



TIG 401iW

**INVERTER TIG
Welding Power Source**

Instruction manual



TIG 401iW

INVERTER TIG WELDING POWER SOURCE



Instruction manual
For
Installation, Operation & General Maintenance

CONTENTS

Item	Page No.
SAFETY	3-4
RATING AND INSTALLATION	5-6
CAUTIONS FOR INSTALLATION	6
WELDING OPERATIONS	7-8
WIRING DIAGRAM	9
TROUBLESHOOTING	10
PARTS LIST AND EXPLODED VIEW	11-15

SAFETY

Users of ESAB welding equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of welding equipment. The following recommendations should be observed in addition to the standard regulations that apply to the workplace.

Trained personnel well acquainted with the operation of the welding equipment must carry out all the work. Incorrect operation of the equipment may lead to hazardous situations, which can result in injury to the operator and damage to the equipment.

1. Anyone who uses the welding equipment must be familiar with:
 - its operation
 - location of emergency stops
 - its function
 - relevant safety precautions
 - welding
2. The operator must ensure that:
 - no unauthorized person is stationed within the working area of the equipment when it is started up.
 - no one is unprotected when the arc is struck
3. The workplace must:
 - be suitable for the purpose
 - be free from drafts
4. Personal safety equipment
 - Always wear recommended personal safety equipment, such as safety glasses, flameproof clothing, and safety gloves.
 - Do not wear loose—fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns.
5. General precautions
 - Make sure the return cable is connected securely.
 - Only a qualified electrician may carry out work on high voltage equipment.
 - Appropriate fire extinguishing equipment must be clearly marked and close at hand.
 - Lubrication and maintenance must not be carried out on the equipment during operation.



Read and understand the instruction manual before installing or operating. ESAB can provide you with all necessary welding protection and accessories.

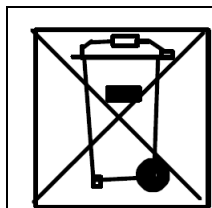


WARNING

Arc welding and 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.

	<p>ELECTRIC SHOCK – Can kill</p> <ul style="list-style-type: none"> • 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 the workpiece. • Ensure your working stance is safe.
	<p>FUMES AND GASES – Can be dangerous to health</p> <ul style="list-style-type: none"> • Keep your head out of the fumes. • Use ventilation, extraction at the arc, or both, to take fumes and gases away from your breathing zone and the general area.
	<p>ARC RAYS – Can injure eyes and burn skin.</p> <ul style="list-style-type: none"> • Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing. • Protect bystanders with suitable screens or curtains.
	<p>FIRE HAZARD</p> <ul style="list-style-type: none"> • Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.
	<p>NOISE – Excessive noise can damage hearing</p> <ul style="list-style-type: none"> • Protect your ears. Use earmuffs or other hearing protection. • Warn bystanders of the risk.
	<p>MALFUNCTION – Call for expert assistance in the event of malfunction. PROTECT YOURSELF AND OTHERS!</p>
	<p>CAUTION! <i>This product is solely intended for arc welding</i></p>



Do not dispose of electrical equipment together with normal waste! In accordance with national law, 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 the local representative. By applying this Directive you will improve the environment and human health

RATING

TIG 401i W INVERTER WELDING POWER SOURCE

Item	Unit	TIG 401iW
Input power	V	3 ~ 415
Frequency	Hz	50/60
Rated input capacity	KVA	18.7
Rated input current	A	26
OCV	V	65
Rated welding voltage	V	26
Welding current	A	20 ~ 400
Base current	A	20 ~ 400
Tig welding current	A	20 ~ 400
MMA welding current	A	25 ~ 350
Current up, down time	S	0 ~ 10
Pulse frequency	Hz	0.5 ~ 250
Duty ratio	%	0 ~ 100
Gas pre-flow	S	0.3 ~ 10
Gas post-flow	S	0.5 ~ 25
Rated output	%	60
TIG arc		HF
Efficiency	η	$\geq 85\%$
Power factor	$\text{Cos}\phi$	0.93
Insulation grade	Level	H
IP	IP	IP21S
Dimension LxWxH	mm	670*307*610
Weight	kg	38

INSTALLATION

The complete installation for TIG application should consist the following items:

	Description	Type	Quantity
1.	Welding Power Source	TIG 401i w	1
2.	TIG Torch for TIG Welding		1
3.	Earth cable with Clamp		1
4.	GAS connection with regulator		1

The complete installation for MMA application should consist the following items:

	Description	Type	Quantity
1.	Welding Power Source	TIG 401i w	1
2.	Welding Cable with Electrode Holder.		1
3.	Earth cable with Clamp		1

CAUTIONS FOR INSTALLATION

- Provide a Switch Box for every Welding Power Source, and use designated fuse
- Tolerance of Power Voltage Variation is $\pm 10\%$ of rated input voltage.

a) Installation place

- Install in the place where less moisture and dust exist. Avoid direct sunlight and rain, and maintain ambient temperature within -10° to $+45^{\circ}$ C as much as possible.
- Keep the welding power source at least 20 cm. away from the wall (if any).
- In case of installation of more two units side by side, a distance of more than 20 cm is recommended between the two power sources.
- Use a shield to protect the welding arc in case of excessive air draft.

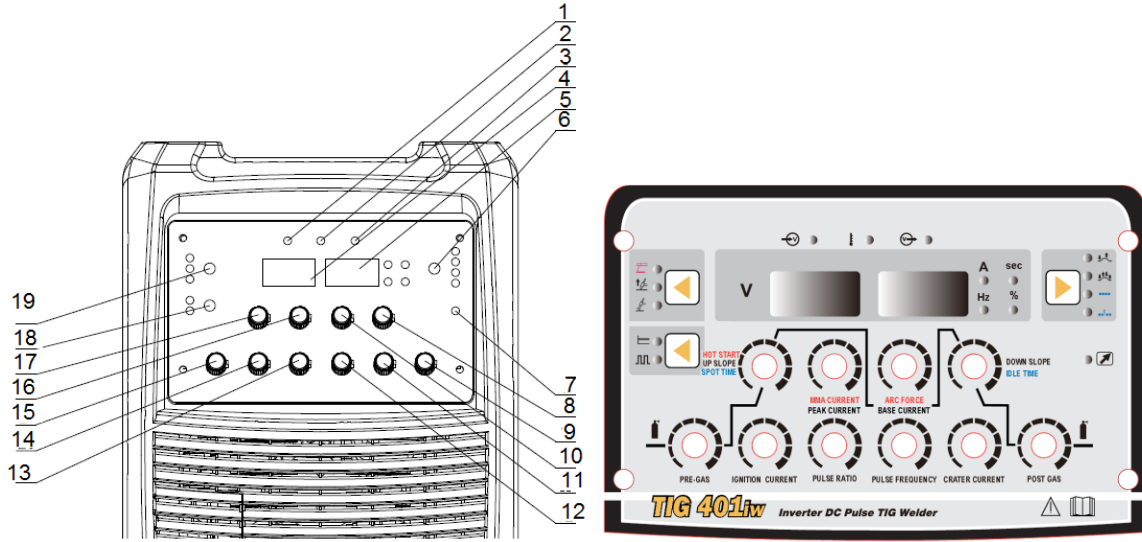
b) Ventilation

Adequate ventilation is recommended at the place of installation. For example the following guideline should be followed:

- a) In case of the area being more than 300 square meters (per unit), no ventilation is required, provided the room is not completely airtight.
- b) In case of the area being less than 300 square meters and the welding is continuously performed, adequate ventilation is recommended with the help of vent fan or exhaust duct.
- c) While performing the grounding work, it is recommended that a skilled electrician does the work.

WELDING OPERATIONS

FRONT PANEL



FRONT PANEL

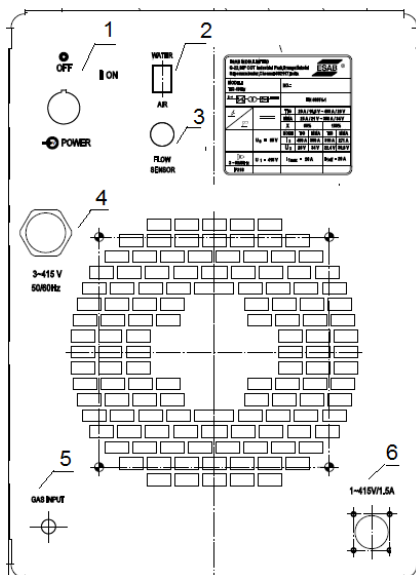
1. Power Indicator.	2. Protection Indicator.	3. Working Indicator.	4. Voltage Display.
5. Welding Data Display.	6. TIG Welding Trigger Mode Selection.	7. Remote Control Indicator.	8. Down Slope / Idle Time adjusting knob.
9. Post Gas Flow adjusting Knob.	10. Arc Force / Base Current adjusting Knob.	11. Crater Current Adjusting Knob.	12. Pulse Frequency adjusting Knob.
13. Pulse Ratio adjustment Knob.	14. Ignition Current Adjustment Knob.	15. Pre Gas flow adjusting Knob.	16. MMA Current / Peak Current adjusting Knob.
17. Hot Start / UP Slope/Spot Time adjusting knob.	18. Remote Control Socket.	19. Pulse ON / OFF Selection.	

FRONT PANEL LOWER

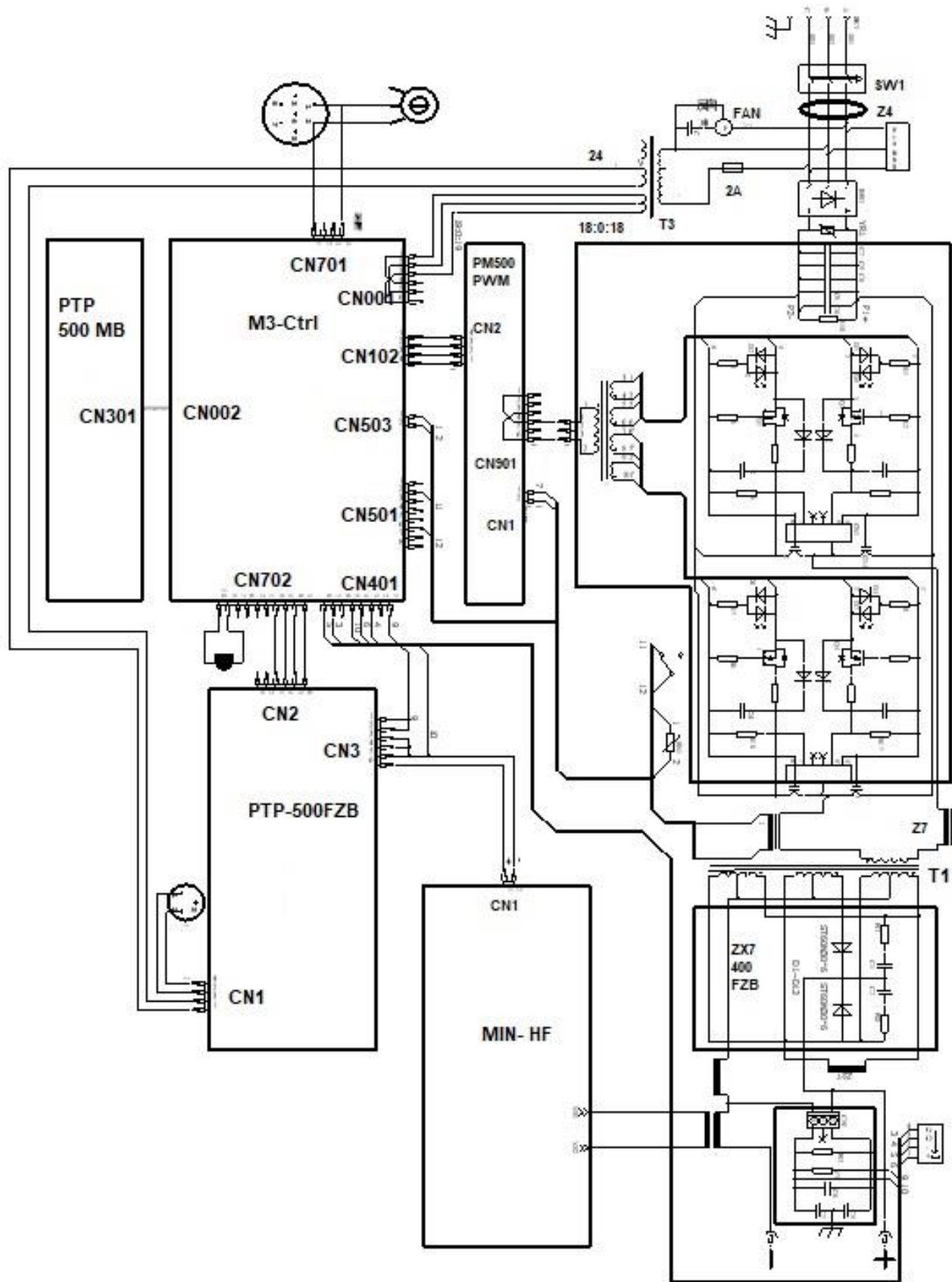


1. "+" output power Socket.	2. Remote Socket.	3. Torch Switch Control Socket.	4. "-" Output Power Socket (TIG Torch).
5. Torch GAS connection.	6. Water connection for TIG Torch.	7. Water connection for TIG Torch.	

REAR PANEL



1. Power ON/ OFF Switch.	2. Air / Water Torch Selection.	3. Flow Sensor connection.
4. Input Power Connection.	5. Input Gas connection.	6. Power Output to cooling unit.



WIRING DIAGRAM

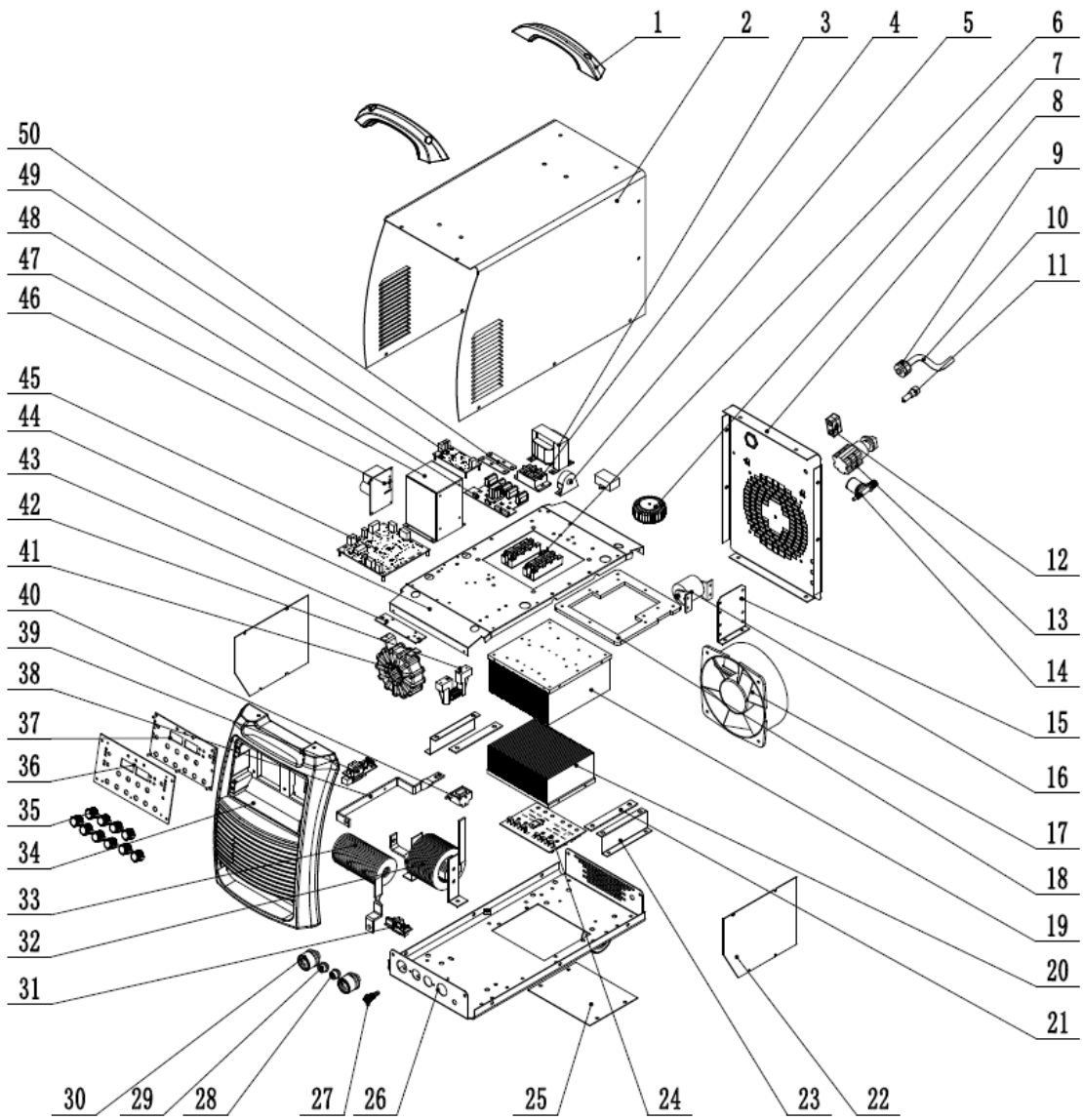
TROUBLESHOOTING

Fault	Cause	Solutions
Cooling fan is not working	Fan is faulty	Replace or repair
	Wire is cut /falling off	Find the disconnection and connect it reliably
No HF arc-pilot	Torch switch is faulty	Replace
	Main PCB is faulty	Replace
	Wire is cut /falling off	Find the disconnection and connect it reliably
No output Gas	No Gas input	Check the regulator & gas pipe and resume supplying gas to welder
	Main PCB is faulty	Replace
	Gas valve is faulty	Replace
	Gas path jammed	Remove foreign matter & clear path
Problem in water flow / trip	Water pump is not working	Check supply, Motor and Flow switch.
	Water path is Jammed	Remove foreign matter & clear path
Overheating protection indicator light on	Inside case overheating.	Recover after the inner temperature cool down
	Temperature sensor faulty	Replace
	Power over or under voltage +-15%.	Until the voltage is normal.
Panel current knob malfunction	The relevant potentiometer is faulty.	Replace
	Main PCB is faulty.	Replace
	Wire is cut /falling off.	Find the disconnection and connect it properly.
Current meter no display	Wire is cut /falling off	Find the disconnection and connect it properly.
	PCB is faulty.	Replace
	Wire is cut /falling off.	Find the disconnection and connect it reliably
Arc not smooth	Loose connection between torch and welder	Check & correct according to manual
	Argon not pure	Change 99.99% Argon
	Tungsten electrode not good or pin head broken	Change to correct electrode
Power trip	Power switch first time turn on after long time(over two days)cut off	Filter capacitor's charge in the main circuit lead to trip, return on the switch is OK.
Others		Please contact ESAB service

Parts List and Exploded view

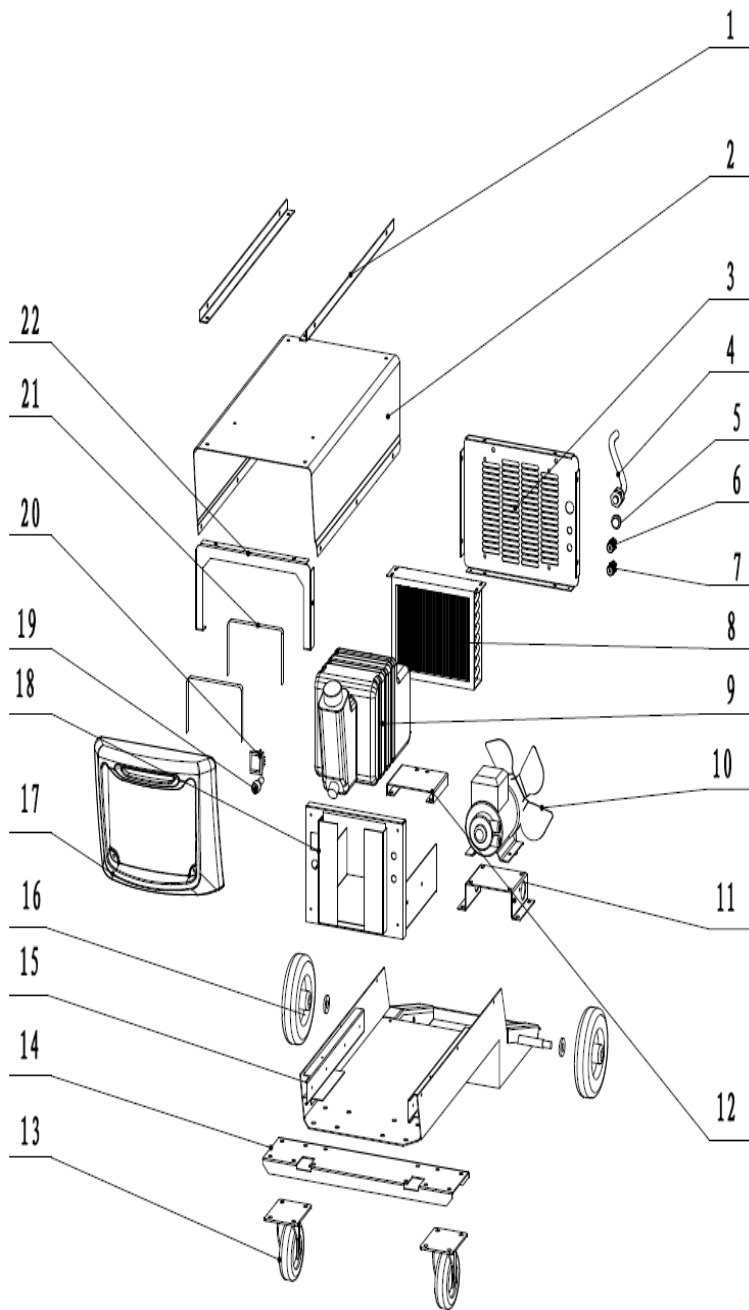
NO.	ESAB CODE	DESCRIPTION
1	020050080052	PLASTIC HANDLE TIG 401W
2	011010012207	METAL COVER TIG 401W
3	020070250166	CONTRAL TRANSFORMER TIG 401W
4	020070370028	THREE PHASE RECTIFIER TIG 401W
5	011120270006	MUTUAL INDUCTANCE TIG 401W
6	020070330015	IGBT MODULE TIG 401W
7	020030304727	COMMON CHOKE TIG 401W
8	011010031481	BACK PANEL TIG 401W
9	020040300009	POWER CABLE HOLDER TIG 401W
10	012070024209	POWER INPUT CABLE TIG 401W
11	020070520004	FUSE HOLDER TIG 401W
12	020050170019	BRACKET(PWR I/P CABLE)TIG 401W
13	020070800051	MAIN SWITCH TIG 401W
14	020070550033	GAS VALVE TIG 401W
16	020070120127	FILTERING CAPACITOR TIG 401W
17	020070890166	FAN TIG 401W
18	020050050293	INSULATING FRAME TIG 401W
19	020070430166	HEAT SINK TIG 401W
20	020070430165	HEAT SINK TIG 401W
21	011020013350	INSULATING FRAME TIG 401W
22	011020013348	SUPPORTING PANEL TIG 401W
23	011020013349	SUP.BRACKET(FRD H.SINK)TIG401W
24	012010100373	OUTPUT RECTIFIER PCB TIG 401W
25	011010060796	COVERING PANEL TIG 401W
26	011010041748	BOTTOM PANEL TIG 401W

27	020070660003	GAS CONNECTOR TIG 401W
28	020030300632	TRIGGER SWITCH TIG 401W
29	020070540025	TRIGGER SWITCH CONNECTOR TIG 401W
30	020070570185	EURO QUICK CONNECTOR TIG 401W
31	011050110246	OUTPUT PCB TIG 401W
32	011040030254	OUTPUT INDUCTANCE TIG 401W
33	011040050025	COUPLING TRANSFORMER TIG 401W
34	020050050289	PLASTIC FRONT PANEL TIG 401W
35	020070110022	POTENTIOMETER KNOB TIG 401W
36	011020010996	SUP.PANEL(FRT.CONT.PCB)TIG401W
37	011050070511	FRONT CONTROL PCB TIG 401W
38	011020013932	OUTPUT BUSBAR TIG 401W
39	011050110459	TORCH TRIGGER PCB TIG 401W
40	020070390071	HALL SENSOR TIG 401W
41	020070250130	MAIN TRANSFORMER TIG 401W
42	020070040090	FILTERING INDUCTANCE TIG 401W
44	011010050058	ASSEMBLING PANEL TIG 401W
45	011050020658	MAIN CONTROL PCB TIG 401W
46	011050100064	ARC STRIKING PCB TIG 401W
47	011020010997	SUP.PANEL(ARC STRIKING PCB)TIG401W
48	011050030064	DRIVING PCB TIG 401W
49	011050110283	PULSE WIDTH MODUL.PCB TIG 401W
50	011030040012	IGBT BUSBAR TIG 401W



TIG 401W WATER COOLER

NO.	ESAB CODE	
1	011020014456	CONN'TING FRAME TIG401W COOLER
2	011010012208	METAL COVER TIG401W COOLER
3	012010020001	BACK PANEL TIG401W COOLER
4	012070024209	POWER I/P CABLE TIG401W COOLER
5	020040300007	CABLE HOLDER TIG401W COOLER
6	020070570404	H2O CONN'OR RED TIG401W COOLER
7	020070570403	H2O CONN'R BLUE TIG401W COOLER
8	020070580007	HEAT SINK TIG401W COOLER
9	020050050456	WATER TANK TIG401W COOLER
10	012070024210	PUMP TIG401W COOLER
11	011020014221	BRACKET (PUMP) TIG401W COOLER
12	011020014473	BRACKET(H2O TANK)TIG401W COOLER
13	020050070062	UNIVERSAL WHEEL TIG401W COOLER
14	011010031980	CONN.PLATE(FT.WHEEL)TIG401W COOLER
15	011010040957	BOTTOM PANEL TIG401W COOLER
16	020050070061	RUBBER BACK WHEEL TIG401W COOLER
17	020050050291	PLASTIC FRAME TIG401W COOLER
18	012010030004	FRONT PANEL TIG401W COOLER
19	020070520022	FUSE HOLDER TIG401W COOLER
20	020070800354	POWER SWITCH TIG401W COOLER
21	011020014222	H2O TANK PROT.FRAME TIG401W COOLER
22	011020014458	SUP.FRAME FOR DRAWER TIG401W COOLER



ESAB INDIA LIMITED

Registered and Head Office

13, Industrial Estate, III Main Road

Ambattur, Chennai - 600058

Telephone: + 91 44 42281100

Fax: + 91 44 4228 1107

Email: info@esab.co.in

Web: www.esabindia.com