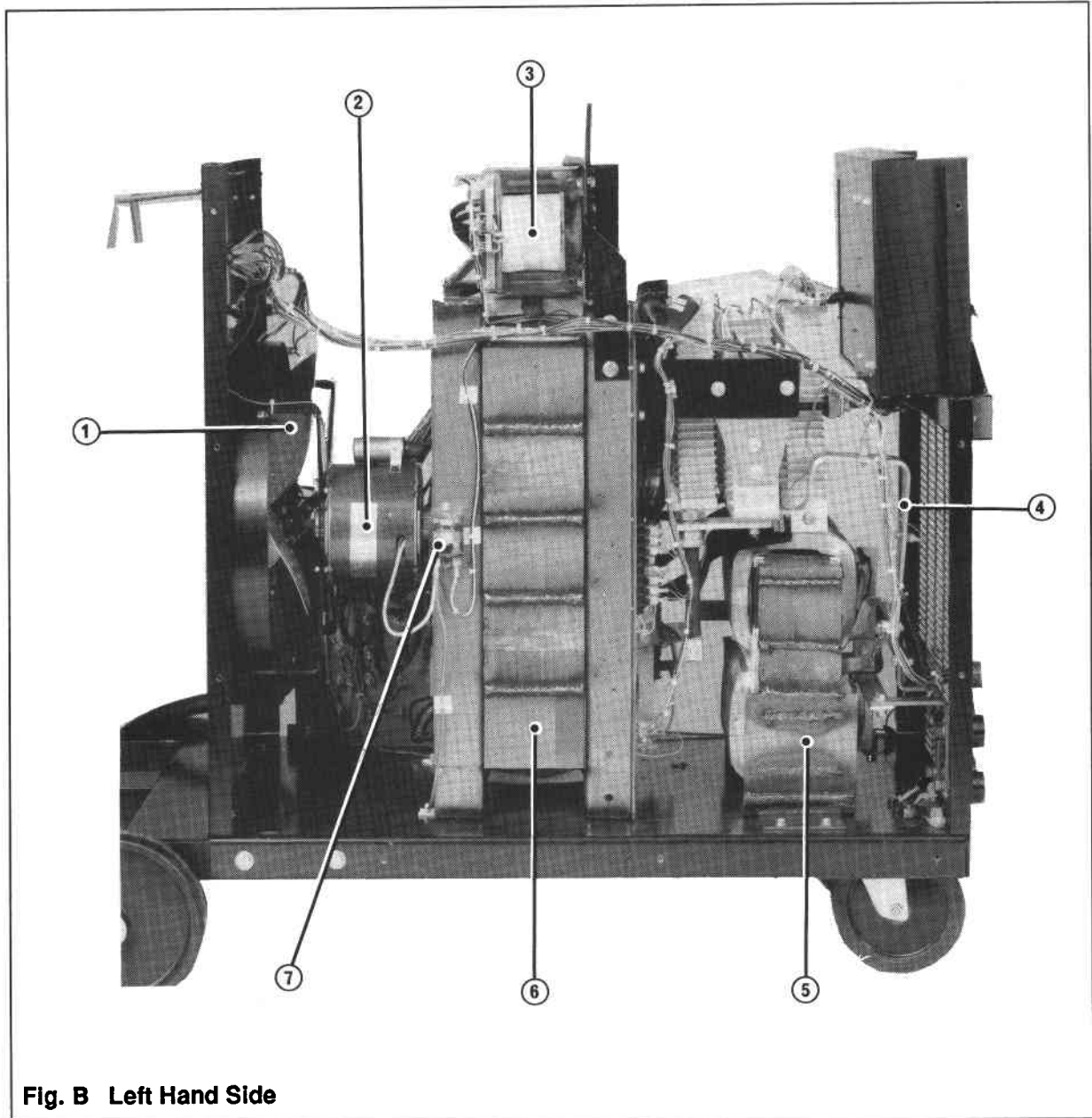


Fig. B Left Hand Side

Item	Part No.	Description	Ref
1	1414856	Fan blade	-
2	1414855	Fan motor	M1
3	1414854	Transformer control	T2
4	1414886	Shunt	SH
5	1414882	Inductor	L1
-	1414885	Thermal switch on item 4	TS6
6	1414887	Transformer main 220/380/415V	T1
-	1414888	Thermal switch on secondary	TS2
-	1414888	Thermal switch in primary	TS1
-	1414889	Thermal switch on core	TS5
7	1413350	Relay fan control	K4