

# ***Power Compact 200/250***

**Halvautomat  
Semi-automatic  
Halbautomat  
Semi-automatique**

**Bruksanvisning och reservdelsförteckning  
Instruction manual and spare parts list  
Betriebsanweisung und Ersatzteilverzeichnis  
Manuel d'instructions et liste des pièces détachées**

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## INTRODUCTION

**Semi-automatic welding (MIG/MAG)** MIG is the abbreviation for METAL INERT GAS and concerns welding with an inactive shielding gas, generally Argon or a mixture of gases (MIX-GAS).

MAG means METAL ACTIV GAS and it concerns welding with an active shielding gas, generally carbon dioxide (CO<sup>2</sup>).



### WARNING



**ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.**

**ELECTRIC SHOCK - Can kill**

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

**FUMES AND GASES - Can be dangerous to health**

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

**ARC RAYS - Can injure eyes and burn skin.**

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

**FIRE HAZARD**

- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

**MALFUNCTION - Call for expert assistance in the event of malfunction.**

**READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.**

**PROTECT YOURSELF AND OTHERS!**

## **TECHNICAL DESCRIPTION**

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Power Compact 200 and 250 are both MIG/MAG welding machines of compact dimensions.

Specially designed for workshops which specialize in light and medium-heavy plate, the Power Compacts satisfy the need of high capacity for repair and maintenance welding.

The machines are fan-cooled and as standard are equipped for seam, spot and interval welding. For body welding purposes, the Power Compacts can be used with a variety of special equipment.

The Power Compacts have space for an in-built 300 mm wire reel (15kg) and in standard specification have a gas bottle rack, front wheels of castor type, and large rubber rear wheels for ease of handling and transportation.

The top of the machine has a rubber covering and forms a very handy storage shelf. The Power Compacts come complete with welding torch, 3 m hose length, 5 m earth return cable with earth clamp and OKC coupling, fitted 5 m mains cable, and a 3 m gas hose complete with hose clamps.

The Power Compact 250 is a 3-phase machine, while the 200 is available in both 3-phase and single phase versions.

See the table for voltage ranges.

**TECHNICAL DATA**

	<b>PC 200</b>	<b>PC 200</b>	<b>PC 250</b>
<b>Mains supply</b>	<b>1-phase 50-60 Hz</b>	<b>3-phase 50-60 Hz</b>	<b>3-phase 50-60 Hz</b>
Voltage (V)	200/230	230/400-415 415/500	230/400-415 415/500
Fuse slow (A)	25	16 10	16 10
Cable area (mm)	3x2,5	4x1,5	4x1,5
Permissible loading			
20%	200A/24V	200A/24V	-
30%	-	-	250A/27V
60%	115A/20V	-	180A/23V
100%	90A/19V	70A/18V	130A/21V
Open circuit voltage	U <sub>0</sub> = 17-37V	U <sub>0</sub> = 17-36V	U <sub>0</sub> = 16-35V
Voltage step	10	10	10
Inductance outlet	2	2	2
Wire feed speed	1-17m/min	1-17 m/min	1-17m/min
Welding time (spot and interval)	0,2-2sek	0,2-2sek	0,2-2sek
Interval time	0,2-2sek	0,2-2sek	0,2-2sek
Efficiency $\eta$	0,69	0,72	0,77
Power factor $\lambda$	0,87	0,88	0,95
Operating voltage	42V AC	42V AC	42V AC
Class of enclosures	IP 21	IP 21	IP 21
Weight	66 kg	73 kg	76 kg
Dimensions (lxwxh)mm	840x375x736	840x375x736	840x375x736

Power Compacts 200 and 250 comply with international standards SS 483 01 11, ISO R700, NF A 85 013 and VDE 0542.

**IP**

**IP** -The code describes the degree of protection provided by the casing, against the penetration of fixed objects and water.

Equipment mark **IP 21** is designed for indoor use, while **IP 23** is also intended for outdoor use.

## **INSTALLATION**

### **INSTALLATION**

#### **Unpacking**

After unpacking fit the wheels and gas bottle rack according to the instructions.

#### **Electrical connections**

First make sure that the power supply is appropriately fused (see Mains connections). When connecting the mains plug, it is **absolutely essential** that the green/yellow wire of the mains cable is connected to the earth screw of the plug. The other two wires (1-phase) respectively three wires (3-phase) should be connected to any two resp. three of the other terminals marked L1 L2 L3 and no particular order is required.

#### **NOTE!**

Electrical connections should only be made by a fully qualified person.

#### **Return welding clamp**

The clamp is attached to the return terminal using the washer and nut provided. Take care to tighten the nut fully so as to prevent inferior earthing.

#### **Connecting the welding torch**

The torch is connected on the front of the machine. Using the key provided, slacken the hex-socket screws in the connecting block. Insert the end of the torch hose into the block, making sure that it bottoms properly. Then re-tighten the hex-socket screws.

#### **Contact nozzle**

The contact nozzle should be screwed into the end of the goose neck contact tube. Also study the user instructions and parts list for the PSF 160 or PSF 250 which are enclosed in the same polyethene bag as the torch and which specify the appropriate sizes of wire. Before the contact nozzle can be fitted, the outer gas nozzle must be removed. Screw the contact nozzle into place and then carefully tighten it using a suitable type of wrench. The gas nozzle can then be pushed on until the ends of both nozzles are level.

#### **Feed rollers**

Make sure that the correct feed rollers and grooves are used for the dimension of wire being used. Each feed roller has grooves for two dimensions of filler wire.

The feed roller must be fitted with its size marking facing you.

The feed roller can be changed or replaced by removing the screw in the centre of the hub.

#### **Wire reel, feeding-in wire and pressure arm**

Fit the reel on to the hub so that the wire runs off at the bottom into the wire guide. Two catches on the hub hold the reel in place. On a new reel, the outer end of the wire is inserted through a hole and bent over. When loosening the wire from the hole, take care to hold the coil so that it does not spring out and ravel. Cut off the bent end of the wire, straighten the tip and then file off any sharp edges so that the wire can run easily through the soft wire guide of the welding conduit without damaging it. These precautions are very necessary. A sharp wire tip can quite easily pierce both the wire guide and the wall of the welding conduit and thus seriously impair the function of the torch.

Feed the wire into the protruding wire guide on the inlet side of the feed unit and then by hand feed the wire up to the rollers. Before the wire is fed further into the guide nozzle of the feed unit, the pressure arm and roller must be lifted up. The wire can now be fed in by hand through the guide nozzle and into the welding conduit and the pressure roller can be lowered again. The contact pressure of the feed rollers is adjusted ex-works, but if necessary it can be modified by means of the screw on the pressure arm.

A rule of thumb for this type of secondary adjustment is that the pressure must not be harder than makes it possible to stop the forward travel of the wire through the torch by pressing the contact nozzle against a piece of wood or equivalent so that the rollers of the feed unit slip. If the pressure is too high when welding, the result may be that the wire will build up and ravel in the outlet nozzle of the feed unit should the tip of the wire stick. This is troublesome to straighten out and, with correct settings, also unnecessary. Another drawback of excessive feed pressure is that the welding wire can be rolled flat which causes unnecessary wear on the wire guide and that contact in the torch will be jeopardized.

### **Gas hose**

Connect the gas hose between the solenoid of the machine and the reducer valve of the gas bottle. If the hose feels stiff, it can be softened up by flushing the ends or submersing them in hot water. To fit the hose, insert it through the hole on the back of the machine beneath the console. Fit a hose clip to each end of the hose. Push the hose ends on to their respective valve nipples by bending the hose up and down, and when fully in position, tighten each hose clip securely. Fitting the hose to the nipples will be made much easier if the nipples are moistened with tap water.

### **Gas, gasbottle and reducer valve**

The next step is to connect the valve to the gas bottle but first placing the gasket provided with the valve onto the valve seat.

#### **NOTE!**

The gas bottles have different connecting threads for reducer valves depending on the type of gas being used

For steel, use carbon dioxide or a mixture of argon and carbon dioxide.

Use pure argon for aluminium. For stainless steel, use argon with a mixture of about 2 % oxygen.

Mixed gases generally consist of 80 % argon and 20 % CO<sup>2</sup>

The union nut on the valve is then threaded on to the gas bottle connection and is tightened using a suitable wrench. Check to make sure that the hose nipple union is also thoroughly tightened.

### **Feeding in the welding wire and setting the gaz flow**

Connect the machine to the mains and the earth return to the workpiece. Remove any covers over the machine to ensure adequate cooling. Set the voltage selector switch to pos 1. The wire feed can be turned to one of the centre settings. Straighten out the torch hose. Wire is fed forwards either by pressing the button on the wire feed unit (cold wirefeed), or by pressing the torch trigger. Take care when the wire emerges from the torch since the point can cause injury. One feature of the Power Compacts is that the amount of gas flow can be measured without needing to lift pressure arm.

Switch the machine on and point the coarse setting switch straight up to the gas symbol.

## **INSTALLATION**

Thus, when the trigger is pulled, the solenoid valve will open but there will be no welding current. The soft funnel on the flow gauge is fitted over the gas nozzle and held in place after which the torch trigger is pulled. The flow of gas is adjusted by means of the reducer valve so that the ball in the flow meter indicates the correct flow of gas which should be between 8 and 10 litres. Too large a flow of gas does not spoil welding results but is unnecessary.

### **Joint preparation**

The joint to be welded must be prepared. During welding, those parts of the workpiece heated by the arc melt and this molten material mixes with the weld metal of the wire or electrode. To make sure that fusion is good and to avoid impurities in the molten pool, it is necessary to clean the surfaces of the joint carefully. Therefore, use a wire brush to remove rust, paint and other forms of contamination where welding is to be carried out. The area to be welded must also be dry.

Fit-up between the parts to be welded together must be adjusted so that the joint gap is uniform from end to end. In the case of light-gauge materials, welding can either be done from one side or both, depending on the strength required. For heavier materials, start with a root bead and then fill up the joint with a sufficient number of passes.

### **Fumes and gas**

In most cases, fumes will not imply a danger to the welder as long as there is adequate ventilation around the welding site. When welding in confined spaces or when working on, for example, galvanized material, extra efficient ventilation will be required.

### **Arc flash**

The electric arc radiates an intensely strong light or flash which can harm the eyes. Therefore, never look directly into the arc without using a screen fitted with a proper welding window. Never use a welding screen which has a scratched welding window. Should you, despite precautions, be exposed to welding flash, this can give eye trouble. A suitable eye bath or flushing the eyes with water can reduce the symptoms.

### **Risk of fire**

Sparks and drips from the weld can cause a fire. Make sure there are no flammable materials or objects in the vicinity of the welding work. Remember that the heat generated by welding can also cause a fire in, for example, a tank which has contained or contains flammable fluids.



### **Words of advice**

1. Plan your welding. Make sure that the workpiece ends are correctly positioned, plan where to do any tack-welding, starting position, accessibility, preparation of the weld, etc.
2. If possible, sit when welding. In this way you will be able to work steadier and a comfortable working position is beneficial to welding results.
3. As far as possible, always support your arms. Even if you can only support yourself on an elbow or by your shoulder, this is much better than "shooting from the hip". In some situations, you can get good forward support by placing your suitably protected hand on the workpiece and moving your hand along the joint as welding proceeds.
4. Do a "milk run" before starting to weld, moving the torch along the joint to make sure that you can actually reach all parts of it. Try angling the torch on tricky parts before you actually start welding.
5. If possible, make sure that the torch is held in such a way that you can always see the weld. In this way, you can be more sure of getting the kind of welding results you are looking for.
6. Before commencing welding, do a try-out on a clean test plate so as to find the appropriate welding parameters and machine settings.

## INSTALLATION

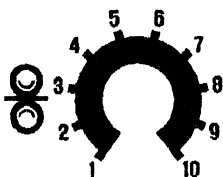
### How to select welding data (seam welding)



Switch the power supply on by means of the main switch. This will cause the light-emitting diode in the switch to light up.



Set the coarse setting switch for welding current to 1-10 (see recommendation table) NOTE! Do not adjust the voltage control while welding. The recommendation table also shows the best inductance output for connection of the earth return cable.



Set the wire feed speed with the potentiometer graded 1-10 (see recommendation table).

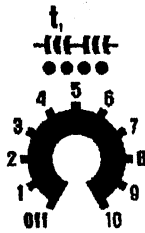
Pulling the trigger on the torch starts the welding process, releasing the trigger stops it. First do a sample weld on a clean piece of plate. Numerous types of fault may occur and are described in the instructions. In the following, we give a summarized description of the most obvious ones.

- The weld lies on top of the material and does not flow out. Remedy: increase the setting of the coarse selector switch to a higher value.
- Holes are burnt in the material. Welding current too high-reduce setting of voltage selector.
- Welding wire seems to bounce off the workpiece. Reduce fine setting control so that wire has time to fuse. (This fault can also be caused by contaminated material or a poorly connected earth return.)
- Arc tends to run up towards the contact nozzle. The cause of this is probably a low wire feed speed-increase the setting. It can also be caused by the wire slipping in the feed rollers-increase roller pressure. A third cause could be a faulty contact tip, replace it.

**Spot Welding (●●●)**

In most cases, spot welding is done from one side to join two overlapping plates.

For spot welding purposes, the torch must be fitted with a special gas nozzle which has two support legs.



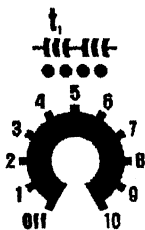
Select the timer setting (t<sub>1</sub>) for spot welding, from 1-10. The spot welding time can be set steplessly between 0,2 and 2 sec. For welding current and wire feed speed settings, see the recommendation table.

Pull the trigger. When the set spot weld time has elapsed, the process is automatically interrupted without the trigger needing to be released.

A new welding process commences when the trigger is pulled again. Max plate thickness when spot welding is about 2 mm. If the plates are of different thicknesses, weld from the thin side.

**Interval Welding (---)**

This form of welding is particularly suitable when working with very thin or inferior plate or when the gap size is large since it gives a cooler weld.

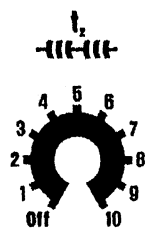


Set the potentiometer graded 1-10 for welding time, and the potentiometer (t<sub>2</sub>) graded 1-10 for pause duration. Both welding time and pause duration can be set steplessly between 0,2 and 2 sec.

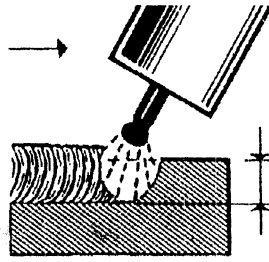
For welding current and wire feed speed settings, see the recommendation table.

Pull the trigger to start the welding process. When the set welding time has elapsed, the process is automatically interrupted and starts again after the set pause duration- after which the process is repeated.

The process continues as long as the trigger is pulled. The molten pool of metal is cooler and the risk of burning through is considerably reduced.

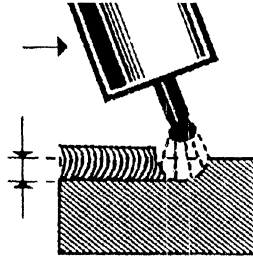


## INSTALLATION



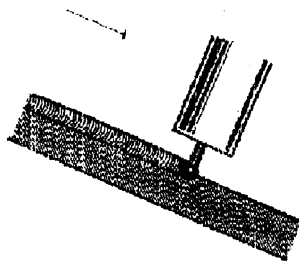
bc03d006

A factor which influences the depth of penetration is how the welding torch is moved during welding. Trailing welding (welding towards the body) increases the penetration depth.



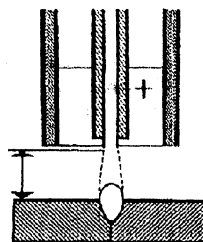
bc03d007

If instead the torch is pushed away from the body, penetration depth is reduced.



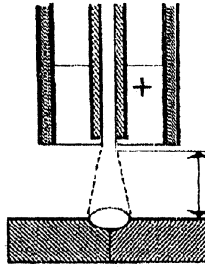
bc03d008

In the case of down-welding, penetration depth is heavily reduced and is at a minimum in vertical down-welding. In up-welding penetration is deep.



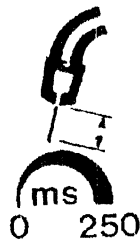
bc03d009

A short arc gives a deeper penetration.



bc03d010

A long arc gives shallower penetration. A long arc also increases the risk of welding spatter.



bc03d011

### **Burn-back time**

Power Compact has adjustable burnback time from 0-250 ms. This is preset when supplied from ESAB. The potentiometer is located inside the machine above the feed unit.

**CAUTION!** In most cases, the preset value should be used. Adjustment should be carried out only in special cases by qualified persons. Use a small screwdriver and adjust carefully.

## INSTALLATION

### Disturbances causing irregular arc or blacking out

FAULT	POSSIBLE CAUSE
Wire does not move forward despite rotation of feed rollers	1. Pressure roller inadequately loaded 2. Dirt in wire guide and/or contact nozzle
Irregular wire feed	1. Faulty contact nozzle 2. Dirt in groove of feed roller 3. Feed roller groove faulty
Arc will not strike	Poor contact between earth return and workpiece
Arc too long and irregular	Voltage too high
Very small arc	Voltage too low
Pores	Incorrect gas flow. Rec. 8-10 l/ min. Inadequate gas shielding due to spatter in nozzle. Draughty workplace. Welding distance too long and/or welding torch wrongly held. Damp, oily, rusty workpiece.
Poor filling up	Welding speed too high. Current too low relative to welding speed.
Lack of fusion	Irregular movement of torch. Voltage too low
Spatter	Voltage too high. Gas nozzle dirtygasmunstycke
Uneven joint	Wire tip too long. Current too high relative to voltage. Welding speed too low.
Poor penetration	Current too low relative to voltage

**NOTE!** Faults in the electrical parts such as the control circuits, relays, switches, transformers, etc, should only be attended to by a proficient service technician.

## ACCESSORIES

**Spot welding** A special spot welding nozzle with support legs is available. As dent removal. Ordinary gas welding wire cut into lengths of 70 mm is used. Depending upon the extent of the dent, one or more wires are welded onto the surface of the dent. ESABs special **knocker hammer with adjustable clamping pliers** is attached to the pull wire.

The wire/wires are pulled by means of light taps until the dent is removed. Then, cut off the pull wire and grind off (polish) the plate surface.

**Heat shrinking of plate. ESABs carbon rod holder** is mounted on the welding gun.

As a result, carbon rods can be used for heat shrinking of dents without any discomfort.

1. Replace the gas nozzle with carbon rod holder.
2. Insert an  $\varnothing$  8 mm carbon rod. Stick-out approx. 50 mm.
3. Disconnect the wire feed by unlocking the pressure arm.
4. **Set the voltage switch to pos. 1. No other position to be used !**
5. The shielding gas may be disconnected.  
Rub the carbon rod with small circular movements against the clean plate surface. The plate will heat up. Use a wet sponge or rag to cool off the plate quickly. This heating and cooling will result in shrinking. Repeat the process until the surface of the plate is smooth and even.

**The following feed rollers available for the Power Compacts:**

367 556-001 0,6-0,8 mm (steel/stainless steel)	Standard PC 200
367 556-002 0,8-1,0 mm (steel/stainless steel)	Standard PC 250
367 556-004 1,0-1,2 mm (Aluminium)	