MKR 300

Welding Column and Boom

Instruction manual

7.001- PO30781 01-01

Valid for Machine No. A100

SAFETY

Full responsibility for safety measures in respect of personnel working on, or in the vicinity of, the system rests upon the user of the ESAB Welding Equipment.

All safety measures must fulfil all regulations and mandatory rules which apply to the type of equipment concerned, in regard to the dangers and the level of hazard involved with the operation of any Welding Plant.

The contents of these recommendations can be looked upon as a supplement to the normal safety rules which apply to the working site.

1. All operations must be
   - carried out in accordance with the instructions
   - handled by specialized personnel
   - A wrong operation can result in an abnormal situation and injure the operator and/or damage the equipment.
2. All personnel working with the Welding Plant must be fully aware of:
   - Handling of the equipment
   - Operation of the equipment
   - The location of emergency stop devices
   - All valid safety rules

   To facilitate this, each selector switch, pushbutton or potentiometer is furnished with a printed plate or symbol, which gives clear directions as to its proper use and function.
3. The operator must make sure
   - that no-one is inside the work area before or during operation.
4. The work area must be:
   - free of machine parts, tools and other piled-up material that can get in the way of the operator.
   - so arranged that the requirements for unrestricted access to emergency stop devices for the welding carriage are met.
5. Personal safety equipment
   - Always use the proper personal safety equipment, such as:
   - Welders' goggles or face-shield, non-flammable clothing, protective gloves
   - Do not wear loose clothing such as belts, bracelets, etc., which may catch on the equipment. In this respect, remember that even rings are dangerous: fingers can be torn off.
6. Required fire-extinguishers should be available in specially marked areas.
   - Floor areas and machine parts are to be kept free of inflammable materials, such as oily waste, cloths etc.
   - Remember that spatter may cause fires and skin burns.

7. Live parts are normally semi-protected.
   - Control- and connection boxes **must not be opened** while in operation, or if power is connected to the equipment.
   - The above-mentioned boxes can be opened only with a key or a tool.
   - Check that recommended, earthed connectors are properly fitted.
   - **Only authorised personnel may work on electrical equipment.**
8. Maintenance
   - Lubrication and maintenance of the equipment **must not be done during operation.**
   - Manual procedures involving hydraulic and pneumatic components **may be carried out only when the system is decompressed**.

9. **The function of all emergency and safety devices is to be checked daily, as well as after any work has been carried out on the machine.**

   In the event of any abnormal function or signal, the underlying cause must be found and remedied before the machine can be taken into normal use.

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.

NOISE - Excessive noise can damage hearing
- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risk.

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

The ***MKR 300*** column and boom belongs to ESAB's standard range of equipment. It is designed for carrying automatic welding equipment.

Note!

- The column and boom unit is intended ONLY for indoor mounting.
- The column and boom may only be used for welding with equipment it is designed for.
- It must not be used as gantry or for moving items about, and
- it must not be used for lifting people (no-one may ride on the column and boom during operation).

The column and boom may be supported on a stationary base or on a rail-mounted carriage. The column is capable of rotating through ±360°.

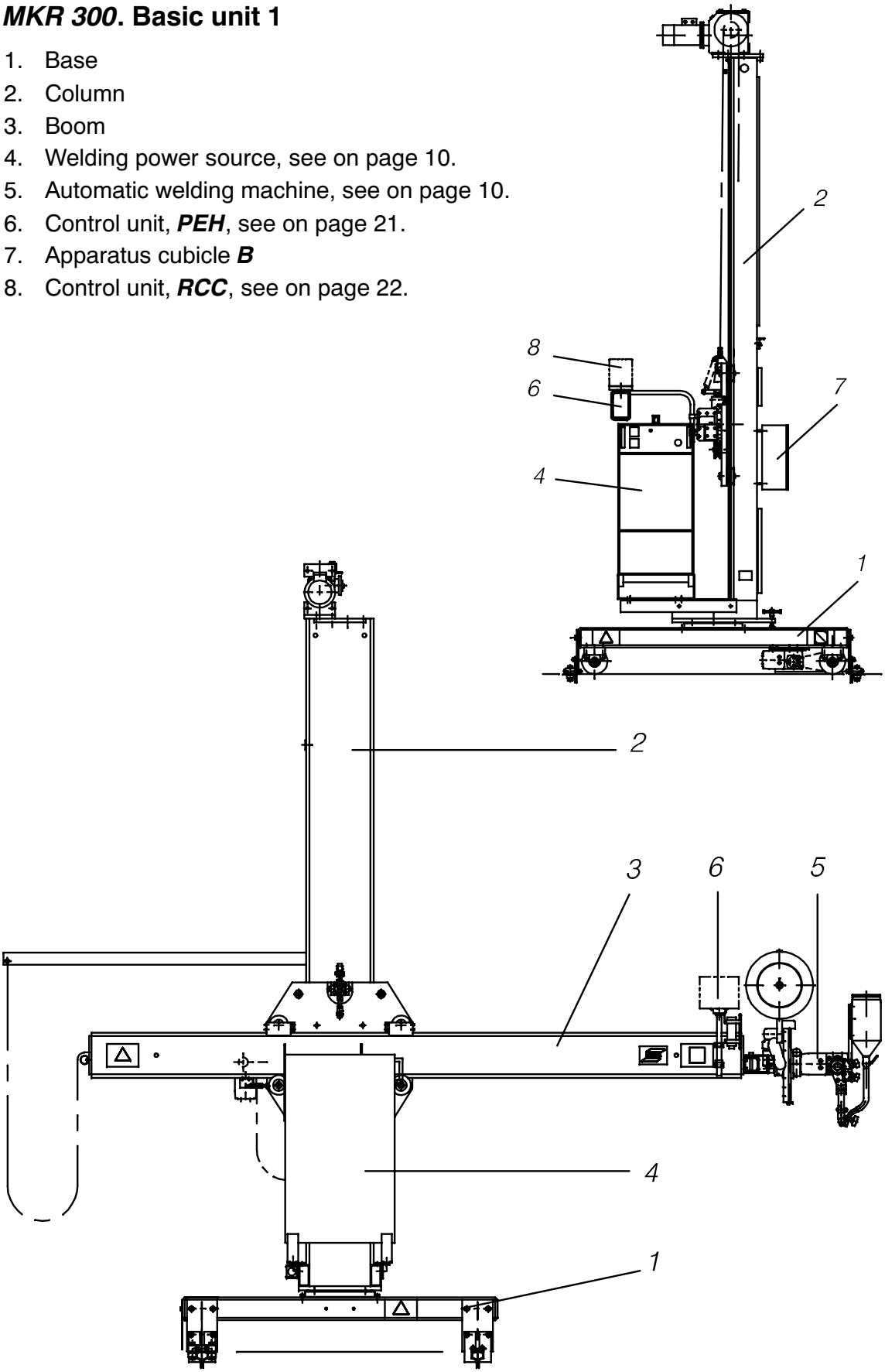
The track is fixed at 1730 mm.

Working ranges are shown in the table below.

Column & Boom Size (m)	Stationary column & boom Part No.	Rail-borne column & boom Part No.
MKR 300 3x3	0443 227 910	0443 222 910
MKR 300 4x4	0443 227 911	0443 222 911
MKR 300 5x5	0443 227 912	0443 222 912

MKR 300. Basic unit 1

1. Base
2. Column
3. Boom
4. Welding power source, see on page 10.
5. Automatic welding machine, see on page 10.
6. Control unit, ***PEH***, see on page 21.
7. Apparatus cubicle ***B***
8. Control unit, ***RCC***, see on page 22.



Main modules

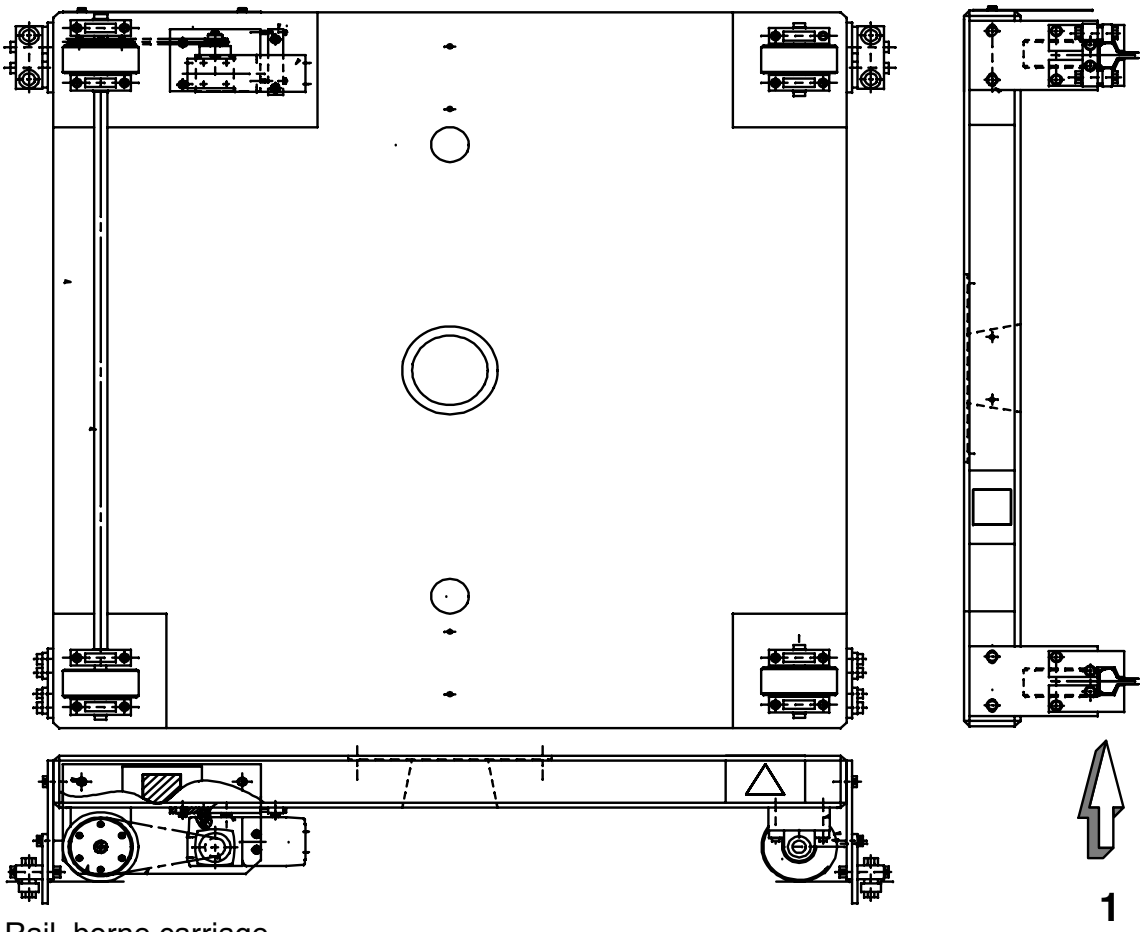
Rail-borne carriage

The carriage is equipped with four single flange wheels and two-wheel drive. Welding speed of the carriage is steplessly variable over the range of 10-200 cm/min, while transport speed is 2.0 m/min.

The standard track gauge is 1730 mm.

An anti-tip device (1) is fitted at each corner of the carriage.

Flanged wheels and the anti-tip devices are intended for use with Type SJ 50 rails. Other types of rails can be used, which may require the anti-tip devices to be adjusted to suit them.



Rail-borne carriage

Tippskydd

Types of rails	Anti-tipping device Part No.
SJ50	0379 233 880
A45	0803 640 880
A55	0379 235 880
A65	0379 234 880

Column

The column is available in tree different standard heights, see the following tables of column versions.

The column is fitted to the base by means of a slew bearing which allows it to be rotated to any required position. Rotation is limited to 360° (in the form of 180° in each direction) by means of a mechanical stop.

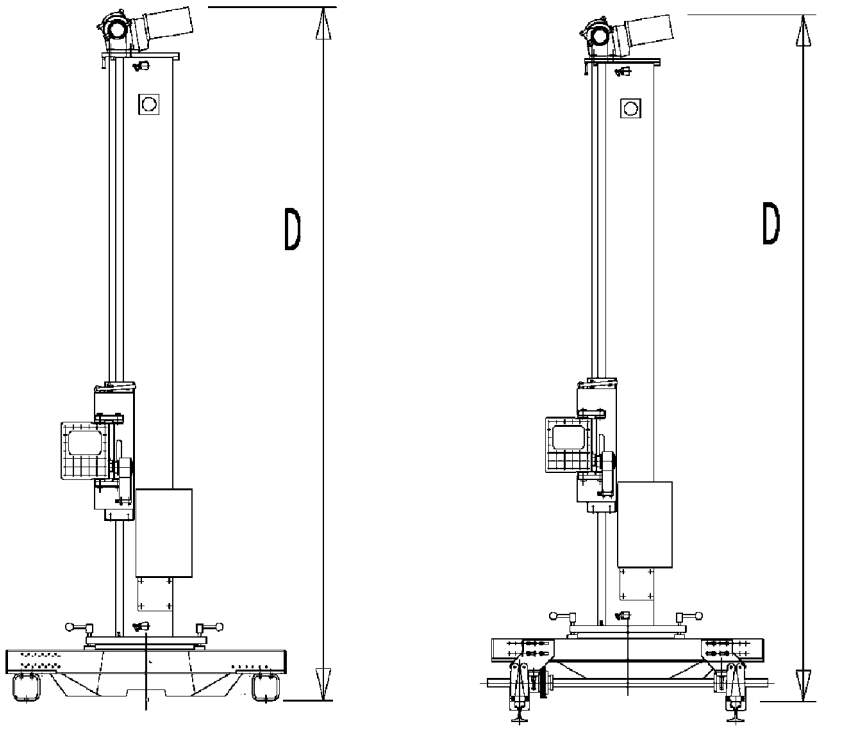
The standard design column is rotated and locked in position manually.

A cross-head (the drive saddle) is fitted to the column, and can be positioned at any height required. The saddle is located by means of four rollers, running on guide bars on the side of the column.

The saddle is raised and lowered by a hoist drive fitted to the top of the column.

The drive unit consists of a three-phase motor with integral brake and reduction worm gear. The use of a worm gear means that the drive fails safe in the event of power failure. Two chains support the saddle, and are connected at the other end to a counterweight inside the column. A plunge guard locks the saddle in position in the event of failure of the chains.

Column with manual column rotation and locking lever			
Part No.	**Column designation**	**Total height ”D” (mm) Stationary base**	**Total height ”D” (mm) Rail-borne carriage**
443 224 880	3,0	4850	5170
443 224 882	4,0	5850	6170
443 224 884	5,0	6850	7170



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Boom

Booms are available in tree different standard lengths, see the following table of boom versions.

The boom is supported by the saddle, and positioned vertically by the hoist drive unit on the top of the column.

The boom can also be positioned horizontally by means of a drive motor and rack. The welding and transport speed is the same as for the rail-borne carriage.

The boom can be fitted with welding machines for different types of welding methods.

Part No.	Boom designation	Total length (mm)	Weight, Kg
443 260 882	3,0	4250	204
443 260 884	4,0	5250	292
443 260 886	5,0	6250	346

Welding equipment

The ***MKR 300*** column and boom unit can be fitted with welding machines for different types of welding methods.

Welding equipment for submerged arc welding:

- Type A2 or A6 welding machines in submerged arc welding versions.
- Type ***OPC***, ***FFRC*** or ***FFRB*** flux handling equipment.

See separate instructions for more detailed descriptions.

Welding equipment for gas metal arc welding

- Type A2 or A6 welding machines, intended for MIG/MAG welding.
- Type ***OCE2*** cooling unit and ESAB standard gas accessories.

See separate instructions for more detailed descriptions.

Welding power source

A power source can be supplied with the column and boom welding unit, together with a platform for fitting it to the column.

The following welding power units are available as standard:

- ***LAF***

See separate instructions for more detailed descriptions.

Electrical equipment

The basic version of the ***MKR 300*** Column and Boom unit is supplied with the following electrical equipment:

- Control cabinet ***B***, for power connections and electrical functions. The cabinet must be mounted on the lower section of the column and boom. All connections on the inside of the control cabinet must be made by a qualified electrician.
- Control unit ***RCC***, for controlling the welding cycle and column and boom travel, portable remote control unit.
- Control unit ***PEH***, which is part of the automatic welding machine and is used to control welding cycle and column and boom travel.
- Cables for connecting electrical components of column and boom.

See also separate operator manuals.

MKR 300 provides the following functions:

- Operating check
- Vertical positioning of boom
- Travel, boom or rail-mounted carriage
- Positioning, boom or rail-mounted carriage
- Start and stop of welding
- Wire feed
- Emergency stop

TECHNICAL DATA

Mains supply:	50 Hz, 16A, 230 V 50 Hz, 10A, 400 V unless otherwise specified.
Compressed air supply:	6 bar
Continuous A-weighted noise pressure:	52 dB

Drive functions:

	Drive unit	**Speed**	**Transmission**	**Final gear ratio**
Carriage	DC motor 312:1	Welding 15-200 cm/min Travel 2 m/min	Chain	1006:1
Boom, horizontally	DC motor 312:1	Welding 15-200 cm/min Travel 2 m/min	Rack	312:1
Boom, vertically	3-phase motor with worm gear	Travel min 0,7 m/min	Chain	453:1
Column rotation	Manual			

See separate description for further details of the ***A6 VEC*** drive motor.

Load capacity

Stationary and rail-mounted base

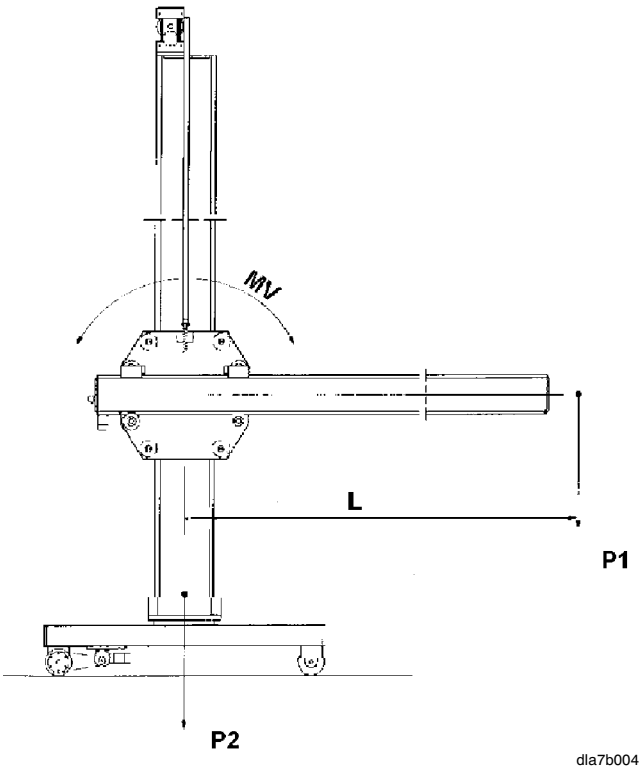
Mv = maximum permissible torque on boom

P1 = maximum permissible load on boom and support

P2 = maximum permissible load at tip of boom

A Working range (m)	L (m)	Mv max (Nm)	P1 max (N)	P2 max (N)
3,0	3,9	7670	2000	6000*
4,0	4,9	7670	1550	6000*
5,0	5,9	7670	1300	6000*

* max. permissible load on base in addition to weight of column and boom.



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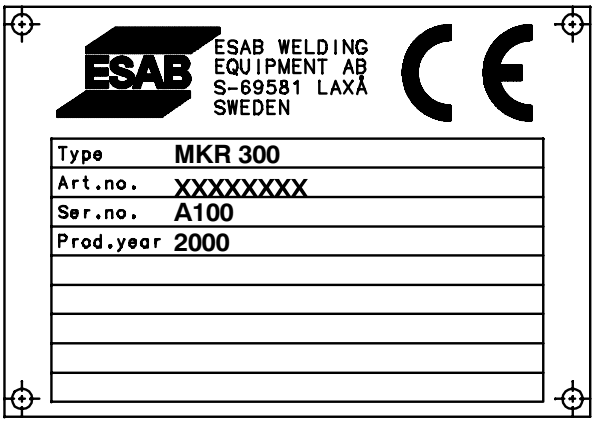
Signs on the equipment

Rating plate



Read Operator's Manual

This safety sign is placed on the cover of the vertical slide.

- Read Operator's Manual for the A6 Slide.

Load capacity

This sign is placed on the front end of the boom.

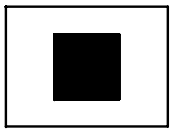
- The column and boom may only be used for welding with equipment it is designed for.
- It must not be used as gantry or for moving items about.

Front sign

This safety sign is placed on front of the boom.

Rear sign

This safety sign is placed on back of the boom.



Electrical shock hazards

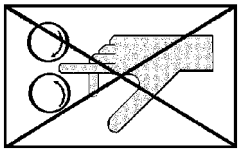
This safety sign is placed on the apparatus cubicle

Rotating parts

This sign is placed on the feed unit.

WARNING!

Rotating parts can cause injury, take great care.



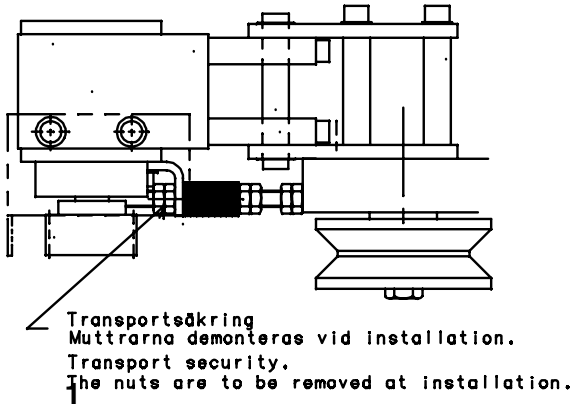
INSTALLATION

- **NOTE!** Installation must be carried out by personel from ESAB or by pesonnel authorised by ESAB.

General safety regulations for the handling of the equipment appear from page 3. Read through before you start using the equipment!

Transport security

- Remove the nuts at installation.



Customer's cable connection:

Demand for disconnection of power plants

All machines must be fitted with a device for putting all power plants out of circuit. The device must be clearly marked out. It must be possible to lock the disconnection device if reconnection could involve danger to exposed persons.

- It must also be possible to lock the disconnection device to safeguard the operator's work when it is impossible for him to check that the power supply is still cut out.
- When the power supply is cut out it must be possible in a normal way to discharge any energy remaining or stored in the circuits of the machinery without risk to exposed persons.

Assembly Instructions for chain protection

VERY IMPORTANT!

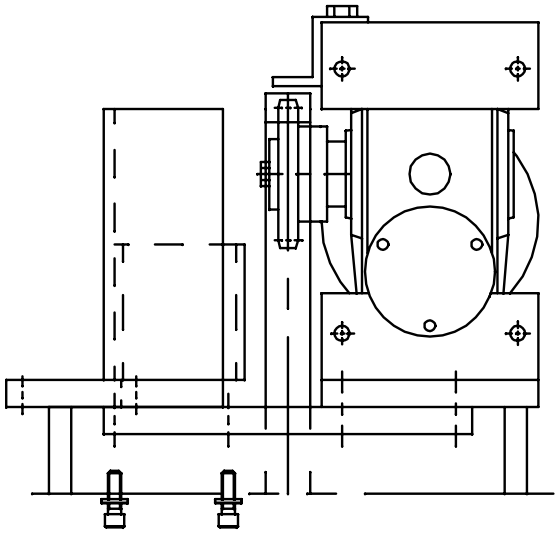
This part is a safety device which has to be mounted on the top of the column according to the attached instruction. It will protect from free fall in case of breakdown of the lifting device.

⚠

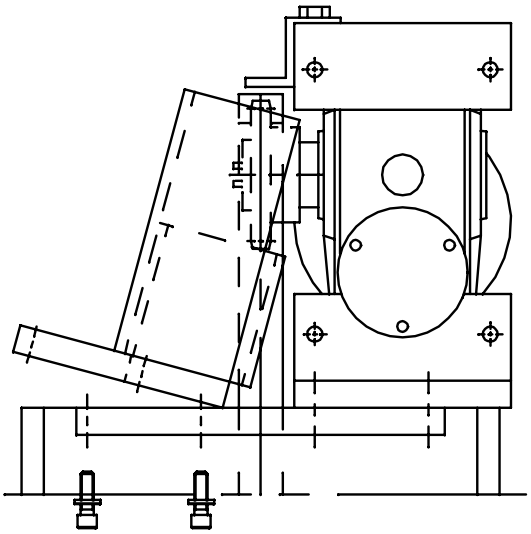
The actual safety regulations must absolutely be followed when measures with regard to the maintenance are taken!

General safety regulations for the handling of the equipment appear from page 3. Read through before you start using the equipment!

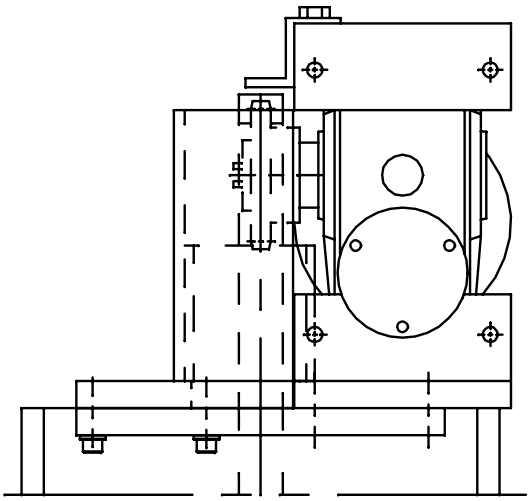
1. Run the boom to lower center position.
2. Switch off the power supply and remove the key, if any, before installation of the chain protection.
   - Set the main selector for column and boom unit switch to position ***OFF.***
3. Disconnect the welding station column***.***
4. Disconnect compressed air.
5. Place the chain protection beside hoisting machinery.



6. The chain protection has to be tilted to pass under the chain wheel.



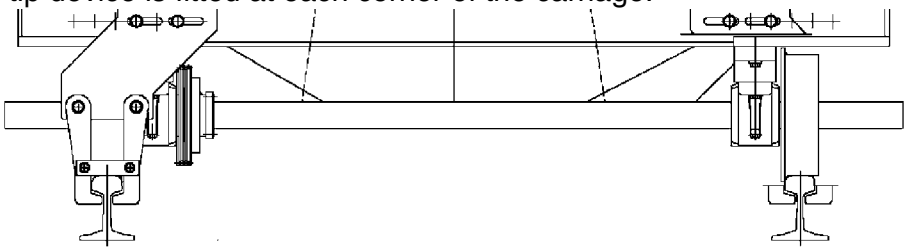
7. Fasten the chain protection properly with four screws.



8. Switch on the power supply.
9. Connect compressed air.

Rail-borne carriage

1. An anti-tip device is fitted at each corner of the carriage.

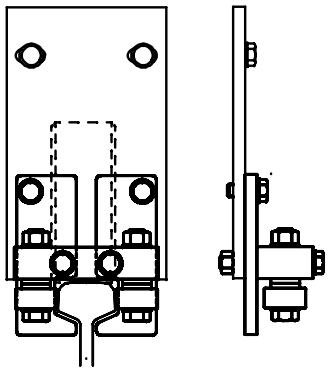


- Mount the anti-tip devices centered on the rails.

Other types of rails can be used, which may require the anti-tip devices to be adjusted to suit them.

Important!
The rail gauge is set at the factory, and should not be altered unless special instructions are available.

2. The carriage is held parallel to the rails by means of four guide rollers. These are located in pairs by the wheels on the opposite side to the drive motor.
   - Mount the guide rollers teight against the rail.



OPERATION

⚠ It is not allowed to be inside the working area during operation, see dimension drawing.

General safety regulations for the handling of the equipment appear from page 3. Read through before you start using the equipment!

The welding column and boom unit is operated from:

1. The portable control box ***RCC***
2. The ***PEH*** control unit

Emergency stop

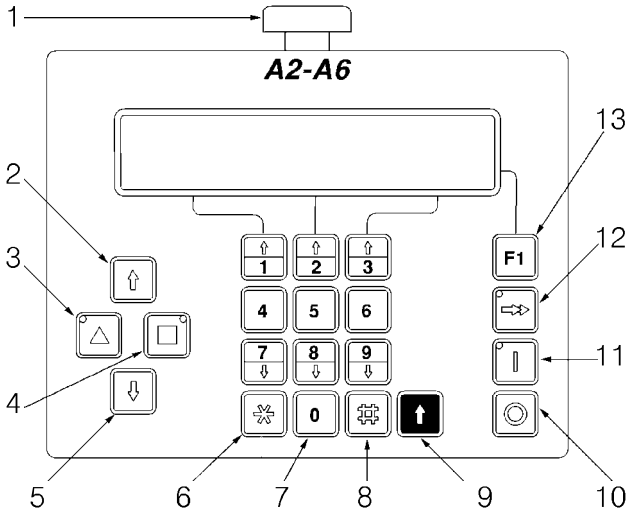
The Emergency stops are located on:

1. The control box ***RCC***
2. The ***PEH*** control unit
   - Reset the emergency stop by pulling out the push button.

Starting

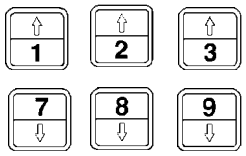
- Turn on the main switch on the welding power source.

PEH control unit



1. Emergency stop
2. Retract wire
3. Travel
4. Travel, opposite direction
5. Advance wire
6. Change menu
7. Numerical key, number entry
8. ENTER key, Change row
9. SHIFT key
10. Stop welding.
    Return to manual mode
11. Start welding. Switch to automatic mode
12. Fast, wire feed or travel
13. Scroll page (welding setup menu) or close valve (main menu)

The arrowed keys are used during welding to increase or decrease the current, voltage and speed.



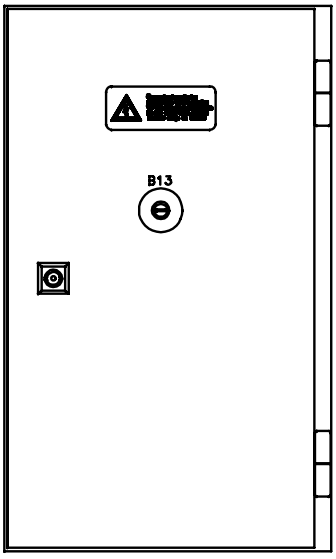
By pressing either , , + or + it is possible to browse.

For further instructions see instruction manual for ***PEH*** control unit.

Apparatus cubicle *B*

Apparatus cubicle ***B*** is the central cubicle of the welding station for integration of all control functions of the welding column and boom unit and the welding equipment.

B13 Emergency stop push-button

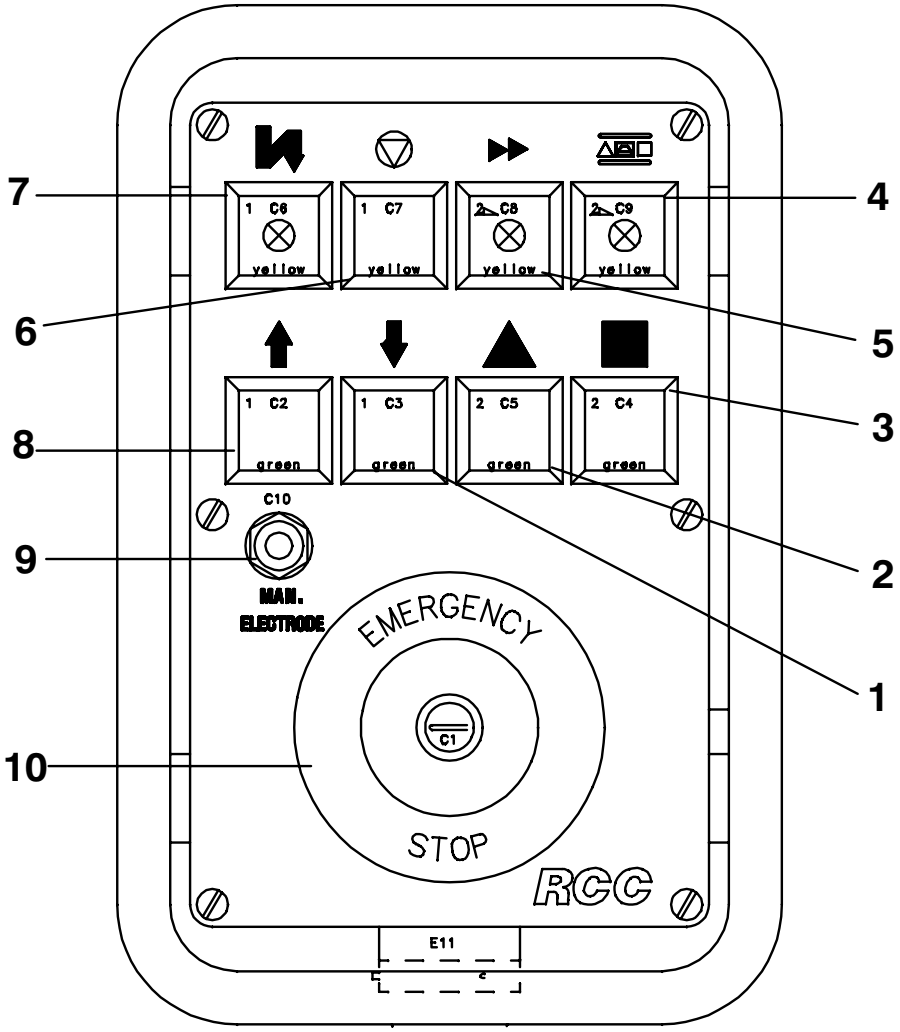


Control unit *RCC*

The ***RCC*** control unit has the following controls and indicating lights:

1. All travel and welding commands are normally sent to the boom.
   - To send travel or welding commands to the rail- mounted carriage press key ***4*** (yellow).
2. Emergency stop
   - Key ***10*** (red)

   Stops all units and welding travel.



Coarse positioning

1. Positioning, boom up,
   - Press key ***8*** (green).
2. Positioning, boom down.
   - Press key ***1*** (green).

3. For coarse positioning of the column and boom or travel forwards
   - Press key ▲ ***2*** (green).
4. Travel backwards
   - Press key ■ ***3*** (green).
5. Travel speed 2 m/min, see quick positioning, press key ▶▶ ***5***, applies to right and left.

Quick positioning

1. Key ▶▶ ***5*** (yellow), increases the travel speed to 2 m/min when
   - pressed in combination with travel keys ▲ and ■ .

Welding

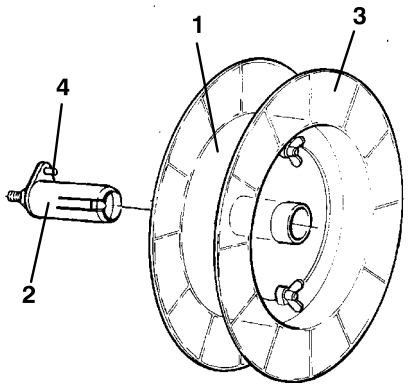
- The speed and travel direction are controlled over the ***PEH*** control unit.
- ***NOTE!***
  Open the flux valve before starting to weld.
- ***NOTE!***
  The position of the welding head can be finely adjusted using the cross-slide on the automatic welding machine.

1. Manual wire feed
   - Switch ***9***, forward / reverse.
2. Start welding
   - Key ***7*** (yellow).
3. Stop welding
   - Key ***6*** (yellow).

Before welding

1. Select wire type and flux powder or shielding gas so that the weld material is as close as possible to the analysis of the base metal. Select wire size and welding data in accordance with the values recommended by the welding materials supplier.
2. Careful joint preparation is essential for good welding results.
   NOTE! The gap in the weld joint must be uniform.
3. To minimize the risk of hot cracking the width of the weld should be larger than the penetration.
4. Always weld a test piece with the same joint preparation and plate thickness as the intended production piece.
   NOTE! NEVER make a trial weld on a production work piece.
5. Check that hose for compressed air is connected to the flux recovery unit
6. Turn on the main switch on the welding power source.
7. Activate the electrical control system, apparatus cubicle ***B.***
8. Load the unit with wire and flux.

Loading of wire

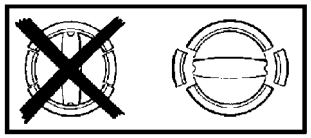


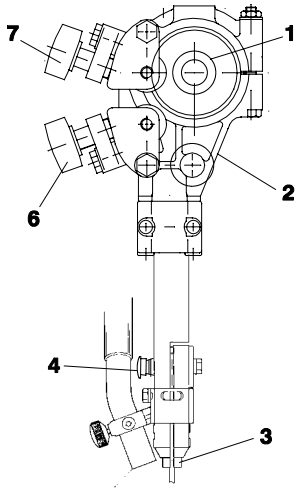
1. Remove the wire drum (1) from the brake hub (2) and take off the side plate (3).
2. Locate the wire reel on the wire drum (1).
3. Cut off the binding wires from around the wire reel.
4. Replace the side plate (3).
5. Replace the wire drum (1) on the brake hub (2). Check that the carrier (4) is in the correct position.

   NOTE! The maximum angle for the wire bobbin is 25°.
   At extreme angles, wear will occur on the brake hub locking mechanism and the wire bobbin will slide off the brake hub brake.

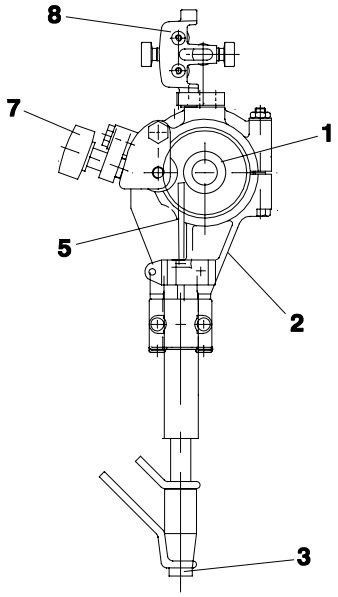
IMPORTANT!

To prevent the reel sliding off the hub: Lock the reel in place by turning the red knob as shown on the warning label attached next to the hub.





SAW



MIG/MAG

6. Check that the feed roller (1) and contact jaw or contact tip (3) are of the correct dimension for the selected wire size.
7. Set the wire tension on the feed roller with the knob (7). ***Note!*** Do not tension more than is required to achieve an even feed. The sprung knob (7) must not be tightened down hard; some spring movement must remain.
8. Feed the wire to the welding heads using the switch.
9. Cut off the tip of the wire on the skew before starting to weld.

Flux handling

- **NOTE!**
  The flux must be dry. If possible, avoid using agglomerated flux outdoors or in humid environment.
- Adjust the height of the flux nozzle above the weld to give the correct amount of flux. The flux cover should be thick enough to prevent arc penetration.

MAINTENANCE

General

The actual safety regulations must absolutely be followed when measures with regard to the maintenance are taken!

General safety regulations for the handling of the equipment appear from page 3. Read through before you start using the equipment!

Power supply

- Switch off the power supply and remove the key, if any, before periodical maintenance or any kind of repair.

Read the instruction manuals for the componets included in the equipment!

Transportation of column and boom

- Dismount the equipment

Note!
If you want to lift the column and boom

- Contact ESAB's representative, see last page.

Ordering of spare parts

Spare parts are to be ordered through your nearest ESAB agency as per the list on the back of the cover. Kindly indicate type of unit, serial number, denominations, and ordering numbers acc. to the spare parts list.

Column and Boom *MKR 300*

CARRIAGE

Pillow block housing	Grease using type 2 grease for the housing and type 3 for the bearing, once a year or every 2000 hours.
Chain and sprocket	SAE 30 oil, clean and lubricate as required.
Drive unit	Maintenance-free gears. Motor with sealed bearings. Brush life approx. 2000 hours.
Guide roller	Grease once a year with type 3 grease.

COLUMN

Gear, lift motor	Sealed with synthetic oil type 4.
Chain sprocket	See roller chains.
Roller chains	Clean as necessary, lubricate with type 1.
Brake	Clean as necessary, lubricate with type 1.
Tracks	Clean as necessary.

BALL TRACK

Track	Type 2 grease or equivalent twice a year.

BOOM

Rack and pinion	Mobiltac oil or equivalent, clean and lubricate as necessary.
Tracks	Clean as necessary.

DRIVE SADDLE

All rollers	Clean tracks as necessary.
Safety brake	Lubricate with type 1 or 2 twice a year. Make sure brake pad is free to move on the shaft.
Drive unit	Maintenance-free gears. Motor with sealed bearings. Brush life approx. 2000 hours.

Regulary:

- Check the brake of the hoist drive motor. For necessary adjustments contact a service-shop authorised by ESAB.

LUBRICANTS

Type 1	ESSO Spartan 150 BP Energol GR 190-XP MOBIL Mobilgear 629 SHELL Omala oil 69 TEXACO Meropa 150
Type 2	ESSO Beacon 2 BP Grease XRB2EP MOBIL Mobillux Grease 2 or Mobilplex 47 SHELL EP Grease 1128 TEXACO Regal AF8 Grease 2
Type 3	Lithium-based grease NLGI 3 Viscosity 74 NmS/m2
Type 4	BP Energol SGXP 220 MOBIL Glygoyle 30 SHELL Tivela oil WB

Daily

- Clean the machine of dust and slag.
- Inspect all cables.
- Check all electrical connections
- Check that all bolted joints are tight.
- Empty the slag filter in the flux recovery unit.

Emergency stop

⚠ ***The function of all emergency and safety devices is to be checked daily, as well as after any work has been carried out on the machine.***

In the event of any abnormal function or signal, the underlying cause must be found and remedied before the machine can be taken into normal use.

1. Press the emergency stop button.
2. Make sure that the emergency stops will interrupt all dangerous functions.
3. Reset the emergency stop.

Interval - 1 month

Pneumatic system

1. Inspect tubes and hoses, valves and cylinders with regard to leaks.

Welding cables

1. Check that the insulating covering of the cables is undamaged as well as the cable lugs.
2. Check that the welding cables and their connections are undamaged and have not been exposed to too high temperature.

Limit switches

1. Inspect the limit switches with regard to mechanical damage on switch, actuator and cable connection.

Interval - 6 months

Relay

1. Inspect visually that the relays are not burnt. If so, the plastic cap of the relay is black.

Interval - Every year

Instruments

All instruments have been inspected and adjusted before delivery from ESAB AB.

Tolerances according to IEC 974.

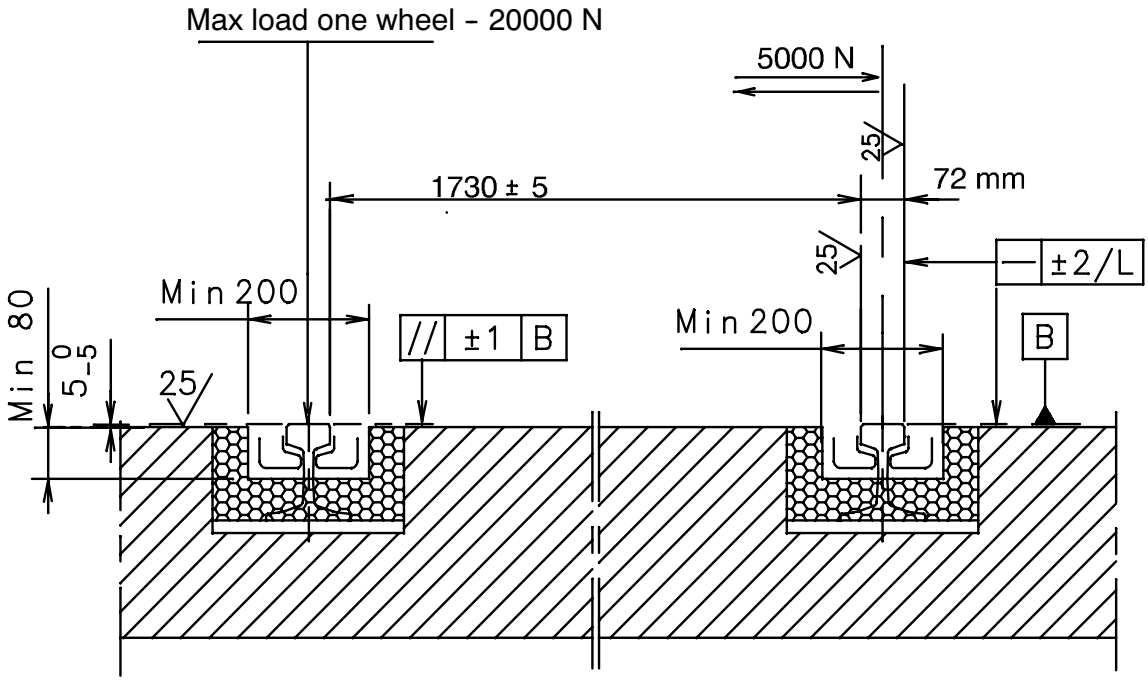
- Inspect and adjust the instruments.

The scope of the inspection is determined by the assignment of the equipment and other requirements, if any.

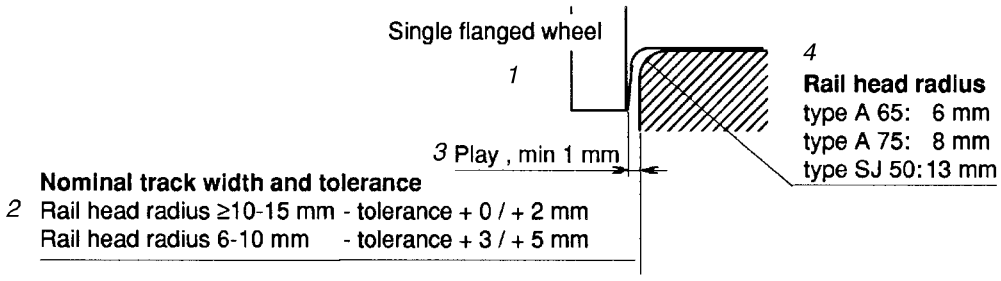
Foundation

Railborne carriage

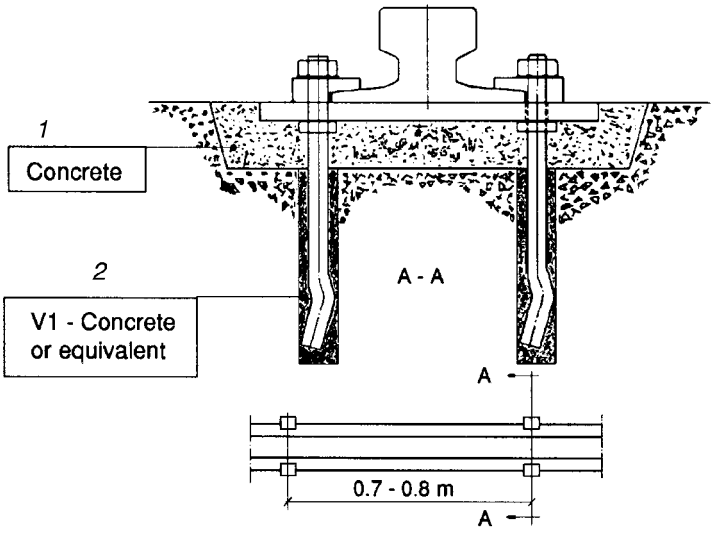
Track width 1730 mm



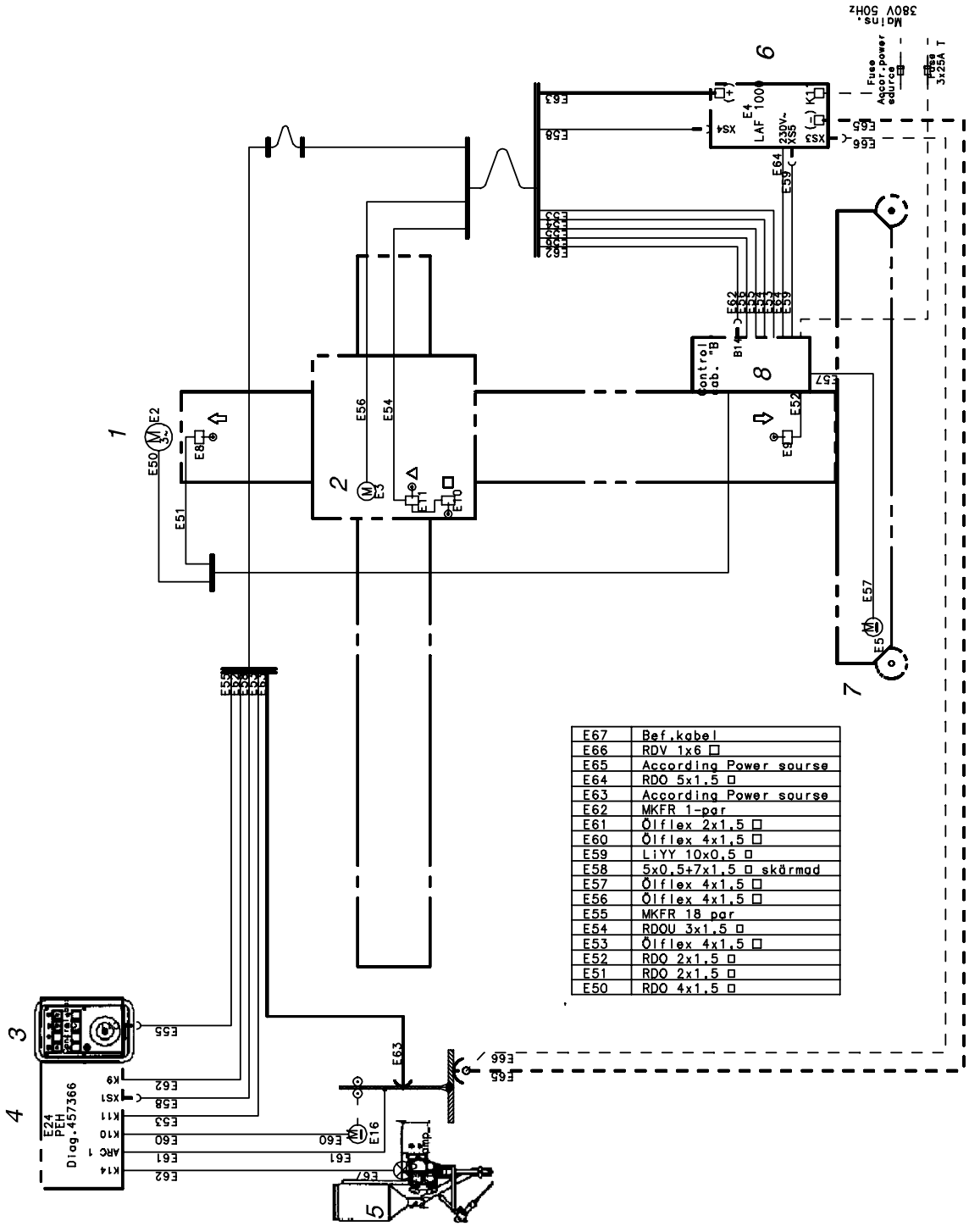
Rail type and track width tolerances for single flanged wheels



Rail clamps with bolts



SCHEMATIC DRAWING



E67	Bef.kabel
E66	RDV 1x6 □
E65	According Power sourse
E64	RDO 5x1.5 □
E63	According Power sourse
E62	MKFR 1-par
E61	Ölflex 2x1.5 □
E60	Ölflex 4x1.5 □
E59	LiYY 10x0.5 □
E58	5x0.5+7x1.5 □ skärmad
E57	Ölflex 4x1.5 □
E56	Ölflex 4x1.5 □
E55	MKFR 18 par
E54	RDOU 3x1.5 □
E53	Ölflex 4x1.5 □
E52	RDO 2x1.5 □
E51	RDO 2x1.5 □
E50	RDO 4x1.5 □

E50 Motor cable
E56 Motor cable
E55 Control cable
E51 Control cable
E53 Control cable
E54 Control cable
E58 Control cable
E59 Control cable
E57 Motor cable
E60 Motor cable
E61 Control cable
E62 Control cable
E64 Control cable
E63 RDV 6x1 Shunt
E65 Welding cable
E66 Return cable

1 Lift motor
2 Boom travel motor
3 Control unit ***RCC***
4 Control unit ***PEH***
5 Automatic welding machine
6 Welding power source
7 Carriage motor
8 Control cabinet ***B***

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