KEMPPI

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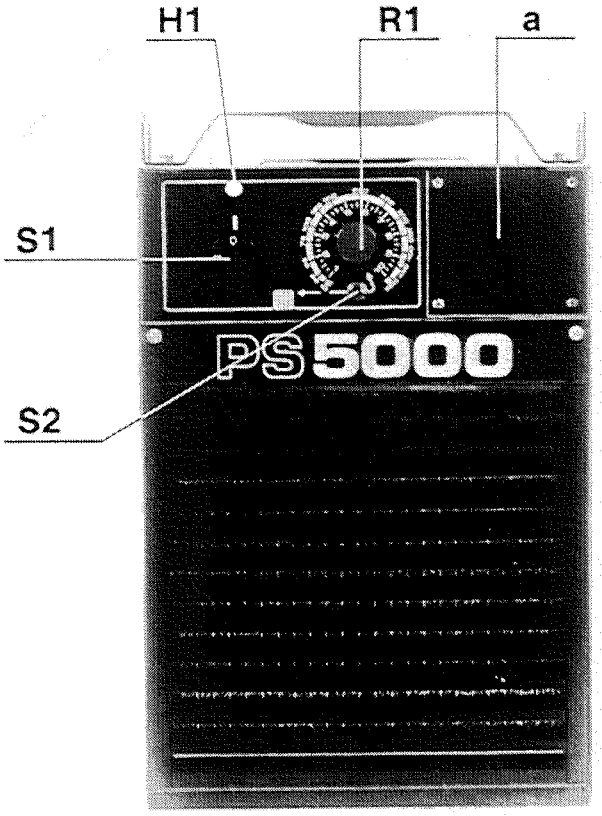
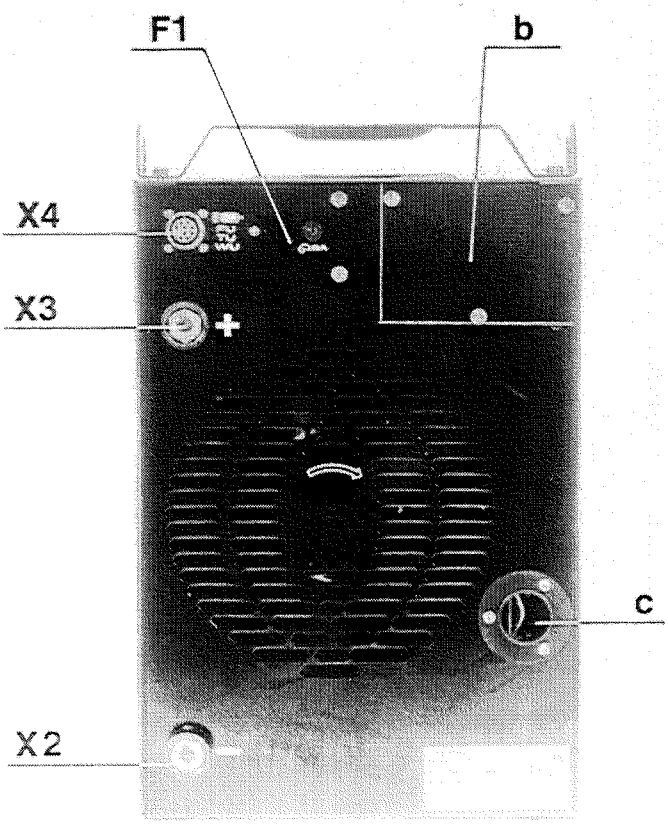
KÄYTTÖOHJE
BRUKSANVISNING
OPERATION INSTRUCTIONS
GEBRAUCHSANWEISUNG

PS5000

1 KÄYTTÖSÄÄTIMET, KYTKIMET JA LIITTIMET
MANÖVERORGAN, BRYTARE OCH ANSLUTNINGAR
OPERATION CONTROL, SWITCHES AND CONNECTORS
BEDIENUNGSELEMENTE, SCHALTER UND ANSCHLÜSSE





F1 Lisälaitteiden ohjaussulake
Manöversäkring för extra utrustningar
Control fuse for accessories
Steuersicherung für Zusatzgeräte

H1 Merkkivalo I/O
Signallampa I/O
Signal lamp I/O
Signallampe I/O

S1 Pääkytkin I/O
Huvudbrytare I/O
Main switch I/O
Hauptschalter I/O

S2 Lähi-/kaukosäädön valintakytkin
Väljare för panel-/fjärreglering
Selecting switch for local/remote control
Wahlschalter für Nah-/Fernregelung

R1 Hitsausvirran säätö
Inställning för svetsström
Control of welding current
Einstellung für Schweissstrom

X2 Hitsauskaapeliliitin
Anslutning för svetskabel
Connector for welding cable
Anschluss für Schweisskabel

X3 Hitsauskaapeliliitin
Anslutning för svetskabel
Connector for welding cable
Anschluss für Schweisskabel

X4 Ohjauskaapeliliitin
Anslutning för manöverkabel
Connector for control cable
Anschluss für Steuerkabel

a Asennusluukku (PSM)
Montagelucka (PSM)
Inspection cover (PSM)
Montageluke (PSM)

b Asennusluukku (PSL)
Montagelucka (PSL)
Inspection cover (PSL)
Montageluke (PSL)

c Verkkokaapelin läpivienti
Genomföring av nätkabel
Inlet of mains cable
Durchführung des Netzkabels

2

PÖLYSUOTIMEN IRROITUS
LOSSNING AV DAMMFILTRET
REMOVAL OF DUST FILTER
LÖSUNG DES STAUBFILTERS

LISÄLAITTEET
EXTRA UTRUSTNINGAR
ACCESSORIES
ZUSATZGERÄTE

PSM 10, PSM 11

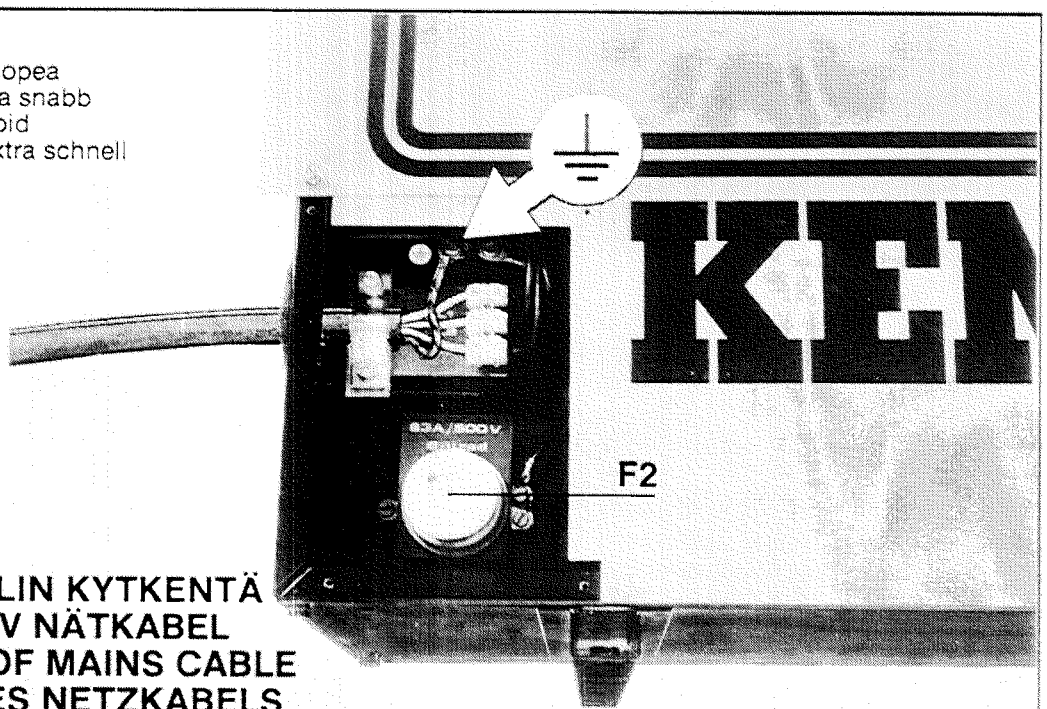
R11 MIG-MAG-dynamiikan säätö
Inställning för MIG-MAG-dynamik
Control of MIG-MAG dynamics
Einstellung für MIG-MAG-Dynamik

R12 Aloitusvirran säätö (puikkohitsaus)
Inställning för startström (elektrodsvetsning)
Control of ignition pulse current (MMA welding)
Einstellung für Zündstrom (Elektrodenschweissen)

S11 Normaali-/täppäysominaiskäyrien valintakytkin
Väljare för normal-/droppsvetsning-karaktäristika
Selecting switch for normal-/point to point welding characteristics
Wahlschalter für Normal-/Steppnaht-schweiss-Charakteristika

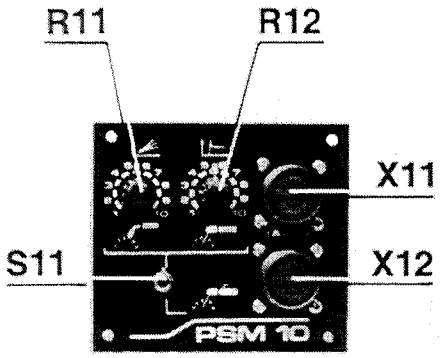
S12 Normaali MIG-MAG/pulssimig-ominais-käyrien valintakytkin
Väljare för normal MIG-MAG/puls-MIG-svetskaraktäristika
Selecting switch for normal MIG-MAG/ pulse-MIG welding characteristics
Wahlschalter für Normal-MIG-MAG/ Puls-MIG-Schweiss-Charakteristika

F2 Pääsulake, erikoisnopea
Huvudsäkring, extra snabb
Main fuse, extra rapid
Hauptsicherung, extra schnell

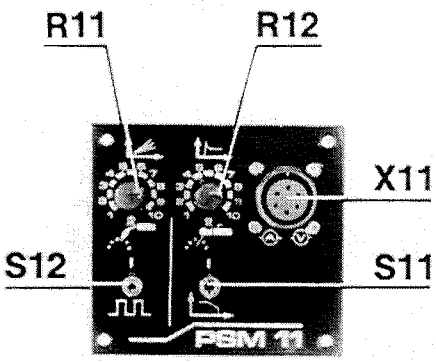


3

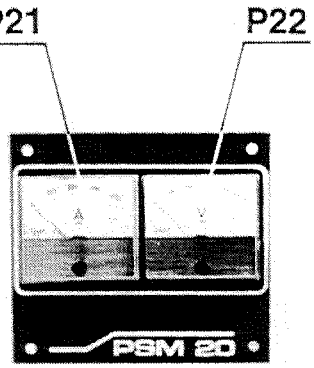
VERKKOKAAPELIN KYTKENTÄ
ANSLUTNING AV NÄTKABEL
CONNECTION OF MAINS CABLE
ANSCHLUSS DES NETZKABELS



PSM 10



PSM 11



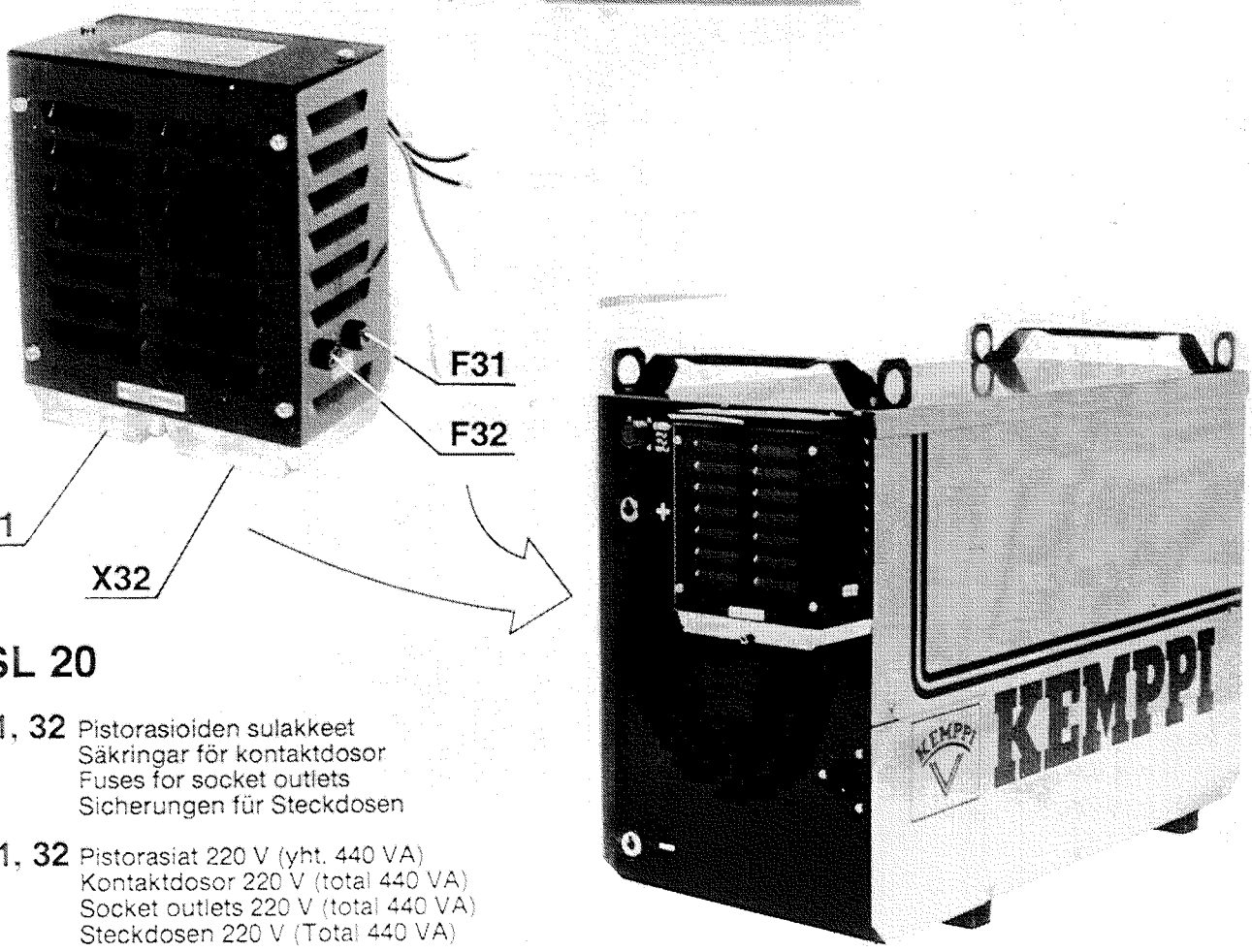
PSM 20

X11 Liitin jännite- ja virtamittaukseen (MU)
X12 Anslutning för spännings- och strömmätning (MU)
Connector for voltage and current measuring (MU)
Anschluss für Messung von Spannung und Strom (MU)

PSM 20

P21 Virtamittari
Strömmätare
Current meter
Messgerät für Strom

P22 Jännitemittari
Spänningsmätare
Voltage meter
Messgerät für Spannung



PSL 20

F31, 32 Pistorasioiden sulakkeet
Säkringar för kontaktdosor
Fuses for socket outlets
Sicherungen für Steckdosen

X31, 32 Pistorasiat 220 V (yht. 440 VA)
Kontaktdosor 220 V (total 440 VA)
Socket outlets 220 V (total 440 VA)
Steckdosen 220 V (Total 440 VA)

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ENGLISH

The PS 5000 is a multi-purpose power source based on inverter techniques. PS 5000 is designed as a part of MULTISYSTEM and is suitable for MMA, MIG and TIG welding with direct current.
PS 5000 is ready to be used as power source for welding automate or robot.

The MULTISYSTEM is comprised of the following units:

TIG arc ignition units: **TU 10**, **TU 20**

MIG wire feed units: **FU 05**, **FU 10**, **FU 20**, **FU 30**

Auxiliary functional units for FU 20 and 30: **FP 5**, **FP 5SH**, **F 2S**, **F 3SH**, **FA 1** and sub-feeder **FU 02**

Cooling water circulation unit: **WU 10**

Remote control devices: **C 100C** (MMA/TIG), **C 100D** (MMA/TIG), **C 100P** (long pulse control unit/TIG), **C 110D** (MIG), **C 120P** (pulse MIG), **C 100S** (MIG/TIG/MMA), **C 110S** (MIG/TIG/MMA + MIG/MMA-selection)

Transport carriages: **T 10** (gas-coooled MIG or TIG), **T 30** (water-cooled MIG or TIG)

The operation of the FU-, TU- and WU units are explained in their operation instructions. The fitting of the devices to the transport units has been explained in the accompanying fitting instructions.

N.B.
KEMPPI'S LISA, LHF AND CV UNITS TOGETHER WITH KEMPPI'S OLD REMOTE CONTROL DEVICES, ARE UNSUITABLE FOR USE WITH THE PS!

TECHNICAL DATA

Mains voltage 3 ~, 50—60 Hz	380 — 415 V
Rated power 60 % duty cycle 100 % duty cycle	27,5 kVA 21,4 kVA
Rated current 60 % duty cycle 100 % duty cycle	500 A/40 V 390 A/35,6 V
Welding current MMA/TIG MIG	10 A/10 V — 500 A/40 V 40 A/12 V — 500 A/40 V
Open circuit voltage	ca. 80 V
Welding current control (MMA/TIG)	stepless
Welding voltage control (MIG)	stepless
Efficiency	85 % (500 A/40 V)
Power factor	0,9 (500 A/40 V)
Idling power	ca. 150 W
Frequency	max. 5 kHz
Storage temperature range	—40...+60 °C
Operation temperature range	—20...+40 °C
Temperature class	B (130 °C)
Degree of protection	IP 23
Allowable control devices	C-remote control devices FU TU
Supply voltage for the control devices	30 VAC (240 VA/100 %)
Dimensions length width height	710 mm 360 mm 580 mm
Weight	93 kg
Allowable auxiliary functional units	PSM 10, PSM 20, PSL 20

The product meets conformity requirements for CE marking.

INSTALLATION

Siting the machine

A distance of at least 20 cms between the rear of the machine and any surrounding objects must be ensured to allow good circulation of the cooling air through the machine.
Metal and carbon dusts are not good to the operation of the machine, SO IT IS VERY IMPORTANT THAT THE MACHINE IS POSITIONED AWAY FROM THE LINE OF PARTICLE SPRAY, CREATED BY GRINDING TOOLS ETC.
If the machine is used in an outside environment, it is advisable to cover the machine with a waterproof sheet for extra protection, but in no way must the flow of the cooling air be obstructed.

Connection to the mains supply (See picture 3)

CONNECTION OF THE CONNECTION CABLE TO THE MAINS SUPPLY SHOULD ONLY BE CARRIED OUT BY A COMPETENT ELECTRICIAN.

A small removable inspection cover is situated on the left hand side of the machine. When removed, this exposes the terminal block to which the primary connection cable is connected. The cable is entered through the inlet ring on the rear panel of the machine and fastened with the cable clamp. The phase leads of the connection cable, are coupled to connections L1, L2 and L3 and the earth protection lead coloured green-yellow is coupled to the earthing screw marked thus ⏚.
Sizes of the connection cable and fuse ratings for the machine at 100 % duty cycle loading, are specified in the table below.

	380—415 V
Fuses (delayed)	35 A
Connection cable	4x6 mm²

Tolerance of the mains supply voltage

The PS 5000 is designed to operate from a standard 380 or 415 V (50/60 Hz) supply WITHOUT ANY ALTERATIONS OR ADJUSTMENTS TO THE MACHINE.

OPERATION (See picture 1)

Main switch

To start the machine the main switch located on the facia panel is turned from the **zero** position to position **I**. At the same time the pilot lamp by the main switch is illuminated. A quiet idling voice is heard from the machine when the local/remote control switch on the front panel is in position "local control".

Operation of the cooling fan

THE PS 5000 HAS A THERMOSTATICALLY-CONTROLLED COOLING FAN WHICH DOES NOT RUN UNTIL THE PRESET TEMPERATURE IS REACHED.

Local/remote control switch

The switch is located on the facia panel of the machine and when in the "LOCAL POSITION" the machine has a constant current characteristic suitable for MMA WELDING. The welding current is adjusted by using the scaled potentiometer located on the facia panel. When the "REMOTE CONTROL" position is selected, the power source is controlled by using an external remote control device which is connected TO THE CONTROL SOCKET LOCATED ON THE REAR PANEL OF THE MACHINE (see following paragraph).

Selection of the characteristic curve

THE CHARACTERISTIC CURVE OF THE PS IS SELECTED AUTOMATICALLY. The constant voltage characteristic (MIG welding characteristic) is automatically selected immediately the FU wire feed unit is connected to the power source with the interconnection cable.

ASSEMBLY OF THE WELDING EQUIPMENT

THE CABLE CONNECTIONS OF THE WELDING EQUIPMENT FOR MMA, MIG AND TIG WELDING APPLICATIONS ARE ILLUSTRATED IN THE ENCLOSED WIRING DIAGRAMS AT THE END OF OPERATING INSTRUCTIONS. CONNECT THE CABLES ACCORDING TO THE CONNECTION DIAGRAMS ACCOMPANYING WITH THE TRANSPORT UNITS T 10 AND 30.
70—95 mm^2 copper cable is the recommended size for welding cables.

Equipment for MMA/MIG welding

If the equipment is alternately used for MMA and MIG welding the welding method can be changed either by using the local/remote control switch of the PS or the remote control unit **C 110S**. When the method is changed by using the local/remote control switch of the PS the current for MMA welding is adjusted with the potentiometer on the facia panel of the PS and the MIG welding values for wire feed speed and voltage by the FU or the remote control unit connected to it (e.g. **C 110D**, **C 100S**).
When the remote control unit **C 110S** is used each of its three channels can be set to adjust either the current for MMA welding or the MIG welding values for wire feed speed and voltage.
The selection MMA/MIG is done with selecting switches of the **C 110S** according to channels.
N.B.
WELDING VOLTAGE IS AT THE SAME TIME PRESENT IN THE ELECTRODE HOLDER AND THE MIG GUN, IF THE ELECTRODE HOLDER IS CONNECTED TO THE POSITIVE POLE OF THE PS OR THE FU BY MEANS OF E.G. A BRANCH CONNECTOR.

Equipment for MMA/TIG welding

MMA welding applications normally use different polarity. WHEN CHANGING FROM ONE METHOD TO ANOTHER, THE ENCLOSED WIRING DIAGRAMS SHOULD BE FOLLOWED VERY CAREFULLY.
If the remote control device **C 100S** is used, the current values, for different welding methods may be adjusted for different channels of the device. WHEN CHANGING OVER TO MMA WELDING, THE MAIN SWITCH OF THE **TU** UNIT IS OPENED, AND THE CORRECT CHANNEL OF THE **C 100S** REMOTE CONTROL IS SELECTED FOR CONTROL OF THE CURRENT.
An alternative is to adjust the current for MMA welding, with the potentiometer on the PS and the current for TIG welding with the potentiometer on the TU unit or with the remote control unit connected to the TU. When a change in welding method from MMA to TIG welding is required, the polarity is changed (according to enclosed wiring diagrams), the local/remote control switch of the PS is set for local and the TU is turned off.

AUXILIARY FUNCTIONAL UNITS PSM (See pages 4 and 34)

Auxiliary units may be mounted on the front panel of the PS. The units make the welding work easier e.g. the possibility of a more precise adjustment of welding parameters.
ISOLATE THE PS FROM THE MAINS SUPPLY AND WAIT AT LEAST 2 MINUTES BEFORE FITTING THE PSM UNIT. FOLLOW EXACTLY THE MOUNTING INSTRUCTIONS SUPPLIED WITH THE UNIT.

Universal unit PSM 10

The unit has the following functions (see enclosed figure):

- Stepless adjustment of the level of ignition pulse current in MMA welding.

Operation area:
Welding of thin materials with small electrodes.

- Stepless adjustment of dynamic characteristics in MIG-MAG welding.

Operation area:
Demanding manual welding as well automate and robot applications.

- Change of characteristics in MMA welding, performed with switches.

Operation area:
Mainly welding of thin stainless materials through point to point welding-method.

- External meter readout equipment **MU 10**, can be

connected to the unit.

Operation area:

Exact adjustment, control and recording of welding values as well automate and robot drives. (See Note 1)

- Connection for sending the current and voltage information to control units of robots and automates.

NOTE 1:

The meters indicate the average values of voltage and current. The voltmeter indicates the pole voltage of the machine and it should be noted that the arc voltage may be several volts lower than the pole voltage, when welding with high currents and long cables.

Universal/pulse unit PSM 11

Besides the operations for PSM 10 (see above) there is also a switch in the unit with which the power source PS 5000 is changed suitable for pulse MIG operation. The pulse MIG welding is subject to the use of remote control unit **C 120P** in MULTISYSTEM MIG equipment.

Combinations of pulse MIG equipment and use of PSM 11 have been described in the operation instructions for **C 120P**.

Meter unit PSM 20

The unit is designed for the control and measurement of the current and voltage in such cases where the accuracy demand is not high. The power source must be in a horizontal position. The accuracy of the meter indications are ≤ 4 % of their full scale indications. Note 1 in previous paragraph is also valid for this unit.

AUXILIARY VOLTAGE UNITS PSL (See page 4)

Auxiliary supply voltage units can be mounted to the rear panel of the PS. These units supply voltage for a gas preheater and cooling water circulation unit. CONNECTION OF THE PSL UNIT TO THE PS SHOULD ONLY BE CARRIED OUT BY A COMPETENT ELECTRICIAN. THE MOUNTING INSTRUCTIONS ARE SUPPLIED WITH THE UNIT. BEFORE MOUNTING, ISOLATE THE PS FROM THE MAINS AND WAIT AT LEAST 2 MINUTES. THE UNIT IS NOT LIVE, UNTIL THE MAIN SWITCH OF THE PS IS IN POSITION I.

PSL 20

Designed for use with:

PS voltage version 380—415 V.

Use:

Power supply for WU 10 and/or gas preheater.

Rated power:

440 VA/220 V, 1-phase.

OPERATION DISTURBANCES

In order to locate an operation disturbance, the steps in the following instructions should be taken. It should be noted, that a general reason for an operating problem e.g. in MIG welding is a damaged gun or a mechanical wire feeding problem. Another reason may be caused by bad electrical connections in the welding cables or interconnection cables.

THE FIRST ITEM TO CHECK IS THE POWER SOURCE. THIS CAN BE CHECKED BY TURNING THE "LOCAL/REMOTE" CONTROL SWITCH ON THE PS TO THE "LOCAL" POSITION. IF A CONTINUOUS IDLING NOISE IS GENERATED BY THE MACHINE, THEN THE CAUSE OF THE PROBLEM IS PROBABLY OUTSIDE OF THE PS.

Loss of a phase in the mains supply

The machine includes an overvoltage releasing which may operate if there is a very short (less than 1 s) break in the mains supply. Normal operation is then returned by resetting once, with the main switch of the machine (I → 0 → I).
A common fault situation is the loss of one phase to the machine. The most common reasons are throughburning of a mains supply fuse, or a broken connection in the connection cable. The loss of one phase is not always indicated by the pilot lamp on the front panel of the machine, but it can be recognized by the very poor welding characteristics achieved.

Operation of the overvoltage releasing

The machine has an overvoltage releasing which stops the operation if the welding pole voltage exceeds 100 V.

THE MACHINE IS RESTARTED AS BEFORE BY RESETTING WITH THE MAIN SWITCH.

Operation of the overload protection

The overload protections (thermal protections) of the machine operate if the machine is continuously loaded above the rated values.
The device may also operate if a blocked dust filter prevents the flow of cooling air through the machine.
THE MACHINE CANNOT BE RETURNED TO OPERATION UNTIL SUFFICIENT COOLING TIME HAS BEEN ALLOWED. ONCE THIS TIME HAS ELAPSED THE MACHINE CAN BE RESET AS BEFORE WITH THE MAIN SWITCH.

Take the following steps:

- Reset once with the main switch (I → 0 → I).
- If the machine does not start wait 10—20 minutes until the cooling fan cools the machine.
- After the cooling down period, a further resetting with the main switch (I → 0 → I) restores the machine to welding conditions.

Specific main fuse of the machine

ISOLATE THE MACHINE FROM THE MAINS SUPPLY AND WAIT AT LEAST 2 MINUTES BEFORE LOOSENING THE COVER PLATE. (See picture 3).
It is very important that it is replaced with a fuse of the same type and rating which is marked on collar of fusebox.
DAMAGE CAUSED BY A WRONG TYPE FUSE, IS NOT COVERED BY THE GUARANTEE.

Control fuse

The FU and TU units receive their supply voltage from connector on rear panel of PS. As protection of auxiliary transformer of PS there is an 8 A slow-blow cartidge fuse beside the connector (see picture 1). The fuse is in protection voltage circuit (30 VAC). If the failure of this fuse is apparent, some of the possible causes are as follows:

- Damaged interconnection cable (short circuit)
- MIG gun in bad condition, causing overloading of motor of FU especially when a sub-feeder is used.
- Damaged remote control unit, or its cable.

MAINTENANCE

The amount of use and the working environment should be taken into consideration when planning the frequency of maintenance of the PS equipment.

Careful use and preventive maintenance will help to ensure trouble-free operation.

Cleaning of the dust filter (See picture 2)

The cleaning of the machine's dust filter should be performed at regular intervals, the regularity of which is dependent upon the machine's working environment.

THE CLEANING IS RECOMMENDED TO BE DONE AT LEAST ONCE EVERY 3 MONTHS IF THE MACHINE IS IN CONSTANT USE. ISOLATE THE MACHINE FROM THE MAINS SUPPLY AND WAIT AT LEAST 2 MINUTES BEFORE REMOVING THE MACHINE'S FRONT GRATE COVER. WHEN THE DUST FILTER IS REMOVED, LIVE PARTS ARE EXPOSED, WHERE LINE AC AND HIGH VOLTAGE DC ARE PRESENT.

The maintenance is performed as follows:

- Remove the front grate of the machine (2 screws).
- Remove the fastening screws holding the dust filter (2 pcs).
- Wash the filter carefully with water and if necessary a detergent based degreasing solvent can be added e.g. dish washing liquid. DO NOT USE INFLAMMABLE LIQUIDS.
- Check the condition of the filter. If for example the aluminium filler material has come out from it's support frame, or it is damaged in any other way, it has to be replaced with a new one.

  A DAMAGED FILTER CAN CAUSE A SHORT CIRCUIT WITHIN THE MACHINE AND SERIOUS DAMAGE MAY RESULT.
- Refasten **the dry filter** in place. THE SCREWS HAVE TO BE FITTED WITH LOCKING PLATES.
- Refasten the front grate to the machine.

Regular maintenance

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

- Cleaning of the machine
- Maintenance of the dust filter
- Checking of the connectors
- Checking of the switches and potentiometer
- Check the condition and mounting of the mains cable and plug
- Checking and tightening of the connections inside the machine
- Damaged parts or parts in bad condition 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.

IN CASE OF PROBLEMS CONTACT THE KEMPPI WORKS IN LAHTI, FINLAND OR YOUR KEMPPI-DEALER. THE SERVICE REPAIR SHOPS MAKE ALSO REGULAR MAINTENANCE ACCORDING TO AGREEMENT.

OPERATION SAFETY

Never watch the arc without a face shield designed for arc welding!
The arc damages unprotected eyes!
The arc burns unprotected skin!
Be careful for reflecting radiation of arc!
Protect yourself and the surroundings against the arc and hot spray!
Don't use power source for melting of frozen pipes!
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 fire 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.
Watch out for the welding fumes!

Ensure that there is sufficient ventilation.
Follow special safety precautions 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.

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

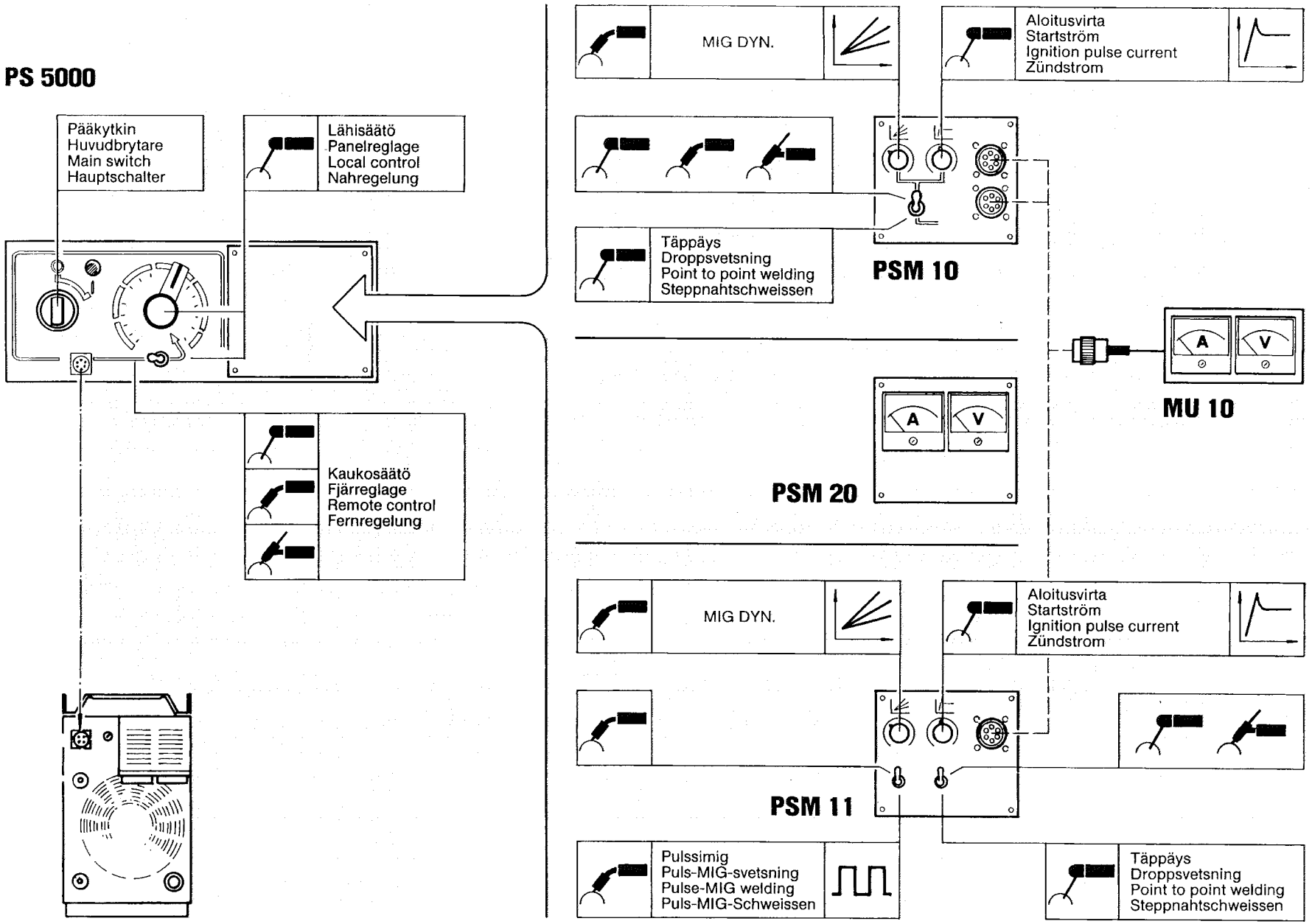
The following conditions are not covered under terms of guarantee: defects due to natural wear and tear, non-compliance with operating and maintenance instructions, connection to incorrect or faulty supply voltage (including voltage surges outside equipment spec.), incorrect gas pressure, overloading, transport or storage damage, fire or damage due to natural causes i.e. ligthning or flooding. This guarantee does not cover direct or indirect travelling costs, daily allowances or accomodation.
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-authorised agents.

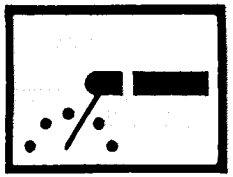
Guarantee period

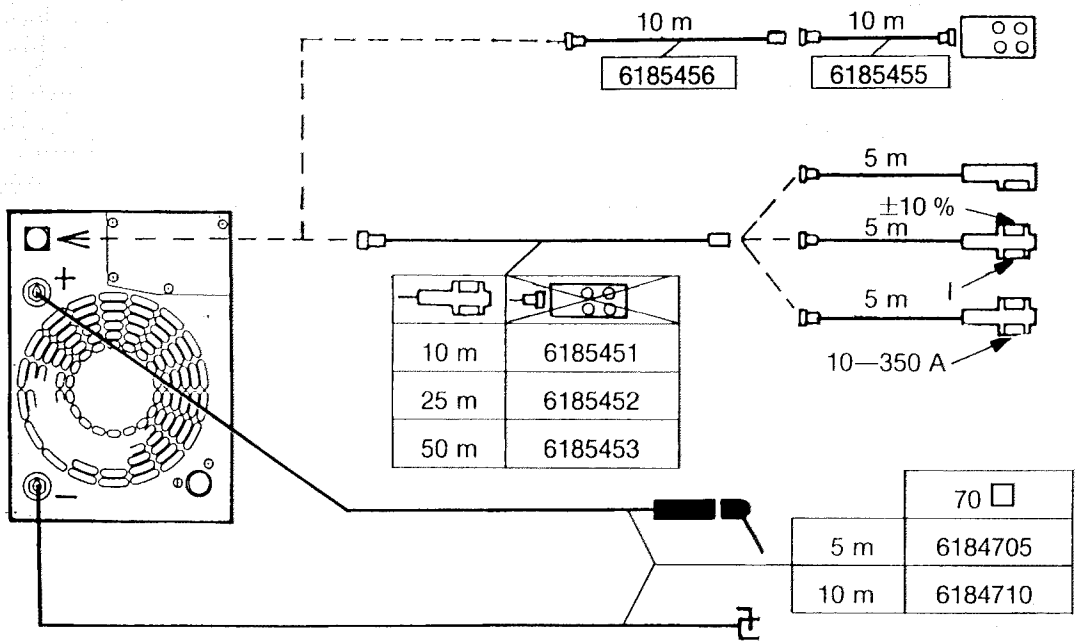
The guarantee is valid for one year from date of purchase, provided that the machine is used for single-shift operation.
The guarantee period for double and treble shift operation is six months and four months respectively.

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.
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.


PS 5000
Pääkytkin
Huvudbrytare
Main switch
Hauptschalter
Lähisäätö
Panelreglage
Local control
Nahregelung
Kaukosäätö
Fjärreglage
Remote control
Fernregelung
MIG DYN.
Aloitusvirta
Startström
Ignition pulse current
Zündstrom
Täppäys
Droppsvetsning
Point to point welding
Steppnahtschweissen
PSM 10
A
V
MU 10
PSM 20
MIG DYN.
Aloitusvirta
Startström
Ignition pulse current
Zündstrom
PSM 11
Pulssimig
Puls-MIG-svetsning
Pulse-MIG welding
Puls-MIG-Schweissen
Täppäys
Droppsvetsning
Point to point welding
Steppnahtschweissen





C100P	6185424
C100S	6185422
(C110S)	6185425

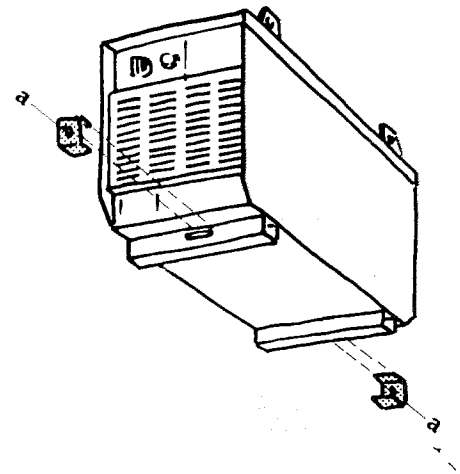
C100C	6185410

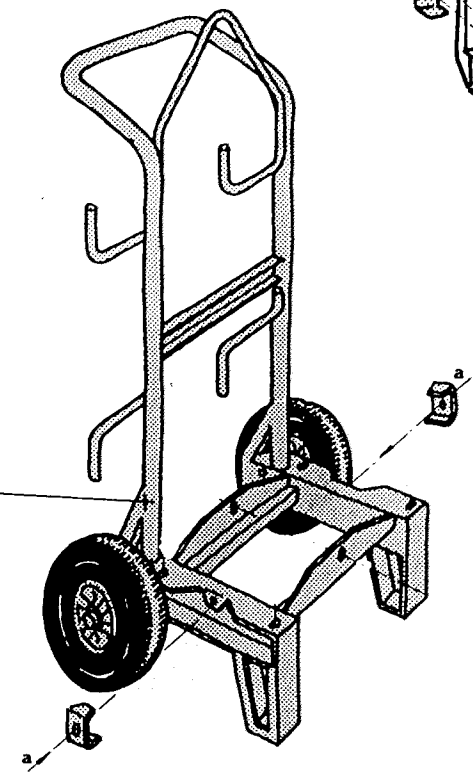
C100D	6185413

C110D	6185421

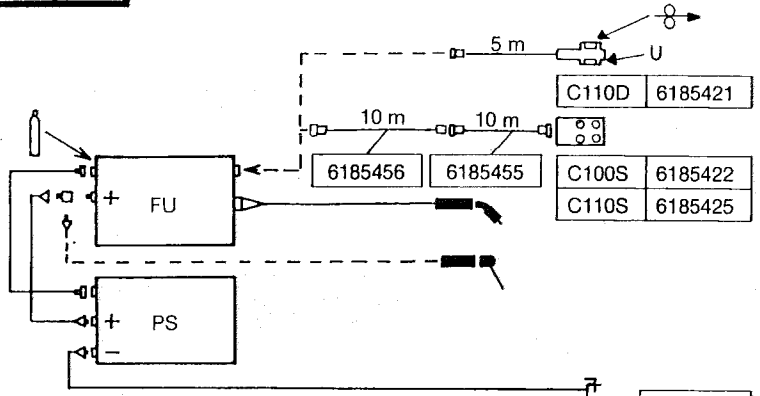
10 m	6185451
25 m	6185452
50 m	6185453

	70 □
5 m	6184705
10 m	6184710





T10	6185231



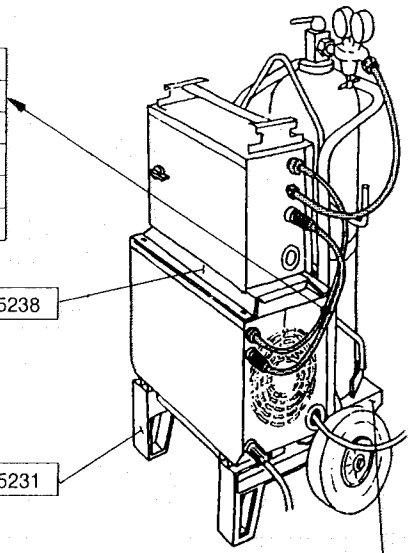
C110D	6185421
6185456	6185455
C100S	6185422
C110S	6185425

FU 10	6231110
FU 20	6231120
FU 30	6231130

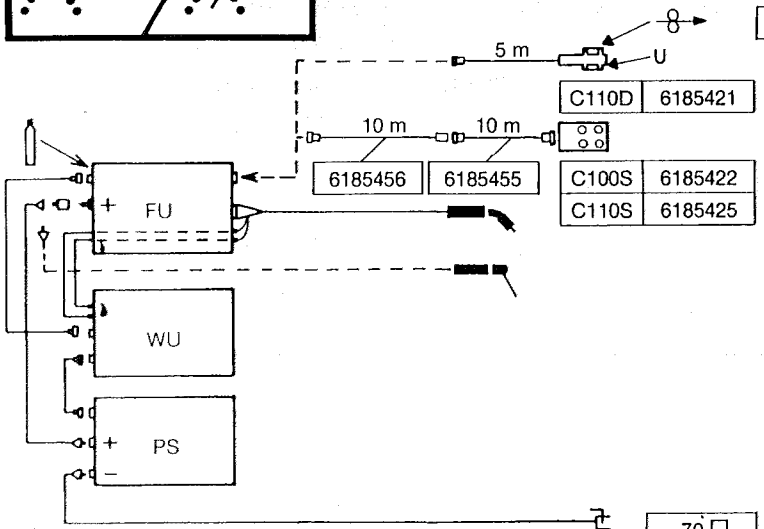
PS 5000	380—415 V	6142553

	70 □
5 m	6184711
10 m	6184712

	70 □
0,6 m	6260181
1,75 m	6260182
5,0 m	6260184
10,0 m	6260186
15,0 m	6260188



T4	6185238
T10	6185231
P10	6185239

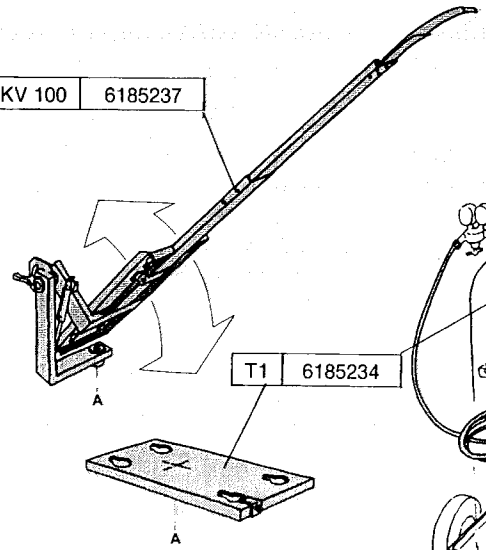


C110D	6185421
6185456	6185455
C100S	6185422
C110S	6185425

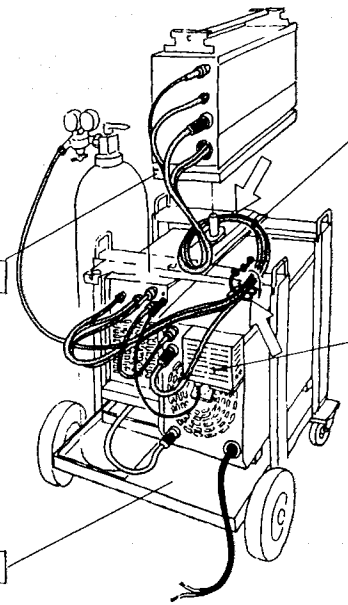
WU 10	220 V	6262010

	70 □
5 m	6184711
10 m	6184712

KV 100	6185237

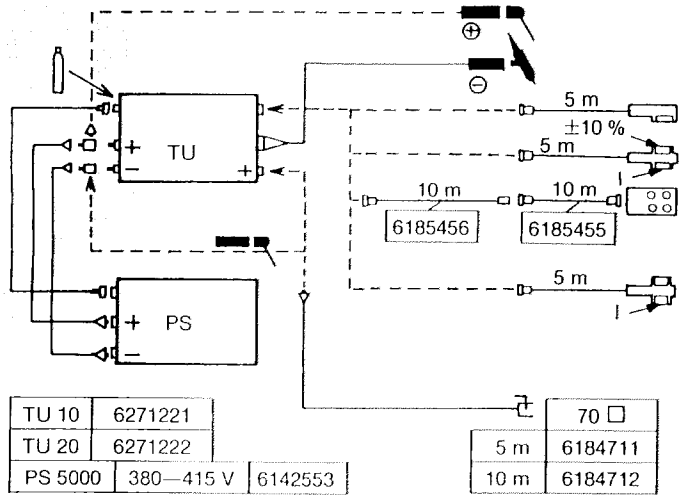


T1	6185234
T30	6185233



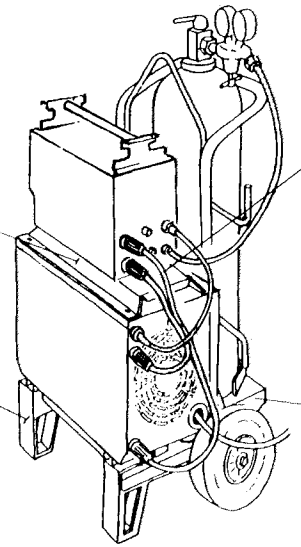
	70 □
1,75 m	6260183
5,0 m	6260185
10,0 m	6260187
15,0 m	6260189

PSL 20	6185602



C100C	6185410
C100D	6185413
C100P	6185424
C100S	6185422
(C110S)	6185425
(C110D)	6185421

T4	6185238
T10	6185231



	50 □
0,8 m	6271851
1,75 m	6271852
5,0 m	6271854
10,0 m	6271856
15,0 m	6271858

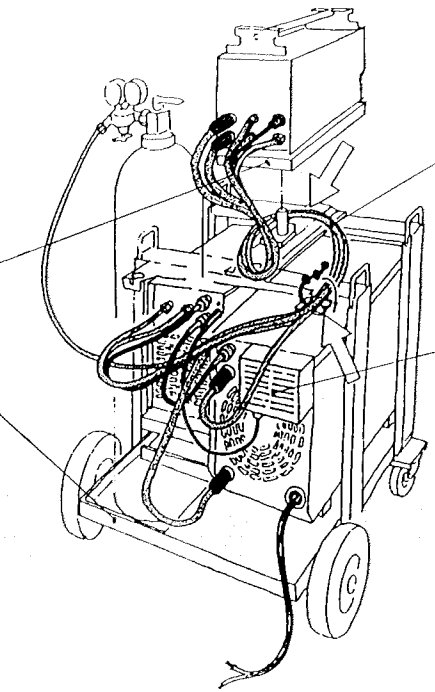
P10	6185239

TU 10	6271221	
TU 20	6271222	
PS 5000	380—415 V	6142553

	70 □
5 m	6184711
10 m	6184712

C100C	6185410
C100D	6185413
C100P	6185424
C100S	6185422
(C110S)	6185425
(C110D)	6185421

T2	6185235
T30	6185233



	50 □
1,85 m	6271853
5,0 m	6271955
10,0 m	6271857
15,0 m	6271859

PSL 20	6185602

WU 10	220 V	6262010

	70 □
5 m	6184711
10 m	6184712