

MASTERTIG

9905

Operation instructions
Gebrauchsanweisung
Gebruiksaanwijzing
Manuel d'utilisation

1913610E

MASTERTIG 1500 MASTERTIG 2200



English
Deutsch
Nederlands
Français

Read carefully these instructions before you use the welding machine !

Bitte lesen Sie diese Gebrauchsanweisungen vor Gebrauch der Schweißmaschine !

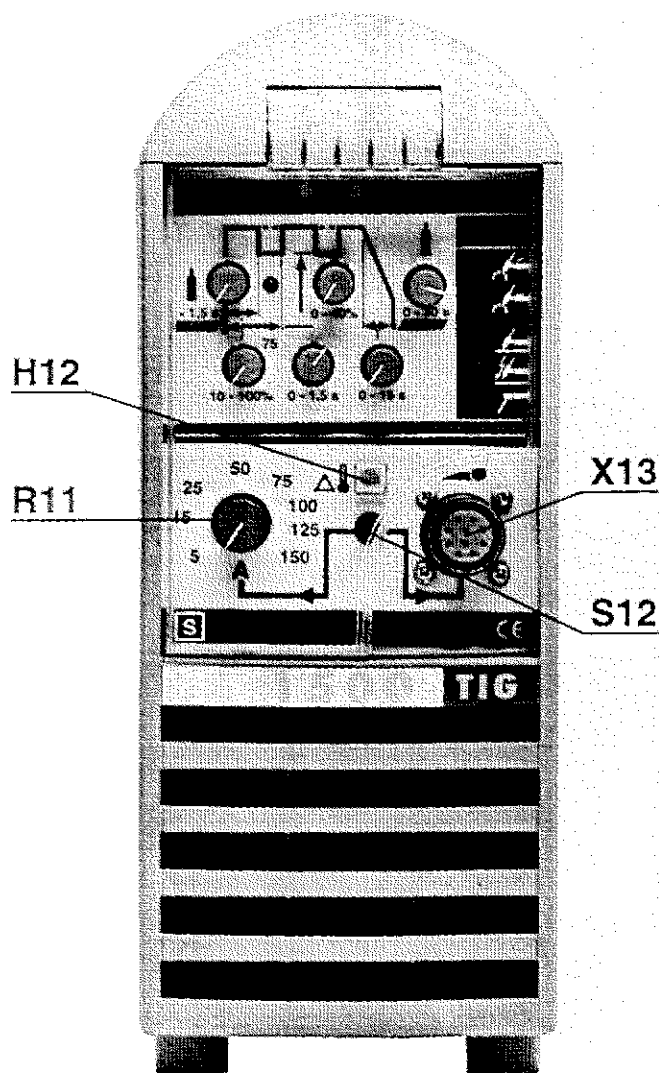
Lees deze gebruiksaanwijzing aandachtig door voor u de lasmachine in gebruik neemt !

Veuillez lire et appliquer ces instructions avant utilisation de la machine !

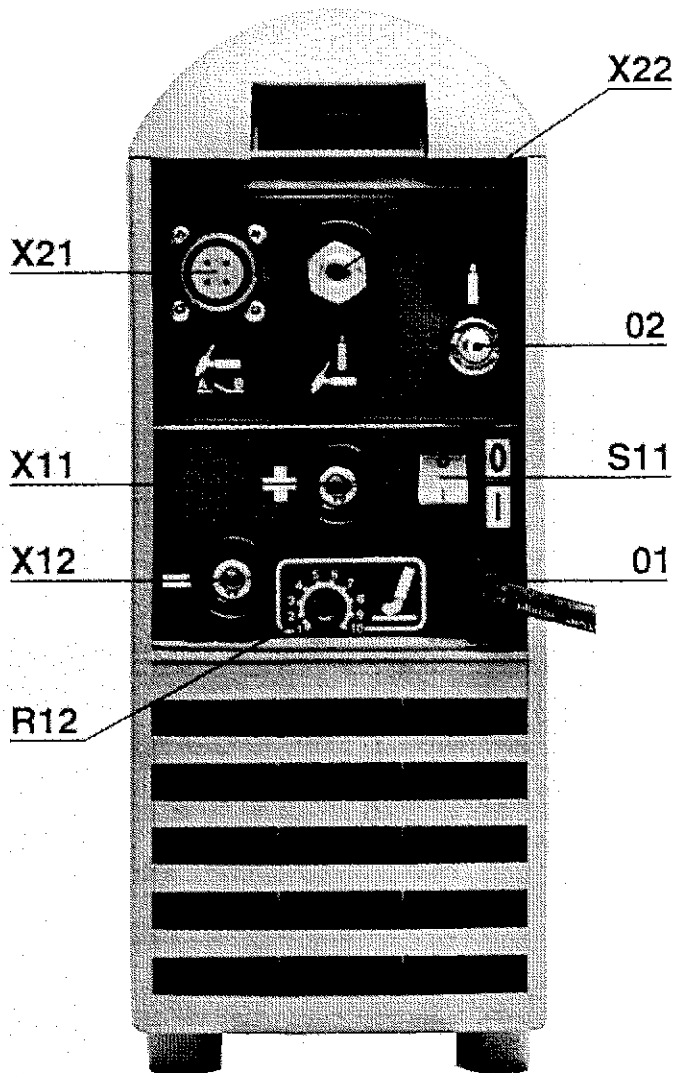


KEMPMI

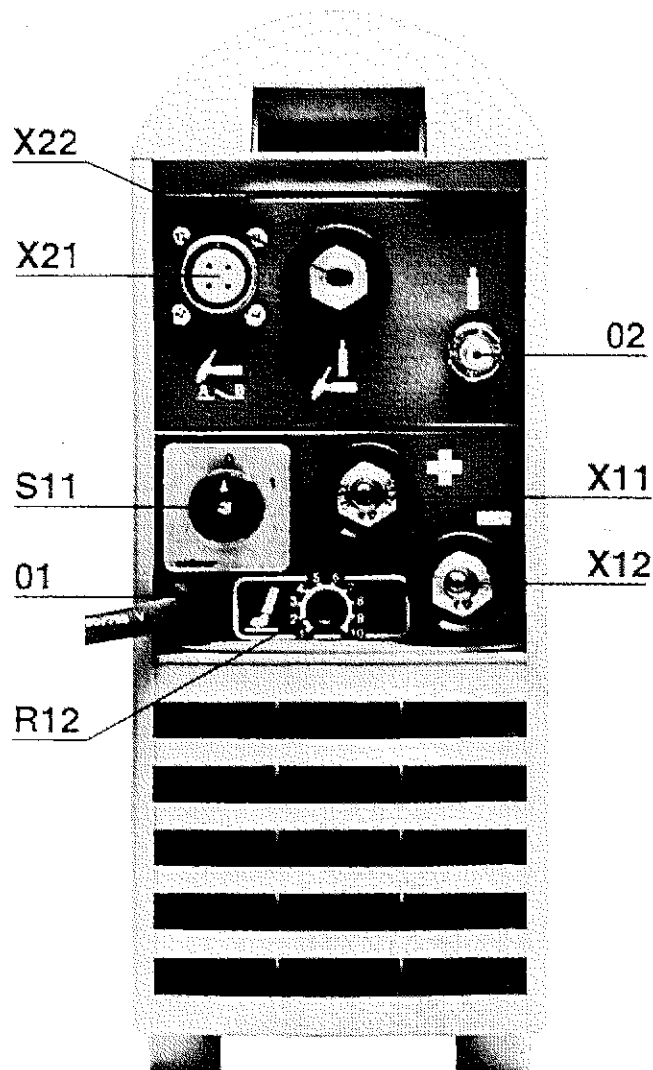
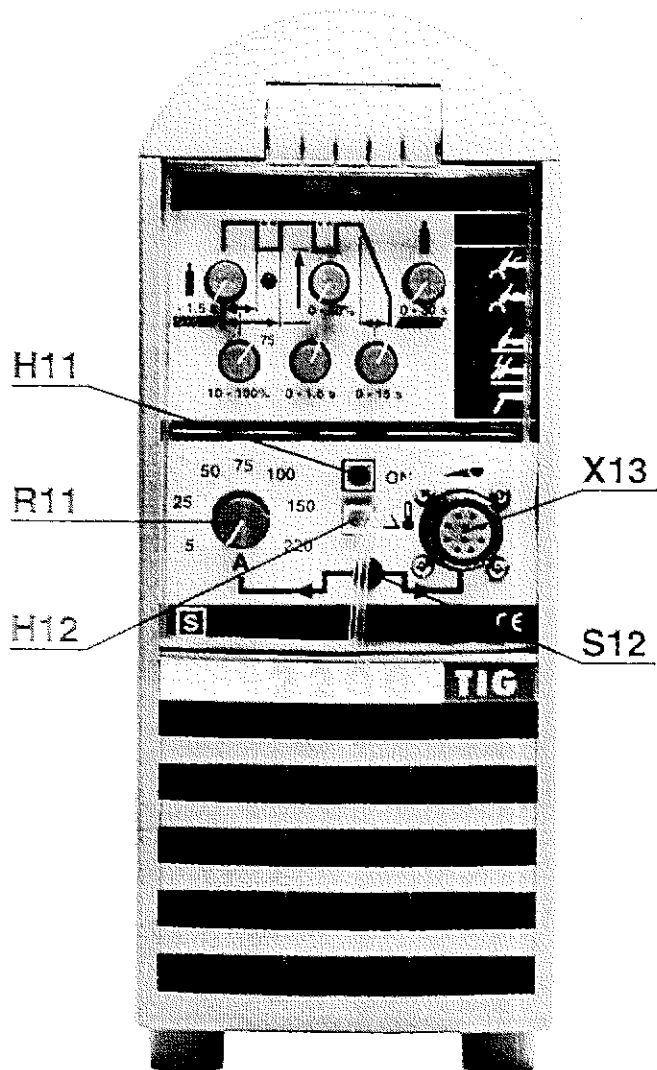
OPERATION CONTROL AND CONNECTORS
 BEDIENUNGSELEMENTE UND ANSCHLÜSSE
 BEDIENING EN AANSLUITINGEN
 COMMANDES ET CONNECTEURS



- H11** Signal lamp I/O
 Signallampe I/O
 Signaallamp I/O
 Voyant lumineux I/O
- H12** Warning lamp for thermal shield
 Warnungslampe für Wärmeschutz
 Waarschuwinglicht voor warmteafvoerspiraai
 Feu indicateur pour écran thermique
- R11** Adjustment of welding current
 Einstellung für Schweißstrom
 Regeling voor lasstroom
 Réglage du courant de soudage
- R12** Adjustment of MMA welding dynamics
 Einstellung für Stabelektrodenschweiß-Dynamik
 Regeling voor elektrodenlassen-dynamiek
 Réglage pour dynamique du soudage électrode



- S11 MASTERTIG 1500**
 I/O main switch with signal lamp
 I/O Hauptschalter mit Signallampe
 I/O hoofdschakelaar met signaallamp
 I/O interrupteur principal avec voyant témoin
- S11 MASTERTIG 2200**
 Main switch I/O
 Hauptschalter I/O
 Hoofdschakelaar I/O
 Interrupteur principal I/O
- S12** Selection for local/remote control
 Wahl für Nah-/Fernregelug
 Keuze voor paneel-/afstandbediening
 Sélection commande locale/à distance



X11 Welding and return current connections
X12 Schweiß- und Rückleitungsanschlüsse
 Aansluiting voor las- en werkstuk kabel
 Connecteur courant de soudage et de masse

X13 Connection for remote control
 Anschluß für Fernreglung
 Aansluiting voor afstandbediening
 Connecteur commande à distance

X21 Start connection
 Startanschluß
 Toortscontact
 Connecteur amorçage

TIG torch
 WIG-Brenner
 TIG -toorts
 Torche TIG

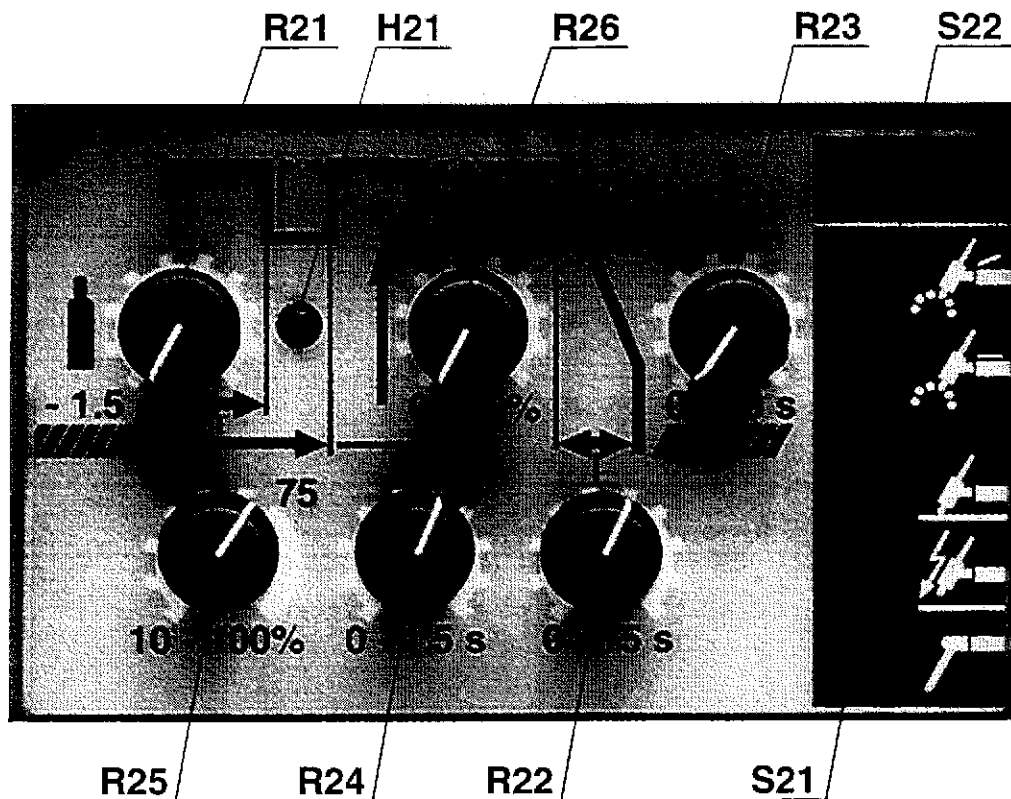
X22 Gas-/welding current connection
 Gas-/Sweißstromanschluß
 Gas-/stroomaansluiting
 Connecteur courant de soudage/gaz

TIG torch
 WIG-Brenner
 TIG -toorts
 Torche TIG

01 Inlet of mains cable
 Durchführung des Netzkabels
 Doorvoer voor aansluitkabel
 Passe-câbles

02 Shielding gas connection
 Schutzgasanschluß
 Aansluiting voor beschermgas
 Connecteur gaz de protection

(Snap connector)
 (Schnellkupplung)
 (Snellkoppeling)
 (Connecteur rapide)



H21 Signal lamp
 Signallampe
 Signaallamp
 Voyant lumineux

TIG welding
 WIG-Schweißen
 TIG-lassen
 Soudage TIG

R21 Adjustment of pre-gas time
 Einstellung für Vorgaszeit
 Regeling voor gasvoorstroomtijd
 Réglage du temps de pré-gaz

R22 Adjustment of down slope time of welding current
 Einstellung für Absenkzeit des Schweißstromes
 Regeling voor aflooptijd voor de lasstroom
 Réglage du temps d'évanouissement du courant

R23 Adjustment of post gas time
 Einstellung für Nachgaszeit
 Regeling voor gasnastroomtijd
 Réglage du temps de post gaz

S21 Selection for MMA/TIG and
 selection for TIG ignition (Spark/contact ignition)
 Wahl für Stabelektroden-/WIG-Schweißen und
 Wahl für WIG-Zündweise (Funken-/Kontaktzündung)
 Keuze voor elektroden-/TIG-lassen en
 keuze voor TIG-ontsteking (HF/contactontsteking)
 Sélection soudage électrode/TIG et
 sélection méthode d'amorçage TIG (HF/par contact)

S22 Selection for operation way for torch switch
 Wahl für Funktionsweise des Brennerschalters
 Keuze voor de bediening van de toortsschakelaar
 Sélection de mode d'opération de la torche

OPERATION CONTROL FOR PULSED TIG WELD- ING **BEDIENUNGSELEMENTE FÜR PULS-WIG- SCHWEISSEN** **REGELING VOOR PULS TIG** **COMMANDES DE SOUDAGE TIG PAR IMPULSION**

R11 Adjustment of welding pulse current
 Einstellung für Strom für Schweißpuls
 Regeling voor pulsstroom
 Réglage du courant de pulse de soudage

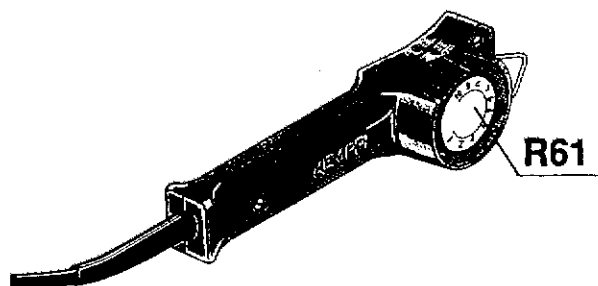
R24 Adjustment of welding period (Pulse frequency)
 Einstellung für Schweißperiode (Pulsfrequenz)
 Regeling voor periode tijd (Pulsfrequentie)
 Réglage du temps de période à soudage
 (Fréquence de pulsation)

R25 Selection of continuous or pulsed welding and
 adjustment of pulse ratio
 Wahl für kontinuierliches oder Pulsschweißen und
 Einstellung für Pulsverhältnis
 Keuze voor continue of gepulseerd lassen en
 regeling voor pulsverhouding
 Sélection de soudage continu ou par impulsion et
 réglage de proportion de pulsation

R26 Current adjustment for pause time
 Stromeinstellung für Pausenzeit
 Regeling voor basisstroom
 Réglage du courant pour temps de pause

**REMOTE CONTROL UNITS
FERNREGELEINHEITEN
AFSTANDBEDIENINGEN...
COMMANDES A DISTANCE**

C 100C



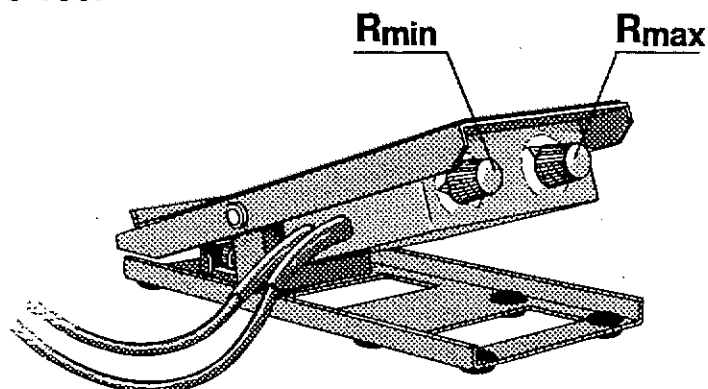
Control of MMA/TIG welding current (R61), reference scale 1-10.

Einstellung für Stabelektroden-/WIG-Schweißstrom (R61), Referenzskala 1-10.

Lasstroomregeling elektroden-/TIG-lasen (R61), schaal 1-10.

Réglage du courant de soudage Electrode/TIG (R61), échelle 1-10.

C 100F



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)

Fußpedalregler für WIG-Schweißen

- Start-Funktion
- Einstellung für Schweißstrom mit Bewegung am Pedal
- Begrenzung des Schweißstrombereiches mit min.- und max.-Potentiometern (Referenzskala 1-10)

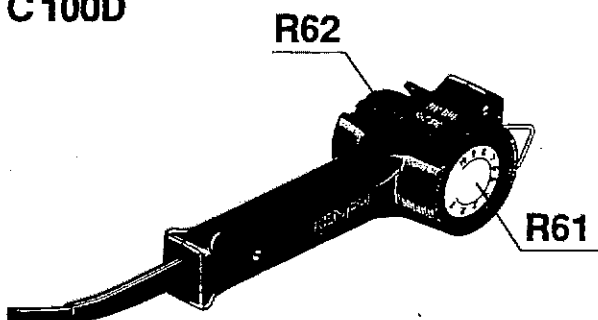
Voetpedaalregeling voor TIG-lasen

- startfunctie
- lasstroomregeling
- begrenzing van het lasstroombereik met min.- en max.-potentiometers (schaal 1-10)

Dispositif de commande à pédale pour soudage TIG

- Mise en route
- Réglage du courant de soudage par appui sur la pédale
- Limitation de la plage du courant de soudage par potentiomètres à maximum et à minimum (échelle 1-10)

C 100D

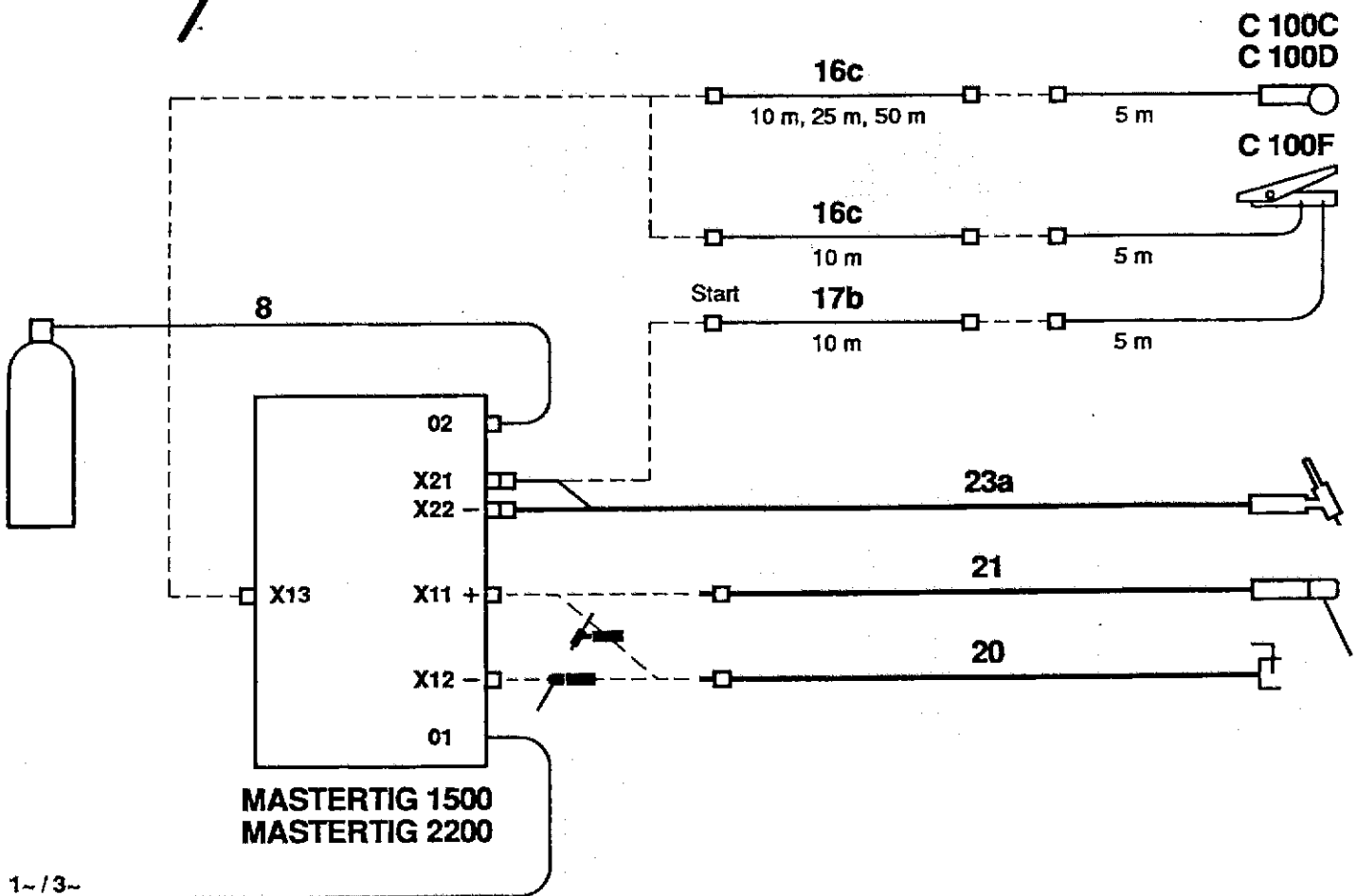
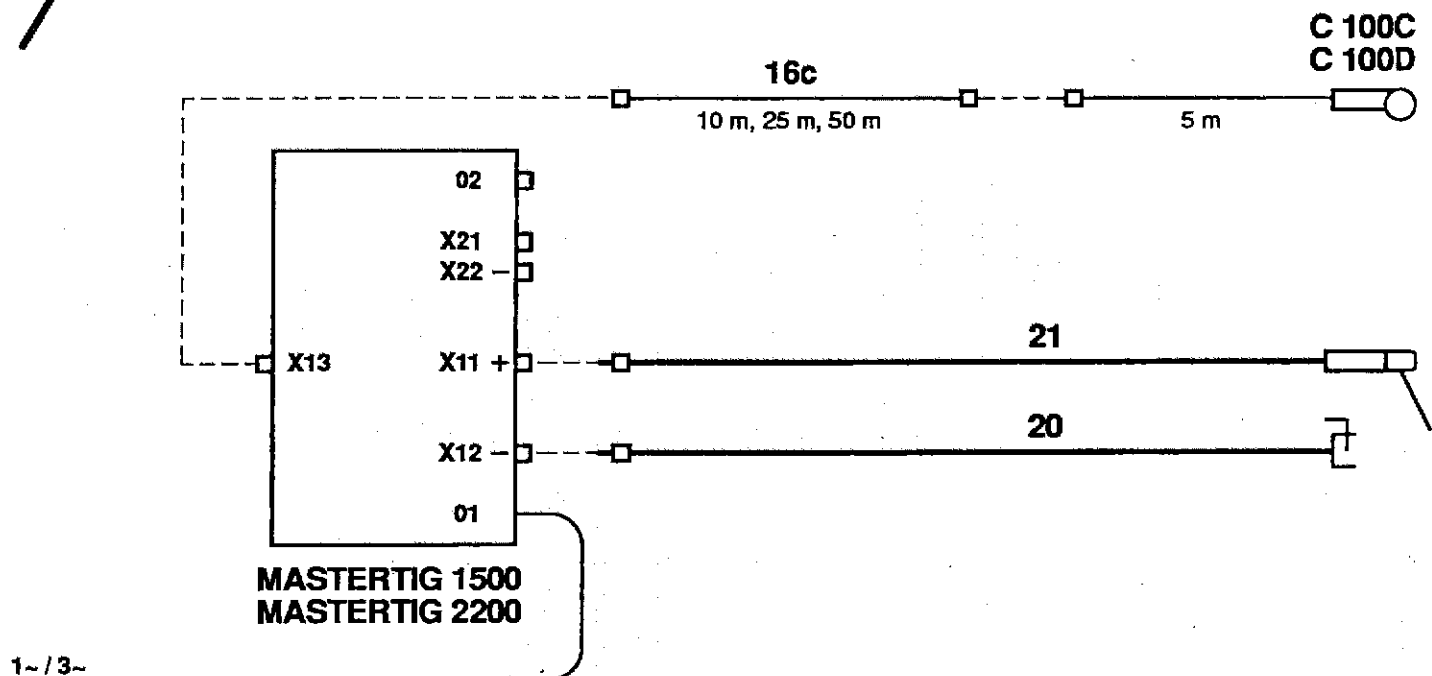


Rough control (R61), reference scale 1-10, and fine control +/- (R62) for MMA/TIG welding current.

Grobeinstellung (R61), Referenzskala 1-10, und Feineinstellung +/- (R62) für Stabelektroden-/WIG-Schweißstrom.

Grofregeling (R61), schaal 1-10, en fijnregeling +/- (R62) voor lasstroom elektroden-/TIG-lasen.

Réglage d'approche (R61), échelle 1-10, et réglage fin +/- (R62) du courant de soudage électrode/TIG.



CABLES
KABEL
KABELS
CABLES

- 8** Shielding gas hose
Schutzgasschlauch
Gasslang
Tuyau de gaz de protection
- 16c** Extension cable for remote control
Verlängerungskabel für Fernregelung
Verlengkabel voor afstandbediening
Câble prolongateur pour commande à distance
4 poles
4-polig
4-polig
4 pôles
- 17b** Start extension cable
Startverlängerungskabel
Start verlengkabel
Câble prolongateur de démarrage
- 20** Return current cable
Stromrückleitungskabel
Werkstukkabel
Câble de masse
- 21** Cable for MMA welding
Kabel für Stabelektrodenschweißen
Kabel voor elektrodenlassen
Câble soudage d'électrode
- 23a** TIG torch
WIG-Brenner
TIG-toorts
Torche TIG
gas-cooled
gasgekühlt
gasgekoeld
refroidie gaz
- C 100C** Remote control units, see also page 5
C 100D Fernregel-Einheit, auch Seite 5 sehen
C 100F Afstandbedieningen, zie ook pag. 5
Commandes à distance voir également page 5

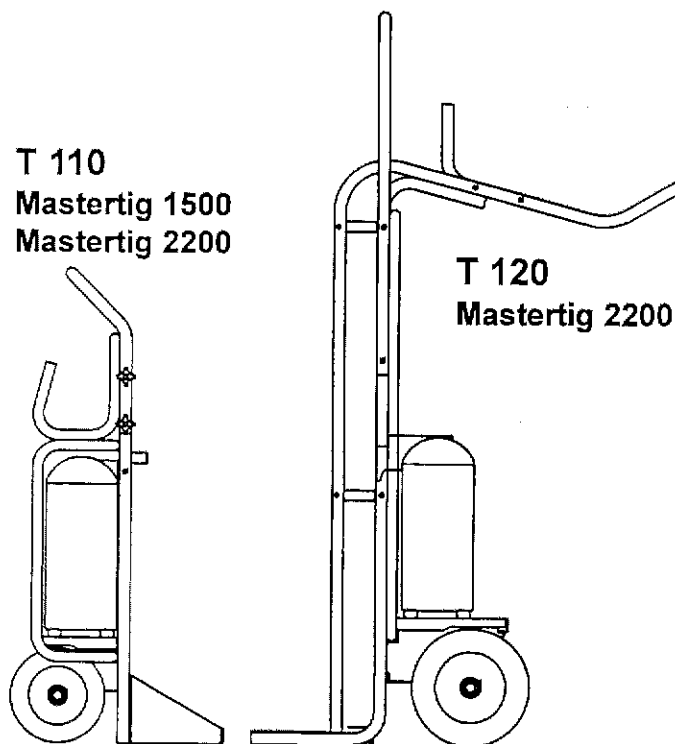
C 100C	6185410
C 100D	6185413
C 100F	6185405
8 / 1,5 m	4069030
16c / 10 m	6185451
/ 25 m	6185452
/ 50 m	6185453
17b / 10 m	6185310

MASTERTIG 1500

20/5 m – 16 mm²	6184015
21/5 m – 16 mm²	6184005

MASTERTIG 2200

20/5 m – 25 mm²	6184211
/ 10 m – 25 mm ²	6184212
21/5 m – 25 mm²	6184201
/ 10 m – 25 mm ²	6184202



T 110	6185251
T 120	6185252
Transport unit	
Fahrwagen	
Onderwagen	
Chariot	

MASTERTIG is a DC power source for demanding MMA / TIG / pulsed TIG welding.

There are two sizes of MASTERTIG inverter power sources: a 1-phase of 150 A and a 3-phase of 220 A. The MASTERTIG power sources are protected against overload with overcurrent protections and thermal releases. Operation of a thermal release is indicated with a signal lamp on the front wall of the machine.

To delivery package of MASTERTIG welding power sources includes carrying strap, mains cable and gas hose.

Ease of use of MASTERTIG can be enhanced with remote control units which can be delivered as accessories.

TECHNICAL DATA

MASTERTIG 1500		
Mains voltage	1~, 50/60 Hz	220 V -10 % ... 240 V +6 %
Rated power	20 % ED	150 A / 6,6 kVA
	60 % ED	105 A / 4,4 kVA
	100 % ED	75 A / 3,0 kVA
Connection cable / fuse		3 x 1,5S – 3 m / 16 A slow-blow
Welding current range	MMA TIG	15 A / 20,5 V...150 A / 26,0 V 5 A / 10,0 V...150 A / 16,0 V
Max. welding voltage		31,0 V / 150 A
Electrode sizes to be welded		ø 1,5 ... 3,25 mm
Welding current control		stepless
Open circuit voltage		80 V
Efficiency		80 % (150 A / 26,0 V)
Power factor		0,75 (150 A / 26,0 V)
Open circuit power		approx. 10 W
Storage temperature range		- 40 ...+ 60 °C
Operation temperature range		- 20 ...+ 40 °C
Temperature class		H (180 °C) / B (130 °C)
Degree of protection		IP 23C
External dimensions:		
	length	410 mm
	width	152 mm
	height	385 mm
Weight		14 kg
Suitable accessories:		
remote control units		C 100C, C 100D, C 100F
torches		gas-cooled connection R ¹ / ₄
welding cables		connection DIX 25
gas hose		snap connector

MASTERTIG 2200		
Mains voltage	3~, 50/60 Hz	380 V -10 % ... 415 V +6 %
Rated power	25 % ED	220 A / 8,4 kVA
	60 % ED	145 A / 5,5 kVA
	100 % ED	110 A / 3,5 kVA
Connection cable / fuses		4 x 1,5S – 5 m / 10 A slow-blow
Welding current range	MMA TIG	15 A / 20,5 V...220 A / 28,8 V 5 A / 10,0 V...220 A / 18,8 V
Max. welding voltage		35,0 V / 220 A
Electrode sizes to be welded		ø 1,5 ... 4,0 (5,0) mm
Welding current control		stepless
Open circuit voltage		80 V
Efficiency		82 % (220 A / 28,8 V)
Power factor		0,9 (220 A / 28,8 V)
Open circuit power		approx. 10 W
Storage temperature range		- 40 ...+ 60 °C
Operation temperature range		- 20 ...+ 40 °C
Temperature class		H (180 °C) / B (130 °C)
Degree of protection		IP 23C
External dimensions:		
	length	472 mm
	width	152 mm
	height	385 mm
Weight		16,5 kg
Suitable accessories:		
remote control units		C 100C, C 100D, C 100F
torches		gas-cooled connection R ¹ / ₄
welding cables		connection DIX 35
gas hose		snap connector

The products meet conformity requirements for CE marking.

INSTALLATION

Siting the machine

By siting of the machine you should consider the following:

- Site the machine on a fixed dry base, from which there doesn't come any dust etc. into suction air.
SEE TO THAT THE MACHINE IS POSITIONED AWAY FROM THE LINE OF PARTICLE SPRAY, CREATED BY GRINDING TOOLS ETC.
- Preferably site the machine somewhat higher above the floor level.
- See to that in front of the machine as well as at the rear of the machine there is at least 20 cm free distance to allow good circulation of the cooling air through the machine.
- **PROTECT THE MACHINE AGAINST HEAVY RAIN AND IN HOT CIRCUMSTANCES AGAINST DIRECT SUNSHINE.** Ensure the free circulation of the cooling air.


Connection to the mains supply

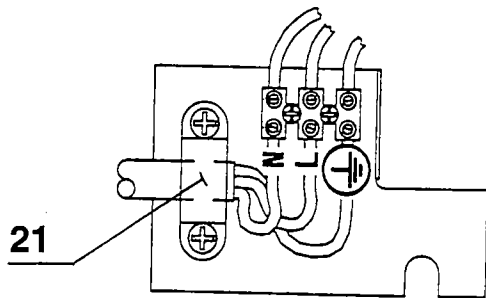
CONNECTION OF THE MAINS CABLE AND MOUNTING AND CHANGE OF THE PLUG SHOULD ONLY BE CARRIED OUT BY A COMPETENT ELECTRICIAN.

BEFORE CONNECTING THE MAINS CABLE REMOVE HANDLE AND CASING PLATE OF THE MACHINE

MASTERTIG 1500

MASTERTIG 1500 is delivered with a schuko-plug mains cable for connection into the 230 V mains supply.

By change of the mains cable take into attention the following:
The cable is entered into the machine through the inlet ring on the rear panel of the machine and fastened with a cable clamp (21). The phase lead of the cable is connected to terminal L, the blue N-lead is connected to terminal N and the earth protection coloured green-yellow is connected to terminal .



MASTERTIG 1500

Sizes of the mains cables and fuse ratings for the machine at 100 % duty cycle are specified in the table below:

Rated voltage	230 V 1~
Mains voltage range	220 V -10 % ... 240 V +6 %
Fuse	16 A slow-blow
Connection cable	3 x 1,5 mm ² S *) max. 3 m
Extension cables (recommendation)	3 x 2,5 mm ² S *) max. 50 m

EXTENSION CABLES


A long extension cable will cause a voltage loss which reduces max. voltage given by the machine in MMA welding. Effect might appear at high currents as breaking of arc.

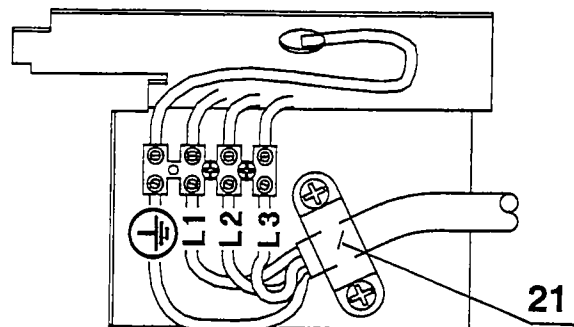
Use the extension cable shown in the table above in order to reduce cable voltage loss and heating. Because of excessive

heating it is not advisable to keep the cable coiled if you weld at high currents.

In TIG welding the length of extension cable has not the same importance because voltage of arc is essentially lower than in MMA welding.

MASTERTIG 2200

MASTERTIG 2200 is delivered with a mains cable without plug. By change of the mains cable take into attention the following:
The cable is entered into the machine through the inlet ring on the rear panel of the machine and fastened with a cable clamp (21). The phase leads of the cable are connected to terminals L1, L2 and L3. The earth protection lead coloured green-yellow is connected to terminal .



MASTERTIG 2200

Sizes of the mains cable and fuse ratings for the machine at 100 % duty cycle are specified in the table below:

Rated voltage	400 V 3~
Mains voltage range	380 V -10 % ... 415 V +6 %
Fuses	10 A slow-blow
Connection cable	4 x 1,5 mm ² S *)

*) In cables of S type there is a protective grounding conductor coloured green-yellow.

Welding and return current cables

Use only copper cables: MASTERTIG 1500 16mm²
MASTERTIG 2200 25mm²

DON'T USE THINNER CABLES due to voltage losses and heating.

Fasten the earthing press of the return current cable carefully, preferably direct onto the piece to be welded. The contact surface of the press should always be as large as possible.

CLEAN THE FASTENING SURFACE FROM PAINT AND RUST!

Welding torch and shielding gas

In MASTERTIG you can use only gas-cooled torch.

Make sure that the torch being in your use is designed for welding current given by the machine! **NEVER USE A DAMAGED TORCH!**

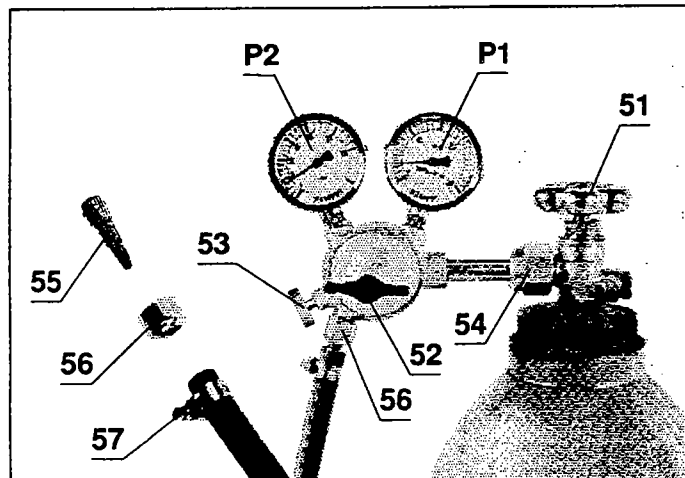
Choice of electrode and flow amount of shielding gas

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	Electrode	Gas nozzle	Gas flow rate
A	ø mm	number	l/min
5...80	1,0	4 / 5	6,5 / 8,0
70...150	1,6	4 / 5 / 6	6,5 / 8,0 / 9,5
140...220	2,4	6 / 7	9,5 / 11,0

Gas flow regulator

Gas flow regulator should be suitable for argon gas. The regulator being in your use might be different from the one in picture, however, following general instructions are valid for all pressure regulators.



BEFORE MOUNTING OF FLOW REGULATOR

- Step aside, open cylinder valve (51) somewhat for a moment, in this way you can blow out any dirt that may be in the valve of bottle.
- Screw press regulation screw (52) of regulator outwards so long that no spring pressure can be felt (screw is turning freely).
- Close needle valve (53) if there is one in regulator

CONNECT REGULATOR ONTO VALVE OF BOTTLE

- Tighten connecting nut (54) preferably with a wrench.
- Put hose spindle (55) of regulator with jacket nuts (56) onto gas hose, connection should be ensured with hose clamp (57).
- Connect hose onto regulator and machine, tighten jacket nuts.

OPEN VALVE OF BOTTLE SLOWLY

- Pressure meter (P1) shows pressure of bottle. NEVER USE UP ALL THE GAS IN THE BOTTLE, send the bottle for filling up when bottle pressure still is 2 bar.
- Open needle valve if there is one in regulator
- Screw regulation screw (52) inwards until hose pressure meter (P2) shows flow (or pressure) required. By regulation of flow the machine has to be in operation and the torch switch should be pressed on at the same time.

CLOSE VALVE OF BOTTLE ALWAYS AFTER HAVING STOPPED WELDING

- If the machine will be unused for a longer time, you should also unscrew pressure regulation screw (52).

Gas bottle

NOTE! THE GAS BOTTLE MAY EXPLODE IF IT FALLS!

ALWAYS FASTEN GAS BOTTLE TIGHTLY IN VERTICAL POSITION, TO WALL STAND OR BOTTLE CART, SPECIALLY DESIGNED FOR IT!

FOR SAFETY REASONS ALWAYS REMOVE GAS BOTTLE FROM TRANSPORT STAND OF MACHINE BEFORE LIFTING OR CAR TRANSPORT OF MACHINE!

OPERATION CONTROL SWITCHES AND POTENTIOMETERS AND THEIR USE

Main switch I/O

When you turn the switch into I-position, pilot lamp is lit and the machine is ready for use.

If selecting switch for welding method is in MMA position, there will be open circuit voltage in welding cable connectors.

ALWAYS START AND SWITCH OFF THE MACHINE WITH THE MAIN SWITCH, NEVER USE THE MAINS PLUG AS A SWITCH.

Pilot lamp

Pilot lamps of machine indicate electric operation:

ON

Green pilot lamp H11 for readiness for use is always on when the machine is connected to mains supply and main switch is in I-position.

In MASTERTIG 1500 pilot lamp (orange) is connected with the main switch.



Yellow pilot lamp H12 of thermal protection is on when thermostat has released due to overheating of machine. The cooling fan is cooling down the machine and when the pilot lamp goes off, the machine is again ready for welding.

Pilot lamp for TIG welding H21 is on when the machine is switched on for TIG welding. The pilot lamp is blinking when the machine is switched on for pulsed TIG welding.

Operation of the cooling fan

The cooling fan of MASTERTIG starts during welding and operates for some time after welding has been stopped.

MMA WELDING

Welding and return cables

Connect cables to connectors X11 (positive pole) and X12 (negative pole).

See wiring scheme on page 6 and cable sizes on page 7 and 9.

Selection of welding method

Switch 3-position switch for MMA welding.

Local/remote control of welding current

You can control welding current either with local control potentiometer R11 of machine or with a potentiometer connected to remote control connector X13. When you use the remote control unit, switch S12 should be in remote control position.

Suitable remote control units: C 100C, and C 100D, see page 5.

Control for MMA dynamics

On rear wall of machine there is a tool adjustable control R12 for MMA dynamics.

With the potentiometer you can control the behaviour of the arc according to requirements of the electrode type to be welded and to your own liking.

The control influences on the behaviour of the machine in the drop short circuits.

Potentiometer turned to the left: Welding will be softer, arc pressure and spatter will be reduced, demands a more steady transport.

Potentiometer turned to the right: Welding will be rougher, arc pressure and spatter will increase.

Recommended initial setting is about in the middle of the scale.

Softer control is advisable in position welding and with thin stainless base materials and electrodes.

Electrodes to be welded

By the MASTERTIG power sources you can use all electrodes designed for DC or AC welding within the current limits of the machine in question.

The MASTERTIG power sources are not suitable for carbon arc gouging or cutting.

TIG WELDING

Torch and return cable

Connect gas-cooled torch according to scheme on page 6:

- Gas/welding current cable (sign colour: yellow) to connector **X22**.
- Control cable to start connector **X21**.

Connect return cable to connector **X11** (positive pole), cable size according to table on page 7 or page 9.

Connect shielding gas hose according to above-mentioned scheme, see also paragraph: "Gas flow regulator".

Selection of welding method

Turn 3-position potentiometer **S21** switched on for TIG welding, you can select either spark or contact ignition. LED lamp **H21** above the potentiometer for pulse length is lit.



Spark ignition:

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

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

If arc is not ignited within 1 s, you have to repeat the ignition.



Contact ignition:

Spark generation is prohibited and arc is ignited as follows:

1. Touch the work piece with electrode.
2. Start the power source with torch switch.
3. Lift the electrode off from the work piece at which the arc is ignited.

If the arc is not ignited within 1 s, you have to repeat the ignition.

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 case of difficult interference

situations take contact with authorized Kemppi service repair shop.

Selection of torch switch operation

Select either 2- or 4-function operation for torch switch with switch **S22**.



2-function:

1. After having pressed torch switch down, shielding gas starts to flow. Welding starts after set (**R21**) pre-gas time, welding current goes immediately up to current level defined by current control potentiometer.
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 potentiometer **R22**. When welding current is zero, there begins post gas time, the length of which is controlled with potentiometer **R23**.



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 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 the 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.

Local and remote control of welding current

You can control welding current either with local control potentiometer **R11** or with potentiometer which is connected to remote control connector **X13**. When you use remote control unit, switch **S12** has to be in remote control position.

Suitable remote control units:

C 100C, **C 100D**, or pedal **C 100F**, see page 5.

Pre-gas time

You may set a pre-gas time of 0,1...1,5 s with potentiometer **R21**.

Enough pre-gas time is needed in order to give for gas flow time to become steady before ignition of arc, time is dependent in the first place on length of torch hose and gas flow regulator.

With contact ignition the pre-gas time is always 0,1 s.

Up-slope time of welding current

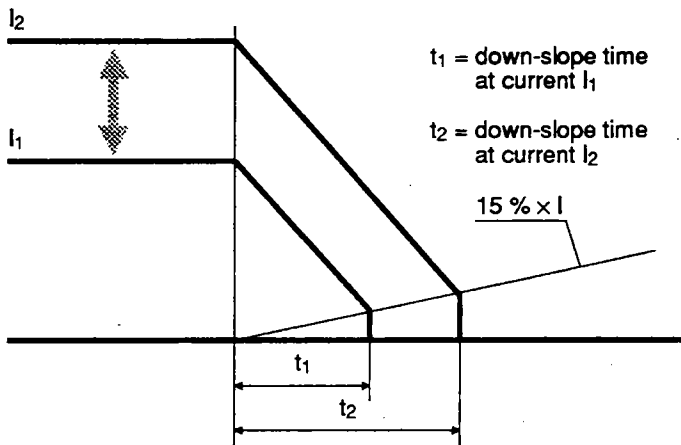
Up-slope time of welding current (max. 0,15 s) is controlled automatically according to welding current so that the electrode tip is not damaged by ignition even at high currents.

Down-slope time of welding current

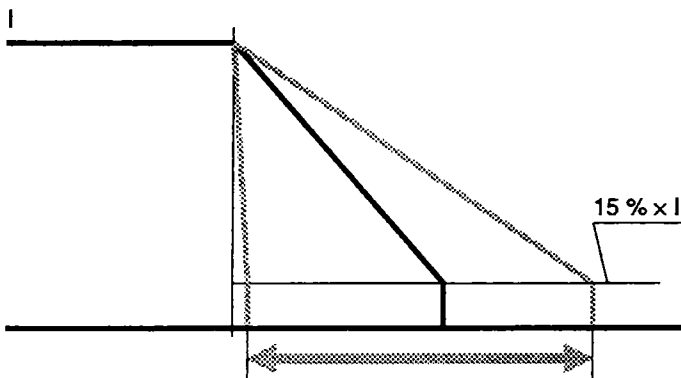
As down-slope time of welding current can be adjusted 0,1...15 s with potentiometer **R22**, scale values corresponds to down-slope time at max. welding current. During down-slope time current is going smoothly down to approx. 15 % of welding current, on which level current is switched off.

In order to reduce need for adjustments the down-slope time is proportional to the setting of welding current so that e.g. in about the middle of down-slope scale the time changes to 0...7,5 s when welding current is adjusted from 5 A to max. value.

How the current control affects the down-slope time



How the down-slope time control affects the down-slope time



Tack welding automatics

For tack welding down-slope operation of current is prohibited at short welding times, less than 5 s.

Post gas time

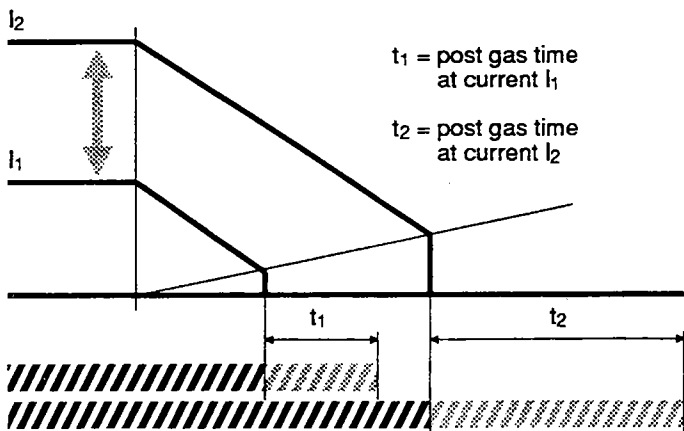
Post gas time is controlled with potentiometer **R23**, scale is approximately 0...30 s.

In order to reduce need for adjustment, the post gas time is proportional to the setting of welding current so that:

at max. current setting post gas time is adjustable 7,5...30 s.
 at min. current setting post gas time is adjustable 2,5...10 s.

E.g. in about the middle of post gas scale time changes 5...20 s when welding current is adjusted from 5 A to max. value.

How the current control affects the post gas time



Pulsing of welding current

With MASTERTIG machines you can pulse TIG welding current. Pulsing is used e.g. at thermally well-conductive materials and in difficult welding circumstances.

TIG unit begins to pulse welding current when you turn control potentiometer for pulse ratio (**R25**) from continuous welding

range to pulse ratio control range. LED lamp (**H21**) above control potentiometer begins to blink at pulse rate. The highest pulse rate cannot be seen from arc.

Other adjustable values are welding period length (**R24**), welding pulse current (**R11**), or remote control unit) and pause time current (**R26**).

Welding pulse current

Welding pulse current is the same as power source set value which has been set as local or remote control. See welding current local and remote control.

Pause current

Pause current is adjusted in respect to welding current. Control range (**R26**) is from min. value to approx. 40 % of welding pulse current.

Welding period time or pulse frequency

Welding period is the sum of welding pulse and pause time. Length of welding period is controlled with potentiometer **R24** approx. 0,02...1,5 s corresponding to approx. 50...0,7 Hz frequencies.

Frequency is selected experimentally according to welding case.

Selection of continuous or pulsed welding and control of pulse ratio

The pulse ratio is the ratio of welding pulse time to welding period time. Time of pulse is adjusted in proportion with welding period length.

Pulsed welding is selected by adjusting direct from scale the required pulse ratio. Control range of pulse ratio on front wall potentiometer **R25** is 10...75 % of welding period time.

Continuous welding is selected by turning the potentiometer over 75 % point when light of LED lamp **H21** is changed from blinking to continuous lighting.

Change of operations

KEMPPI service repair shop can change standard operations according to following:

1. Offtake of automatics for tack welding of edges.
2. Extension of current down-slope time with small currents.
3. Extension of current down-slope time until min. current.
4. Postgas time as independent of current.
5. Adjustment of contact ignition current.

MINILOG operation

By means of MINILOG control you can by TIG welding use two adjustable current levels, which can be selected during welding with torch switch.

MINILOG- operation is used e.g. during change of filler wire or in pipe welding in order to alter current in sector of upper and lower half.

MINILOG operations can be mounted to your machine. Contact your KEMPPI dealer.

OPERATION SAFETY

NEVER WATCH THE ARC WITHOUT A FACE SHIELD DESIGNED FOR ARC WELDING!

**THE ARC DAMAGES UNPROTECTED EYES!
 THE ARC BURNS UNPROTECTED SKIN!**

PROTECT YOURSELF AND THE SURROUNDINGS AGAINST THE ARC AND HOT SPRAY!

REMEMBER GENERAL FIRE SAFETY!

PAY ATTENTION TO THE FIRE SAFETY REGULATIONS. WELDING IS ALWAYS CLASSIFIED AS A FIRE RISK OPERATION.

WELDING WHERE THERE IS FLAMMABLE OR EXPLOSIVE MATERIAL IS STRICTLY FORBIDDEN.

IF IT IS ESSENTIAL TO WELD IN SUCH AN AREA REMOVE INFLAMMABLE MATERIAL FROM THE IMMEDIATE VICINITY OF THE WELDING SITE.

FIRE EXTINGUISHERS MUST ALWAYS BE ON SITE WHERE WELDING IS TAKING PLACE.

NOTE! SPARKS MAY CAUSE IGNITION MANY HOURS AFTER COMPLETION OF WELDING.

WATCH OUT FOR THE MAINS VOLTAGE!

TAKE CARE OF THE CABLES - THE CONNECTION CABLE MUST NOT BE COMPRESSED, TOUCH SHARP EDGES OR HOT WORK PIECES.

FAULTY CABLES ARE ALWAYS A FIRE RISK AND HIGHLY DANGEROUS.

DO NOT LOCATE THE WELDING MACHINE ON WET SURFACES.

DO NOT TAKE THE WELDING MACHINE INSIDE THE WORK PIECE (I.E. IN CONTAINERS, CARS ETC.)

ENSURE THAT NEITHER YOU NOR GAS BOTTLES OR ELECTRICAL EQUIPMENT ARE IN CONTACT WITH LIVE WIRES OR CONNECTIONS!

DO NOT USE FAULTY WELDING CABLES.

ISOLATE YOURSELF BY USING DRY AND NOT WORN OUT PROTECTIVE CLOTHES.

DO NOT WELD ON WET GROUND.

DO NOT PLACE THE WELDING CABLES ON THE POWER SOURCE OR OTHER ELECTRICAL EQUIPMENT.

BE CAREFUL OF TIG IGNITION PULSE VOLTAGE!

DON'T PRESS ON TORCH SWITCH, IF THE TORCH IS NOT DIRECTED TOWARDS WORK PIECE.

DON'T USE WET TIG TORCH.

WATCH OUT FOR THE WELDING FUMES!

ENSURE THAT THERE IS SUFFICIENT VENTILATION.

FOLLOW SPECIAL SAFETY MEASURES WHEN YOU WELD METALS WHICH CONTAIN LEAD, CADMIUM, ZINC, MERCURY OR BERYLLIUM.

NOTE THE DANGER CAUSED BY SPECIAL WELDING JOBS!

WATCH OUT FOR THE FIRE AND EXPLOSION DANGER WHEN WELDING CONTAINER TYPE WORK PIECES.

MAINTENANCE

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

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.
- 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 are undamaged
- there are no sharp bends in torch cable

REPLACE DAMAGED PARTS IMMEDIATELY WITH NEW ONES!

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

Cables

Check the condition of welding and connection cables daily.

DO NOT USE FAULTY CABLES!

Make sure that the mains connection cables in use are safe and according to laid down regulations.

THE REPAIR OF MAINS CONNECTION CABLES MUST BE CARRIED OUT ONLY BY AN AUTHORISED ELECTRICIAN.

Power source

NOTE! DISCONNECT THE PLUG OF THE MACHINE FROM THE MAINS SOCKET AND WAIT APPROX. 2 MINUTES (CAPACITOR CHARGE) BEFORE REMOVING THE CASING PLATE

Check at least every half year:

- Electric connections of the machine - clean the oxidized parts and tighten the loosened ones

NOTE! YOU MUST KNOW CORRECT TENSION TORQUES BEFORE STARTING THE REPARATION OF THE JOINTS.

- Clean the inner parts of the machine from dust and dirt e.g. with a soft brush and vacuum-cleaner.

DO NOT USE COMPRESSED AIR, THERE IS A RISK THAT DIRT IS PACKED EVEN MORE TIGHTLY INTO GAPS OF COOLING PROFILES!

DO NOT USE PRESSURE WASHING DEVICE!

ONLY AUTHORISED ELECTRICIAN SHALL CARRY OUT REPAIRS TO THE MACHINES.

Regular maintenance

KEMPPI-SERVICE REPAIR SHOPS MAKE REGULAR MAINTENANCE ACCORDING TO AGREEMENT.

The major points in the maintenance procedure are listed as follows:

- Cleaning of the machine
- Checking and maintenance of the welding tools
- Checking of switches and potentiometers
- Checking of electric connections
- Checking of mains cable and plug
- Damaged parts or parts in bad connection are replaced by new ones
- Maintenance testing. Operation and performance values of the machine are checked, and adjusted when necessary by means of test equipment

OPERATION DISTURBANCES

IN CASE OF PROBLEMS CONTACT THE KEMPPI WORKS IN LAHTI, FINLAND OR YOUR KEMPPI-DEALER.

Check the maintenance objects before the machine is sent to the service repair shop.

Operation of the overload protection



Yellow pilot lamp H12 of thermal protection is lit when thermostat has operated due to overheating of machine.

The thermostat of machine will operate, if machine is continuously loaded over rated values or cooling air circulation is blocked.

COOLING FAN COOLS DOWN THE MACHINE AND WHEN THE PILOT LAMP GOES OFF THE MACHINE IS AUTOMATICALLY READY FOR WELDING.

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.

Control fuses

The machine is protected in low voltage circuit by glass tube fuses:

- On control card of power source unit a 1,0 A slow-blow.
- On control card of TIG unit a 0,63 A slow-blow.
- Reason for fuse damage might be a damaged control card.

It is very important to use a fuse of same type and rating which is marked on collar of fusebox.

DAMAGE CAUSED BY A WRONG TYPE FUSE IS NOT COVERED BY THE GUARANTEE.

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 Authorized KEMPPI Service Agent. Packing, freight and insurance costs to be paid by third party. The guarantee is effected on the day 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 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 the guarantee, welding torches and their consumables, feed, drive rollers 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.

Guarantee period

The guarantee is valid for one year from date of purchase, provided that the machine is used for single-shift operation.

The guarantee period for double and treble shift operation is six months and four months respectively.

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 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.