

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

1927340E

0537

PROTIG

410



CONTENTS

1.	PREFACE	3
1.1.	Introduction	3
1.2.	Product introduction	3
1.2.1.	Operation control and connectors	3
1.2.2.	Accessories and cables	5
1.3.	Operation safety	7
2.	INSTALLATION	7
2.1.	Assembly of TIG/MMA equipment	7
2.1.1.	Installation of power source	7
2.1.2.	Assembly of transport wagon and mounting of Pro power source to wagon	7
2.1.3.	Mounting of Protig 410 unit onto the power source	7
2.1.4.	Mounting of Protig 410 control panel	8
2.1.5.	Connecting cables	8
2.1.6.	Connecting torch and extension cable	8
2.1.7.	Use as terminal unit	8
2.1.8.	Assembly and controls of MIG/TIG/MMA equipment	8
2.1.9.	Remote control units	9
2.2.	Installation of TIG/MMA equipment	9
2.2.1.	Choice of electrode and flow amount of shielding gas	9
2.3.	Shielding gas	9
2.3.1.	Installing gas bottle	9
2.4.	Main switch I/O	10
2.5.	Operation of cooling unit (Procool 10, 30)	10
3.	OPERATION OF PANELS	11
3.1.	Control panel TL 6271265	11
3.1.1.	Selection of MMA/TIG welding	11
3.1.2.	Selection of TIG ignition method	11
3.1.3.	Selection of torch switch operation	12
3.1.4.	Adjustment of control unit	12
3.1.5.	Parallel control unit for welding current	13
3.1.6.	Pre-gas time display and current up-slope time display	13
3.1.7.	Display of current down-slope time	13
3.1.8.	Display of post gas time	13
3.1.9.	Display of welding current	13
3.1.10.	Local and remote control of welding current	13
3.1.11.	Controls for TIG welding	13
3.1.12.	Controls for MMA welding	14
3.2.	Control panel TX 6271266	14
3.2.1.	Control ranges for time and per cent	15
3.2.2.	Demo: Learning and control state	15
3.2.3.	Controls for continuous welding	16
3.2.4.	Controls for pulsed TIG welding	16
3.2.5.	Controls for fusion spot welding	17
3.2.6.	MINILOG-operation and control for start current	17
3.2.7.	Breaking down-slope operations	17
3.2.8.	Program storing of Selectotig	18
3.2.9.	Programming of numeric channels	18
3.2.10.	Programming of dot channels	18
4.	ACCURACY OF PANEL DISPLAY	18
5.	REMOTE CONTROL UNIT	19
6.	MAINTENANCE	19
6.1.	Welding torch	19
6.2.	Cables	20
7.	OPERATION DISTURBANCES	20
8.	DISPOSAL OF THE MACHINE	20
9.	ORDERING NUMBERS	21
10.	TECHNICAL DATA	22
11.	TERMS OF GUARANTEE	23

1. PREFACE

1.1. INTRODUCTION

Congratulations on having purchased this product. Properly installed Kemppi products should prove to be productive machines requiring maintenance at only regular intervals. This manual is arranged to give you a good understanding of the equipment and its safe operation. It also contains maintenance information and technical specifications. Read this manual 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 warning texts 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

Protig 410 is a TIG ignition unit for demanding professional use. The unit is controlled by means of a microprocessor and ignition spark is generated by means of thyristors.

These operation instructions are for Protig 410 ignition unit, assembly and installation of TIG equipment as well as panel functions. In addition instructions describe assembly of Mig/TIG/MMA equipment, cables and main operations of installation.

1.2.1. Operation control and connectors

Start connection of torch

Air-cooled torch

Switch for air-liquid-cooled torch



Liquid-cooled torch

Cooling liquid connection, welding torch

X11 Welding current connections Supply -

X12 Welding current connections Supply +

X13 Earth connection

X14 Connection of welding torch

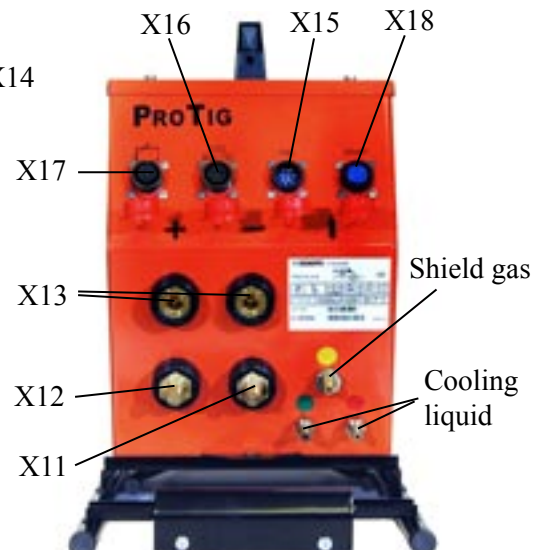
X15 Connection for control cable Pro power source

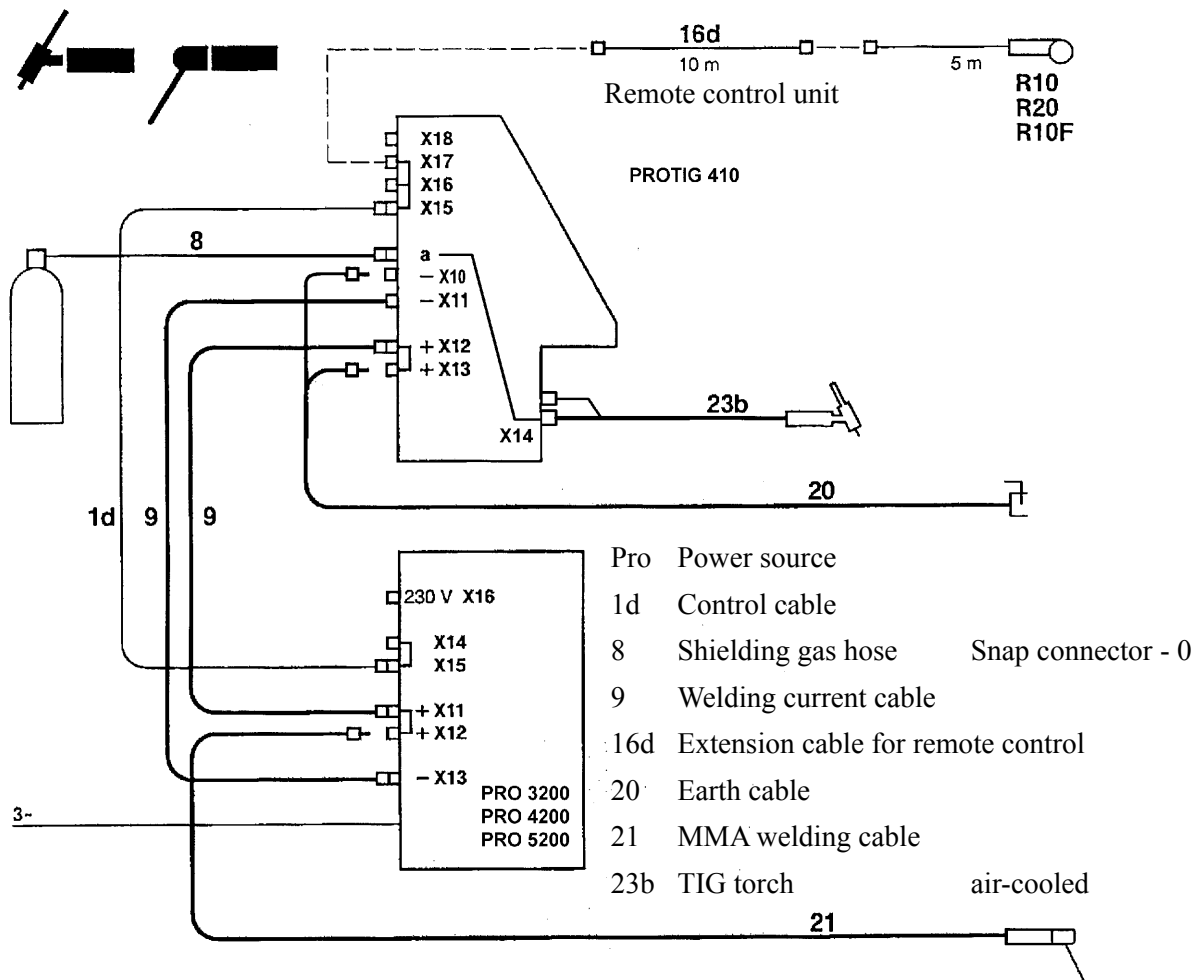
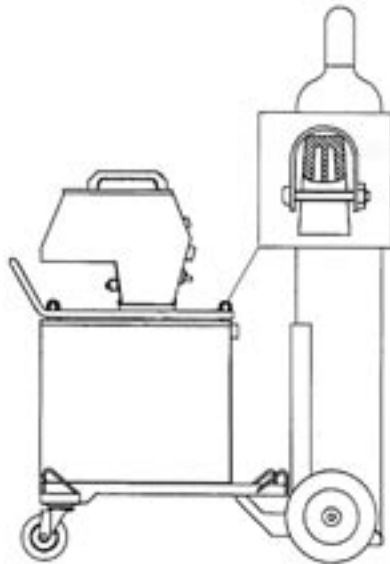
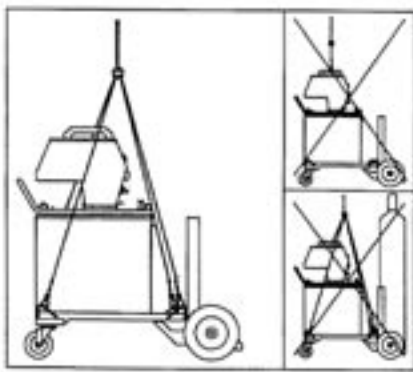
X16 Connection for control cable Procool

X17 Connection for control cable Remote control unit

X18 Start connection

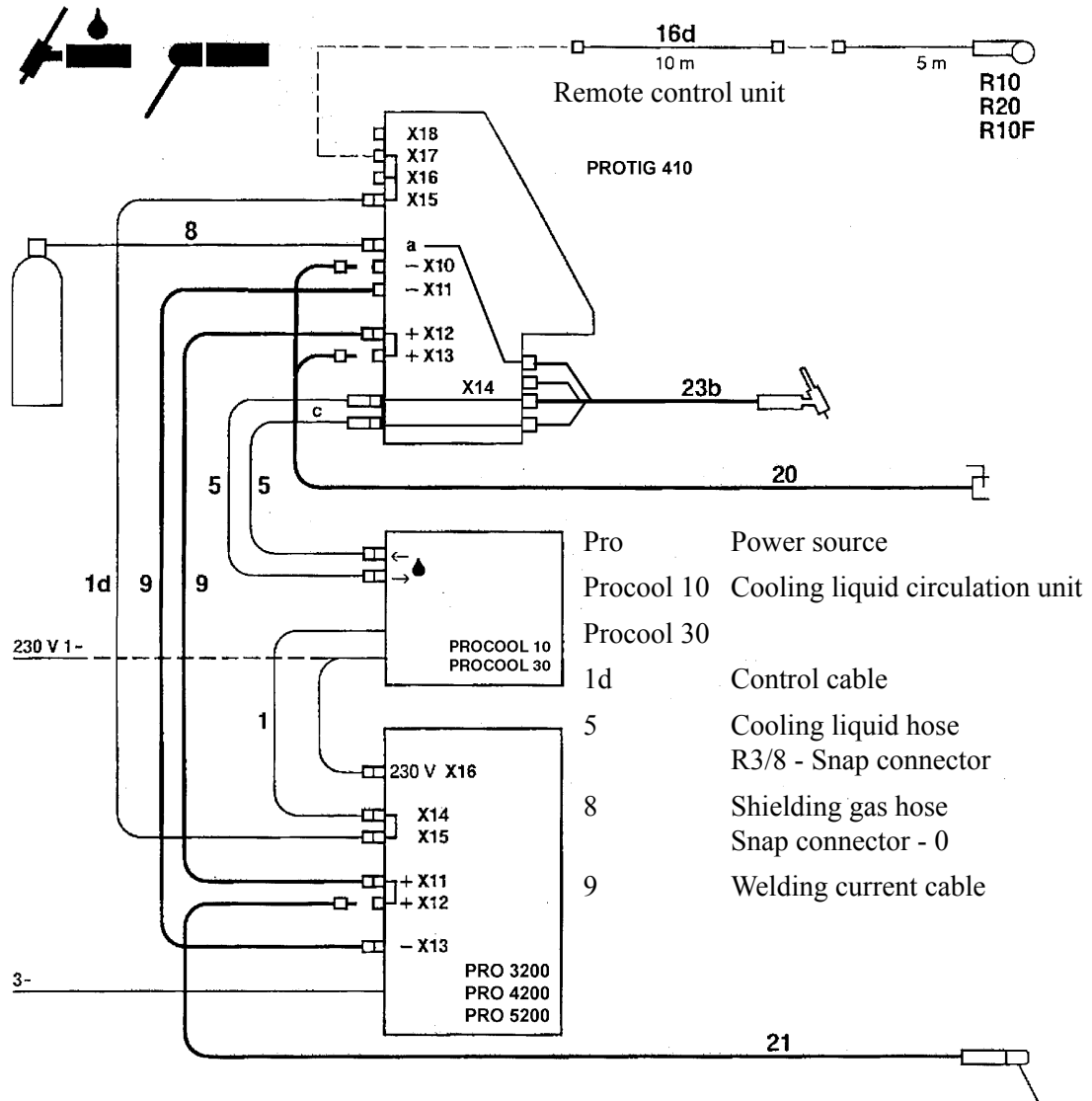
Remote control unit





1.2.2. Accessories and cables

23c TIG extension cable air-cooled



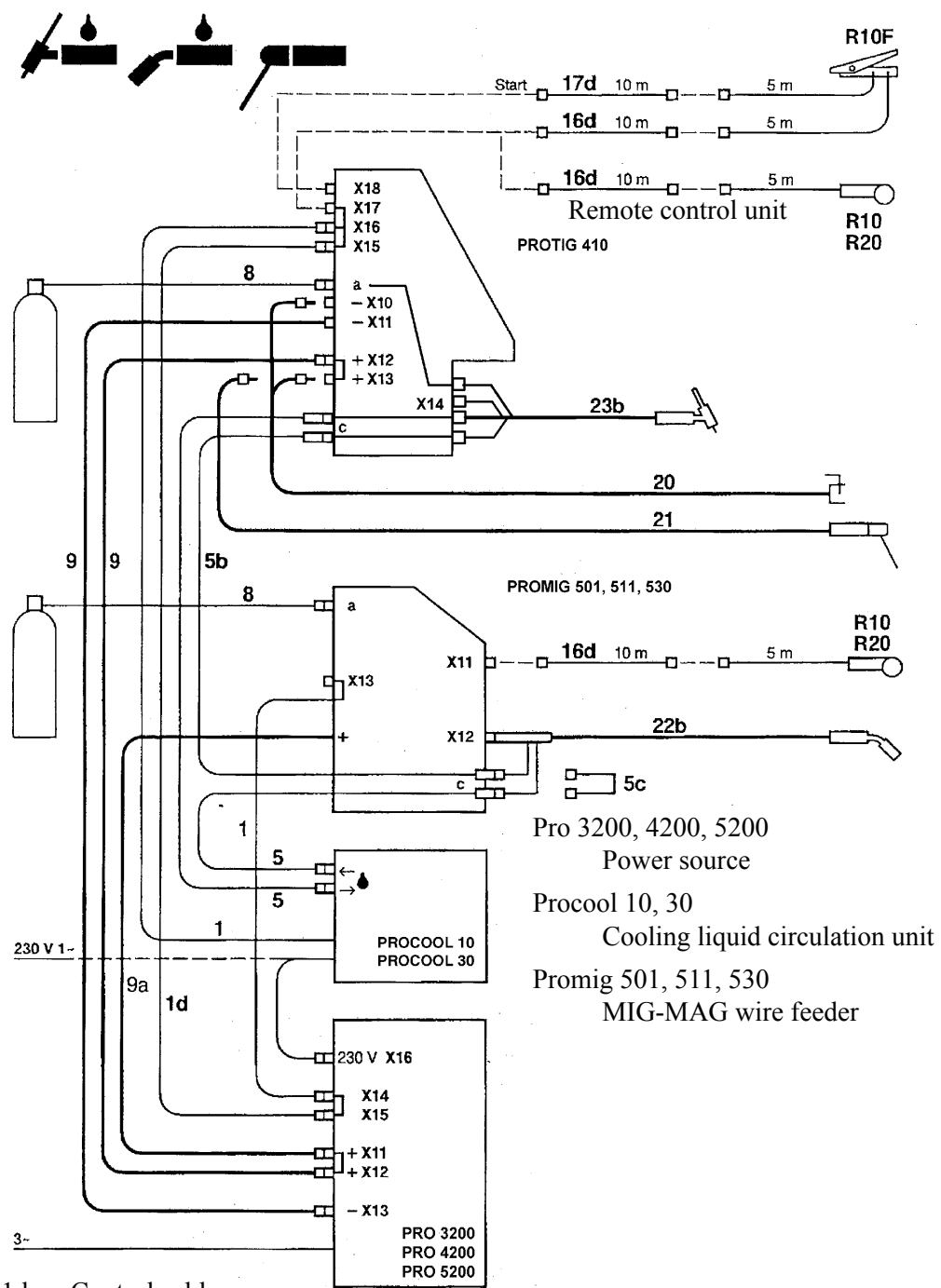
16d Extension cable for remote control

20 Earth cable

21 MMA welding cable

23b TIG torch liquid-cooled

23d TIG extension cable liquid-cooled



- 1d Control cable
- 5 Cooling liquid hose R3/8-Snap connector
- 5b Cooling liquid hose Snap conn. - Snap conn.
- 5c Cooling liquid hose Bridge element
- 8 Shielding gas hose Snap connector - 0
- 9a Welding current cable
- 16d Extension cable for remote control
- 17d Start extension cable
- 20 Earth cable
- 21 MMA welding cable
- 22b Mig gun liquid-cooled
- 23b TIG torch liquid-cooled
- 23d TIG extension cable liquid-cooled

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 ensure that you have sufficient fire fighting equipment available where you are welding. 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 damaged cables without delay. Damaged cables may cause an injury or set out 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 defect cables. Do not put the MIG-gun or welding cables on welding machine or on other electric equipment. Do not press the MIG-gun 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. ASSEMBLY OF TIG/MMA EQUIPMENT

Assemble the equipment in below-mentioned order and follow mounting and operation instructions which are delivered with packages.

2.1.1. ***Installation of power source***



Connection of mains cable and mounting operations as well as change of plug should only be carried out by a competent electrician.

Read paragraph: "Installation" in operation instructions (1913130) for Pro power sources and carry out the installation according to that.

2.1.2. ***Assembly of transport wagon and mounting of Pro power source to wagon***

P20	6185261	air-cooled TIG equipment
P30W	6185262	liquid-cooled TIG equipment
P40, P40L	6185264, 6185264L	air-cooled TIG equipment

Lifting of wagon together with bottle is forbidden due to safety reasons!

2.1.3. ***Mounting of Protig 410 unit onto the power source*** (figure page 4)



Lock the Protig unit carefully as shown in fig. onto pro power source. Loose unit might cause a danger situation.

2.1.4. Mounting of Protig 410 control panel

TL 6271265

TX 6271266

2.1.5. Connecting cables

Follow enclosed figures:

Air-cooled equipment on page 4

Liquid-cooled equipment on page 5

When connecting cables take into consideration the fact that the most generally used polarity in TIG welding is the torch - and ground cable +. In MMA welding the polarity is generally on the contrary (Electrode holder+). Follow instructions as shown on page 4 and 5 when changing welding method.

2.1.6. Connecting torch and extension cable

Connection to the Protig 410 unit is shown on page 4 (air-cooled torch) and on page 5 (liquid-cooled torch).

Tighten connector of torch carefully in order to avoid heating, contact disturbances and mechanical damage of connector as well as gas leakage to inside of connector.



Check by connection of water and gas hoses that there is no dirt, metal powder or other waste. Waste might cause blockage of water circulation, throughburning of torch, or stopping or breaking of pump (Procool 10, Procool 30).

Connect water hoses of torch and interconnecting cable as shown in figure on page 5. (These are fixed to tube frame). Fix water hoses (torch - interconnecting cable - Procool) 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.



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

2.1.7. Use as terminal unit

Between power source and the Protig 410 unit are available 10 m interconnecting cables which are inside of mutual power.

On page 4 are shown following mechanical operations which are involved in use of unit.

2.1.8. Assembly and controls of MIG / TIG / MMA equipment

Connecting cables are shown on page 6 (liquid-cooled).

Circulation systems of liquid-cooled torches are series connected. Read carefully warnings in paragraph 6.

Do not forget to change polarity according to paragraph 5 when you go over from MMA welding to TIG welding.

Equipment will automatically select Mig welding method and controls when you press operation switch of Mig gun and respectively TIG welding method when you press switch of TIG torch.

Remote controls for Mig or TIG welding operate from remote control units which are connected to respective Promig 501/511/530 and Protig 410 units.

You can select MMA welding from panel of one or the other unit, when remote control for MMA welding is operating from remote control unit which is connected to device in question.



At welding and at no-load of MMA welding also other welding tools are exposed to voltage depending on polarity. Be careful that welding tools won't produce any short-circuits.

2.1.9. Remote control units

Connect remote control unit as shown in figures on page 4 or 5. Operation of remote control unit is explained on page 19.

2.2. INSTALLATION OF TIG/MMA EQUIPMENT

Fasten earthing press of ground cable carefully, preferably direct to welding piece. Contact surface of press always should be as large as possible.

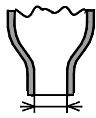
Clean the fastening surface from paint and rust!

Use in your TIG/MMA equipment 50 mm² cables. Thinner cross-sectional areas might cause overheating of connectors and insulations.

Make sure that the torch being in your use is designed for max. welding current needed by you! Never use a damaged torch!

2.2.1. Choice of electrode and flow amount of shielding gas

Use argon as TIG shielding gas. Electrode size and shielding gas flow rate are defined by welding current size. The table below is given only as a guide.

Welding current A	Electrode ø mm	Gas nozzle		Gas flow rate l/min
		number	 ø mm	
5...80	1,0	4 / 5	6,5 / 8,0	5...6
70...150	1,6	4 / 5 / 6	6,5 / 8,0 / 9,5	6..7
140...250	2,4	6 / 7	9,5 / 11,0	7...8
225...330	3,2	7 / 8	11,0 / 12,5	8...10
330...	4,0	10	16,0	10...12

2.3. SHIELD GAS



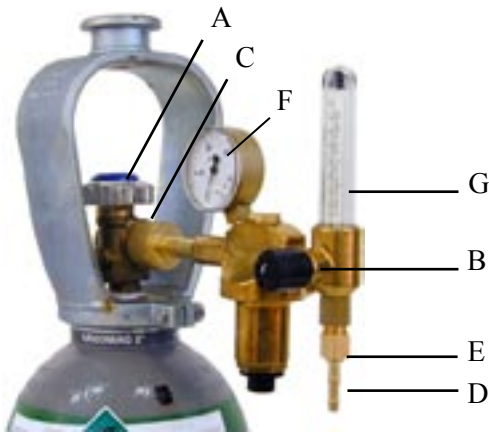
Handle gas bottle with care. There is a risk for injury if gas bottle or bottle valve is damaged!

For welding stainless steels, mixed gases are normally used. Check that the gas bottle valve is suitable for the gas. The flow rate is set according to the welding power used in the job. A suitable flow rate is normally 8 - 10 l/min. If the gas flow is not suitable, the welded joint will be sporous. Contact your local Kemppi-dealer for choosing gas and equipment.

2.3.1. Installing gas bottle



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.



Parts of gas flow regulator

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

The following installing instructions are valid for most of the 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.
2. Turn the press 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 the hose with the regulator and the other end with the wire feed unit. 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 in 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.

2.4. MAIN SWITCH I/O

When you turn the main switch of the Pro power source into I-position, pilot lamp close to it is lighted and the equipment is ready for welding. The equipment is returned to that welding method with which the welding was last carried out before the main switch was turned to zero position.



Always start and switch off the machine with the main switch, never use the mains plug as a switch.

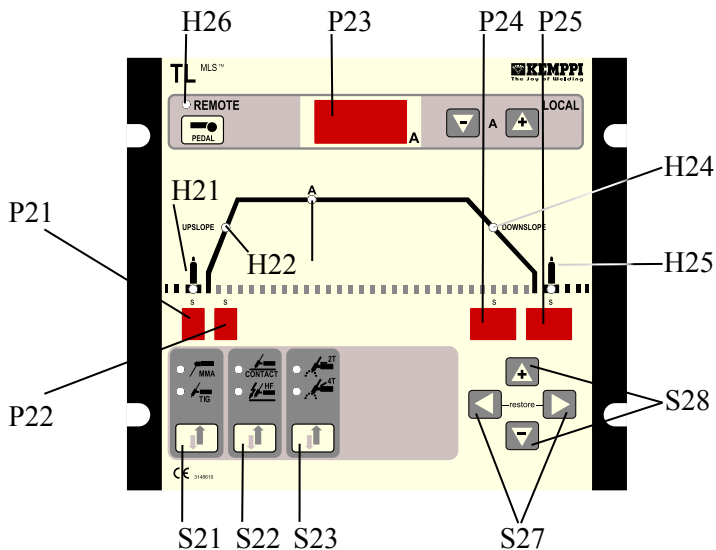
2.5. OPERATION OF COOLING UNIT (PROCOOL 10, 30)

Operation of cooling unit is controlled in such a way that pump is started when welding is started. After welding stop pump is rotating for approx. 5 min cooling the liquid to ambient temperature. Purpose of this operation is to make maintenance intervals of pump longer.

Read in operation instructions for the Procool 10 / Procool 30 unit the trouble situations of the liquid circulation system and protection against torch etc. damage.

3. OPERATIONS OF PANELS

3.1. CONTROL PANEL TL 6271265



Selection of MMA/TIG welding (S21)

Selection of TIG ignition method (S22)

Selection of operating mode of torch switch (S23)

Selection of adjustable parameter (S27)

+/- adjustment of selected parameter (S28)

Display for pre-gas time (P21)

Display for current up-slope time (P22)

Display of welding current (P23)

Display of down-slope time of current (P24)

Display of post gas time (P25)

Led-lamp is illuminated to show those selections and operations which are used.



3.1.1. Selection of MMA/TIG welding

Don't forget to change polarity of voltage when you go over from one method to another: TIG welding generally in torch-, MMA welding generally in electrode holder +, see connection on page 4 or 5.

3.1.2. Selection of TIG ignition method



Contact ignition:

Spark generation is prevented and arc will be ignited as follows:

1. Touch work piece with an electrode.
2. Start power source with the torch switch.
3. Lift electrode off from work piece in which case arc will be ignited. If arc is not ignited within 1 s, the ignition must be repeated.

Scratch ignition is not recommended.

Control of ignition spark

Spark power may cause interference with electronics equipment, which are not properly protected. If there is interference, use contact ignition.

In order to reduce spark voltage in difficult interference situations, take contact with authorized Kemppi service work shop.

Spark ignition:



Arc is ignited with high frequency with high voltage spark without touching work piece.

Use of torch switch starts spark generation. Spark strikes from electrode to work piece and arc is ignited. Welding current is immediately set at set value. Spark distance, shielding gas flow and current through earthing press have a profound effect on ignition.

If arc is not ignited within 1s, the ignition must be repeated.



Be careful that the torch tip is not touching near skin, clothes or components which are sensitive for damage, like panels, connectors or switches.

3.1.3. Selection of torch switch operation

2-function:



1. After having pressed torch switch down, shielding gas starts to flow. Welding starts after ca. 0,3 s pregas time, welding current goes immediately up to current level according to settings.
2. When you release torch switch up, welding current begins to go down smoothly, and current is cut off after time defined by down-slope time. When welding current is zero, there begins post gas time.
3. Tack weld automatics with 2-function: if welding time was less than 3s, there won't come any down-slope time.

Begin trial operation of unit with this mode of switch in order to avoid confusion. Go through all operations and controls of panel.

4-function:



1. Press torch switch down, shielding gas begins to flow.
2. Release the switch up, welding is started as above. Welding is continued, when the switch is released.
3. Press the switch again down, welding is continued.
4. Release the switch up, welding is stopped as above.

Stopping unintentional start

With spark ignition:

If arc is not ignited, e.g. torch has not been directed towards work piece, ignition spark will go out within 1 s from pressing down the torch switch. If electrode is fastened on the work piece when the torch is pressed down, welding current will be switched off immediately and there comes no ignition spark.

With contact ignition:

If electrode is fastened on the work piece, when torch is switched down, and electrode is not lifted off from the work piece, welding current is switched off within 1 s.

3.1.4. Adjustment of control unit



With + and - keys, parameters (time or current) are adjusted to higher or lower values.

Adjustable operation is selected with arrow keys: welding current, current down-slope time or post gas time.

Adjustment speed is growing during adjustment.



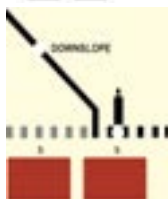
3.1.5. Parallel control unit for welding current

Controlling is directed only on welding current, in which case changing current is rapid in operation mode. Control unit is operating in parallel with key S39 on right lower corner of panel if welding current is adjusted from them. Parallel control unit cannot be used for adjusting times or per cents.

3.1.6. Pre-gas time display and current up-slope time display



Control ranges are 0...9 s.



3.1.7. Display of current down-slope time

Control range is 0...30 s.

3.1.8. Display of post gas time

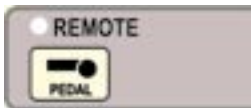
Control range is 0...99 s.

3.1.9. Display of welding current



On no-load the meter shows set value of welding current and at welding true value.

3.1.10. Local and remote control of welding current

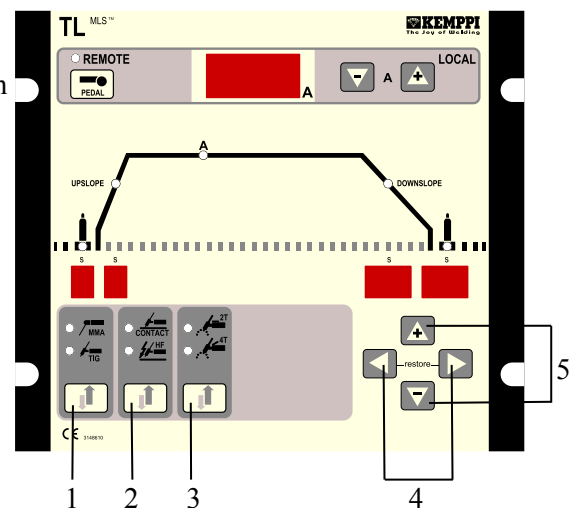


Local control is carried out from +/- keys. Remote control unit R10 can be put into operation by pressing the selection key for remote control.

3.1.11. Controls for TIG welding

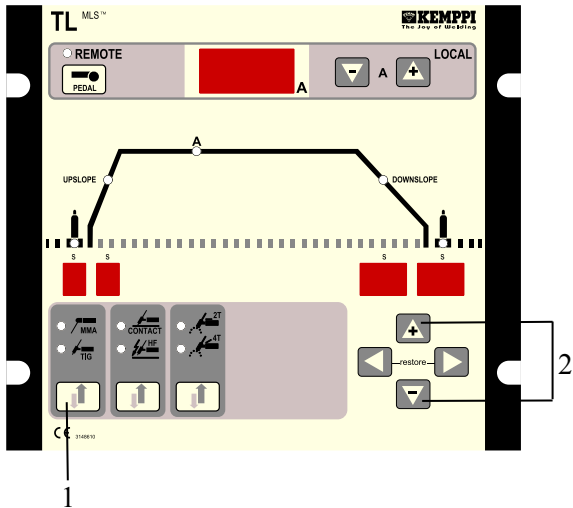
Starting situation: Torch is switched, but start switch is not pressed.

- 1 Select TIG welding.
- 2 Select spark ignition.
- 3 Select 2-function position.
- 4 Press one or the other of arrow keys until light H23 will be lighted.
- 5 Press the + or the - key and adjust the needed current value to display P23.
You can test suitability of current by welding and adjust current again if necessary.
- 6 Press arrow key once to right, until lamp H24 will be lighted. Adjust the down-slope time as suitable. Seconds are displayed in P24.
- 7 Press again arrow key and H25 will be lighted. Adjust post gas time as suitable. Seconds are displayed in P25.
- 8 Keep pressing the arrow key, and adjust the pre-gas time and current up-slope time correspondingly (H21 ja H 22).



Breaking of down-slope time at 2-function of torch is done by pressing down the switch, when current starts to go up to set value with the same speed with which it had gone down. At 4-function down-slope of current is stopped when torch switch is pressed down and down-slope operation will be continued by releasing the switch. Intermittent up- and down-slope operations are produced by pressing the switch for a short time.

3.1.12. Controls for MMA welding

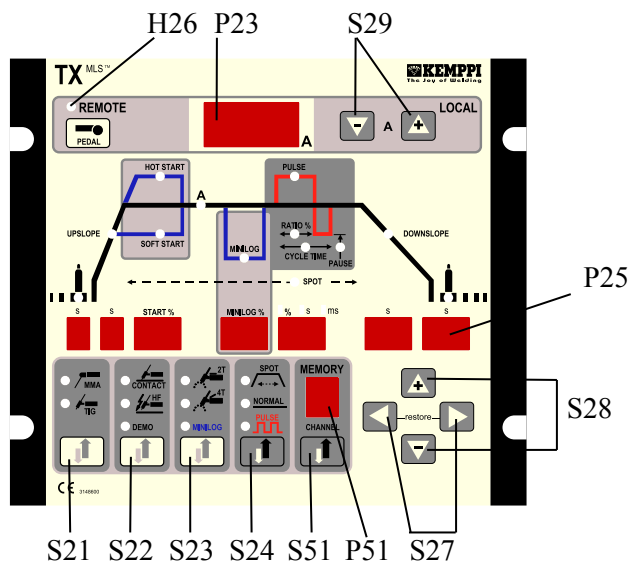


- 1 Select the MMA welding.
- 2 Adjust with the +/- keys current needed.

Set value can be seen in display P23 on no-load. At welding the display shows welding current. When the light H26 for remote control is lighted, you can control welding current from remote control unit R10.

Don't forget to change polarity of welding current by changing connection of cables as shown in figures on page 4 or 5.

3.2. CONTROL PANEL TX 6271266



Read following paragraphs in operation instructions for panel TL:

- Selection of MMA/TIG welding (S21)
- Selection of TIG ignition method (S22)
- Selection of operation mode of torch switch (S23)
- Operation of control unit (S27), (S28)
- Display for post gas time (P25)
- Local and remote control of welding current (H26)
- Welding current display (P23)
- Controls for MMA welding

In panel TX there are also following operation and controls:

Demo: learning and control state
Controls for continuous welding
Controls for pulsed TIG welding
Controls for fusion spot welding
Minilog-function and control of start current
Breaking the down-slope operations
Program storing of selectotig

3.2.1. Control ranges for time and per cent

Pre-gas time	0...9 s
Current up-slope time	0...9 s
Start current	30...150 %
Minilog basic current	10...90 %
Pulse ratio	10...80 %
Length of cycle	0,002...4 s (max. 500 Hz)
Pause current of pulse	10...80 %
Spot welding time	0...9 s
Current down-slope time	0...30 s
Post gas time	0...99 s
Minilog pressing:	short less than 0,7 s
	long more than 0,7 s

Per cent values of table are calculated from control value.

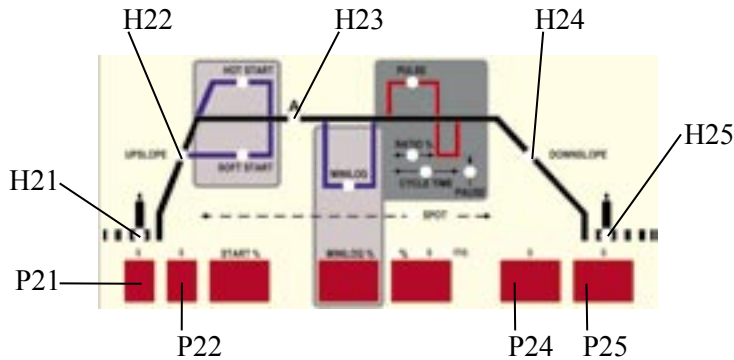
3.2.2. Demo: Learning and control state



In demo state coming of ignition spark and gas are stopped. All other controls operate as during welding. Basic controls for current, times and per cent can be carried out safely in this state and after that you can go over to welding using either spark or contact ignition.

Use arrow keys when you go over to control different functions. You can go to available controls by selected welding mode. It is indicated by pilot lamp, in which stage of operation flow chart you are now and which parameters can be controlled by you.

3.2.3. Controls for continuous welding



- 1 Select Demo, 2-function switch operation and continuous welding S24.
- 2 Adjust welding current with parallel control S29, or go over to adjustment for welding current with arrow keys S27 and adjust current with +/- keys S28. Reading will be visible in display P23.
- 3 Go with arrow keys S27 to pre-gas point H21. Adjust pre-gas time P21 with +/- keys S28.
- 4 Go to up-slope point of current H24. Adjust up-slope time P22 with keys +/-.
- 5 Go to down-slope point of current H24. Adjust down-slope time P24 with +/- keys.
- 6 Go to post gas point H25. Adjust post gas time P25 with +/- keys.

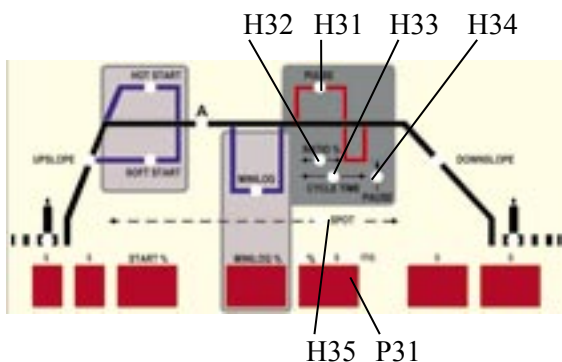
By pressing the torch switch you can go through the whole operation cycle and after that go to welding by selecting the ignition mode. You can use as operation models of torch switch also the 4-function and Minilog operations.

Note the up- and down-slope times changing with current control and adjust when necessary.

If arc is not ignited within 1 s from start, the unit will automatically go to stop without timing.

Values of up- and down-slope times change automatically, when set values of welding current are changing. Due to automatics you don't need to change times in many welding cases, when you change current.

3.2.4. Controls for pulsed TIG welding



- 1 Select TIG welding, Demo, 2-function switch operation and pulsed welding S24.
- 2 Adjust welding parameters as above in point: "Controls for continuous welding".

Automatics of unit set pulse parameters automatically according to start values in storage. Automatics of unit calculate a new average value for current, when pulse values are changed. Automatics make the operations in that way easier that you need not always adjust again other parameters of pulse, when pulse or mean current value is changed.

- 3 Adjust pulse values in turns by going with arrow keys S27 to required adjustment point: pulse current H31, pulse ratio H32, cycle time H33 and pause current H34. Control values can be seen in display P31.

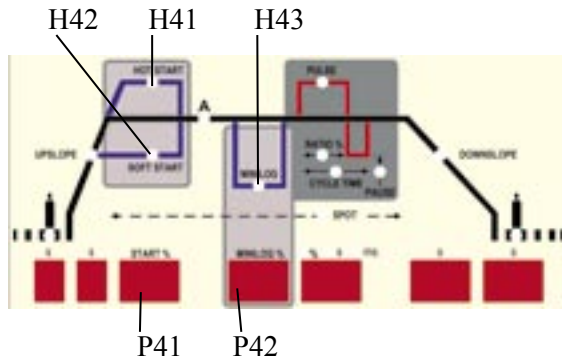
However, it is impossible to distinguish separate pulses from arc during rapid pulse cycle times 2, 4, 8 and 16 ms, controls are working in the normal way. Welding of thin materials can be considered as one application because there directing arc to narrow range is very important, or if slow transportation speed is necessary.

3.2.5. Controls for fusion spot welding

- 1 Select TIG welding, Demo, 2-function operation and fusion spot welding S24.
- 2 Adjust welding parameters as above in point: Controls for continuous welding.
- 3 Go with arrow keys S27 to fusion welding point H35. Adjust spot welding time P31 with +/- keys S28.

Spot welding is working also in 4-function position, then torch switch needs not be pressed until at start.

3.2.6. Minilog-operation and control for start current



Operation of Minilog is based on two pressings of different length, short and long (over 0,7 s), on torch switch. With long pressing you make first the gas to flow. When the switch is released, you go through pre-gas time and up-slope current to start current, when lamps H41 and/or H42 are lighted.

If start current has been adjusted onto different value from welding current, you go to welding current with short pressing. If start current is the same as the welding current, you go directly to welding current without any additional pressing. After that you can alternate with short pressings between welding current and basic current levels.

- 1 Select TIG welding, Demo, Minilog operation S23 and continuous or pulsed welding.
- 2 Adjust the welding parameters as above in point: Controls for continuous welding.
- 3 You can adjust start current value with +/- keys S28 either to lower or higher value by means of display P41. Control range for start current is approx. 30...150 % of welding current value. When upper pilot lamp H41 is lighted, there is in display reading exceeding 100 %. When lower pilot lamp H42 is lighted, there is in display reading under 100 %.
- 4 Adjust basic current level H43 with +/- keys. Reading will come to display P42.
- 5 Stop welding with long pressing, when releasing switch you go to down-slope current and post gas time. You can start down-slope from any point operation cycle you like.

3.2.7. Breaking down-slope operations



In 2-function position of torch switch welding current begins to slope down, when torch switch is released. If you press the torch switch again, current begins to slope up (in its maximum to the reference value) with the same speed as it was earlier sloping down. With the operation the slope-down can be controlled without interfering the down-slope time.

In 4-function and Minilog positions the respective operation can be produced by short pressing of the torch switch. Current down-slope can also be stopped to value of that moment by keeping the switch pressed down. When the switch is released, current down-slope is continued until the down-slope time is at end.

3.2.8. Program storing of Selectotig



The unit has as standard 20 channels. For all channels there are stored reference values, which you can change and store as changed.

Numeric channels are channel numbers from 0 to 9 without dot. Dot channels are channel numbers from 0...9 with dots.

Ranges from 0 to 4 are directly in use, to range from 5 to 9 and back you can get with long pressing of CH key S51. Dot channels should be used to store values which you would like to keep in storage more permanently.

You can store values of dot channel only in Demo state S22. Welding takes always place on respective numeric channel to which you go automatically from respective dot channel or with CH key. Dot channel values are copied only to respective numeric channel and destroy previous values when you start welding from this dot channel.

3.2.9. Programming of numeric channels

On numeric channel there are always the last welded values. The storing is made by welding automatically always when the post gas time begins after normal stopping. Reference values don't get lost even though you cancel the welding program made by you in the below-mentioned way.

3.2.10. Programming of dot channels

1. Select dot channel (number and dot) or numeric channel with key CH.
2. On dot channel: Carry out necessary controls and selections S22 in Demo-position. You cannot make storing in position for spark or contact ignition. On numeric channel: If you want to store the welding values used by you permanently, you can go to Demo state and store the values as in point 3, in which case the values are stored on corresponding dot channel.
3. Start the program with torch switch to welding current and press key CH, when capital letter P comes to CH display P51.
4. Go over to weld stop from torch switch and wait until the post gas time begins. Your program has been stored to dot channel, when on display P25 for post gas time appear for two seconds horizontal lines - -.

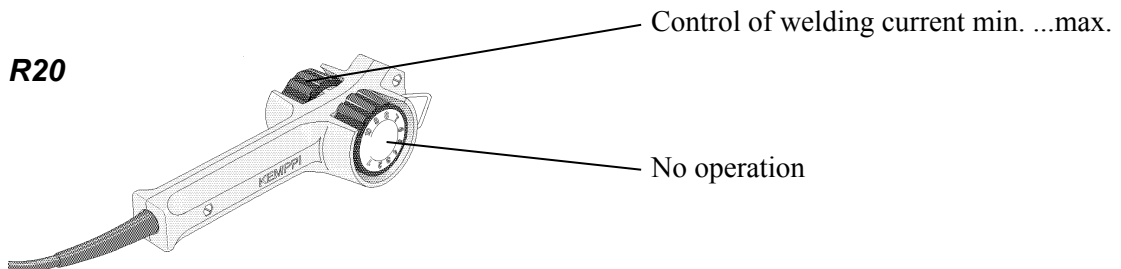
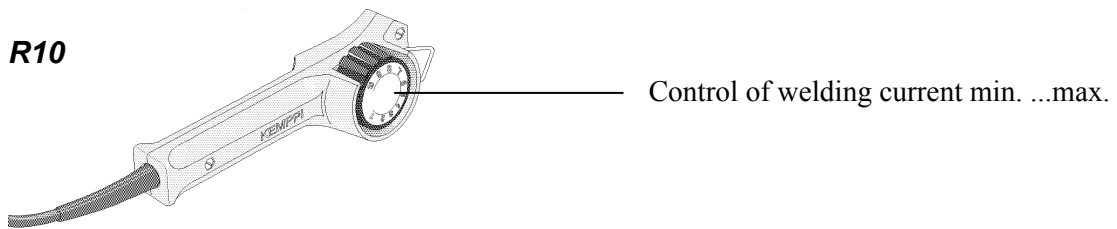
The parameters which are shown last in display and welded or stored last are kept in storage, though electricity would be disconnected from unit. At connection electricity is restored to the channel, on which you were last. All channels have reference values which don't disappear from memory though you would store to channels anything. You can cancel program of channel from memory as follows:

1. Select channel number to display CH.
2. Press at the same time both arrow keys. All lights on panel are lighted at the same time and the program is cancelled and original reference values are restored to channel.

4. ACCURACY OF PANEL DISPLAY

Accuracy of digital meters in TL and TX panels as follows: Accuracy of current set value in ratio to true value is $\pm 2,5\%$, $\pm 2\text{ A}$.

5. REMOTE CONTROL UNIT



R10F



Foot pedal control unit for TIG welding

- Start operation
- Control for welding current with movement on pedal
- Limiting of welding current range with min. and max. potentiometers (reference scale 1...10).

6. MAINTENANCE

The amount of use and the working environment should be taken into consideration when planning the frequency of maintenance of Protig 410 unit. Careful use and preventive maintenance will help to ensure trouble-free operation.

6.1. WELDING TORCH

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.
- gaz 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!

Follow in all maintenance and repair measures instructions given by torch manufacturer.

6.2. CABLES

Check the condition of welding and connection cables daily. Don't use any damaged cables!
Make sure that the mains connection cables in use are safe and according to regulations!

The repair and mounting of mains connecting cables must be carried out only by an authorised electrician.

7. OPERATION DISTURBANCES

The most usual operation disturbances:

Arc is not ignited:

- Cable is loose or there is a bad connection.
- Electrode of torch is highly oxidized (grey). Sharp 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 of torch is broken and ignition spark is "escaping" from elsewhere than from electrode of torch.
- Torch or extension cable is wet.
- There are leakages due to moisture or dirt in connectors or cables of Protig 410 unit.
- At low current too big or blunt electrode.
- If with operation disturbances there comes to current display continuously error code in form "E + number", take contact with Kemppi service work shop and tell them also above-mentioned error code.

8. 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!

9. ORDERING NUMBERS

Protig 410				6271261
Kemppi Pro Evolution 3200				6131320
Kemppi Pro Evolution 4200				6131420
Kemppi Pro Evolution 5200				6131520
R10				6185409
R20				6185419
R10F				6185406
Remote control cable		10 m		6185481
Start extension cable		10 m		6185482
Return current cable		5m - 50 mm ²		6184511
MMA welding cable		5 m - 50 mm ²		6184501
TTK welding torch:				
	TTK 130	TTK 130F	TTK 160	TTK 160S
4m	627063004	627063104	627066004	627066204
8m	627063008	627063108	627066008	627066208
16m	627063016	627063116	627066016	627066216
	TTK 220	TTK 300W	TTK 350W	TTK 250WS
4m	627072004	627080504	627085504	627075704
8m	627072008	627080508	627085508	627075708
16m	627072016	627080516	627085516	627075716
	TTK 220S			
4m	627072304			
8m	627072308			
16m	627072316			
Intermediate cable 50-1-G		1 m - 50 mm ²		6271906
Intermediate cable 50-10-GH		10 m - 50 mm ²		6271913
Procool 10				6262012
Procool 30				6262016
P30W				6185262
P 40				6185264
P 40 L				6185264L
Intermediate cable 50-1-W		1 m - 50 mm ²		6271907
Intermediate cable 50-10-WH		10 m - 50 mm ²		6271914
Promig 501				6232501
Promig 501 L				6232505
Promig 511				6232511
Promig 530				6232530
Promig 501 + Protig				
Intermediate cable PROTIG/MIG 501-III-W		1m - 50 mm ²		3135780
Promig 511 + Protig				
Intermediate cable PROTIG/MIG 511-III-W		1m - 50 mm ²		3135790

10. TECHNICAL DATA

Protig 410

Working voltage (safety voltage)	50 VDC
Rated power	50 W
Max. load	60 % ED 400 A
	100 % ED 310 A
Pressure endurance of gas hose	600 kPa max.
Connection of gas hose	snap connector
Welding cable connectors	DIX 70
Torch connection (adapter)	Multi-function
Operation temperature range	-20...+40 °C
Storage temperature range	-40...+60 °C
Temperature class	B (130 °C)
Degree of protection ¹⁾	IP 34
Dimensions	length 615 mm
	width 260 mm
	height 400 mm
Weight	17 kg

The product meets conformity requirements for CE marking.

¹⁾ IP 34 means that the device is protected against water coming from any direction, directly or splashing.

Control panels

Main operations of Protig 410 panels TL and TX are in enclosed table.

	TL 6271265	TX 6271266
Spark ignition	yes	yes
Contact ignition	yes	yes
2 function / 4 function torch operation	yes	yes
Fusion point timer	--	yes
Pulsing	--	yes
Minilog operation	--	yes
Up-slope timer for current	yes	yes
Down-slope timer for current	yes	yes
Selectotig memory channels	--	yes
Current display (digital)	yes	yes

11. 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 of 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-authorised 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.