

**TTC** | 130, 130F, 160, 160S  
220, 200W, 250W, 250WS



Operating manual • English *EN*

Käyttöohje • Suomi *FI*

Bruksanvisning • Svenska *SV*

Bruksanvisning • Norsk *NO*

Brugsanvisning • Dansk *DA*

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Manuel d'utilisation • Français *FR*

Инструкции по эксплуатации • По-русски *RU*



# **OPERATING MANUAL**

**English**

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## 1. PREFACE

### 1.1 GENERAL

Congratulations on having purchased this product. Used correctly, Kemppi products can significantly increase the productivity of your welding, and provide years of economical service.

This operating manual contains important information on the use, maintenance and safety of your Kemppi product. The technical specifications of the equipment can be found at the end of the manual.

Please read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on Kemppi products, contact Kemppi Oy, consult an authorised Kemppi dealer, or visit the Kemppi web site at [www.kemppi.com](http://www.kemppi.com).

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

#### **Important notes**

Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with the '**NOTE!**' notation. Read these sections carefully and follow their instructions.

#### **Disclaimer**







While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. Kemppi reserves the right to change the specification of the product described at any time without prior notice. Do not copy, record, reproduce or transmit the contents of this guide without prior permission from Kemppi.

### 1.2 PRODUCT INTRODUCTION






TTC 130, TTC 130F, TTC 160, TTC 160S, TTC 220, TTC 200W, TTC 250W and TTC 250WS are TIG welding torches designed for demanding use. They are suitable to be used with the Mastertig MLS welding machines.

### 1.2.1 Selection table for consumable parts TTC 130, TTC 130F, TTC 160S, TTC 200W, TTC 250WS

#### Normal gas nozzle equipment

Welding current									
									9878013
DC (A)	AC (A)	_____					Size		
		ø mm (in)							
			WC20	9873531				3	9878018*
5 – 80	5 – 50	1,0 (.040)	WZ8	9873520	7990635	7990640	7990660	4	7990760 9878019*
								5	7990761 9878020*
			WC20	9873532				4	7990760 9878019*
70 – 150	30 – 100	1,6 (1/16)	WZ8	9873521	7990636	7990641	7990661	5	7990761 9878020*
								6	7990762 9878021*
			WC20	9873533					
130 – 250	80 – 150	2,4 (3/32)	WZ8	9873522	7990637	7990642	7990662	6	7990762 9878021*
								7	7990763 -





#### Gas lens equipment

Welding current									
									9878013
DC (A)	AC (A)	_____					Size		
		ø mm (in)							
			WC20	9873531					
5 – 80	5 – 50	1,0 (.040)	WZ8	9873520	7990635	7990640	7990700	4	7990779*
								5	7990780
			WC20	9873532				4	7990779*
70 – 150	30 – 100	1,6 (1/16)	WZ8	9873521	7990636	7990641	7990701	5	7990780
								6	7990781
			WC20	9873533					
130 – 250	80 – 150	2,4 (3/32)	WZ8	9873522	7990637	7990642	7990702	6	7990781
								7	7990782






\*) Delivery only ex works. By deliveries ex works you have to pay the real delivery costs.  
Data in table are given only as a guide.

## 1.2.2 Selection table for consumable parts TTC 160, TTC 220, TTC 250W

### Normal gas nozzle equipment

Welding current								
								9580266
DC (A)	AC (A)	ø mm (in)				Size		
			WC20	9873531				
5 – 80	5 – 50	1,0 (.040)	WZ8	9873520	9876866	7990680	4	7990766
							5	7990770
			WC20	9873532			4	7990766
70 – 150	30 – 100	1,6 (1/16)	WZ8	9873521	9876867	7990681	5	7990770
							6	7990771
			WC20	9873533				
130 – 250	80 – 150	2,4 (3/32)	WZ8	9873522	9876868	7990682	6	7990771
							7	7990772
			WC20	9873534			7	7990772
220 – 350	120 – 210	3,2 (1/8)	WZ8	9873523	9876869	7990683	8	7990773
							10	7990775
			WC20	9873535			8	7990773
330 – 500	180 – 280	4,0 (5/32)	WZ8	9873524	9876870	7990684	10	7990775
			W	9873505			12	7990776

### Gas lens equipment

Welding current									
								9876860 + 9580266	
DC (A)	AC (A)	ø mm (in)				Size			
			WC20	9873531					
5 – 80	5 – 50	1,0 (.040)	WZ8	9873520	9876866	7990710	5	7990783	
			WC20	9873532					
70 – 150	30 – 100	1,6 (1/16)	WZ8	9873521	9876867	7990711	5	7990783	
							6	7990784	
			WC20	9873533					
130 – 250	80 – 150	2,4 (3/32)	WZ8	9873522	9876868	7990712	6	7990784	
							7	7990785	
			WC20	9873534			7	7990785	
220 – 350	120 – 210	3,2 (1/8)	WZ8	9873523	9876869	7990713	8	7990786	
							11	7990787	
			WC20	9873535					
330 – 500	180 – 280	4,0 (5/32)	WZ8	9873524	9876870	7990714	8	7990786	
			W	9873505			11	7990787	

Data in table are given only as a guide.

## 1.3 OPERATION SAFETY

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 reserve sufficient fire-fighting equipment on welding place. Be prepared for hazards in special welding jobs, eg. for the 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 (eg. container or truck). Do not place welding machine on a wet surface. Always check cables before operating the machine. Change defected cables without delay. Defected cables may cause an injury or set out a fire. Connection cable must not be compressed, 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 defected 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 gun is not directed towards a 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.

## 2. INSTALLATION

### 2.1 CONNECTING TTC-TORCH

Connect torch (and extension parts) according to welding machine's operation instructions. Tighten adaptors of torch carefully in order to avoid heating of adaptors, contact disturbances, mechanical damage and water or gas leakage.

*NOTE! Check by connection of liquid hoses that there are no dirt, metal powder or other wastes. Wastes may cause blocking in liquid circulation, throughburning of torch or stopping or breaking of pump.*

Connect liquid hoses of torch according to operation instruction of the cooling liquid circulation unit. (They are fastened to pipe chassis.) Fix liquid hoses (torch – cooling liquid circulation unit) in such a way that those having red code always are connected to corresponding red counter connectors and the blue ones respectively to blue counter connectors.

*NOTE! If connections cross, cooling liquid is circulating in wrong direction in torch, and torch handle and neck body might be considerably heated.*

### 2.2 SWITCH AND REGULATOR OPERATIONS

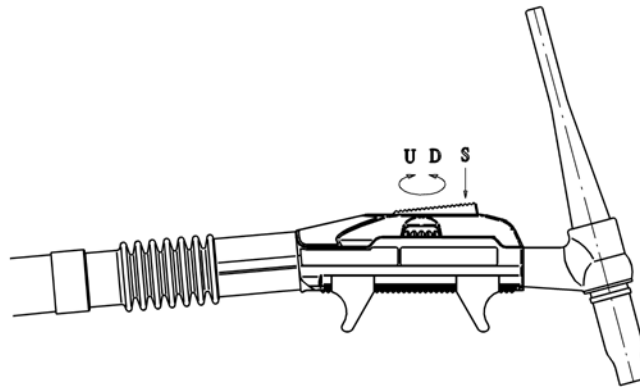
The TTC torches are equipped with ON/OFF switch. Operation of switch in 2-functions, 4-functions and Minilog positions is described in operation instructions of the welding machine.

TTC torches can be equipped with RTC 10 or RTC 20 torch regulators which are available as assessorry. Regulators can be assembled in place of the original start-switch.



**RTC 10 (code 6185477)**

Besides the start-switch there is a potentiometer for controlling the welding current.



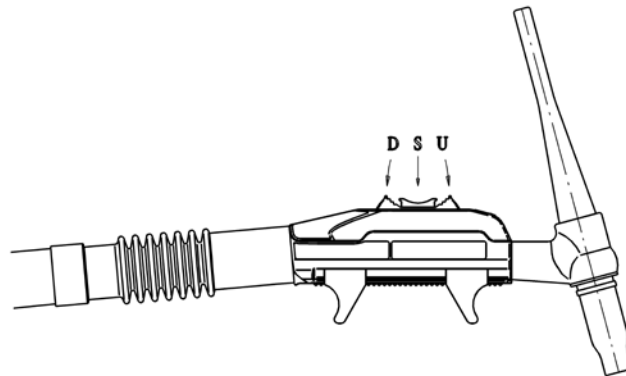
S = start

U (clockwise) = welding current will slope-up

D (anticlockwise) = welding current will slope-down

**RTC 20 (code 6185478)**

Besides the start-switch there is a seesaw switch for controlling the welding current.



S = start

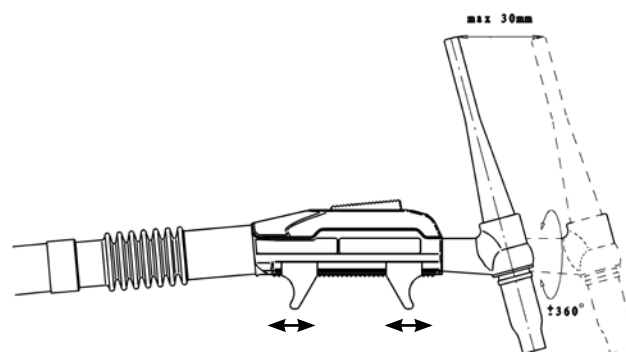
U = welding current will slope-up

D = welding current will slope-down

Assembly instruction is delivered with the regulators.

**2.3 ADJUSTMENT OF TORCH BODY AND GRIPS**

You can draw the torch neck outwards from inside the handle in approx. 30 mm length in order to grow reach or to minimize heat radiation to welder's hand. You can also twist the torch body 360° in regard of the handle. Twisting of neck makes the length adjustment easier. Before starting to weld make sure that the parts being exposed to voltage at the back end of the neck body are not visible.




You can without tools move or twist grips on the lower surface of the handle into such position you like that you can get a steady hold on the torch. You can also easily remove one or both of the grips through the front end of the handle.

## 2.4 CHOICE OF ELECTRODE SIZE AND FLOW AMOUNT OF SHIELDING GAS

Electrode size and shielding gas flow are defined by welding current level. The most usual shielding gas for TIG welding is argon.

The table below is given only as a guide.

Welding current DC- (AC)	Electrode	Gas nozzle		Gas flow rate
				
A	Ø mm	Number	Ø mm	l/min
5 – 80 (5 – 50)	1,0	4/5	6,5/8,0	5 – 6
70 – 150 (30 – 100)	1,6	4/5/6	6,5/8,0/9,5	6 – 7
130 – 250 (80 – 150)	2,4	6/7	9,5/11,0	7 – 8
220 – 350 (120 – 210)	3,2	7/8/10	11,0/12,5/16,0	8 – 10
330 – 500 (180 – 280)	4,0	10/11/12	16,0/17,5/19,0	10 – 12

### 2.4.1 Electrode choice according to base material to be welded

Electrode		Welding current	Base material			
Type	Symbol colour		Fe	Ss	Al	Ti
WC20	grey	AC DC-	•	•		•
WZ8	white	AC DC-			•	
W	green	AC DC-			•	

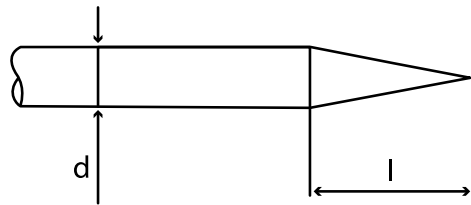
Delivery length of electrodes is 175 mm.

Data in table are given only as a guide.

## 2.5 SHARPENING OF ELECTRODE

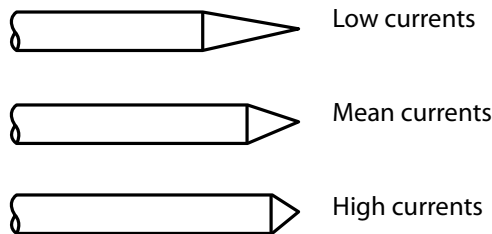
### 2.5.1 D.C. welding

In D.C. welding the tip of electrode is sharpened into cone shape in order to get a steady arc and to concentrate heat energy on welding point. Size of sharpening angle has an effect on width of welding run and depth of penetration. Ratio of sharpening length to electrode diameter:



$$l = 1 - 5 \times d$$

Suitable sharpening length depends on welding current which is used most often.

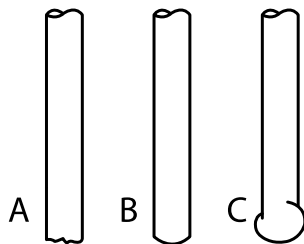


Always make sharpening grinding lengthwise of electrode.

### 2.5.2 A.C. welding

In A.C. welding the temperature of electrode tip rises a little more higher than melting point of tungsten and brings about formation of ball-shaped curved surface. On basis of tip formation and arc behaviour you can determine suitability of welding current for used electrode size and material.

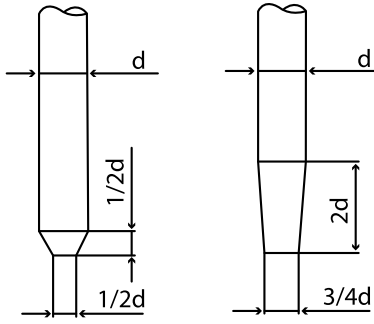
- Low welding current or big electrode size. Arc will be unsteady and is not directed on welding object.
- Suitable current.
- Too high current or too small electrode diameter.



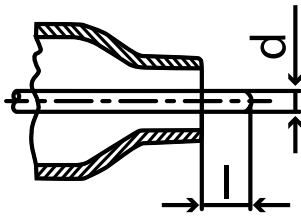
You can speed up the tip formation by electrode change e.g. with following:

- Adjust welding current a little higher than usually.
- Burn arc to waste piece by keeping the torch in vertical position.
- Arc is extinguished immediately after the electrode tip has become round.
- Current is reduced to be suitable for work and welding is started.

You can grind the electrode partly at its tip at which the tip will be better ball-shaped and the arc more steady.



## 2.6 PROJECTION OF ELECTRODE



Suitable distance of electrode tip from front edge of gas nozzle depends among others on electrode diameter and current type.

Formation of weld preparation has a considerable effect on suitable electrode projection. E.g. when you are welding the external angle, you should use a clearly smaller projection than in fillet weld.

Tighten the electrode with reasonable force. Too strong a tightening may damage tightening parts of electrode.

## 3. MAINTENANCE

Due to high temperatures and wear the welding end of TIG torch requires most maintenance, but also condition of other parts should be checked regularly.

### Welding end

Check that...

- All insulations of welding end are undamaged and at their place.
- Gas nozzle is undamaged and suitable for work.
- Flow of shielding gas is free and even.
- Electrode is undamaged. Use electrode size and tip sharpening angle which is suitable for welding case. Make sharpening grinding lengthwise of electrode.
- Fastening parts of electrode are undamaged and electrode is fastened tightly at its place.

### Torch cable

Check that...

- Insulations of handle and torch cable are undamaged.
- There are no sharp bends in torch cable.

Replace damaged parts immediately by new ones.

*NOTE! Frequent bending of neck body of torch may cause damage of gas or liquid channels. Length adjustment of neck body doesn't work on bent neck.*

## 4. OPERATION DISTURBANCES

### 4.1 THE MOST USUAL OPERATION DISTURBANCES ARE AS FOLLOWS:

#### Arc is not ignited:

- Cable is loose or there is a bad connection.
- Electrode of torch is highly oxidized (grey). Sharpen again lengthwise. Check that post gas time is long enough. Check ignition by using pre-gas e.g. by 4-function operation of torch.
- There are impurities in shielding gas (moisture, air).
- Protective hose or another insulation of torch is broken and ignition spark is "escaping" from elsewhere than from electrode of torch.
- Torch is wet.
- At low current is used too big or blunt electrode.

#### Gas shielding is bad (weld pool "is boiling", electrode will be oxidized)

- There are impurities in shielding gas (moisture, air).
- There are impurities in base material (rust, base coat, grease).
- On gas nozzle or housing of tightening bushing has stuck "spatter".
- Net of gas lens is damaged.
- There is too much draught at welding place.
- Note! With gas lens equipment you get a more balanced gas flow than with normal gas nozzle equipment.

## 5. ORDERING NUMBERS

	4 m	8 m	16 m
TTC 130	627013004	627013008	627013016
TTC 130F	627013104	627016008	627013116
TTC 160	627016004	627066008	627016016
TTC 160S	627016204	627016208	627016216
TTC 220	627022004	627022008	627022016
TTC 200W	627020504	627020508	627020516
TTC 250W	627025504	627025508	627025516
TTC 250WS	627025704	627025708	627025716

## 6. TECHNICAL DATA

	Loading capacity DC-		Electrode sizes to be used	Voltage class	Cooling	Connection to TIG-unit	
	40% ED	100% ED				Gas/ current	Water
<b>TTC 130</b>	130A	-	ø 1,0 – 2,4	L	Air	R¼	-
<b>TTC 130F</b>	130A	-	ø 1,0 – 2,4	L	Air	R¼	-
<b>TTC 160</b>	160A	-	ø 1,0 – 2,4	L	Air	R¼	-
<b>TTC 160S</b>	160A	-	ø 1,0 – 2,4	L	Air	R¼	-
<b>TTC 220</b>	220A	-	ø 1,0 – 4,0	L	Air	R¼	-
<b>TTC 200W</b>	-	200A	ø 1,0 – 3,2	L	Liquid - min. 1 l/min In inlet: - max. 50 °C - min. 1 bar - max. 5 bar	R¼	Snap connectors
<b>TTC 250W</b>	-	250A	ø 1,0 – 2,4	L	Liquid - min. 1 l/min In inlet: - max. 50 °C - min. 1 bar - max. 5 bar	R¼	Snap connectors
<b>TTC 250WS</b>	-	200A	ø 1,0 – 4,0	L	Liquid - min. 1 l/min In inlet: - max. 50 °C - min. 1 bar - max. 5 bar	R¼	Snap connectors

The torch meets the construction and safety requirements according to norm IEC / EN 60974-7.

Make sure that the torch being in your use is designed for max. welding current needed by you.



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