KEMPOMAT 320 is a fan-cooled MIG welding machine for not so heavy industry.

The wide choice of voltages - 16 different steps - and the stepless regulation of the wire feed speed enables the optimum welding values to be selected for widely different applications.

In the welding of thin sheets and in repairs, where the sheet quality and fit-ups are poor, the scope of the machine is widened by the cycle arc timer. The scope of use is also widened by the possibility for spot welding.

TECHNICAL DATA

Mains voltage 3~	V	380/220 or 415
Mains current (100 % duty)	kVA	6,6
Welding current		
at duty cycle *) 40 %	A/V	320/30,0
60 %	A/V	265/27,3
100 %	A/V	205/24,3
Voltage steps	pc	16
Open circuit voltage	V	15,5 - 40,0
Wire feed speed	m/min	0 - 18
Wire sizes	mm	0,6 - 1,2
Weight of wire reel	kg	20
Cycle arc-/fusion spot welding times	s	0,1 - 1,5
Shielding gas		CO_2 or CO_2/Ar
Dimensions		
length	mm	815
width	mm	390
height	mm	1010
Weight	kg	112
Temperature class		H (180°C)
KEMPOMAT 250 complies with the safety regulations set out in VDE 0542 and SEN 8301 standards.		

*) According to VDE 0542/7,65 standard:
The duty cycle is the percentage of arcing-time in a 5 min total time.
Example: 3 min welding in a 5 min period = 60 % duty cycle.

INSTALLATION

Siting

- the machine should be used indoors, away from strong draughts.
- the location should be free from excessive moisture or grinding dust.
- if the machine has to be covered, free cooling air circulation should be ensured.

Lifting of the machine

TAKE OFF THE GAS BOTTLE FROM THE BOTTLE CARRIER BEFORE LIFTING THE MACHINE. For the lifting there are lifting ears in the reel case of the machine (picture 7).

Connection to the mains *)

The mains cable is led to the machine through the grommet in the back wall of the machine and connected to the mains terminal strip and locked with the clamp (B).
The phase wires to the cable are connected to the connectors L1, L2 and L3.
The yellow-green protective earth cable is connected to the earth screw ⏚ beside the terminal strip. Picture 1.

Connection cable:

Connection voltage	Connection cable	Fuses delayed
220 V 3 ~	4 × 2,5 mm²	20 A delayed
380 V 3 ~	4 × 2,5 mm²	16 A delayed
415 V 3 ~	4 × 2,5 mm²	16 A delayed

Change of connection voltage *) (pictures 2 and 3)

When the 380/220 V machine is coupled on 220 V, on the change-over contactor and the terminal strip of the auxiliary transformer are made the changes in switching according to pictures 3a and 3b.-
From the wiring diagram delivered with the machine you can see the connections more clearly. The 380/220 V machine is coupled on 380 V when it is delivered from factory unless it has otherwise been agreed in writing.

***) NOTE! The connection of the primary cable from the mains supply and changes to any internal primary voltage connectors should only be carried out by a competent electrician.**

Shielding gas

Construction steel: mixed gas 80 % Ar/20 % CO_2 or CO_2
Construction steel: mixed gas 98 % Ar/2 % O_2
Aluminium: Argon
Flow speed of shielding gas apprx. 10 l/min.

Mounting of the welding gun (picture 5)

- inside the multi-function adapter of the welding gun is a **liner**, which is **always selected according to the filler wire and the wire diameter** in the table
- check that the liner inside the cable of the welding gun is suitable for the filler wire:
  white symbol colour for wire ø 0,6 - 0,8 mm
  red symbol colour for wire ø 0,9 - 1,2 mm
- **change to the gun suitable contact tip for the wire diameter**
- connect the welding gun on the central adapter of the machine, **tighten the lock nut with hand.**

Filler wire ø mm/mater.	Liner inner ø mm	Liner symbol	Liner mater.
0,6-1,0 steel	1,2	1,2	steel
1,0-1,2 steel	1,5	1,5	steel
1,0-1,2 alum.	1,5	red	Teflon

Mounting of the filler wire

- open the press arm above the feed roll
- **choose the feed roll according to wire diameter** and set it onto the draw axle so that the marking of the wire diameter "0,6...1,2" is at the back side of the roll
- **set the wire reel onto the hub, lock the reel NOTE!** Wire reels with metal circles may be warped. Control that the reel has enough place to rotate without touching body or other metal parts of the machine.
- release the wire end from the reel and cut off the bent wire end. **SEE THAT THE WIRE REEL DOES NOT GET RELEASED**

- straighten about 20 cm of the wire and make sure that the end is not sharp. A sharp end could damage the liner and the contact tip of the welding gun
- thread some wire into the liner of the welding gun
- see to that the wire is placed correctly onto the feed roll and close the press arm of the feed rolls
- (choose the contact tip according to the filler wire)
- turn the main switch to position I, the selecting switch for welding method to position ▬ and set the wire feed speed at a low value
- keep the hose of the welding gun straight and press the switch, until the wire end comes out of the contact tip
- **the pressure adjustment of the feed rolls** (6 in picture 5) must be set so that the wire is fed evenly into the liner and small restriction of the wire can be made without the feed rolls slipping. NOTE! **Excessive pressure** will cause flattening of the wire and loosening of the wire coating and undue wear of the rolls
- **regulate the braking of the wire reel hub** (picture 6) so that the reel stops rotation at the same time as the feed rolls, in other words the wire may not be loosened on the reel.

OPERATION

SETTINGS (picture 4)

Earth cable

The welding characteristics of the machine are greatly influenced by the welding choke. The selection of the optimum choke value is combined with connection of the earth cable.

Connection **I** This connection is used when welding thin sheets (under 1 mm).

Connection **II** This connection is used when welding thicker sheets and in spot welding.

The earth connection from the weld plant should at all times be made directly onto the piece to be welded. The contact between the earth connection and the job should be as large and as flat as possible and all rust and paint on the workpiece should be removed.

The settings of the welding voltage

The welding voltage is set with a 4-step coarse and fine adjustment switch.
Open circuit voltages are according to the table.
DO NOT ADJUST THE VOLTAGE DURING WELDING.

Coarse	Fine	Open circuit voltage
1	1 - 4	15,5 - 17,8 V
2	1 - 4	18,7 - 21,8 V
3	1 - 4	23,2 - 28,3 V
4	1 - 4	30,5 - 40,0 V

The settings of the wire feed speed

The wire feed speed is stepless 0—18 m/min and equipped with memory scale (0—10).

Selecting switch for welding method

With the selecting switch for welding method it is possible to select the wire feed for three different welding methods:

▬ continuous welding
▬ ▬ cycle-arc welding
● ● ● spot/plug welding

Setting of the welding timer

Setting stepless 0,1 - 1,5 s
1. For wire feed time in cycle-arc welding
2. For welding time in spot/plug welding

Control of the burn back time

The burn back time is controlled from the potentiometer inside the reel housing (picture 4), which is regulated with a screw gouge. The time can be controlled from 0,05 s to 0,5 s.

It may be necessary to control the burn back time when going over to weld different qualities of filler wire, e.g. when going over from welding of steel to welding of aluminium.

The burn back time is correctly controlled when the filler wire is not fastened on the work piece or burnt on the contact tip at the end of welding.

WELDING

Continuous welding ▬▬

- a normal welding method with a continuous wire feeding

Cycle-arc welding ▬▬▬

- in this welding method the wire is fed in cycles.

  In cycle-arc welding the feed of the filler wire is controlled by the timer. The feeding is divided into the working and pause cycles. The time for the working (welding) cycle is adjusted with a welding timer and the pause cycle is fixed 0,3 s. The welding is made during the working cycle. During the pause cycle the wire feed is stopped and the arc will extinguish. During the pause cycle the molten pool will cool down. The arc will extinguish again at the beginning of the following working cycle, when the filler wire makes contact with the molten pool.
  The welding current is switched on and the shielding gas supply will remain on during the pause cycle.
- this is used on thin sheet to avoid burn-through and reduce distortion.

Fusion spot welding ●●●

- a welding method with one wire feed cycle

  MIG spot welding is made from one side of the sheets placed one upon another so that the high welding current penetrates through the upper sheet (max. 2 mm) also a part of the lower sheet. When welding sheets of unequal thickness the thinner sheet must be on top.
  Thicker sheets can be welded together by having a hole in the top sheet and directing the wire into the hole - this is known as **"plug welding"**.
  Fusion spot welding requires no extreme pressure; the sheets are pressed against each other with the studs of the gas nozzle.
- the gas nozzle is changed for a spot welding nozzle with studs. The studs must be cut off as follows:
  free wire length with ø 0,8 mm wire is 8 - 10 mm
  with thicker wire 10 - 15 mm
- the selecting switch for welding method to position ●●●
- adjust the welding voltage and the wire feed speed considerably high compared with the normal welding
- the welding time to give the required depth of penetration is adjusted with the welding timer potentiometer

KEMPOMAT 320C

Differing from the basic model, the KEMPOMAT 320C is equipped with remote control connection for wire feed speed.

Selecting switch for local/remote control

In the local control position of the switch the wire feed speed is adjusted from the potentiometer on the front panel on the mahcine.
In the remote control position of the switch the wire feed speed is ajusted from the remote control unit which is connected to the remote control connection.

Remote control unit

As the remote control unit can be used only the C 100C control unit.

MAINTENANCE

The frequency of maintenance must take into account the amount of use and the environment. Proper use and rational preventive maintenance ensure the most troublefree use of the machine without any unforeseen interruptions.
Basic maintenance should be carried out at least twice a year for the following:
- welding gun
- wire feed mechanism
- power source unit

In addition the welding gun requires daily cleaning and service.

Welding gun

Due to high temperature and wear the welding end of the gun requires most attention.

Gas nozzle
- **clean the gas nozzle often during the day**
- **at the same time check the insulators of the gas nozzle**

Weld spatter from the arc will build-up on the gas nozzle and prevent the free flow of shielding gas. Severe spatter build-up can lead to short-circuiting between the nozzle and the contact tip causing severe damage.

Contact tip
- **the spatter on the contact tip should be cleaned**
- **the condition of the tip should be checked weekly**

An enlarged or blocked contact tip should be changed for a new one.

Liner
- **the liner should be cleaned and checked** at least each time a new wire reel is fitted to the machine.

Dry compressed air is blown through the liner, blowing should be preferably made from the neck end.

Wire feed mechanism

Check the following:

- groove of the roll. If the groove is worn this will cause disturbances in the wire feed
- that the wire runs straight. The liner of the multi-function adapter must be as near the feed rolls as possible, without touching them, and the wire must run straight from the hole of the liner to the groove of the feed roll
- function of brake of wire reel hub; the brake band must be lubricated lightly

Clean the unit of dust and dirt.

Power source

Switch off the machine from the mains before all cleaning, service and reparations in the power source unit.
- clean the interior parts and components of the machine with dry compressed air
- check the condition of all electrical connections
  * the oxidized parts must be cleaned
  * the loose parts must be tightened
- possible faults must be repaired immediately

WHEN CLEANING WITH COMPRESSED AIR, ALWAYS PROTECT YOUR EYES WITH PROPER EYE PROTECTION!

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

GUARANTEE

The machines produced and products represented by Kemppi Oy are guaranteed against defects in material or manufacture. Within the limits of the guarantee the defective part will be replaced by a new one, or when possible, repaired free of charge. The guarantee is valid for one year provided that the machine is used in one-shift work.
The guarantee does not compensate for damage due to improper use, neglect or normal wear. Possible travelling costs or freight or postage charges are not covered by the Kemppi guarantee.
Guarantee repairs shall be carried out only by Kemppi authorised representative. In case guarantee repair is demanded a certificate about validity of guarantee has to be presented.