

Operation instruction • english  
Gebrauchsanweisung • deutsch  
Gebruiksaanwijzing • nederlands  
Manuel d'utilisation • français

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# MASTER

MLS™ 2500, 2503, 3500, 3503

# MASTERTIG

MLS™ 3000, 3003, 4000, 4003

# MASTERCool

10



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# 1. PREFACE

## 1.1. INTRODUCTION

Congratulations on having purchased a KEMPPI product. Properly installed and used Kemppi products should prove to be productive machines requiring a small amount of regular maintenance. This manual is to give you a good understanding of the equipment and its safe operation. It also contains maintenance information and technical specifications. Read this manual completely from front to back before installing, operating or maintaining the equipment for the first time. For further information on Kemppi products please contact us or your nearest Kemppi distributor.

The specifications and designs presented in this manual are subject to change without prior notice.

In this document, for danger to life or injury the following symbol is used: 

Read the warnings carefully and follow the instructions. Please also study the Operation safety instructions and respect them when installing, operating and servicing the machine.

## 1.2. PRODUCT INTRODUCTION

Kemppi Master MLS™ 2500, 2503, 3500 and 3503 is a MMA welding machine designed for industrial use and for welding all kinds of covered electrodes, including difficult-to-weld types such as cellulose electrodes. The equipment consists of power source, welding cables and function panel.

Kemppi Mastertig MLS™ 3000, 3003, 4000 and 4003 is a TIG welding system especially designed for industrial use and for welding e.g. stainless steel materials. The equipment consists of a power source, function panel, TIG welding torch, ground cable and an optional cooling unit. The cooling unit Mastercool 10 is used in water-cooled TIG welding.

The power source is a multifunctional machine for demanding professional use for MMA, TIG and pulsed TIG welding with direct current. The power source is controlled with IGBT transistors with a frequency of approximately 20 kHz, and the operational functions with a microprocessor. The welding torch can be either water-cooled or gas-cooled.

## 1.3. SAFE OPERATION

Please study these Operation safety instructions and respect them when installing, operating and servicing the machine.

### ***Welding arc and spatters***

Welding arc hurts unprotected eyes. Be careful also with reflecting arc flash. Welding arc and spatter burn unprotected skin. Use safety gloves and protective clothing.

### ***Danger for fire or explosion***

Pay attention to fire safety regulations. Remove flammable or explosive materials from welding place. Always have sufficient fire-fighting equipment wherever you are welding. Be prepared for hazards in special welding jobs, e.g. for danger of fire or explosion when welding container-type work pieces. Note! Fire can break out from sparks even several hours after the welding work has been finished!

### ***Mains voltage***

Never take welding machine inside a work piece (e.g. container or truck). Do not place welding machine on a wet surface. Always check cables before operating the machine. Change damaged cables without delay. Damaged cables may cause an injury or start a fire. Connection cable must not be crushed, it must not touch sharp edges or hot work pieces.

## ***Welding power circuit***

Isolate yourself by using proper protective clothing, do not wear wet clothing. Never work on a wet surface or use damaged cables. Do not put TIG torch or welding cables on welding machine or on other electric equipment. Do not press TIG torch switch if the torch is not directed towards the work piece.

## ***Welding fumes***

Take care that there is sufficient ventilation during welding. Take special safety precautions when welding metals which contain lead, cadmium, zinc, mercury or beryllium.

## ***Lifting the equipment***

Always remove gas bottle before lifting.

# **2. INSTALLATION**

## **2.1. REMOVAL FROM PACKAGING**

The equipment is packed in durable packages designed especially for it. However, it is necessary to check the equipment before using it to make sure that the equipment or any part of it has not got damaged during transportation. Also check that the delivery corresponds to your order and that you have received all necessary instructions for installing and operating the equipment. The packaging material is recyclable.

## **2.2. LOCATING THE MACHINE**

Place the machine on a horizontal, stable and clean ground. Protect the machine from rain and direct sunshine. Check that there is enough space for cooling air circulation in front of and behind the machine.

## **2.3. SERIAL NUMBER**

Serial number of the machine is marked on the rating plate. The serial number is the only proper means of identifying parts for a specific product. It is important to make correct reference to the serial number of the product when making repairs or ordering spare parts.

## **2.4. INSTALLATION AND MAIN PARTS**



### ***Front of machine***

1. Function panel
2. Remote control connector
3. TIG torch control connector, not in MMA version
4. Shield gas and current connector for TIG torch, not in MMA version
5. (+) connector for electrode holder or earth cable, in TIG welding for earth cable
6. (-) connector for earth cable or electrode holder in MMA welding (stick welding)

Markings for (+/-) poles on the machine front are embossed.



### Rear of machine

1. Mains switch
2. Snap connector for gas



Torch



Installing gas-cooled torch

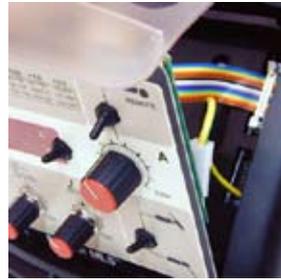


Installing water-cooled torch

## 2.5. INSTALLATION OF THE PANEL



1.



2.

1. Fasten the cable connectors of the function panel to the power source (2 pieces).
2. Place the bottom edge of the panel behind the securing clips on the machine. Remove the fixing pin from the top edge with, for example, a screwdriver. Then gently push the upper part of the panel into place. Make sure that the cables do not get damaged, continue gently pushing the upper part of the panel until it clips into place. Finally, push the fixing pin back into its place.

## 2.6. MAINS CONNECTION

**⚠ Only an authorised electrician is allowed to install mains cable and plug!**

The power source is equipped with a 5-meter mains cable without plug. The plug may be installed by an authorised electrician only. The fuse and cable sizes are given in the Technical data at the end of this manual.

**⚠ This equipment's electromagnetic compatibility (EMC) is designed for use in an industrial environment. Class A equipment is not intended for use in residential location where the electrical power is provided by the public low-voltage supply system.**

## 2.7. WELDING CABLE CONNECTIONS

### 2.7.1. Choosing welding polarity in MMA welding

You can change the welding polarity by choosing (+) or (-) cable connector.

### 2.7.2. Earthing

If possible, always fasten the earth clamp of return current cable directly onto work piece.

1. Clean contact surface of earth clamp from paint and rust.
2. Fasten clamp properly, so that contact surface is as large as possible.
3. Check that clamp is fastened firmly.

## 2.8. COOLING UNIT TO MASTERCOOL 10

**⚠ Cooling liquid is injurious! Avoid also contact with skin or eyes. In case of injury, seek for medical advice.**

Cooling unit Mastercool 10 together with TIG torch of Kemppi's TTC-W range enables TIG welding with water-cooled torch.

The cooling unit is installed beneath the power source with screws. Electrical connections are on the bottom of power source. Fill the reservoir with a 20 - 40 % mixture of etanol and water, or with any other suitable antifreeze. The capacity of the reservoir is 3 litres.

### **Mastercool 10:**

Mastertig MLS™ 3000  
Mastertig MLS™ 4000  
Mastertig MLS™ 3003  
Mastertig MLS™ 4003



### **Installation of cooling unit**

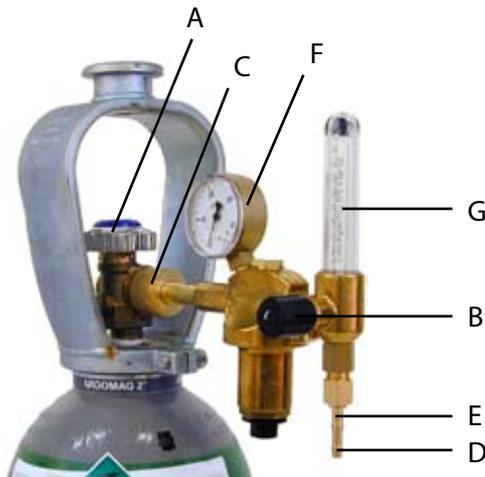


## 2.9. SHIELD GAS

**⚠ Handle gas bottle with care. There is a risk for injury if gas bottle or bottle valve is damaged!**

Use inert gases such as argon, helium or argon-helium mixture as shield gas for TIG welding. Make sure that the gas flow regulator is suitable for the gas type used. The flow rate is set according to the welding current, joint form and the size of the electrode. A suitable flow rate is normally 8 – 10 l/min. If the gas flow is not suitable the welded joint will be porous. Spark ignition becomes more difficult if the gas flow is too high. Contact your local Kemppi dealer for choosing gas and equipment.

### 2.9.1. Installation of gas bottle



#### **Parts of gas flow regulator**

- A Gas bottle valve
- B Pressure regulation screw
- C Connecting nut
- D Hose spindle
- E Jacket nut
- F Gas bottle pressure meter
- G Gas hose pressure meter

**⚠ Always fasten gas bottle properly in vertical position in a special holder on the wall or on a carriage. Remember to close gas bottle valve after having finished welding.**

The following installation instructions are valid for most gas flow regulator types:

1. Step aside and open the bottle valve (A) for a while to blow out possible impurities from the bottle valve. Note! Watch out for the gas flow.
2. Turn the pressure regulation screw (B) of the regulator until no spring pressure can be felt.
3. Close needle valve if there is one in the regulator.
4. Install the regulator on bottle valve and tighten connecting nut (C) with a wrench.
5. Install hose spindle (D) and jacket nut (E) into gas hose and tighten with hose clamp.
6. Connect one end of the hose with the regulator and the other end with the power source. Tighten the jacket nut.
7. Open bottle valve slowly. Gas bottle pressure meter (F) shows the bottle pressure. Note! Do not use the whole contents of the bottle. The bottle should be filled when the bottle pressure is 2 bar.
8. Open needle valve if there is one in the regulator.
9. Turn regulation screw (B) until hose pressure meter (G) shows the required flow (or pressure). When regulating flow amount, the power source should be switched on and the gun switch pressed simultaneously.

Close bottle valve after having finished welding. If the machine will be out of use for a long time, unscrew the pressure regulation screw.

## 3. OPERATION



**Welding in places presenting an immediate fire or explosion hazard is forbidden!**

**Welding fumes may cause injury, take care of sufficient ventilation during welding!**

### 3.1. WELDING PROCESSES

#### 3.1.1. MMA welding

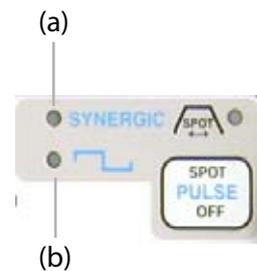
MMA welding, as well as carbon arc gouging, is possible with all Master MLS™ and Mastertig MLS™ power sources with all MLS panel versions when switched to MMA process.

#### 3.1.2. TIG welding

Mastertig MLS™ power sources are designed especially for TIG welding. They are equipped with HF spark ignition and versatile panel functions depending on the panel used. The panels predominantly for TIG welding are MTL, MTX, MTZ and MTM. Also the MEL and MEX panel on Master MLS™ power source can be used for TIG welding with contact ignition.

#### 3.1.3. Synergetic Pulsed TIG welding (a)

MTX, MTZ and MTM panels include the synergetic pulsed TIG process, in which you only need to adjust the welding current while other pulse parameters are programmed. Pulsing frequency is high, which guarantees concentrated arc and increased welding speed.



#### 3.1.4. Long Pulsed TIG welding (b)

This method gives you the possibility to adjust all pulse parameters. Weld pool control is also easier. Long pulsed TIG welding is included in MTX, MTZ and MTM panels.

## 3.2. OPERATION FUNCTIONS

### 3.2.1. Power source



**Always switch the machine on and off from main switch. Do not use the mains plug for switching!**

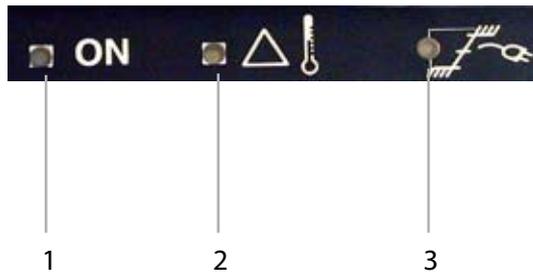
**Never watch the arc without a proper face shield designed for arc welding! Protect yourself and the surroundings against welding arc and hot spatters!**

### 3.2.2. Function panels

Before welding starts, welding settings suitable for the work piece are chosen with the function panel. See 3.1. Welding processes.

The Kemppi Multi Logic System, MLS™, allows you to select from different function panels according to your welding application. MEL and MEX panels are designed for MMA welding. MTL, MTX, MTZ and MTM panels are for TIG welding with basic functions, or with pulsed TIG, 4T-LOG, or MINILOG control of welding current, or with memory channels. See also 3.1. Welding processes.

### 3.2.2.1. Indicator lights



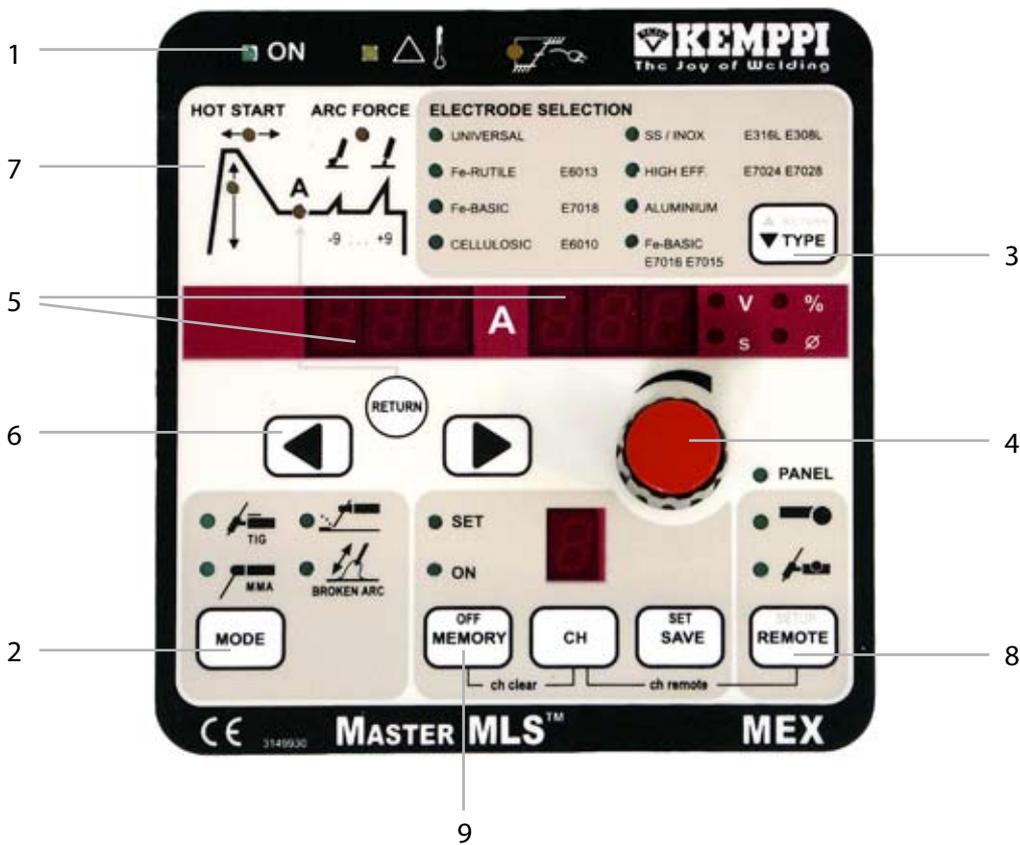
1. Power On
2. Thermal overload of power source
3. Wrong mains voltage, over or under-voltage

### 3.2.2.2. MMA welding panel MEL



1. Remote/local control switch
2. Welding current potentiometer
3. Contact TIG welding
4. MMA welding
5. Arc force
6. Hot start
7. Digital display and amperage/voltage switch
8. Welding current table

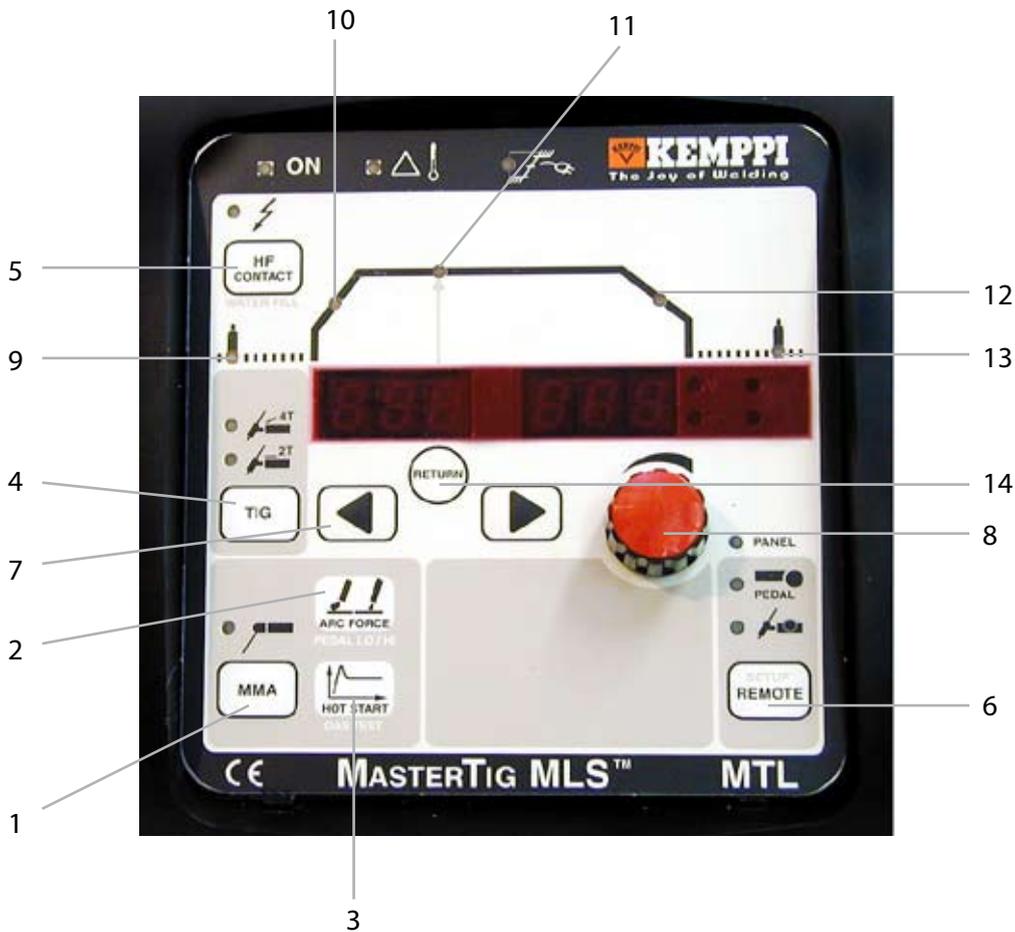
### 3.2.2.3. MMA welding panel MEX



MEX panel is available separately. The functions of MEX panel are described in the operating manual delivered with the panel.

1. Indicator lights: Main switch, overheating, wrong mains voltage
2. MODE button for welding method selection: MMA, contact TIG, carbon arc gouging, broken arc
3. Selection of electrode type
4. Potentiometer for regulation of welding current and other parameters
5. Displays of welding current and other parameters (A, V, s, mm)
6. Selection of welding parameter to be regulated (arrow button to the left / to the right, focusing (RETURN))
  - Hot start regulation (HOT START)
  - Welding current (A)
  - Arc force control dynamics (ARC FORCE)
7. Figure indicating selection of welding parameter: HOT START, A, ARC FORCE
8. Selection of remote control / SETUP function
9. Memory functions

### 3.2.2.4. TIG welding panel MTL – basic functions



1. Selection of MMA welding
2. Selection of arc force (MMA) and pedal low/high (minimum and maximum welding current) displays and regulation (TIG welding)
3. Selection of hot start (MMA) and gas test (TIG welding)
4. Selection of TIG welding, 4T and 2T functions of torch switch
5. Selection of HF/contact and water fill function
6. Selection of panel, foot pedal and remote control
7. Selection of welding parameters
8. Adjustment of welding parameters
9. Pre-gas 0 - 10 s
10. Upslope 0 - 10 s
11. Welding current
12. Downslope 0 - 15 s
13. Post-gas 1 - 30 s
14. Return to welding current

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## **1. MMA**

Select MMA welding by pressing the selection button of MMA welding. The led is lit when MMA is on.

## **2. Arc force**

Press the arc force button and you will see the numerical value corresponding to the MMA dynamics in the display. Factory setting for all electrode types is zero. You can change the value by turning the pulse potentiometer. If numerical value is adjusted negative (-1...9) the arc is softened, and the amount of spatter decreases when welding at the upper end of the recommended current range of the electrode. On the positive side (1...9) the arc is rough.

In TIG mode, you can select the max. and min. current for the foot pedal (PEDAL LO/HI).

## **3. Hot start**

When pressing the hot start button, you will see on the display the numerical value corresponding to the MMA hot start pulse. You can adjust the value by turning the potentiometer. In TIG mode you can select gas test function.

## **4. TIG welding is selected**

### **4. Welding torch switch 2 sequence function**

Gas flow starts when the torch switch is pressed. After preset pre-gas time welding starts, and current will rise to the welding level within the up-slope time. Release the torch switch, and the current starts to drop, and after the selected down-slope time the arc is broken. After this, the shield gas will flow for the time selected.

### **4. Welding torch switch 4 sequence function**

Gas flow starts when the torch switch is pressed. Release the torch switch. The ignition spark ignites the arc, and the current will rise to the welding level within the up-slope time. Press the torch switch down, and the welding continues. Release the torch switch, and the current starts to drop and after the selected down-slope time the arc is broken. After this, the shield gas will flow for the time selected.

## **5. HF/contact ignition in TIG welding (water fill)**

TIG arc can be started either with high frequency (HF) or without (contact ignition). HF ignition is chosen by pressing the HF CONTACT button (5) to turn on the HF light.

If you use water-cooled torch you can fill it with water by pressing the HF CONTACT button for more than 2 seconds.

## **6. Remote control**

If you choose to adjust the welding current with a remote control unit you need to connect the unit and select the REMOTE button. The panel led switches off and you can select the unit (R10, wireless remote control R11T for MMA welding, or foot pedal control R11F). There is an automatic recognition of remote control units with potentiometers and only the symbol of a connected unit can be chosen. The foot pedal control works only in 2T mode.

## **7., 8. and 14. Adjustment of parameters**

To select TIG welding parameters you only need to use two buttons: arrow-left and arrow-right. Adjustment is done with the potentiometer. When pressing the RETURN button, adjustment of parameters goes straight to welding current. The display shows automatically numeric values and the units of the parameters. When you adjust the parameters, you can see the value on the numerical display. After 10 seconds, the display will return to the welding current.

### 3.2.2.5. TIG welding panel MTX – pulsed TIG functions



1. 4T-LOG
2. Selection for spot, synergetic quick pulse and long pulse
3. Search arc 10 – 80 % of welding current
4. Pulse current 10 A – max.
5. Pulse ratio 10 – 70 % of pulse time
6. Frequency 0.2 – 300 Hz
7. Base current 10 – 70 % of pulse current
8. Spot time 0 – 10 slph
9. Tail arc 10 – 80 % of welding current

#### **1. Welding torch switch 4T-LOG function (only MTX panel)**

When torch switch is pressed current goes to search arc; after the switch is released current goes to welding current within the upslope time. When the switch is pressed again, current goes to downslope and then to the tail arc. Current stops when the switch is released.

#### **2. Spot**

Spot function is practical when welding a definite spot with TIG. It can be used both in 2T and 4T mode. Enter the spot time adjustment by pressing arrow button, and when the led is lit you can choose the spot time needed by turning the pulse potentiometer.

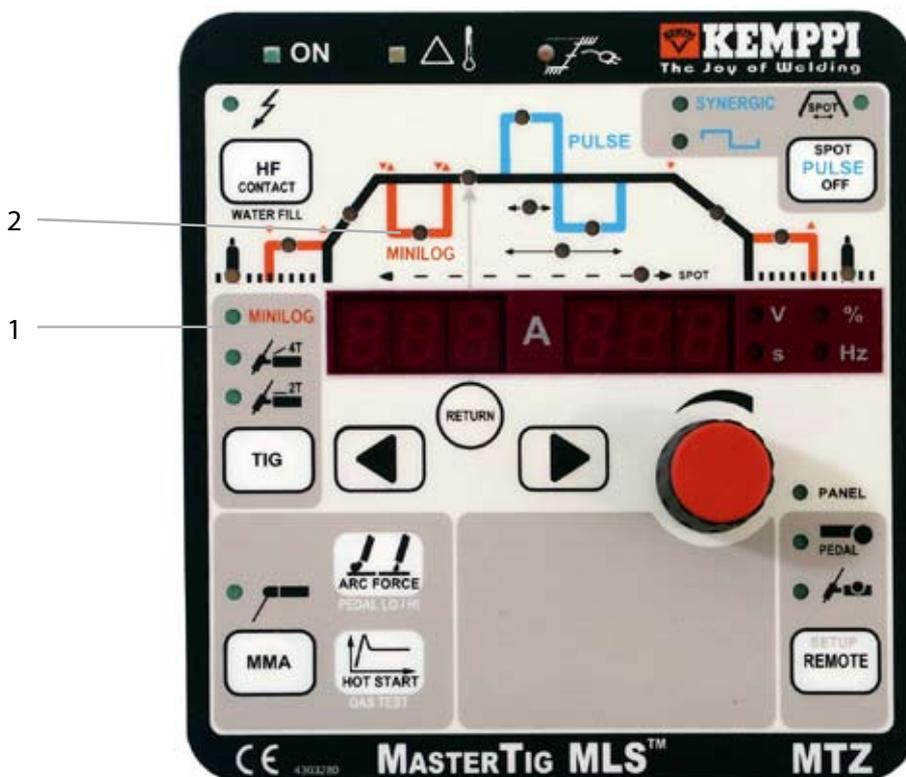
## 2. Synergetic quick pulse

Press the PULSE button twice and the synergetic light turns on. Pulse parameters are calculated automatically when average welding current is selected. Other pulse selections are not necessary.

## 2. Long pulse

Long pulse method gives you the possibility to adjust all pulse parameters (pulsing frequency, pulse ratio, pulse current and pause current). You can also adjust the welding current, in which case you receive a new pulse current value. Pulse ratio and pause current percentage remain constant. When you adjust the pulse ratio, pulse current or pause current, the new average welding current value is shown on the display.

### 3.2.2.6. TIG welding panel MTZ – pulsed TIG and MINILOG function



1. Minilog
2. Minilog 10 – 90 % of welding current

### 1. MTZ Minilog

When torch switch is pressed current goes to search arc; after the switch is released current goes to welding current within the upslope time. With Minilog operation you can select from two current levels: the welding current and the Minilog current. You can move from one to the other by quickly pressing the torch switch. Press torch switch for 1 second, current goes to downslope and then to the tail arc. Current stops when the switch is released.

### 3.2.2.7. TIG welding panel MTM – pulsed TIG and MINILOG function with memory



1. Minilog
2. Selection of memory function
3. Selection of channel in memory function
4. Minilog 10 – 90 % of welding current
5. SAVE

#### 1. Minilog operation

When torch switch is pressed gas flow starts. When you release the switch current goes to search arc. A quick press on the switch, and current goes to welding current within the upslope time. After another short press it goes to Minilog operation, and you can select from two current levels: the welding current and the Minilog current. You can move from one to the other by quickly pressing the torch switch. Press the torch switch for 1 second, release it and current goes to downslope.

#### 3.2.3. Saving welding settings (MTM)

MTM panel has 10 memory channels for user settings. The selections are made in the MEMORY field. Not only welding parameters but also function selections can be saved in the memory. MMA welding values can also be stored in memory channels. Proceed as follows:

1. Press MEMORY button twice and if the SET light starts blinking the channel is free. If the channel is reserved the led will remain lit.
2. Select memory channel by pressing CH button.
3. Select the parameters and press SAVE button.
4. Press MEMORY button twice. ON led is lit.
5. Start welding and adjust settings if necessary.

If the saved settings need to be adjusted the led has to be moved from ON to SET position in order to select parameters. Press the SAVE button. It is also possible to save the currently used parameters by pressing SET when the memory function is in OFF state (no lights on). Channel is cleared if MEMORY and CH buttons are pressed simultaneously in SET mode.

### 3.2.4. Adopting the saved settings

1. Select MEMORY by pressing the button.
2. Select memory channel by pressing the CH button.
3. Start welding.

### 3.2.5. Remote control memory channels

Memory channels are selected by pressing simultaneously both REMOTE and CH button. With the remote control you can retrieve saved settings on memory channels.

### 3.2.6. SETUP functions

A so called SETUP state is included for modifying panel functions. You can enter the SETUP state by pressing the REMOTE (SETUP) button longer than normally. Exit is performed in the same way. You can select the function (see list below) by pressing the arrow buttons and then change the setting by turning the potentiometer.

Display	Function	Factory setting
A1	Upslope with constant time setting / gradient (steepness) setting	0 constant time
A2	Downslope with constant time setting / gradient (steepness) setting	0 constant time
A3	TIG antifreeze off / on	1 off
A4	MMA antifreeze off / on	1 on
A5	MMA hot start pulse non adaptive / adaptive	0 non adaptive
A6	Downslope cut off on / off	0 on
A7	MMA open circuit voltage 80V / 40V	0 80 V
A8	2T downslope normal / cuts off by short switch action	0 normal
A9	Tacking automatics off / on	0 off
A10	Current at arc start steep / slightly sloped	0 steep.
A11	Downslope linear / non-linear	0 linear
A12	MMA/TIG method selection with remote control off / on	0 off
A13	Search arc off / on	1 on
A14	Possibility to current freezing during downslope off / on	0 off
A15	Control of channels with torch up-down switch off / on	0 off
A16	Control of current with torch up-down switch always active / active only when selected with REMOTE button	0 always active
A17	Guard functions of cooling unit not activated / activated	1 activated
A18	Downslope for Minilog and 4T in MTM and MTL panels performed during long switch action / after switch operation (normal)	0 normal
A19	Cooling unit operates on forced control / automatic on/off control	0 automatic

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### **3.2.7. Foot pedal control R11F**

First read under "3.2.2.4. TIG welding panel MTL" point "6. Remote control" for installing the remote control ready for operation. Foot pedal R11F is used in TIG welding, and its control range is adjustable. The minimum value of control range is set with the panel potentiometer when the pedal is not pressed, display shows "LO". Control range maximum is set similarly by pressing first the PEDAL LO/HI button on the panel, display shows "HI". Welding is started with a light press on the pedal, the arc ignites to the set minimum current. Welding current goes to maximum when the pedal is pressed to the bottom. The arc is broken when the pedal is released. Adjust again if necessary.

### **3.3. COOLING UNIT OPERATION MASTERCool 10**

The operation of cooling unit Mastercool 10 is controlled by the power source. The cooling unit pump starts automatically when welding starts. Proceed as follows:

1. Start power source.
2. Check water level and input flow of the reservoir, add liquid if needed.
3. If you use a water-cooled torch you can fill it with water by pressing WATER FILL (HF CONTACT) button for more than 2 seconds.

The pump operates for 5 another minutes after welding has been finished to cool the water to the same temperature as in the machine surrounds. This reduces the need of service.

#### ***Thermal overload***

The thermal overload light is lit, the machine stops and display shows COOLER when temperature control of the machine has detected cooling water overheating. The cooling unit fan cools down the water, and when the light goes out welding can be started again.

#### ***Water flow signal***

Display shows COOLER when water flow is blocked.

### **3.4. STORAGE**

The machine must be stored in a clean and dry room. Protect the machine from rain and direct sunshine in places where temperature exceeds +25 °C.

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## 4. MAINTENANCE



**Watch out for mains voltage when handling electric cables!**

Degree and circumstances of machine utilisation should be taken into consideration when planning product maintenance. Careful use and preventive maintenance help to avoid unnecessary production disturbances and breaks. Check the condition of the welding and connection cables daily. Do not use damaged cables.

### 4.1. REGULAR MAINTENANCE

#### 4.1.1. Every sixth months

NOTE! Disconnect the plug of the machine from the mains socket and wait for ca. 2 minutes (capacitor charge) before removing the casing plate.

**The following maintenance operations should be carried out at least every sixth months:**

- Electric connections of the machine – clean any oxidised parts and tighten any loose ones. NOTE! You must know the correct tension torques before you start repairing the connections.
- Clean the inner parts of the machine from dust and dirt e.g. with a soft brush and a vacuum cleaner. Do not use compressed air because there is the danger that the dirt is packed even more tightly in the gaps of the cooling profiles. Do not use a pressure washer.



**Only an authorised electrician may repair the machine.**

#### 4.1.2. Service contract

KEMPPI service workshops make special service contracts with customers about regular maintenance. All parts are cleaned, checked and if necessary, repaired. Also the operation of welding machine is tested.

## 4.2. TROUBLESHOOTING

### ***Power On light is not lit.***

There is no power in the machine.

- Check mains fuses, replace blown fuses.
- Check mains cable and plug, replace defect parts.

### ***The machine is not welding properly.***

There are plenty of spatters during welding. Weld joint is porous or power supply is insufficient.

- Check welding settings and adjust if needed.
- Check gas flow and gas hose connection.
- Check that earth clamp is properly fastened and that earth cable has no defects. Change the position if necessary and replace defect parts.
- Check welding torch cable and connector. Tighten the connection and replace defective parts.
- Check the consumable parts of welding torch. Clean and replace defect parts.
- Check mains fuses, replace blown fuses.

### ***Power source overheat indicator light is lit.***

Power source is overheated.

- Check that there is enough free space behind the machine for cooling air circulation.
- Check cooling unit for water circulation, cleanliness of heat exchanger and air grate. Add cooling liquid if necessary.

For further information and assistance, contact your nearest Kemppi service workshop.

### 4.3. DISPOSAL OF THE MACHINE



Do not dispose of electrical equipment together with normal waste!

In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation 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 our local representative.

By applying this European Directive you will improve the environment and human health!

## 5. ORDERING NUMBERS

**Master MLS™ 2500** 6104250

**Master MLS™ 2503** 6102250

Welding cable 35mm<sup>2</sup>, 2,5 m 6184301

Earth cable 25mm<sup>2</sup>, 2,5 m 6184311

Electric plug 16 A, 5-poles 9770812

**Master MLS™ 3500** 6104350

**Master MLS™ 3503** 6102350

Welding cable 50mm<sup>2</sup>, 2,5 m 6184501

Earth cable 50mm<sup>2</sup>, 2,5 m 6184511

Electric plug 16 A, 5-poles 9770812

**Mastertig MLS™ 3000** 6114300

**Mastertig MLS™ 3003** 6112300

Torches

TTC 160 4m 627016004

TTC 160 8m 627016008

TTC 160 16m 627016016

TTC 220 4m 627022004

TTC 220 8m 627022008

TTC 220 16m 627022016

Earth cable 35mm<sup>2</sup>, 5 m 6184311

Electric plug 16 A, 5-poles 9770812

Gas flow meter AR/clock 6265136

**Mastertig MLS™ 4000** 6114400

**Mastertig MLS™ 4003** 6112400

Torches

TTC 160 4m 627016004

TTC 160 8m 627016008

TTC 160 16m 627016016

TTC 220 4m	627022004
TTC 220 8m	627022008
TTC 220 16m	627022016
Earth cable 35mm <sup>2</sup> , 5 m	6184311
Electric plug 16 A, 5-poles	9770812
Gas flow meter Ar/clock	6265136

**Mastercool 10** 612235001

***Water-cooled torches***

TTC 200W 4m	627020504
TTC 200W 8m	627020508
TTC 200W 16m	627020516
TTC 250W 4m	627025504
TTC 250W 8m	627025508
TTC 250W 16m	627025516

***Panels***

MEL, MMA	6106000
MEX, MMA	6106010
MTL, TIG	6116000
MTX, TIG 4T-LOG	6116005
MTZ, TIG MINILOG	6116015
MTM, TIG MEMORY	6116010

***Optional device***

***TIG torch controls***

RTC 10	6185477
RTC 20	6185478

***Remote control***

R 10	6185409
R11T	6185442
R11F	6185407

***Transport unit***

T100	6185250
T110	6185251
T130	6185222
T200	6185258

## 6. TECHNICAL DATA

Power source Master MLS™ 2500, Master MLS™ 2503		
<b>Mains voltage</b>		
	3~400V –15%...+20%	Master MLS™ 2500
	3~230V –15%...+15%	Master MLS™ 2503
<b>Rated power</b>		
40% ED MMA	250A	9,4kVA
60% ED MMA	205A	7,3kVA
100% ED MMA	160A	5,3kVA
30% ED TIG	300A	8,4kVA
60% ED TIG	230A	5,8kVA
100% ED TIG	200A	4,7kVA
<b>Connection cable/fuse</b>		
	4 x 1,5S mm <sup>2</sup> – 5 m/10 A delayed	Master MLS™ 2500
	4 x 2,5S mm <sup>2</sup> – 5 m/20 A delayed	Master MLS™ 2503
<b>Welding current range</b>		
	MMA	10 A/20,5V...250A/30,0V
	TIG	5 A/10,0V...300A/22,0V
<b>Max welding voltage</b>		36V / 250 A
<b>Electrode sizes to be welded</b>		Ø1,5...5,0mm
<b>Open circuit voltage</b>		80 V
<b>Welding current control</b>		stepless
<b>Efficiency</b>		86 % (250A/30,0V)
<b>Power factor</b>		0,95 (250A/30,0 V)
<b>Open circuit power</b>		approx. 10W
<b>External dimensions</b>		
	length	500 mm
	width	180 mm
	height	390 mm
<b>Weight</b>		20 kg

<b>Power source Master MLS™ 3500, Master MLS™ 3503</b>		
<b>Mains voltage</b>		
	3~400V –15%...+20%	Master MLS™ 3500
	3~230V –15%...+15%	Master MLS™ 3503
<b>Rated power</b>		
40% ED MMA	350A	15kVA
60% ED MMA	285A	11,3kVA
100% ED MMA	220A	8kVA
30% ED TIG	400A	13,8kVA
60% ED TIG	320A	9,4kVA
100% ED TIG	270A	7,3kVA
<b>Connection cable/fuse</b>		
	4 x 2.5S mm <sup>2</sup> – 5m/16 A delayed	Master MLS™ 3500
	4 x 6S mm <sup>2</sup> – 5m/32 A delayed	Master MLS™ 3503
<b>Welding current range</b>		
	MMA	10 A/20,5V...350A/34,0V
	TIG	5 A/10,0V...400A/26,0V
<b>Max. welding voltage</b>		45V / 350 A
<b>Electrode sizes to be welded</b>		Ø1,5...6,0 mm
<b>Open circuit voltage</b>		80 V
<b>Welding current control</b>		stepless
<b>Efficiency</b>		86 %
<b>Power factor</b>		0,95 (350A/34,0 V)
<b>Open circuit power</b>		approx. 10W
<b>External dimensions</b>		
	length	500 mm
	width	180 mm
	height	390 mm
<b>Weight</b>		21 kg

<b>Power source Mastertig MLS™ 3000, Mastertig MLS™ 3003</b>		
<b>Mains voltage</b>		
	3~400V –15%...+20%	Mastertig MLS™ 3000
	3~230V –15%...+15%	Mastertig MLS™ 3003
<b>Rated power</b>		
30% ED TIG	300A	8,4kVA
60% ED TIG	230A	5,8kVA
100% ED TIG	200A	4,7kVA
40% ED MMA	250A	9,4kVA
60% ED MMA	205A	7,3kVA
100% ED MMA	160A	5,3kVA
<b>Connection cable/fuse</b>		
	4 x 1,5S mm <sup>2</sup> – 5 m/10 A delayed	Mastertig MLS™ 3000
	4 x 2,5S mm <sup>2</sup> – 5 m/20 A delayed	Mastertig MLS™ 3003
<b>Welding current range</b>		
	MMA	10A/20,5V...250A/30,0V
	TIG	5A/10,0V...300A/22,0V
<b>Max welding voltage</b>		36V / 250 A
<b>Electrode sizes to be welded</b>		Ø1,5...5,0mm
<b>Open circuit voltage</b>		80 V
<b>Welding current control</b>		stepless
<b>Efficiency</b>		86 % (250A/30,0V)
<b>Power factor</b>		0,95 (250A/30,0 V)
<b>Open circuit power</b>		approx. 10W
<b>External dimensions</b>		
	length	500 mm
	width	180 mm
	height	390 mm (650 mm TIG power source + cooling unit)
<b>Weight</b>		22 kg

<b>Power source Mastertig MLS™ 4000, Mastertig MLS™ 4003</b>		
<b>Mains voltage</b>		
	3~400V –15%...+20%	Mastertig MLS™ 4000
	3~230V –15%...+15%	Mastertig MLS™ 4003
<b>Rated power</b>		
30% ED TIG	400A	13,8kVA
60% ED TIG	320A	9,4kVA
100% ED TIG	270A	7,3kVA
40% ED MMA	350A	15kVA
60% ED MMA	285A	11,3kVA
100% ED MMA	220A	8kVA
<b>Connection cable/fuse</b>		
	4 x 2,5S mm <sup>2</sup> – 5 m/16 A delayed	Mastertig MLS™ 4000
	4 x 6S mm <sup>2</sup> – 5 m/32 A delayed	Mastertig MLS™ 4003
<b>Welding current range</b>		
	TIG	5A/10,0V...400A/26,0V
	MMA	10A/20,5V...350A/34,0V
<b>Max. welding voltage</b>		45.0V / 350 A
<b>Electrode sizes to be welded</b>		Ø1,5...6,0mm
<b>Open circuit voltage</b>		80 V
<b>Welding current control</b>		stepless
<b>Efficiency</b>		86 % (350A/34,0V)
<b>Power factor</b>		0,95 (350A/34,0 V)
<b>Open circuit power</b>		approx. 10W
<b>External dimensions</b>		
	length	500 mm
	width	180 mm
	height	390 mm (650 mm TIG power source+ cooling unit)
<b>Weight</b>		23 kg

<b>Cooling unit (TIG-welding) Mastercool 10</b>	
<b>Connection voltage</b>	400V –15%...+20%
	230V –15%...+10%
<b>Connection capacity</b>	100 % ED      50 W
<b>Cooling power</b>	1,05 kW
<b>Start pressure, max</b>	450 kPa
<b>Cooling liquid</b>	20% - 40 % etanol-water
<b>Reservoir volume</b>	approx. 3 l
<b>External dimensions</b>	
	length 500 mm
	width 180 mm
	height 260 mm
<b>Weight</b>	8 kg
<b>Power source and cooling unit</b>	
<b>Operating temperature range</b>	-20 ... +40 °C
<b>Storage temperature range</b>	-40 ... +60 °C
<b>Degree of protection</b>	IP 23 S

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## 7. TERMS OF GUARANTEE

Kemppi Oy provides a guarantee for products manufactured and sold by them if defects in manufacture and materials occur. Guarantee repairs must be carried out only by an Authorised Kemppi Service Agent. Packing, freight and insurance costs to be paid by orderer. The guarantee is effected on the date of purchase. Verbal promises which do not comply with the terms of guarantee are not binding on guarantor.

### ***Limitations on guarantee***

The following conditions are not covered under the terms of guarantee: defects due to natural wear and tear, non-compliance with operating and maintenance instructions, connection to incorrect or faulty supply voltage (including voltage surges outside equipment spec.), incorrect gas pressure, overloading, transport or storage damage, fire or damage due to natural causes i.e. lightning or flooding.

This guarantee does not cover direct or indirect travelling costs, daily allowances or accommodation.

Note: Under the terms of guarantee, welding torches and their consumables, feeder drive rolls and feeder guide tubes are not covered. Direct or indirect damage due to a defective product is not covered under the guarantee. The guarantee is void if changes are made to the product without approval of the manufacturer, or if repairs are carried out using non-approved spare parts.

The guarantee is also void if repairs are carried out by non-authorized agents.

### ***Undertaking guarantee repairs***

Guarantee defects must be informed to Kemppi or authorised Kemppi Service Agents within the guarantee period. Before any guarantee work is undertaken, the customer must provide proof of guarantee or proof of purchase, and serial number of the equipment in order to validate the guarantee.

The parts replaced under the terms of guarantee remain the property of Kemppi.

Following the guarantee repair, the guarantee of the machine or equipment, repaired or replaced, will be continued to the end of the original guarantee period.

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