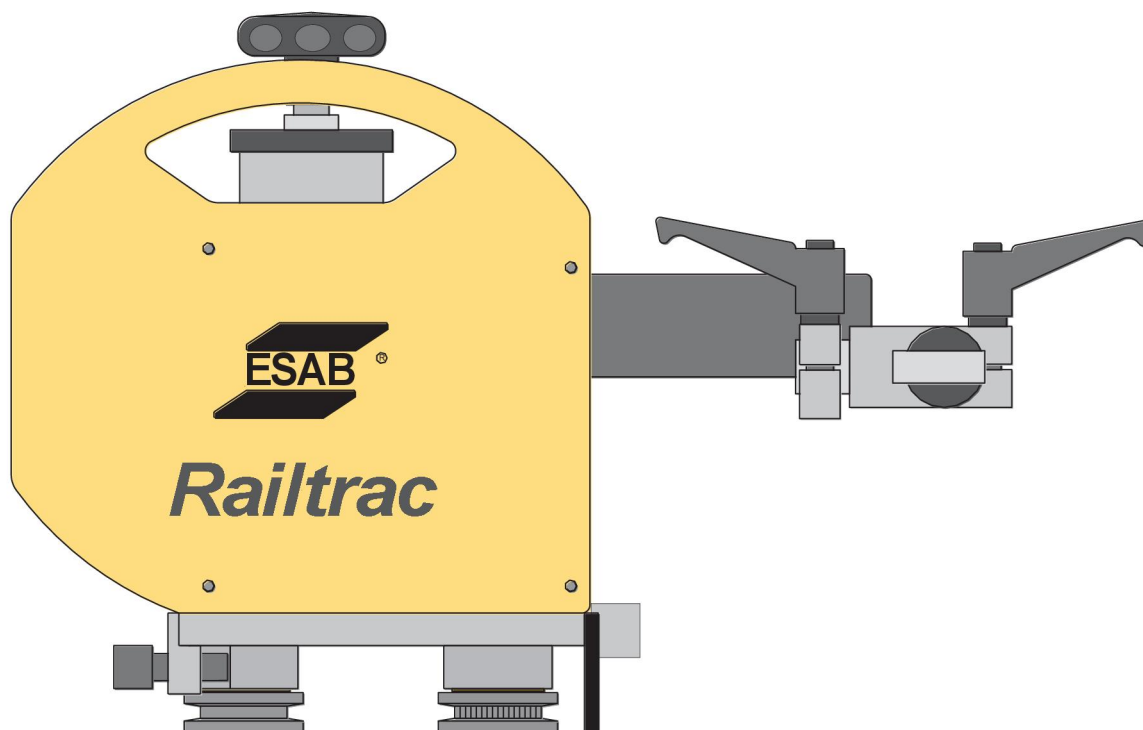




Railtrac™ BV2000



Instruction manual



EU DECLARATION OF CONFORMITY

According to
The Machinery Directive 2006/42/EU, entering into force 29 December 2009
The EMC Directive 2014/30/EU, entering into force 20 April 2016
The RoHS Directive 2011/65/EU, entering into force 2 January 2013

Type of equipment

Welding carriage

Type designation

Railtrac B42V,

Serial number: 1634 xxxx

Railtrac BV2000,

Serial number: 1801 xxxx

Brand name or trademark

ESAB

Manufacturer or his authorised representative established within the EEA**Name, address, and telephone No:**

ESAB AB

Lindholmsallén 9, Box 8004, SE-402 77 Göteborg, Sweden

Phone: +46 31 50 90 00, www.esab.com

The following harmonised standard in force within the EEA has been used in the design:

EN 12100:2010, Safety of machinery - General principles for design. Risk assessment and risk reduction
EN 60974-10:2014 Arc welding equipment. Part 10: Electromagnetic compatibility (EMC) requirements
EN 61000-6-2:2005/AC:2005 Electromagnetic compatibility (EMC). Part 6-2: Generic standards. Immunity for industrial environments.
EN 61000-6-4:2007/A1:2011 Electromagnetic compatibility (EMC). Part 6-4: Generic standards. Emission standard for industrial environments.

Additional Information:

Restrictive use, Class A equipment, intended for use in location other than residential

By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative established within the EEA, that the equipment in question complies with the safety requirements stated above.

Date

Signature

Position

Gothenburg

2018-10-15

Edward Hansen

Global Director, Flexible Automation

CE 2018

TABLE OF CONTENTS

1	SAFETY	4
1.1	Meaning of symbols	4
1.2	Safety precautions	4
2	INTRODUCTION	7
3	TECHNICAL DATA	11
4	INSTALLATION	12
5	OPERATION	14
5.1	Electronic – Carriage	14
5.2	Programs	16
5.3	Remote control	17
5.3.1	Remote control functions	17
5.4	Preheat	18
5.5	Remote control for digital wire feeder	19
5.6	Installation of wire feeder	19
6	MAINTENANCE	20
7	ORDERING SPARE PARTS	21
	DIAGRAM	22
	ORDERING NUMBERS	23
	ACCESSORIES	24

1 SAFETY

1.1 Meaning of symbols

As used throughout this manual: Means Attention! Be Alert!

**DANGER!**

Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.

**WARNING!**

Means potential hazards which could result in personal injury or loss of life.

**CAUTION!**

Means hazards which could result in minor personal injury.

**WARNING!**

Before use, read and understand the instruction manual and follow all labels, employer's safety practices and Safety Data Sheets (SDSs).



1.2 Safety precautions

Users of ESAB equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of equipment. The following recommendations should be observed in addition to the standard regulations that apply to the workplace.

All work must be carried out by trained personnel well-acquainted with the operation of the equipment. Incorrect operation of the equipment may lead to hazardous situations which can result in injury to the operator and damage to the equipment.

1. Anyone who uses the equipment must be familiar with:
 - its operation
 - location of emergency stops
 - its function
 - relevant safety precautions
 - welding and cutting or other applicable operation of the equipment
2. The operator must ensure that:
 - no unauthorised person is stationed within the working area of the equipment when it is started up
 - no-one is unprotected when the arc is struck or work is started with the equipment
3. The workplace must:
 - be suitable for the purpose
 - be free from drafts

4. Personal safety equipment:
 - Always wear recommended personal safety equipment, such as safety glasses, flame-proof clothing, safety gloves
 - Do not wear loose-fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns
5. General precautions:
 - Make sure the return cable is connected securely
 - Work on high voltage equipment **may only be carried out by a qualified electrician**
 - Appropriate fire extinguishing equipment must be clearly marked and close at hand
 - Lubrication and maintenance must **not** be carried out on the equipment during operation

**WARNING!**

Arc welding and cutting can be injurious to yourself and others. Take precautions when welding and cutting.

**ELECTRIC SHOCK - Can kill**

- Install and ground the unit in accordance with instruction manual.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from work and ground.
- Ensure your working position is safe

**ELECTRIC AND MAGNETIC FIELDS - Can be dangerous to health**

- Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.
- Exposure to EMF may have other health effects which are unknown.
- Welders should use the following procedures to minimize exposure to EMF:
 - Route the electrode and work cables together on the same side of your body. Secure them with tape when possible. Do not place your body between the torch and work cables. Never coil the torch or work cable around your body. Keep welding power source and cables as far away from your body as possible.
 - Connect the work cable to the workpiece as close as possible to the area being welded.

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

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to take fumes and gases away 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.

**NOISE - Excessive noise can damage hearing**

Protect your ears. Use earmuffs or other hearing protection.

MOVING PARTS - Can cause injuries



- Keep all doors, panels and covers closed and securely in place. Have only qualified people remove covers for maintenance and troubleshooting as necessary. Reinstall panels or covers and close doors when service is finished and before starting engine.



- Stop engine before installing or connecting unit.
- Keep hands, hair, loose clothing and tools away from moving parts.

FIRE HAZARD



- Sparks (spatter) can cause fire. Make sure that there are no inflammable materials nearby.
- Do not use on closed containers.

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

PROTECT YOURSELF AND OTHERS!



CAUTION!

This product is solely intended for arc welding.



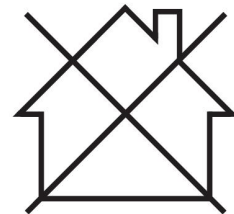
WARNING!

Do not use the power source for thawing frozen pipes.



CAUTION!

Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility of class A equipment in those locations, due to conducted as well as radiated disturbances.



NOTE!

Dispose of electronic equipment at the recycling facility!

In observance of European Directive 2012/19/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical and/or electronic equipment that has reached the end of its life must be disposed of at a recycling facility.

As the person responsible for the equipment, it is your responsibility to obtain information on approved collection stations.

For further information contact the nearest ESAB dealer.



ESAB has an assortment of welding accessories and personal protection equipment for purchase. For ordering information contact your local ESAB dealer or visit us on our website.

2 INTRODUCTION

Railtrac™ BV2000 is a system of components that can be configured to create the optimal solution for a mechanized welding application. Railtrac™ BV2000 is designed for horizontal use and it covers most proven and globally applied welding patterns for repair of rail and rail components in all steel types and casting grades. To minimise problems associated with harsh environments, most mechanical parts are constructed in aluminum and stainless steel.

Equipment

The welding tractor Railtrac™ BV2000 is supplied with:

- Remote control
- Slides and torch holder
- 1x 2 m rail BV2000
- 2x Rail Bracket
- 2x Alignment brackets
- Storage box

Features Railtrac™ BV2000

- 42 V AC or battery driven with standard Makita® 18 V system.
- High speed and low speed in one unit.
- Micro process controlled electronics package in a single onboard housing.
- Stepper motor both for drive and weaving function.
- Only one cable to the wire feeder (not needed if using the battery) and one cable to the remote control (if used) but can be run without any remote control.
- The unit can be programmed and run directly from the controls on the Railtrac™ BV2000 if the remote control is lost-damaged or not preferred.
- Dual high-visibility screens for easy viewing in any orientation.
- The remote control is programmable for weave patterns and travel speed and is capable of controlling voltage and wire feed speed in up to 6 standard programs.
- IP44 environmental rating on both the Railtrac™ and the remote control.
- Choose between welding on left side or right side for remote control to correspond to carriage movement.

Direct connection to all new modern ESAB wire feeders

Railtrac™ BV2000 can be easily connected to most ESAB wire feeders with no major modification. Remote adapters have to be mounted in wire feeders (Aristo® Feed 3004, Aristo® Feed 4804, Origo™ Feed 304, Origo™ Feed 484 and Warrior™ Feed 304).

Six programs can easily be stored

As many as six different programs can be stored. Each program is individual and can be retrieved from the control on the main unit or the remote control.

Remote control of welding parameters and immediate program shift

Both welding current (wire-feed speed) and voltage can be adjusted (in %) during welding. Stepping up or down between the alternative motion programs is also easy, depending on welding position.

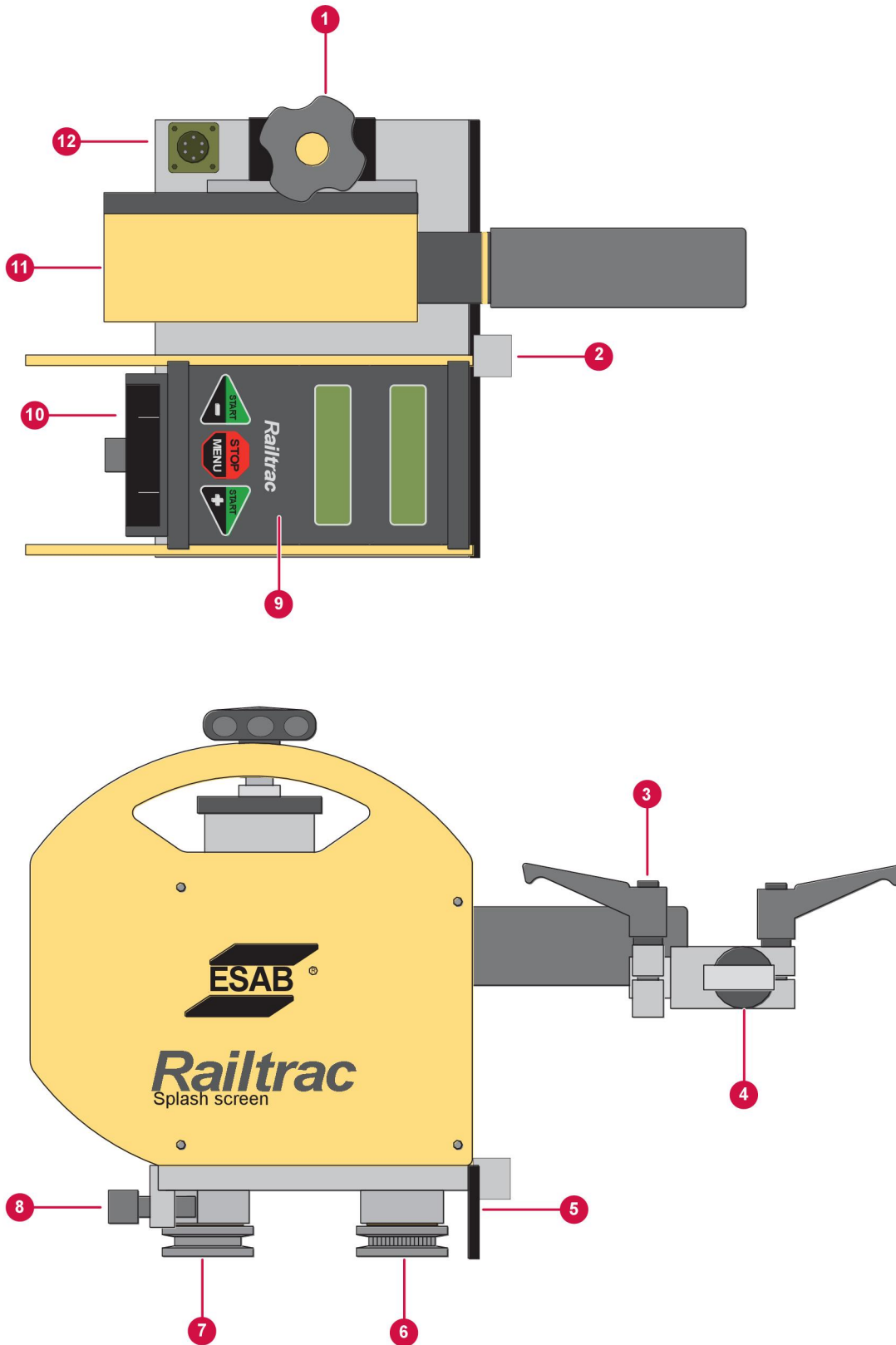
Resilient programming units with great potential

Straightforward, logically-designed programming units are used to set the values for six different programs. All speeds are calibrated in millimetre (mm), for the greatest possible precision and welding quality.

Remote control for the harshest environments

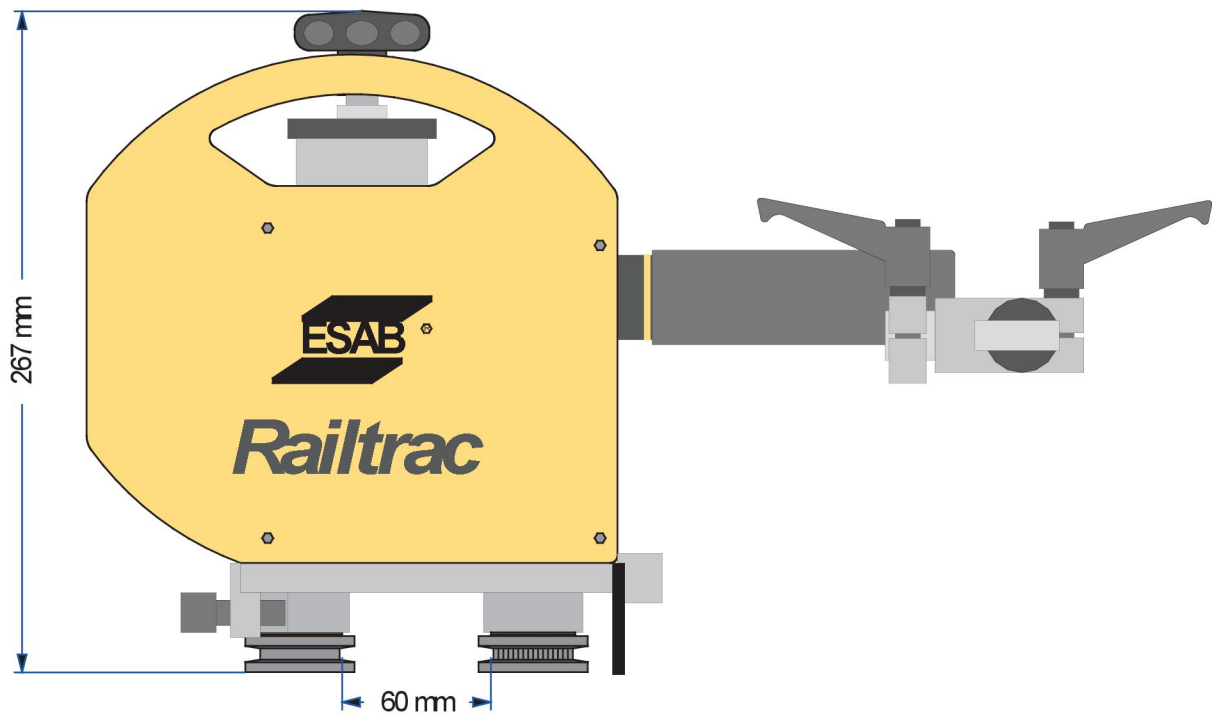
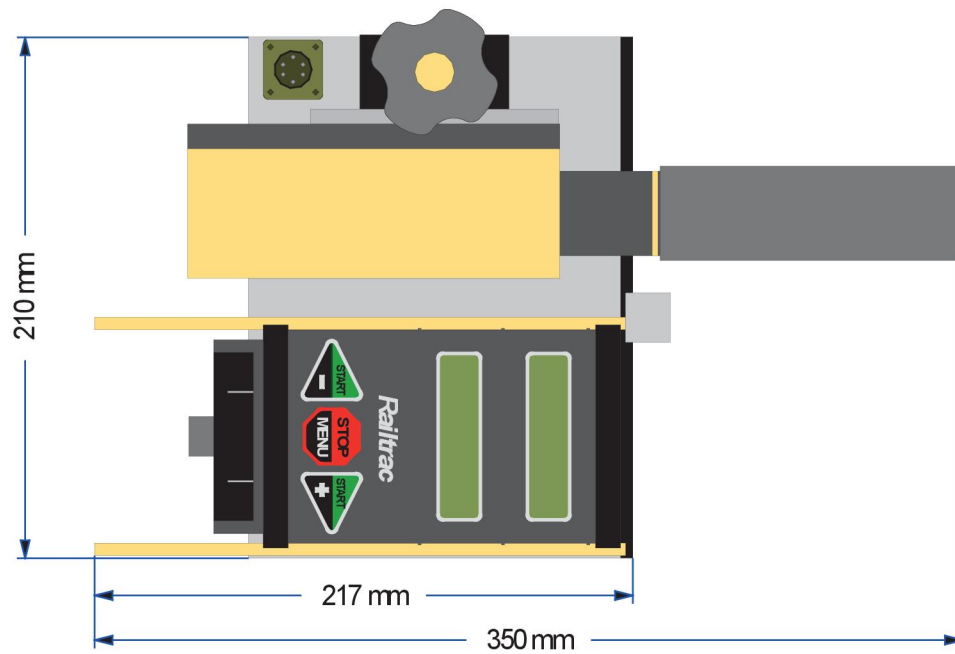
Using the robust and lightweight remote control that comes with the Railtrac™ BV2000, the operator can access and control every function without lifting the welding visor. Individually shaped buttons for:

- Start and stop
- Shift program
- Travel or welding direction (cutting direction)
- Travel or welding speed (cutting speed)
- Weaving width
- Zero-line displacement
- Welding current (wire-feed speed)
- Welding voltage



- | | |
|--|---------------------------------|
| 1. Slide height adjustment | 7. Locking wheel |
| 2. Support wheel holder | 8. Locking screw |
| 3. Bracket for coarse adjustment in/out and height | 9. Electronics |
| 4. Universal torch holder | 10. Battery holder |
| 5. Protection plate | 11. Weaving movement |
| 6. Drive wheel ×2 | 12. Weaving movement connection |

Dimensions



3 TECHNICAL DATA

Railtrac™ BV2000, Valid from serial no. 1801xxxx	
Supply voltage	24–60 V DC
	20–50 V AC
	18 V battery
Power consumption	max 50 W
Battery running time	3–4 h
Weight	8 kg (17.6 lb)
Carriage measurements (L×W×H)	210×350×267 mm (8.27×13.78×10.51 in.)
Length running rail	2 m (2x 1 m) (6 ft 7 in.)
Max temp. Carriage	80 °C (176 °F)
Carriage with battery	60 °C (140 °F)
Max pay load	10 kg (22 lb)
Height adjustment slide	± 45 mm (± 1.77 in.)
Speed carriage	2–150 cm/min (0.79–4 ft 11 in./min)
Rapid speed carriage	15 cm/min (5.91 in./min)
Weaving speed	5–40 mm/s (0.2–1.57 in.)
Weaving width	0–60 mm (0–2.36 in.)
0-line adjustment	±30 mm* (1.18 in.*)
Mechanical adj. in/out	±40 mm (±1.57 in.)
Tot. movement weaver	80 mm (3.15 in.)
Programs	6
Remote control Wire Feed Speed and V (separate adj. on each program)	ESAB 0–10 V
Safety class	DIN40050
Enclosure class	IP44

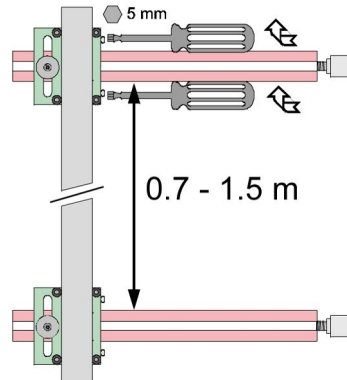
*Depending on weaving width. Max workspace = 80 mm (3.15 in.)

4 INSTALLATION

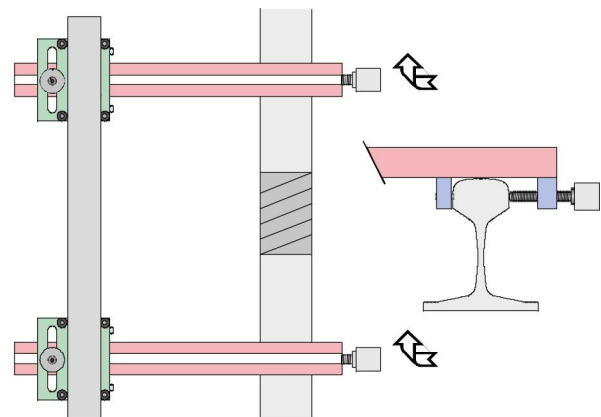
The installation must be carried out by a professional.

For the assembly of the rail brackets, the carriage, the welding torch attachment and for the connection of the control box, please follow the instructions below.

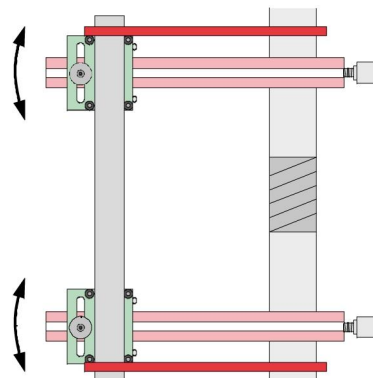
1. Mount the rail brackets on the aluminium rail.



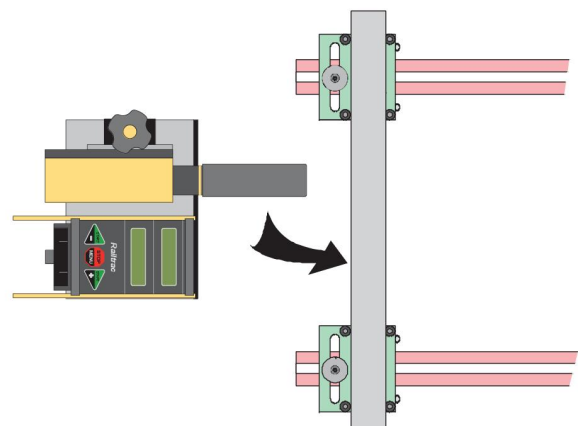
2. Fit the brackets across the rail and secure.



3. Adjust the aluminium rail by way of the gauges.

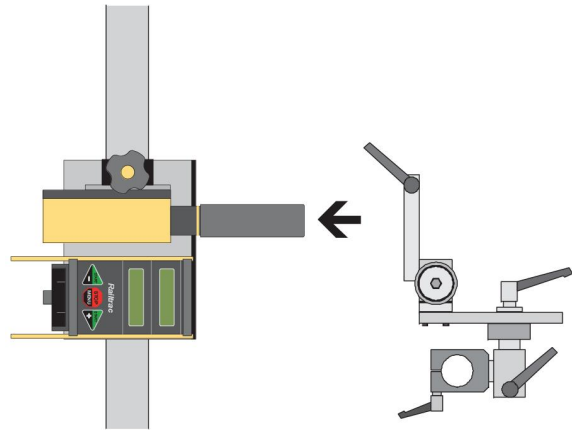


4. Mount the carriage on the rail.

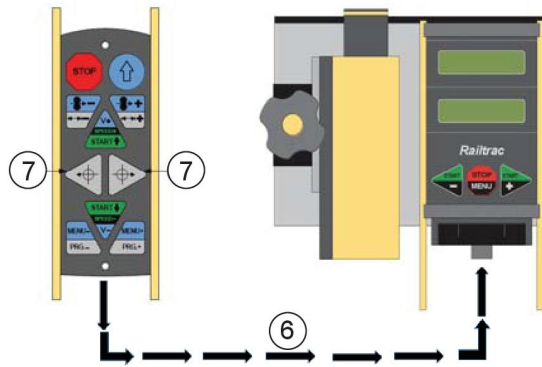


4 INSTALLATION

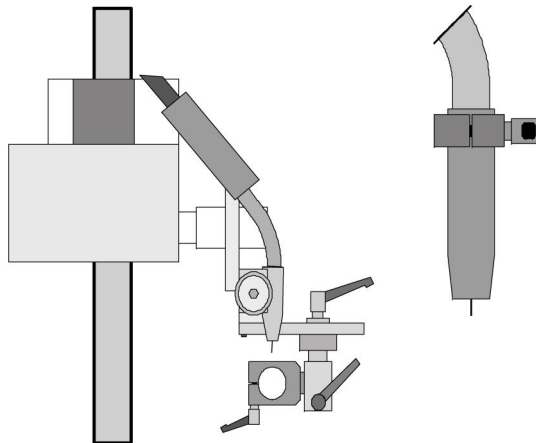
5. Tighten the lock screw.
Fit the attachment of the torch.



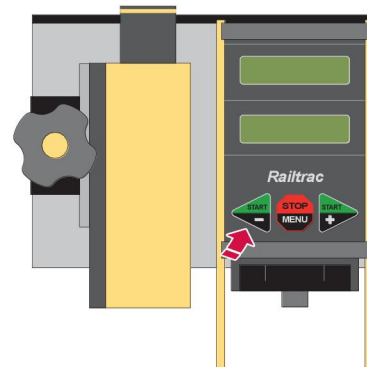
6. Connect the remote control unit to the carriage.
Then connect the voltage supply cable to the carriage and wire feed unit.
7. Press the 0-line in or 0-line out button for positioning.



8. Fit the welding torch.



9. Select a program.
10. Start welding.



5 OPERATION

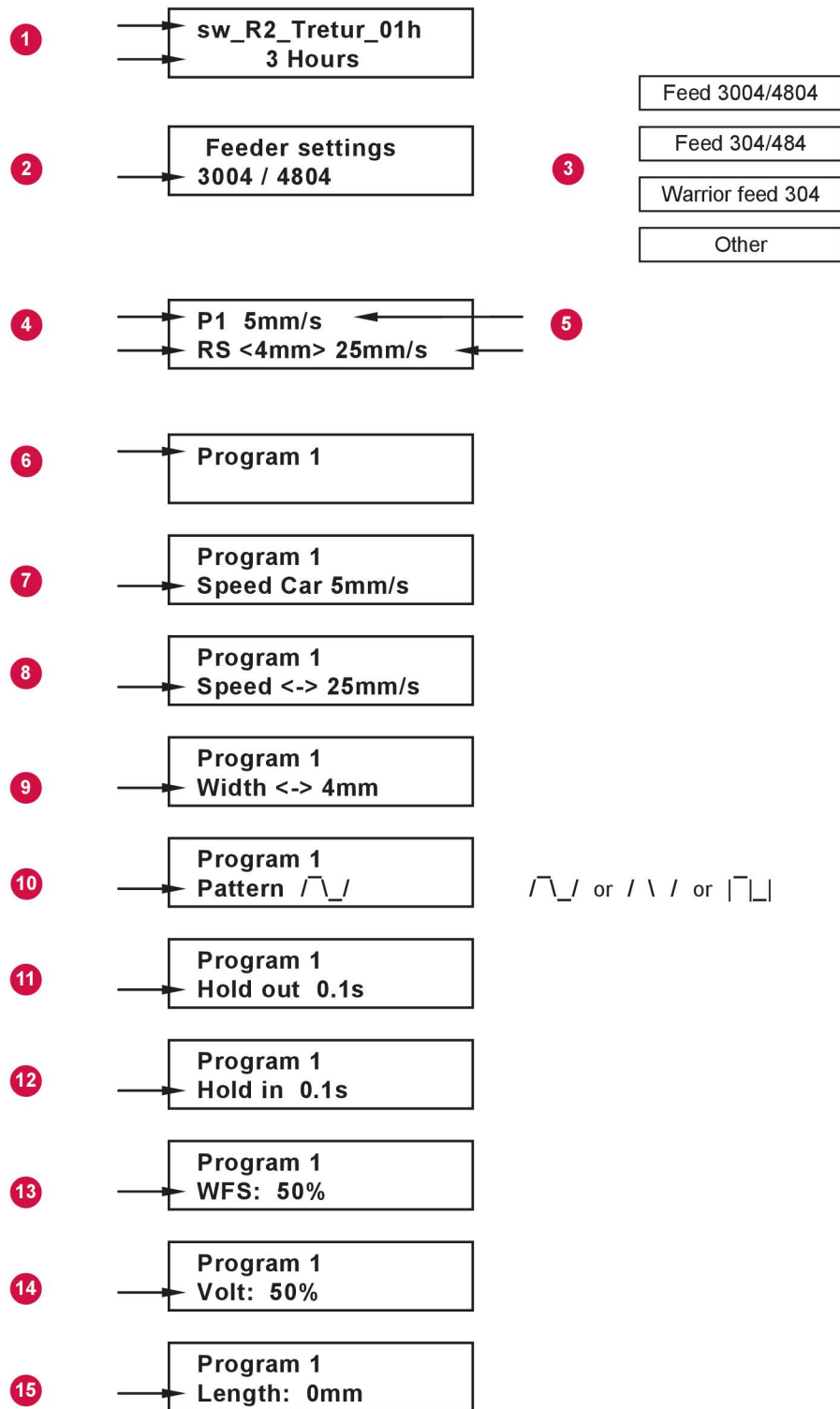
General safety regulations for handling the equipment can be found in the "SAFETY" chapter of this manual. Read it through before you start using the equipment!

5.1 Electronic – Carriage

	1	Start left	<p>One press: Start left without welding</p> <p>Double press: Start left with welding</p> <p>Press 2 seconds: Start with fast move left</p> <p>One press after start: Speed carriage -</p>
	2	Menu/Stop	<p>Before start: Selector for programming parameters. Blinking display indicates programming modus. Adjust parameters using the + and - buttons.</p> <p>After start: Stop carriage and welding.</p> <p>If function Length: Press for 3 seconds to set start position. Display shows 0.</p>
	3	Start right	<p>One press: Start right without welding</p> <p>Double press: Start right with welding</p> <p>Press 2 seconds: Start with fast move right</p> <p>One press after start: Speed carriage +</p>


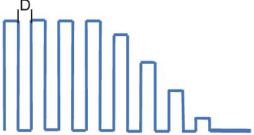
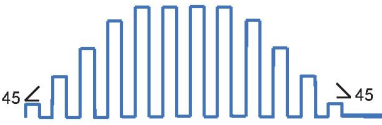
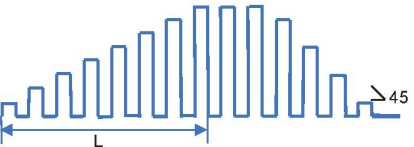


Menus

Program	P0 to P5, Railtrac™ BV2000 has 6 different welding programs.
Weaving width	0–60 mm (0–2.3 in.)
Space weaving strings	1.0–10.0 mm (0.039–0.39 in.)
Speed weaving	5–40 mm/s (0.20–1.6 in./s)
Length	1–200 cm (0.39–79) length in program 3
Speed carriage	20–1500 mm/s (0.79–59 in./s)
0-line adjustment	In steps of 0.5 mm (0.020 in.)
WFS	Wire Feed Speed 1–99% (only for Esab wire feeders)
Volt	1 – 99% (only for Esab wire feeders)



- | | |
|---|--|
| 1. Software version / Running hours | 9. Menu 4: Weaving width |
| 2. Connected wire feeder | 10. Menu 5: Weaving pattern |
| 3. 4 settings. Use button Start right to select | 11. Menu 6: Weaving hold time (hold out) |
| 4. Default: Program number / RS = welding on right side | 12. Menu 7: Weaving hold time (hold in) |
| 5. Default: Speed Carriage / Weaving width, Weaving speed | 13. Menu 8: Wire feed speed |
| 6. Menu 1: Program number | 14. Menu 9: Volt |
| 7. Menu 2: Speed carriage | 15. Menu 10: Welding length. 0 mm > length/auto return off |
| 8. Menu 3: Speed weaving | |

5.2 Programs

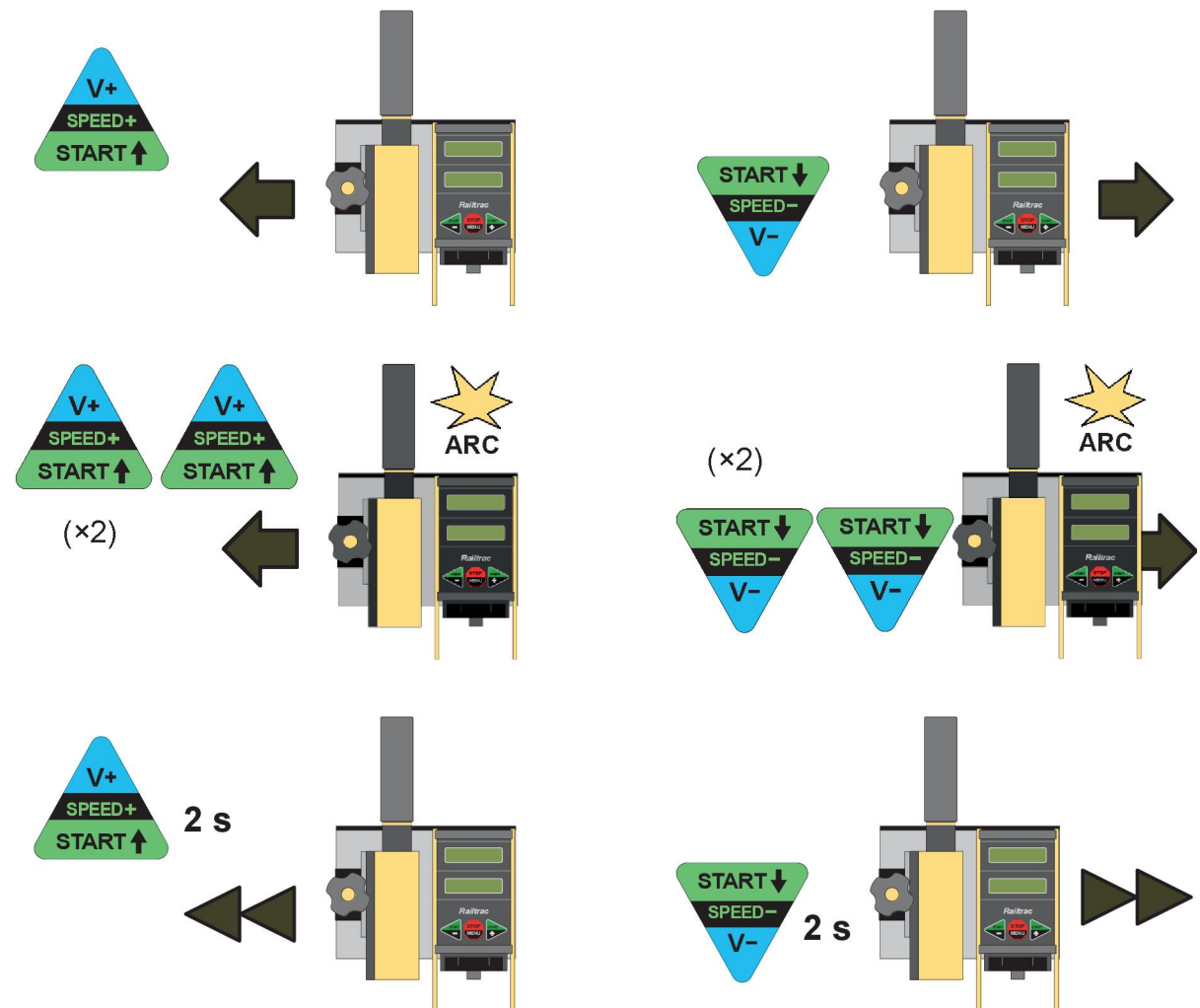
		Menu				
		Weaving Width	Space (D)	Weaving Speed	Length (L)	Speed Carriage
P0						X
P1		X	X	X		
P2		X	X	X		
P3		X	X	X	X	
P4						X
P5			X			X

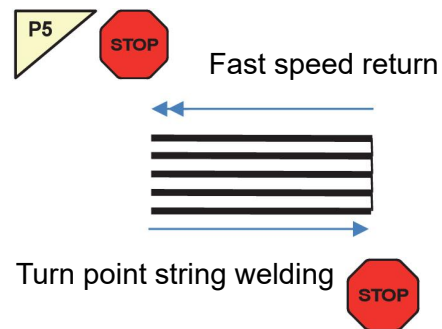
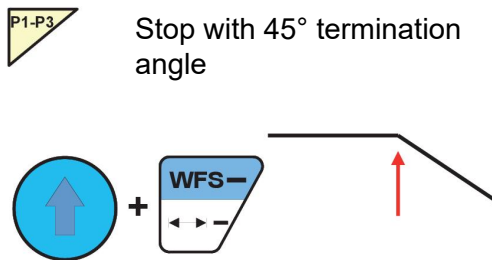
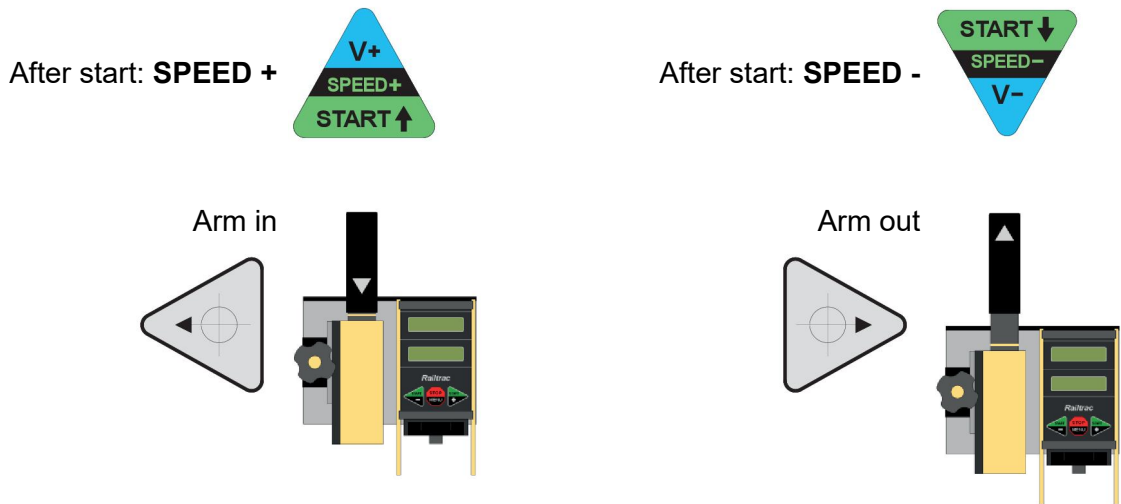
D = Distance between pulses
L = Length

5.3 Remote control

	1		Shift
	2	STOP	
	3	Weaving width -	Wire Feed Speed -
	4	Start left	
	4	After start: Speed +	Volt +
	10	Press 2 seconds for fast move.	
	5	0-line in	
	6	Start right	
	6	After start: Speed -	Volt -
	9	Press 2 seconds for fast move.	
7	Program -	45 degrees ending in P1-P3	
8	Program +	Menu +	
9	0-line out		
10	Weaving width +	Wire Feed Speed +	

5.3.1 Remote control functions



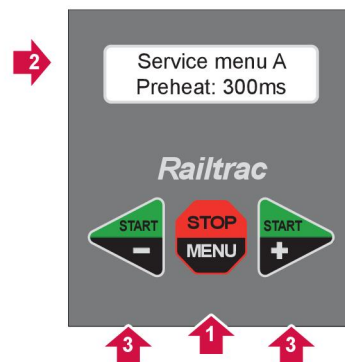


5.4 Preheat

The first menu in service is *Preheat*. Start delay carriage after start welding.

WFS = Wire Feed Speed

1. Press **Stop** for 6 seconds for access to service menu A.
2. Release **Stop** when the display shows *Service Menu A*.
The electronics will stay in the service menu 5 seconds after last button press.
3. The default setting is 300 ms.
Press **+** or **-** to adjust the setting.



5.5 Remote control for digital wire feeder

It is possible to adjust the maximum value on the remote control output (0-10 V) both for wire feed speed and voltage. The maximum value is 0.5 V lower than V_{in} (10 V) due to the voltage drop in the opto driver.

Set Wire Feed Speed (WFS)

1. Press **Menu** once.
The display shows: *DigF max WFS*
2. Press **+** or **-** to adjust the setting.
Scale value: 1 - 40
Higher value gives higher output.



Set Voltage (V)

1. Press **Menu** until *DigF max V* is shown in the display.
2. Press **+** or **-** to adjust.
Scale value: 1 - 40
Higher value gives higher output.



5.6 Installation of wire feeder

The installation must be carried out by a professional.

Railtrac™ BV2000 can be connected to one of the following wire feed units: Aristo® Feed 3004, Aristo® Feed 4804, Origo™ Feed 304, Origo™ Feed 484 and Warrior™ Feed 304.

For necessary adaptation between Railtrac™ BV2000 and the used wire feed unit (including choice of control cable), see the "ACCESSORIES" appendix to this manual.

Universal feeder connection

For the operation of Railtrac™ BV2000 from other wire feeders (none ESAB), use transformer unit and control cable according to the "ACCESSORIES" appendix.

6 MAINTENANCE



NOTE!

All warranty undertakings given by the supplier cease to apply if the customer attempts to rectify any faults on the unit during the warranty period.

Daily

- Check that all cables and plugs are intact.
- Clean the magnet, vacuum cups and air hoses and check for damage.
- Check that the rail is not damaged.
- Clean the carriage and the torch holder.

7 ORDERING SPARE PARTS



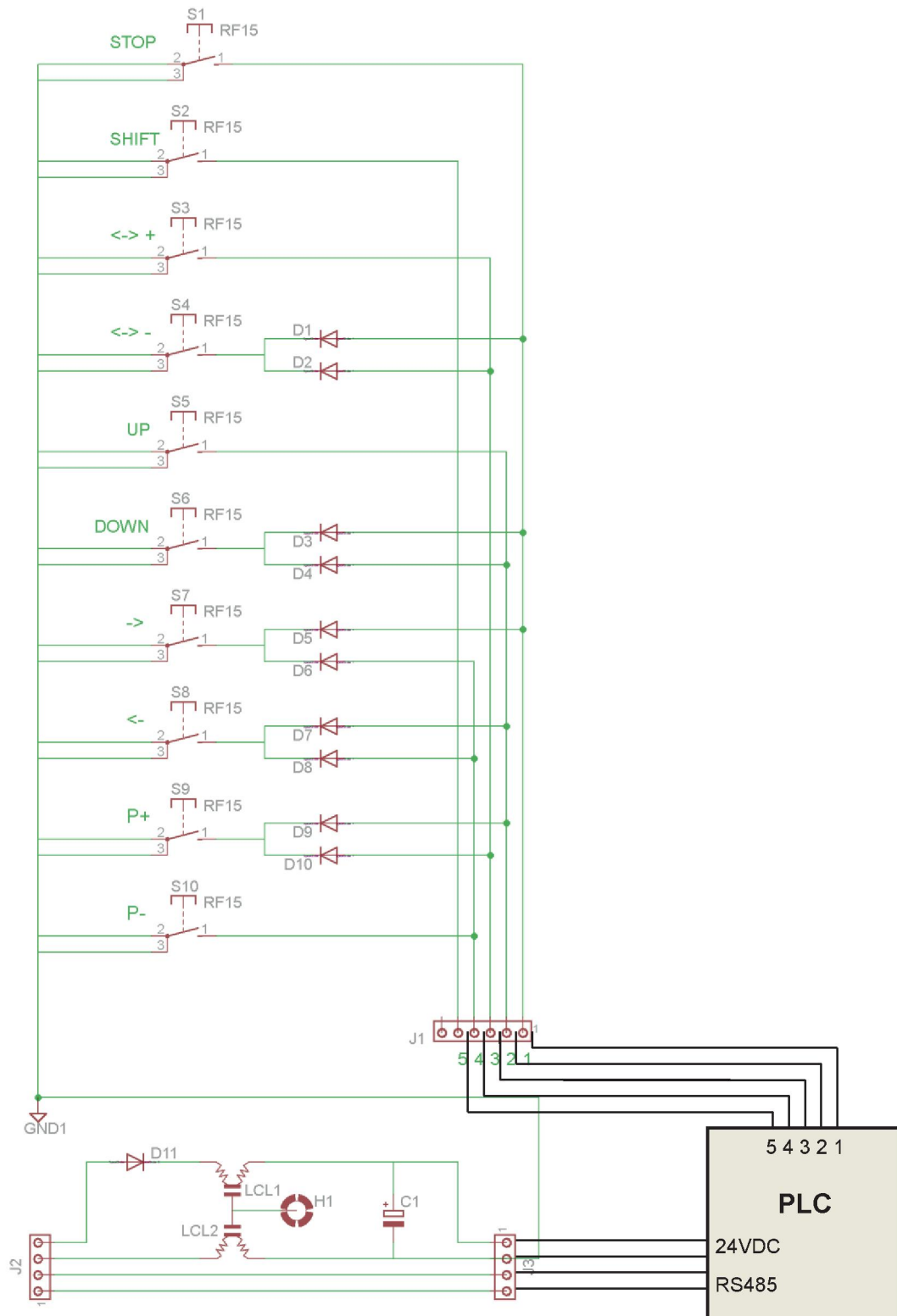
CAUTION!

Repair and electrical work should be performed by an authorised ESAB service technician. Use only ESAB original spare and wear parts.

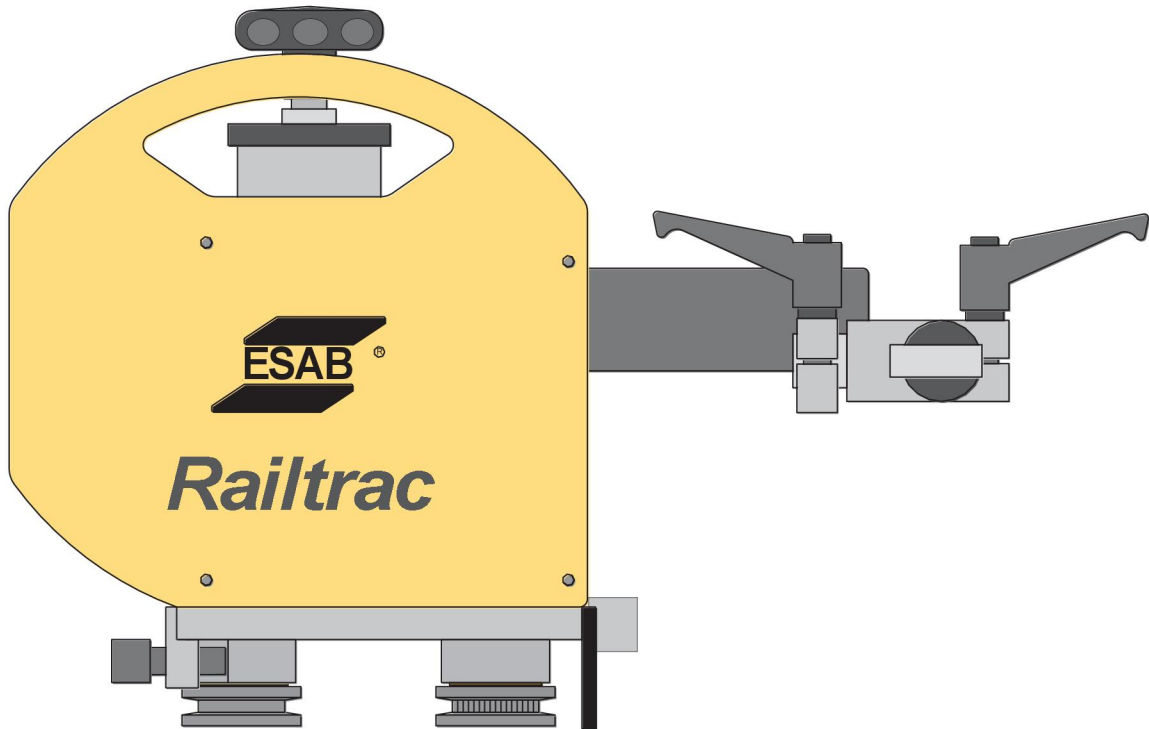
Railtrac™ BV2000 is designed and tested in accordance with the international and European standard **IEC/EN 60974-10 Class A**. It is the obligation of the service unit which has carried out the service or repair work to make sure that the product still conforms to the mentioned standards.

Spare parts and wear parts can be ordered through your nearest ESAB dealer, see esab.com. When ordering, please state product type, serial number, designation and spare part number in accordance with the spare parts list. This facilitates dispatch and ensures correct delivery.

DIAGRAM



ORDERING NUMBERS

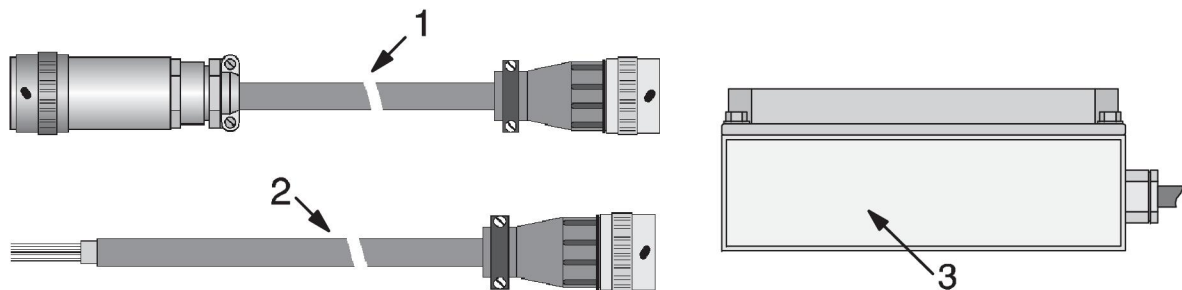


Ordering no.	Denomination	Product	Notes
0459 990 644	Welding tractor	Railtrac™ BV2000	
0463 631 001	Spare parts list	Railtrac™ BV2000	

Technical documentation is available on the Internet at: www.esab.com

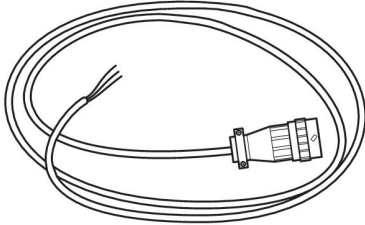


ACCESSORIES

1.	0457 360 880	Control cable (12p- 23p) Railtrac™ - MEK	
2.	0457 360 886	Universal connection cable 12-pin plug	
3.	0457 467 880	Transformer 230/36 V AC with 12-pin plug	
	0457 467 882	Transformer 115 V AC	



0398 145 106	Torch holder universal Ø15-30 mm System features different torch holders for different torches and applications. Railtrac™ BV2000 comes with a universal torch holder (Ø10-22 mm) and adjusters as standard.	
0398 145 101	Torch holder for ESAB PSF torches	
0398 145 202	Tilt bracket Railtrac™ The tilt bracket enables the Railtrac™ to weave when welding fillet joints. It is mounted between drive and weaving unit. The weaving unit can be tilted from 0 to 60 degrees.	
0398 145 203	Turning bracket B42 The turning bracket is used to change the angle of the weaving unit at ±22 degrees from travel direction.	
0457 467 880	Transformer 230 V AC	
0457 467 882	Transformer 115 V AC	
0457 360 880	Connection cable ESAB, 12 + 23-pin	

ACCESSORIES

0457 360 886	<p>Connection cable universal, for start/stop wire feeder, only with 12-pin</p>	
0398 146 120	<p>Quick-extension bracket for flexible rail The quick-extension bracket facilitates rapid mounting and dismounting when using two rails.</p>	
0457 468 074	<p>Battery 18 V / 5 Ah Makita®</p>	
0457 468 072	<p>Battery charger 230 VAC Makita®</p>	

For local purchase at hardware store Makita®

196673-6	<p>BL1850 18 V 18 V 5.0 Ah Li-ion.</p>	
195585-0	<p>DC18RC 14,4 V - 18 V Charger for 14,4 V - 18 V batteries.</p>	

Cable key function diagram B42V and BV2000

Cable key and function diagram for Railtrac™ B42V and BV2000								Functions controlled by Railtrac™ B42V and BV2000			
Feeder unit	Brand	0457 360 880	0457 360 886	0457 468 074	0465 451 881	0459 681 880	0457 467 880	0457 467 882	Voltage	WierFeed Speed	Weld On/Off
Feed 304, 848; M12	ESAB	X							--	X	X
Feed 304, 484; M13	ESAB	X							X	X	X
Feed 3004,4804; MA23, MA24, MA25, U6	ESAB	X				X			X	X	X
Warrior™ Feed 304	ESAB	X			X				X	X	X
Universal Feeder	?		X	X Alt 1			X Alt 2	X Alt 3	-	-	X
Description of Accessories		Cable 23 pins for Railtrac B42V	Control cable Universal	Battery 5h	Remote adapter kit Railtrac/Miggytrac	Remote adapter kit RA 23 Can for Railtrac/miggytrac	Transformer 230 VAC	Transformer 115 VAC			



A WORLD OF PRODUCTS AND SOLUTIONS.



For contact information visit esab.com

ESAB AB, Lindholmsallén 9, Box 8004, 402 77 Gothenburg, Sweden, Phone +46 (0) 31 50 90 00

<http://manuals.esab.com>

