



OPERATOR'S MANUAL

Rail Bull

WELDING CARRIAGE



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Contents

1. GENERAL INFORMATION	3
1.1. Application	3
1.2. Technical data.....	4
1.3. Equipment included	5
1.4. Dimensions	6
1.5. Design	7
2. SAFETY PRECAUTIONS.....	8
3. STARTUP AND OPERATION	10
3.1. Assembling the track.....	10
3.2. Assembling the holder.....	12
3.3. Positioning	13
3.4. Connecting to the welding circuits.....	14
3.5. Operating	15
3.6. Changing the unit of measure	17
3.7. Troubleshooting	18
4. MAINTENANCE	19
5. ACCESSORIES	20
5.1. Semi-flexible track.....	20
5.2. Rigid track.....	20
5.3. Rack adjustment tool.....	20
5.4. Magnetic units.....	21
5.5. Semi-flexible track support.....	25
5.6. Transport attachment.....	25
5.7. 76 mm cross slide	26
5.8. Vacuum track system.....	27
5.9. Torch clamps	28
5.10. Rods	29
5.11. Torch holders	30
6. 115–230 V WIRING DIAGRAM	32
7. 42 V WIRING DIAGRAM.....	33
8. DECLARATION OF CONFORMITY	34
9. WARRANTY CARD.....	35

1. GENERAL INFORMATION

1.1. Application

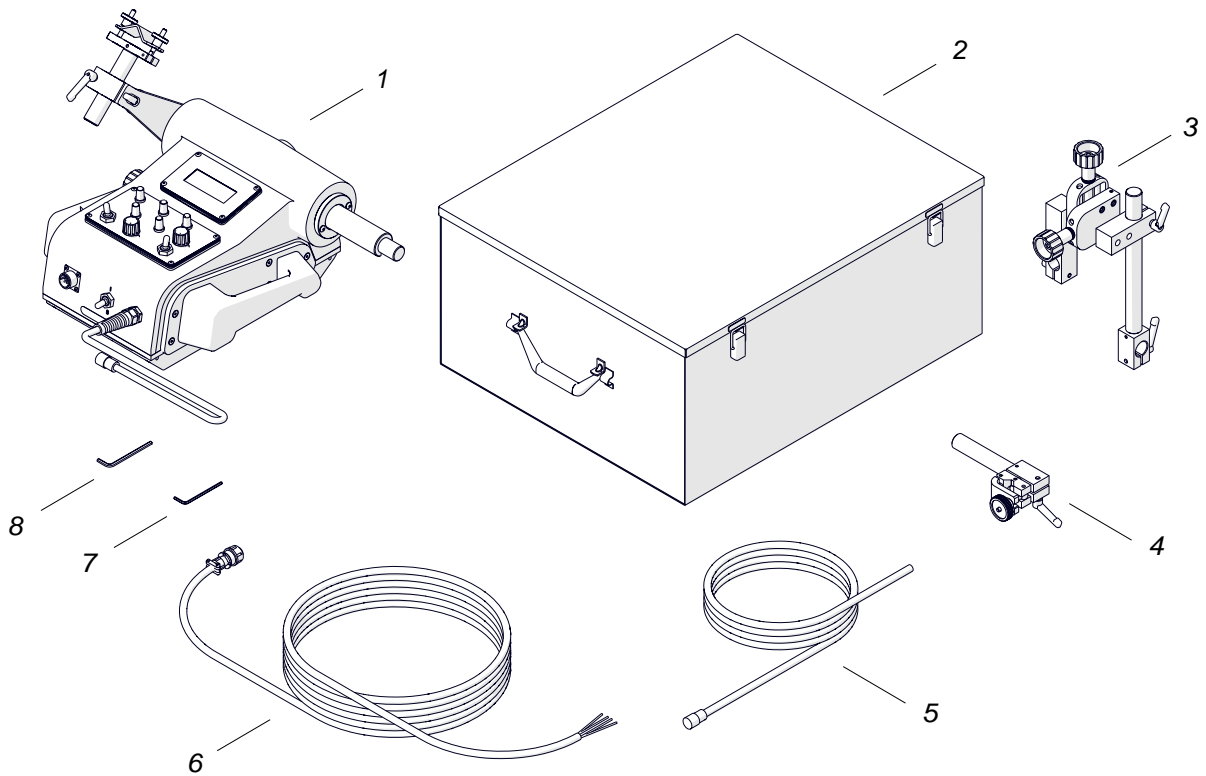
The Rail Bull is a track carriage designed to make butt and fillet welds with or without oscillation. The carriage allows MIG/MAG torches with the handle diameter of 16–22 mm (0.63–0.87"). It can work in the following welding positions: PA/1F/1G, PB/2F, PC/2G, PD/4F, PE/4G, PF/3G, and PG/3F/3G. The track is fixed by using magnetic units to ferromagnetic surfaces that are flat or curved with a radius of at least 5 m (16 ft).

Accessories allow, for instance, using torches with the handle diameter larger than 22 mm (0.87") and guiding the carriage on a semi-flexible or rigid track. Using a vacuum track system allows the track to be fixed to surfaces that are non-ferromagnetic.

1.2. Technical data

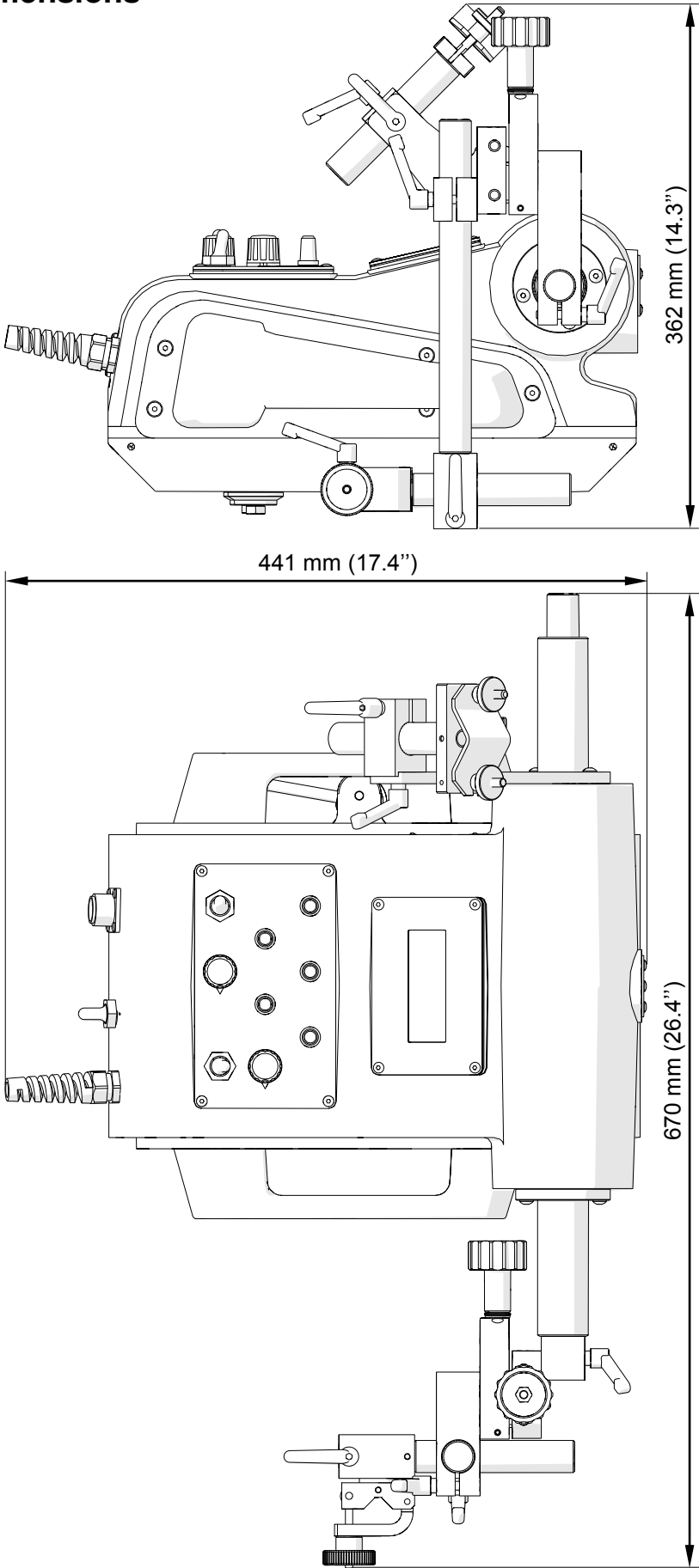
Voltage		1~ 115–230 V, 50–60 Hz 1~ 42 V, 50–60 Hz (60 V DC)
Power		100 W
Welding position (according to EN ISO 6947 and AWS/ASME)	Horizontal	PA / 1F / 1G PB / 2F PC / 2G PD / 4F PE / 4G
	Vertical	PF / 3G PG / 3F (contact your dealer) PG / 3G
Minimum curve radius of a semi-flexible track		5 m (16 ft)
Torch type		MIG/MAG
Torch diameter		16–22 mm (0.63–0.87")
Minimum workpiece thickness for magnetic clamping		5 mm (0.2")
Horizontal pulling force		350 N
Vertical pulling force		150 N
Cross slide adjustment range		0–35 mm (0–1.38", up-down, left-right)
Horizontal speed		0–120 cm/min (0–47.2 in/min)
Vertical speed		0–110 cm/min (0–43.3 in/min)
Oscillation type		Linear
Oscillation path		Trapezoid, triangle, straight line
Oscillator arm stroke		0–100 mm (0–3.9")
Oscillation width		0–50 mm (0–1.9")
Oscillation speed		0–1500 mm/min (0–59 in/min)
Oscillation dwell time at center and on ends		0–5 s
Maximum oscillator pulling force		100 N
Maximum allowed ambient temperature		50°C (122°F)
Maximum allowed ambient humidity		85%
Weight		20 kg (44 lbs)

1.3. Equipment included

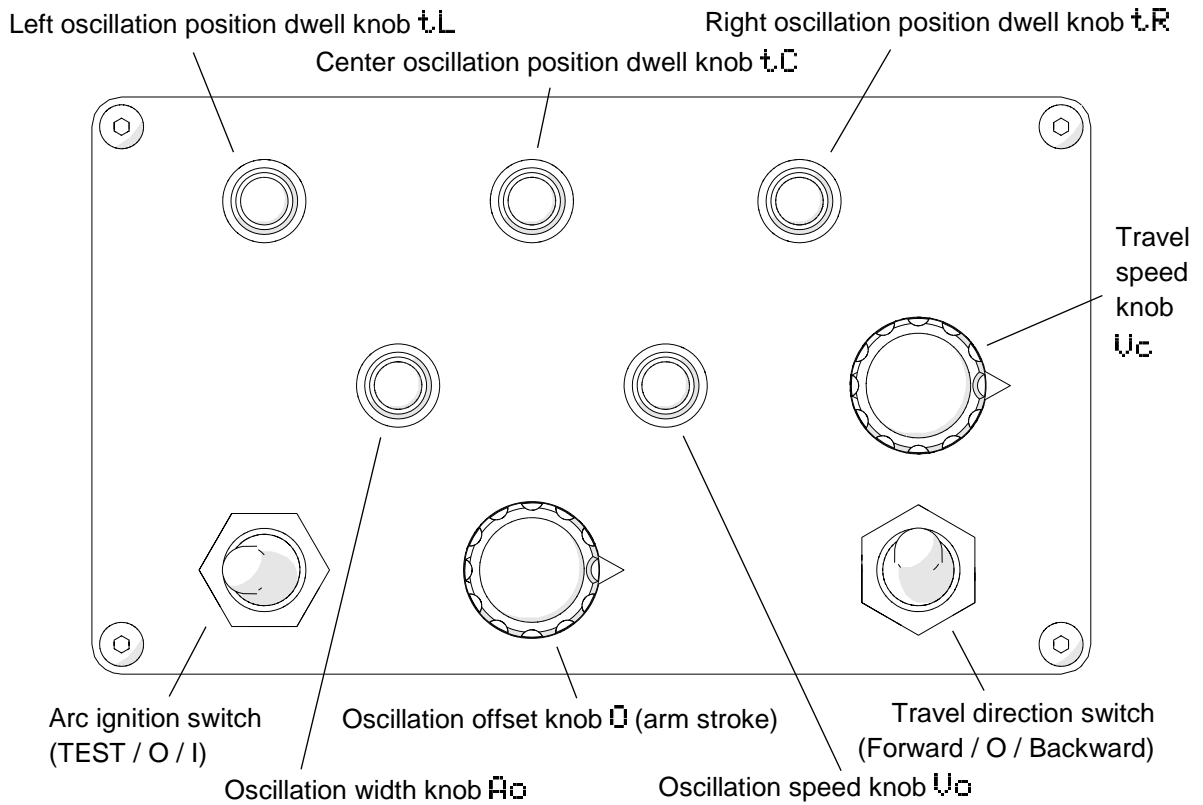
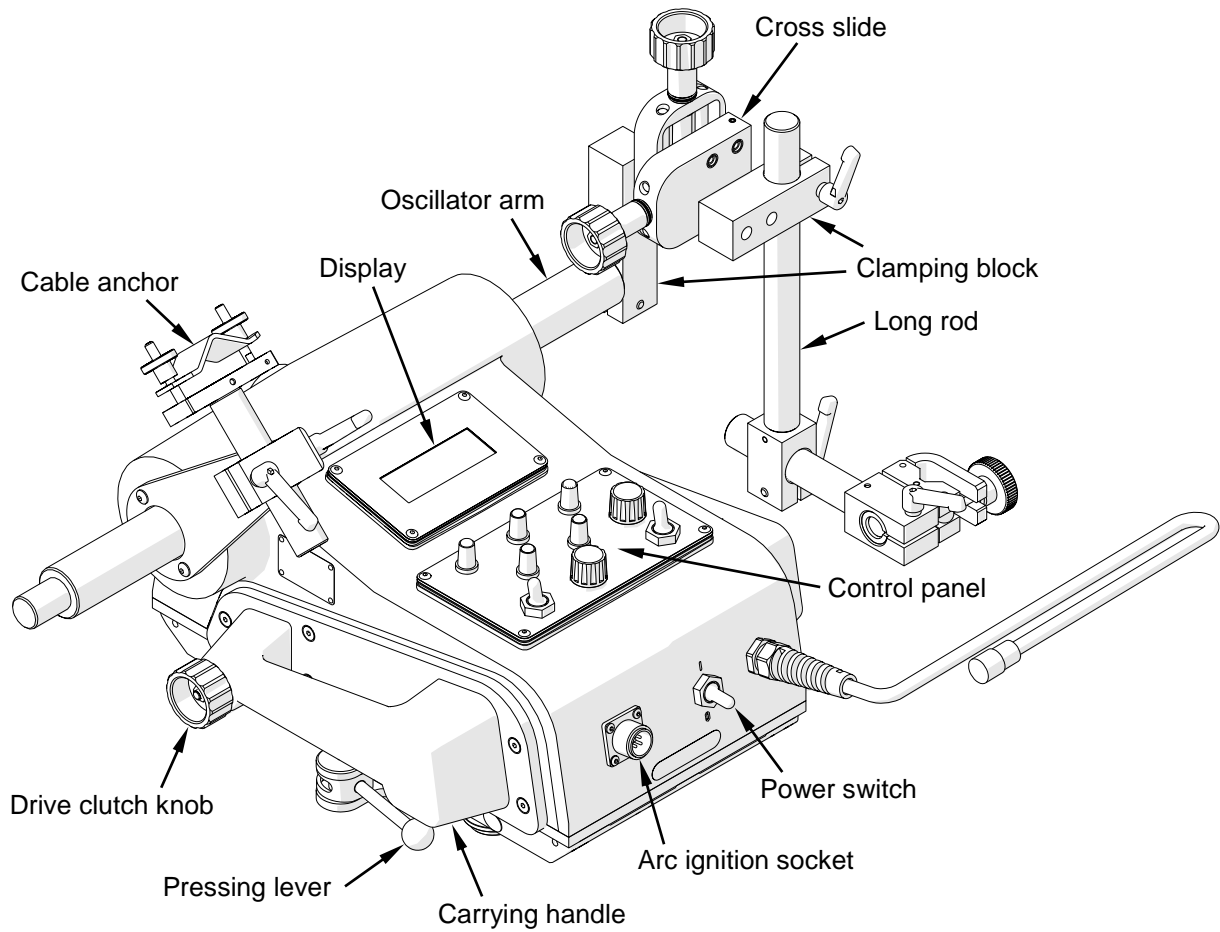


1	Carriage	1 unit
2	Metal box	1 unit
3	Cross slide assembly	1 unit
4	Short rod torch holder with clamp	1 unit
5	3 m (10 ft) power cord	1 unit
6	6.5 m (21 ft) arc ignition cable	1 unit
7	3 mm hex wrench	1 unit
8	4 mm hex wrench	1 unit
–	Operator's Manual	1 unit

1.4. Dimensions



1.5. Design



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2. SAFETY PRECAUTIONS

1. Before starting, read this Operator's Manual and complete proper occupational safety and health training.
2. Use the carriage only in applications specified in this Operator's Manual.
3. The carriage must be complete and all parts must be genuine and fully functional.
4. The specifications of the power source must conform to those specified on the rating plate.
5. Connect the carriage into a properly grounded power source.
6. Never carry the carriage by the cords or arc ignition cable. Never pull them because this may damage them and result in electric shock.
7. Untrained bystanders must not be present near the carriage.
8. Before starting, ensure the correct condition of the carriage, power source, cords, arc ignition cable, plugs, control panel, rollers, and gear.
9. Keep the carriage dry, and never expose it to rain, snow, or frost.
10. Keep the work area well lit, clean, and free of obstacles.
11. Never use near flammable liquids or gases, or in explosive environments.
12. Transport and position the carriage by using the carrying handles.
13. Install the carriage only on the supplied track.
14. Make sure that the gear and rollers are clean and not damaged.
15. Plug the cords and arc ignition cable into sockets only when the power switch is set to 'O'.
16. Keep the sockets clean. Do not use compressed air for cleaning.
17. Install only MIG/MAG torches whose handle diameter is the same as the diameter of the torch holder in use.
18. Suspend cables to reduce the load of the carriage.
19. Do not bend the semi-flexible track to a radius less than 5 m (16 ft).
20. Use the rigid track only on flat surfaces.
21. At heights, protect the carriage and the track from falling. To do this, fasten the track to a fixed structure with chains attached to the leftmost and rightmost magnetic units. Protect the carriage by attaching a chain to a carrying handle. The chains must not be loose.
22. Do not stay below the carriage or the track placed at heights.

23. Always use eye protection (helmet, shield, and screen), hearing protection, gloves, and protective clothing during work. Do not wear loose clothing.
24. Before every use, inspect the carriage to ensure it is not damaged. Check whether any part is cracked or improperly fitted. Make sure to maintain proper conditions that may affect the operation of the carriage.
25. Never try to manually stop the travel. To stop, set the travel direction switch to 'O'.
26. Maintain only when the carriage is unplugged from the power source.
27. Repair only in a service center appointed by the seller.
28. If the carriage falls from any height, is wet, or has any other damage that could affect the technical state of the carriage, stop the work and promptly send the carriage to the service center for inspection and repair.
29. Never leave the carriage unattended during work.
30. Remove from the worksite and store in a secure and dry place when not in use.

3. STARTUP AND OPERATION

3.1. Assembling the track

Connect magnetic units to the rail, and position it on the workpiece. Use the 4 mm hex wrench to attach additional rails (1, Fig. 1), and then switch the levers of the magnetic units to 'I' (2). This will clamp the track to the surface.

When working in PC/2G welding position, place the track so that the teeth of the racks are directed downward.

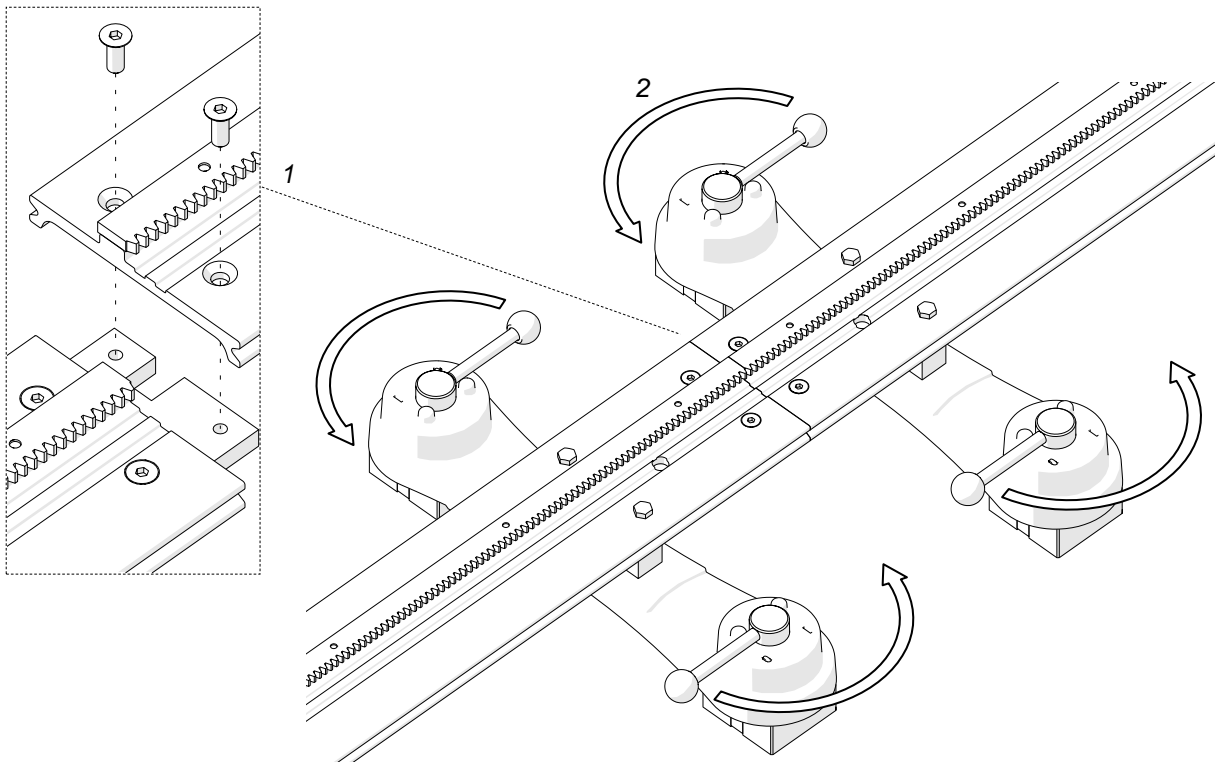


Fig. 1. Connecting the rails and clamping the magnetic units to the surface

Before attaching additional rails to a semi-flexible rail placed on a curve, use the 4 mm hex wrench to loosen the screws of the connecting plates (1, Fig. 2) and of the racks (2). Next, attach the rails, clamp them with levers, and then tighten the connecting plates. Place the rack adjustment tool (not included) into the hole (3), and rotate the tool to the left (4) to remove the gap (5) between the racks. Then, tighten the leftmost screw and the rightmost screw of each rack (2).

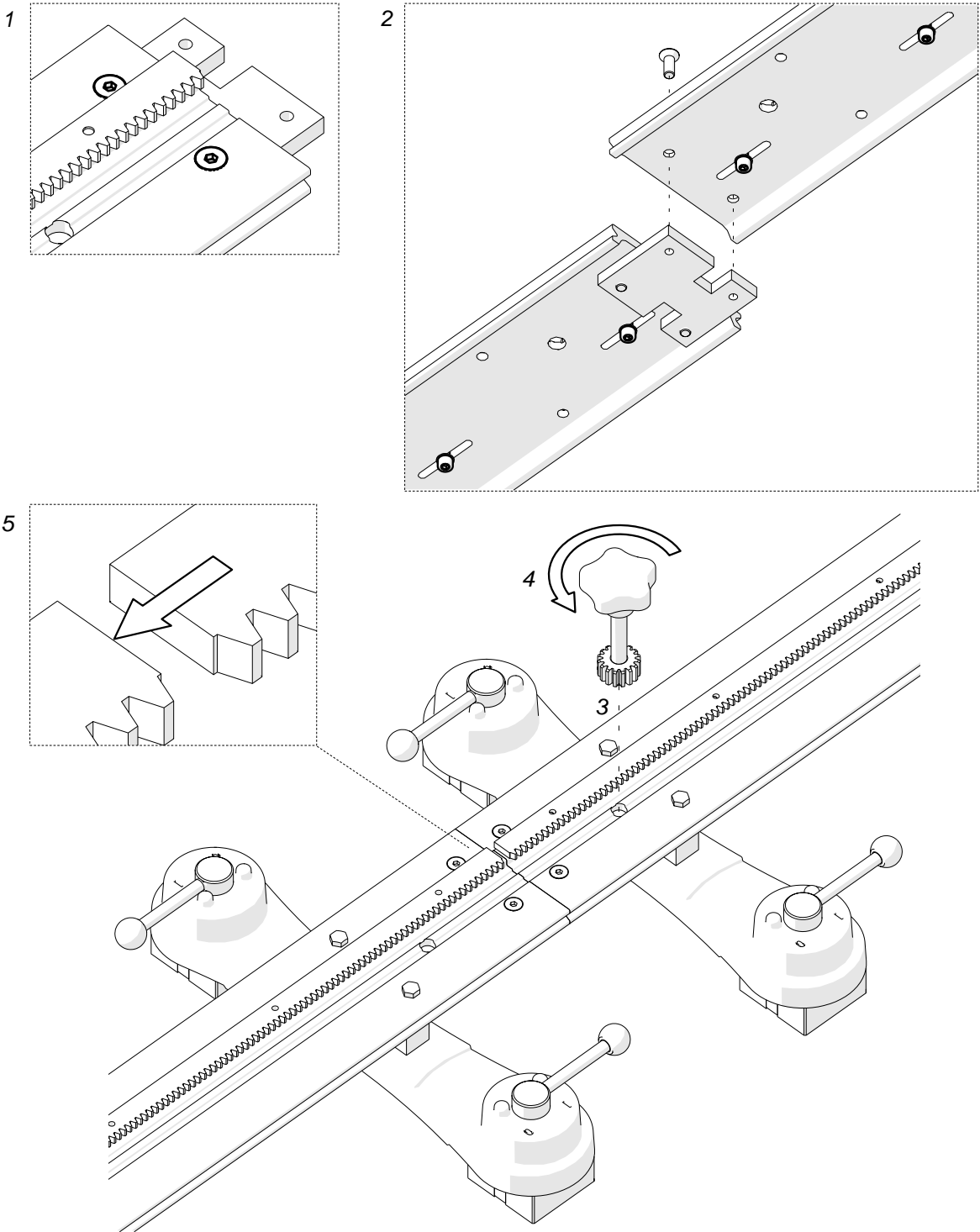


Fig. 2. Removing the gap between the racks of a semi-flexible track

3.2. Assembling the holder

Use the 4 mm hex wrench to tighten the clamping blocks to the cross slide with four M5x20 screws as shown in Fig. 3. The parts shown can be assembled in many ways to form different configurations. However, note that the oscillator moves in and out during startup. Thus, to allow proper startup, install the torch holder and the cross slide so that they will not collide with the carriage side or obstacles.

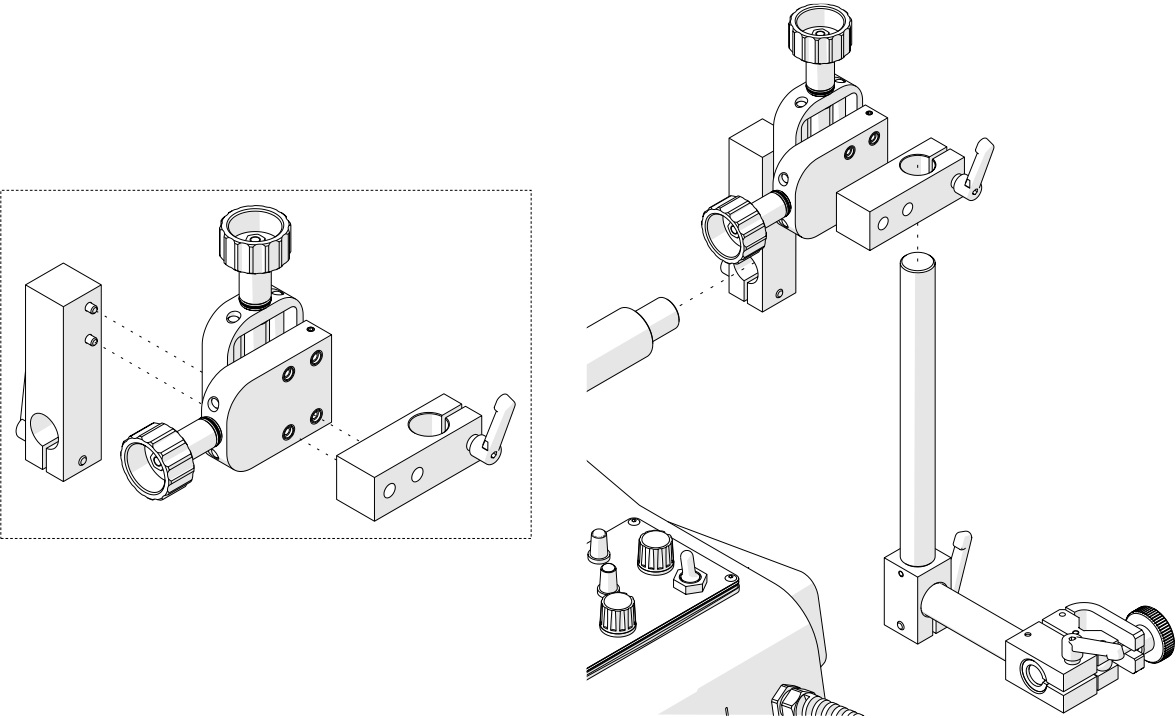


Fig. 3. Sample method of assembling the torch holder

3.3. Positioning

Set the power switch, arc ignition switch, and travel direction switch to 'O'. Next, set the pressing lever to OFF (1, Fig. 4) and loosen the drive clutch knob fully (2). Then, set the carriage onto the track (3) so that the back rollers are placed in the groove (4).

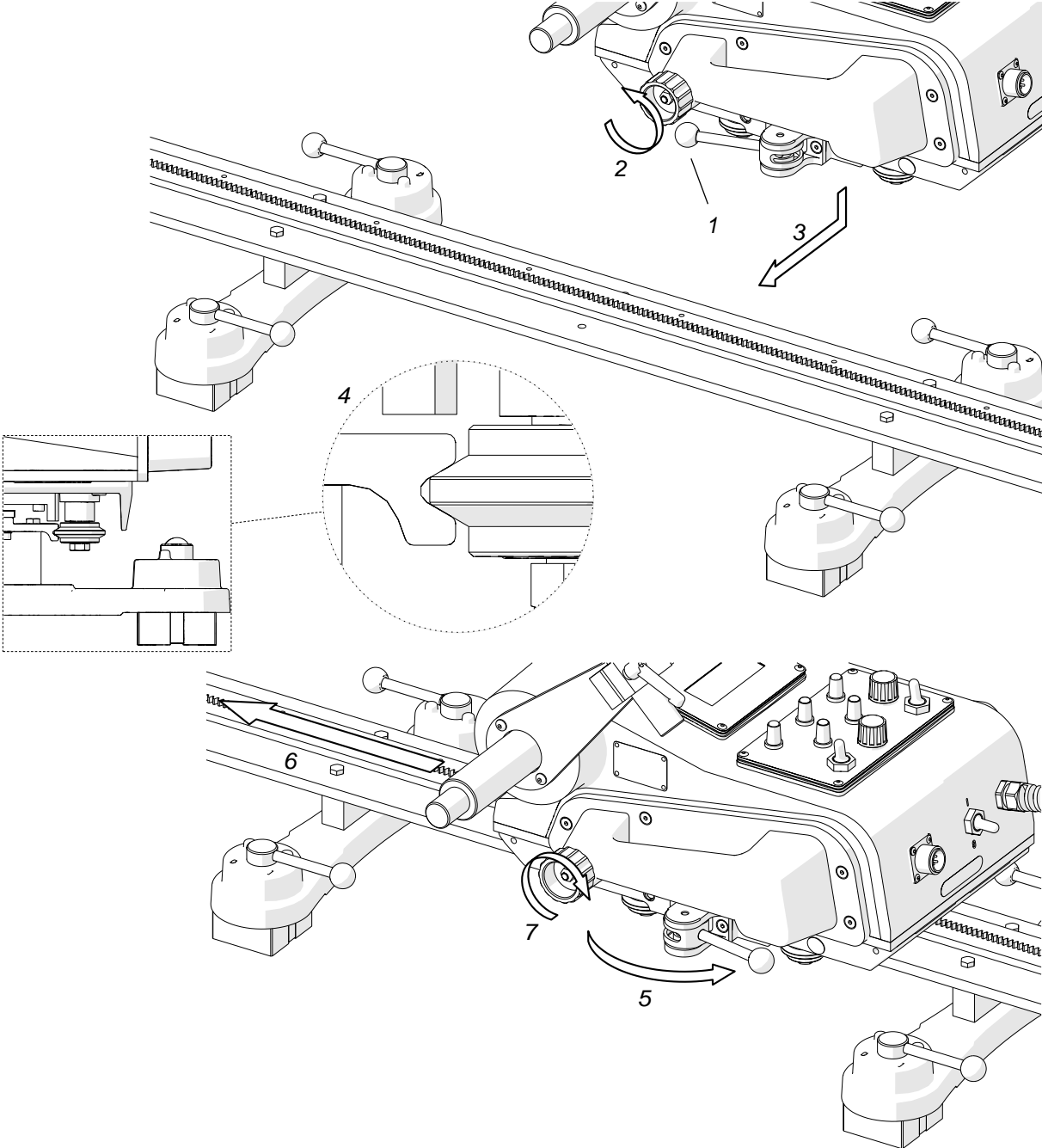


Fig. 4. Positioning the carriage on the track

Set the pressing lever to ON (5) to press the front rollers to the track. Slide the carriage to the required position (6), and fully tighten the drive clutch knob (7) to engage the gear of the carriage with the rack of the rail. Then, loosen the knob by 1/4 rotation.

At heights, protect the carriage and the track from falling. To do this, fasten the track to a fixed structure with chains attached to the leftmost and rightmost magnetic units. Protect the carriage by attaching a chain to a carrying handle. The chains (not included) must not be loose.

Plug the power cord into the power source, and then insert the torch into the torch holder and secure with the knob. Next, insert the torch cable into the cable anchor, secure with knobs, and then fix the anchor in the required position with levers.

3.4. Connecting to the welding circuits

The carriage can control two torches by using the arc ignition cable plugged into the arc ignition socket. To do this, according to the diagram shown in Fig. 5 connect any blue-jacketed wire to any terminal of the welding circuit. Then, connect the second blue-jacketed wire to the second terminal of the same circuit. To control the second torch, connect the green-jacketed wires to the terminals of the second welding circuit.

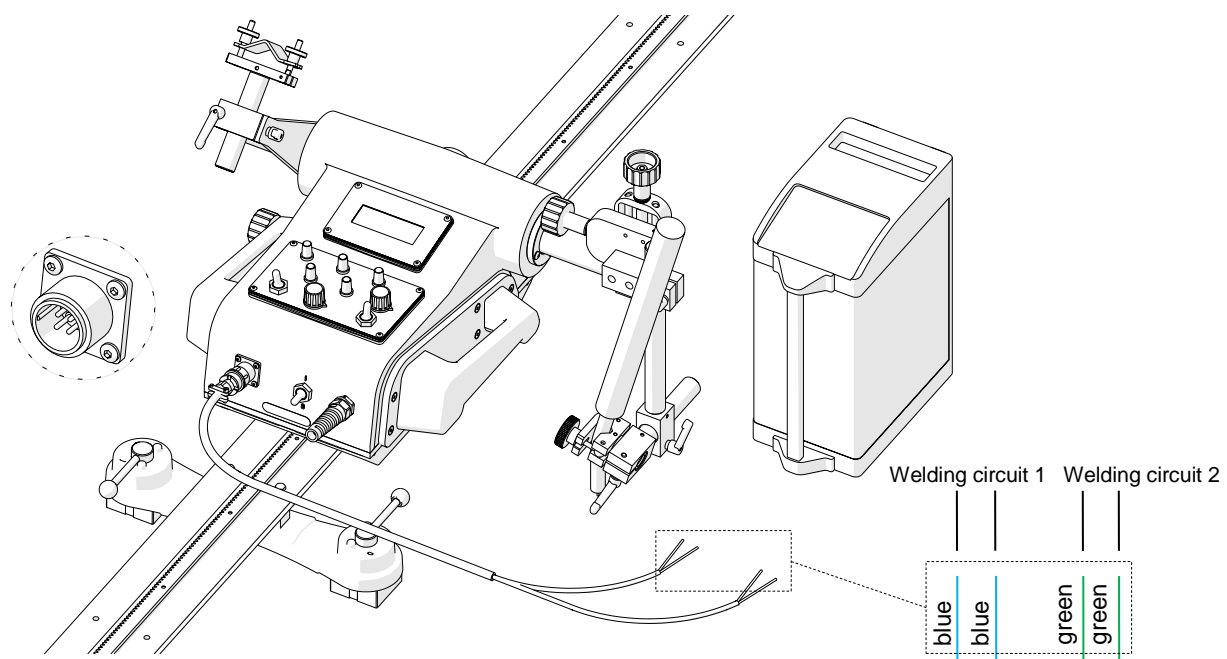
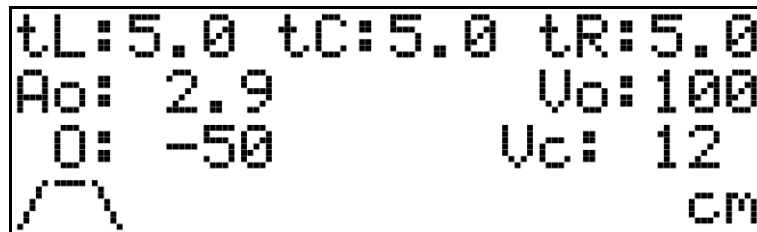


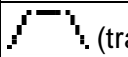

Fig. 5. Connecting the arc ignition cable to welding circuits

To make sure that the arc ignition cable is connected correctly, turn on the power of the carriage, and then set the arc ignition switch to the position TEST. This should enable the arc for a while.

3.5. Operating

Set the power switch to 'I' to turn on the carriage. If ERROR #1 appears on the display, set the travel direction switch to 'O'. Then, use the knobs on the control panel to set the required process parameters (Tab. 1). Right rotation increases the value of the parameter, and left rotation decreases the value.



Parameter	Value	Description
tL	0–5 s [step: 0.1]	Dwell time in left position of the oscillation.
tC	0–5 s [step: 0.1]	Dwell time in center position of the oscillation.
tR	0–5 s [step: 0.1]	Dwell time in right position of the oscillation.
Ao	0–5 cm 0–2 in [step: 0.1 cm/0.02 in]	Oscillation width. Set 0 to weld without oscillation.
Uo	0–100% [step: 1%]	Relative oscillation speed.
O	–100% to 100% [step 1%]	Oscillation offset. If Ao exceeds the value of the parameter O, the parameter O is recalculated automatically.
Uc	0 5–140 cm/min 2–55 in/min	Carriage speed. Setting to 0 during travel stops the main motor. Then, the oscillator goes into the test mode to allow for proper selection of the width and speed of the oscillation (Ao, Uo).
Welding path	 (trapezoid)  (straight line)	Trapezoid is default. To weld according to the triangular pattern, set all dwell times (tL, tC, tR) to 0. To weld along a straight line, set Ao to 0.
Unit	cm in	Unit set by the jumper cap (Fig. 7).

Tab. 1. Configuration parameters

To control the torch via the carriage, set the arc ignition switch to 'I'.



If the arc ignition switch is set to 'I', the torch starts welding promptly after selecting a travel direction.

Use the travel direction switch to select a direction of travel. This will start the travel according to the parameters shown on the display. It is possible to adjust the parameters at any time by rotating the knobs.

The produced welds form a shape similar to that shown in Fig. 6.

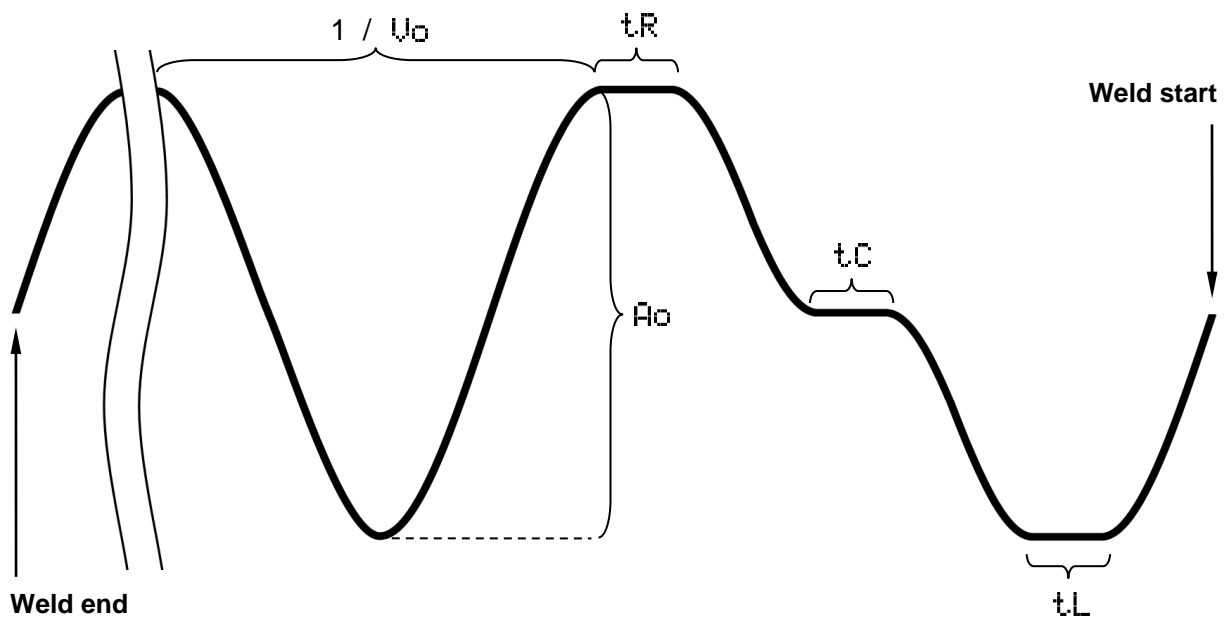


Fig. 6. Graphic description of the oscillation parameters from Tab. 1

To stop the travel and save the values shown on the display, set the travel direction switch to 'O'.

After the work is finished, use the power switch to turn off the power. Then, unplug the carriage from the power source.

3.6. Changing the unit of measure

To change the unit of measure between centimeters and inches, unplug the carriage from the power source and follow the steps shown in Fig. 7.

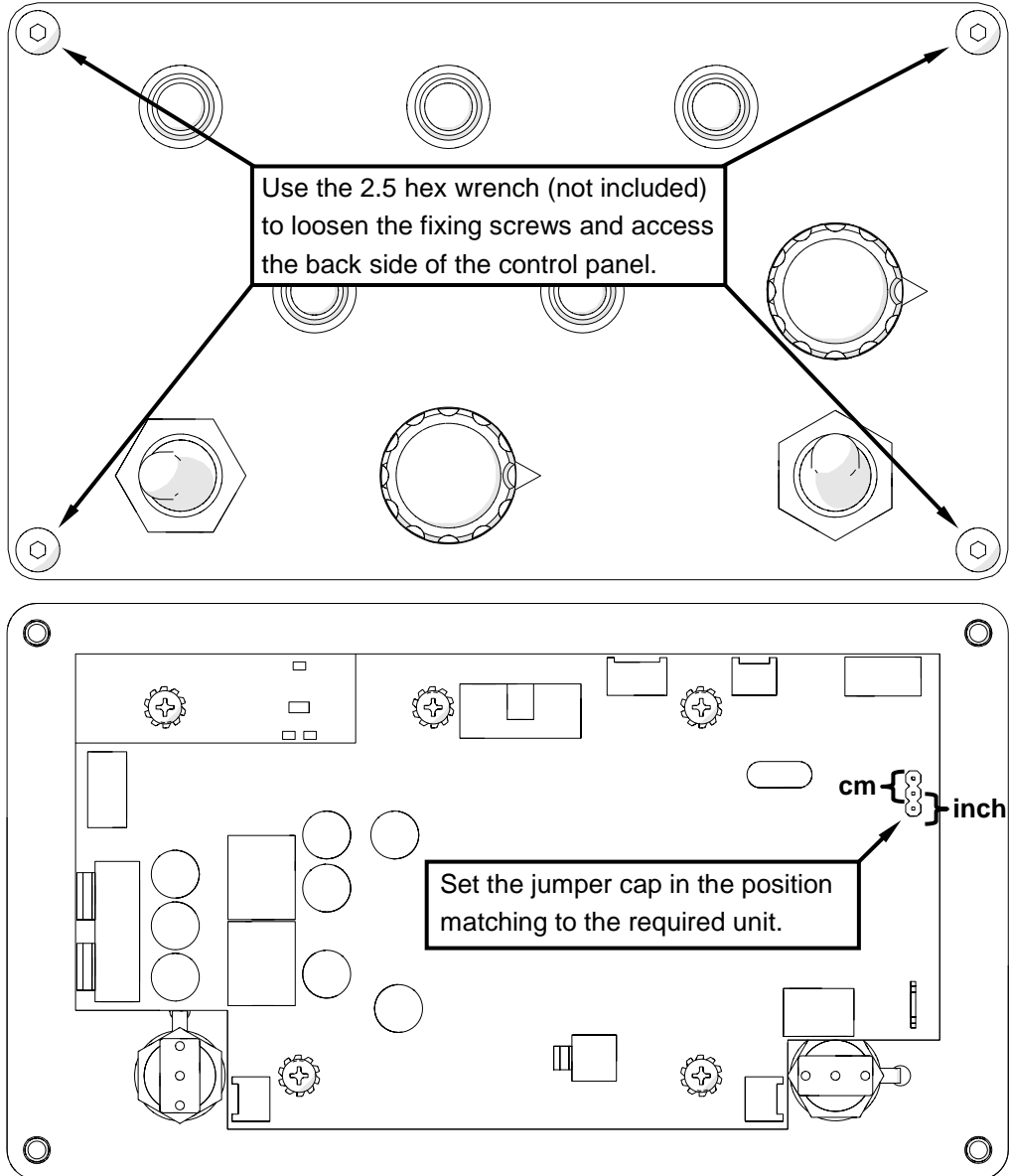


Fig. 7. Changing the unit of measure

When the jumper cap connects the top and center pin, the measurement system will be metric after restart. When the jumper cap connects the center and bottom pin, the system will be imperial.

3.7. Troubleshooting

Problem	Cause	Solution
ERROR #1	Travel direction switch not set to 'O' when powering.	Set the travel direction switch to 'O'.
ERROR #2	Malfunction of the travel direction switch wire set or the controller.	Contact service center for check and repair.
ERROR #3	Power not supplied to the main motor or malfunction of the main motor encoder.	Contact service center for check and repair.
ERROR #4	Oscillator move blocked or power not supplied to the oscillator motor.	Remove obstacles blocking the move of the oscillator. If this message still appears, contact service center for check and repair.
ERROR #5	Malfunction of the oscillator motor encoder or the controller.	Contact service center for check and repair.
ERROR #6	Malfunction of the oscillator sensor.	Contact service center for check and repair.
ERROR #7	Malfunction of the encoder board.	Contact service center for check and repair.

4. MAINTENANCE

Daily:

1. Clean the gear of the carriage and the rack of each rail.
2. Clean the rollers and make sure that they rotate freely.
3. Clean the torch nozzle. Replace if damaged.

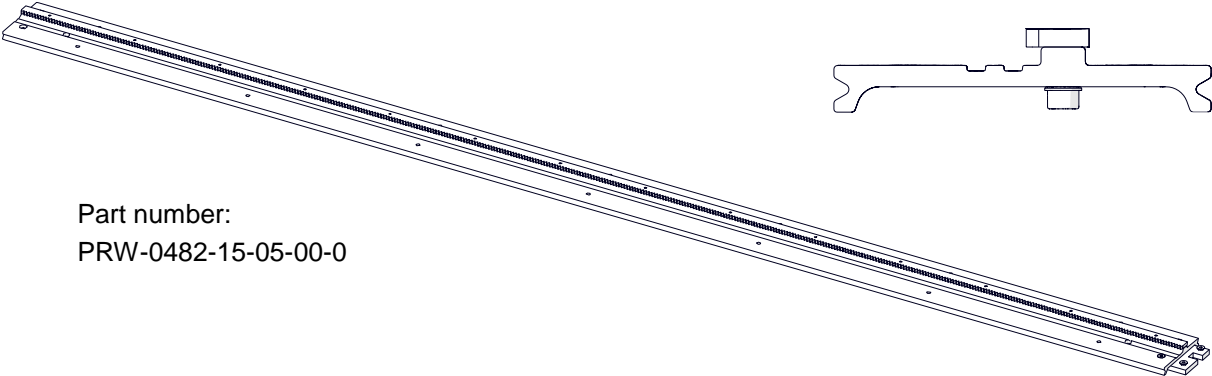
Monthly:

1. Check whether the knobs and switches work as intended. Replace if loose or damaged.
2. Inspect cables, cords, and hoses. Replace if damaged.
3. Tighten screws if loose.

5. ACCESSORIES

5.1. Semi-flexible track

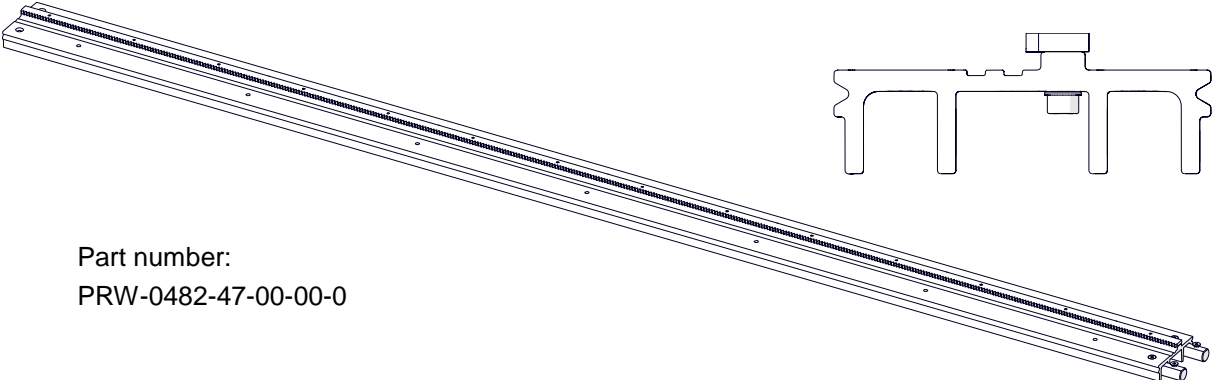
Allows guiding the carriage along a curve. The length of a single rail is 2 m (6.5 ft).



Part number:
PRW-0482-15-05-00-0

5.2. Rigid track

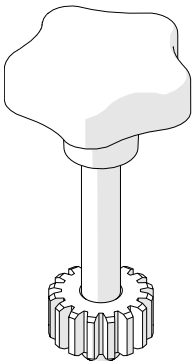
Allows guiding the carriage along a straight line. The length of a single rail is 2 m (6.5 ft).



Part number:
PRW-0482-47-00-00-0

5.3. Rack adjustment tool

Removes the clearance between the racks of two semi-flexible rails that are put on a curve.

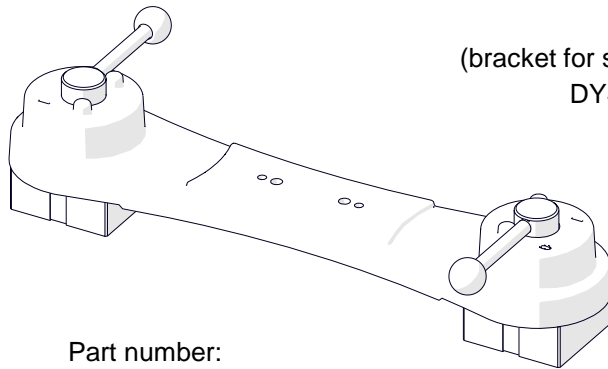


Part number:
PKT-0341-13-00-00-0

5.4. Magnetic units

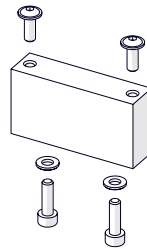
5.4.1. Magnetic unit

Allows clamping a semi-flexible or rigid track to ferromagnetic surfaces.

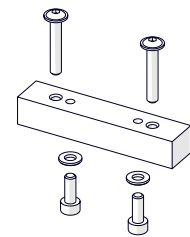


Part number:
 ZSP-0475-44-00-00-0 (magnetic unit)
 ZSP-0475-44-00-00-1 (heat-resistant magnetic unit)

Part number
 (bracket for semi-flexible track):
 DYS-0482-19-00-00-0

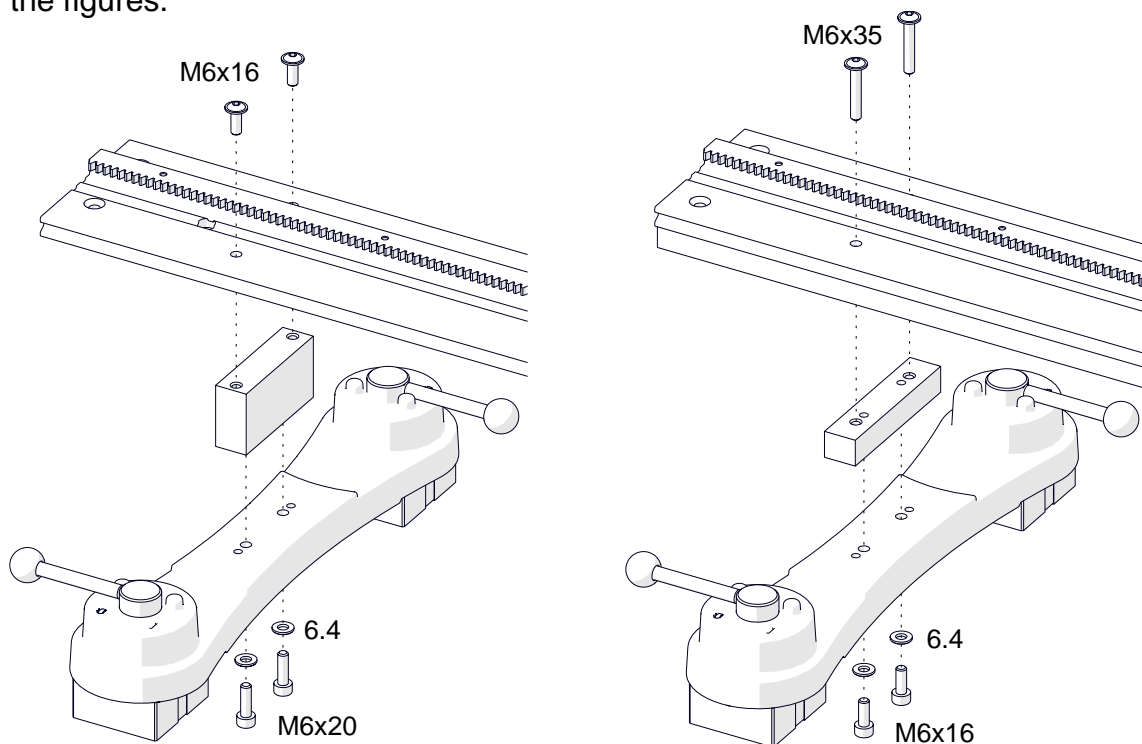


Part number
 (bracket for rigid track):
 DYS-0482-21-00-00-0



Holding force on a 5 mm (0.2") thick surface	Temperature	
	Magnetic unit	Heat-resistant magnetic unit
100% (1200 N)	20°C (68°F)	20°C (68°F)
75% (900 N)	80°C (176°F)	160°C (320°F)
50% (600 N)	120°C (248°F)	200°C (392°F)

Use the 4 mm hex wrench to attach the unit to a semi-flexible or rigid track as shown in the figures.



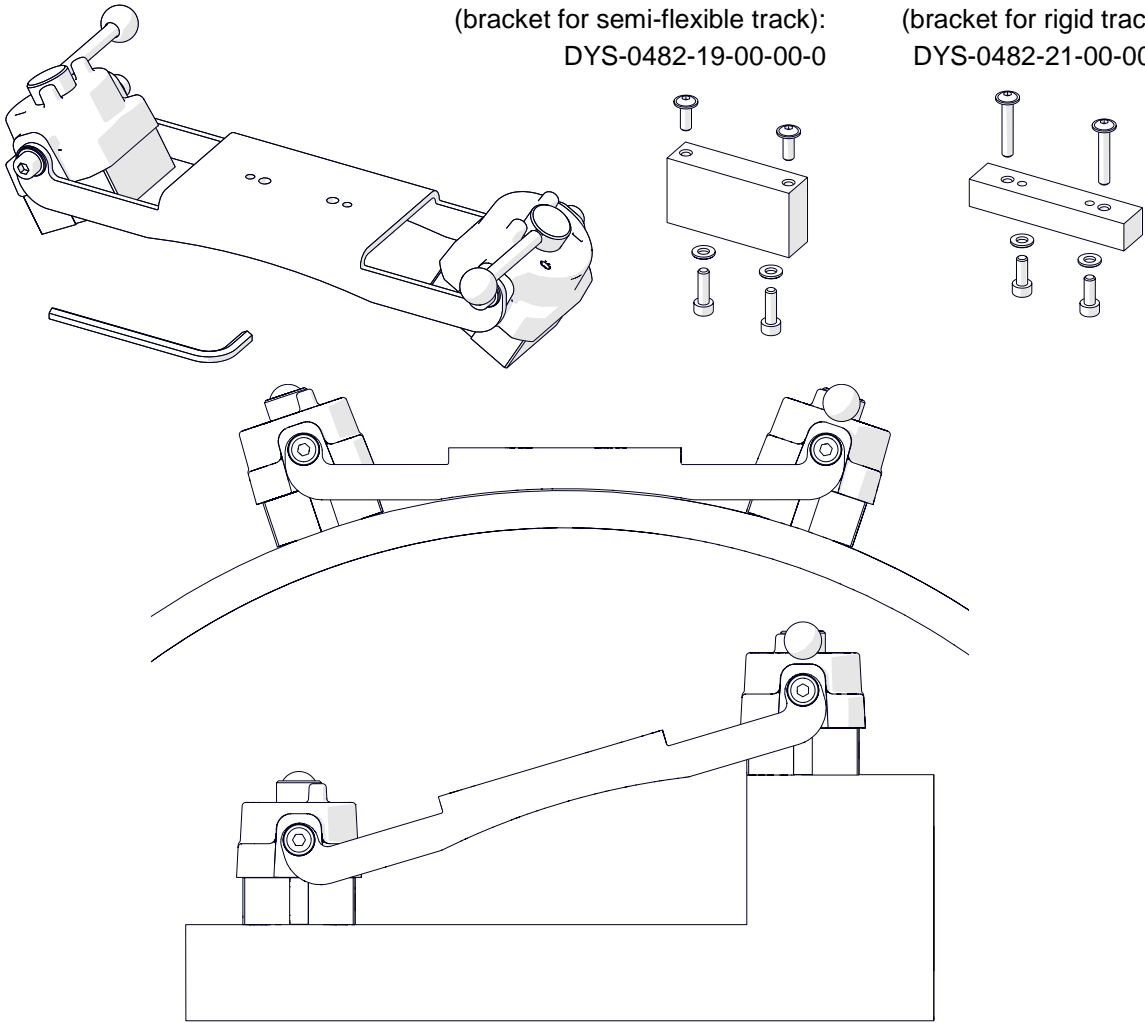
5.4.1. Pivoting magnetic unit

Allows clamping a semi-flexible or rigid track to ferromagnetic surfaces that are concave or convex, to pipes with outer diameters of at least 800 mm (31.5"), and to surfaces that differ in height up to 80 mm (3.1").

Part number:
ZSP-0475-85-00-00-0

Part number
(bracket for semi-flexible track):
DYS-0482-19-00-00-0

Part number
(bracket for rigid track):
DYS-0482-21-00-00-0

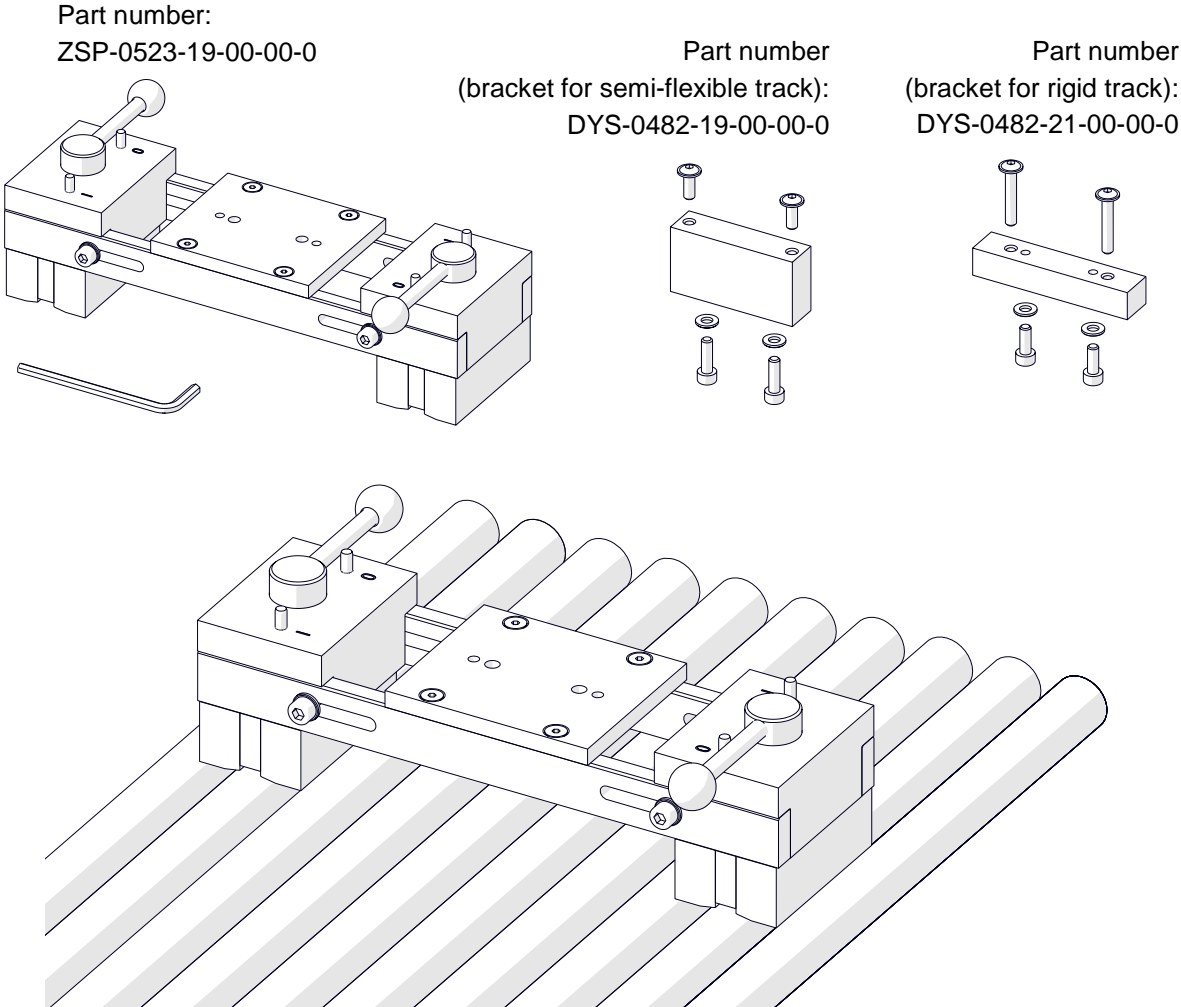


Holding force on a 5 mm (0.2") thick surface	Temperature
100% (1200 N)	20°C (68°F)
75% (900 N)	80°C (176°F)
50% (600 N)	120°C (248°F)

Install the unit in the same way as the magnetic unit is installed. To adjust the angle, use the 6 mm hex wrench and loosen four side screws.

5.4.2. Spacing-adjustable magnetic unit

Allows clamping a semi-flexible track or rigid track to two ferromagnetic pipes with diameters of 25–230 mm (1–9") and the distance between pipe axes of 170–230 mm (6.7–9.1").



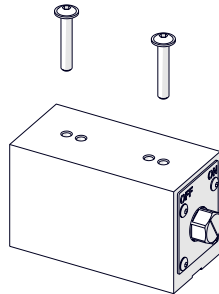
Holding force on a 5 mm (0.2") thick surface	Temperature
100% (1200 N)	20°C (68°F)
75% (900 N)	80°C (176°F)
50% (600 N)	120°C (248°F)

Install the unit in the same way as the magnetic unit is installed. To adjust the spacing, use the 5 mm hex wrench and loosen four side screws.

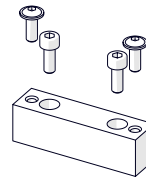
5.4.3. Narrow magnetic unit

Allows clamping a semi-flexible track or rigid track to ferromagnetic surfaces.

Part number:
PDS-0582-10-00-02-0

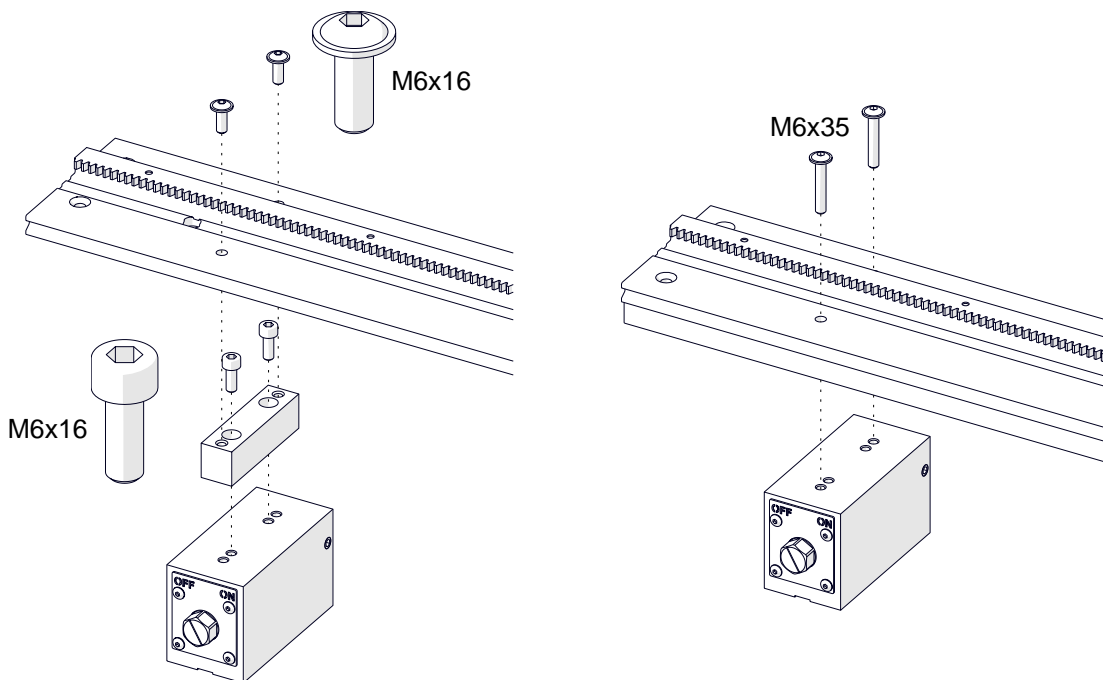


Part number
(bracket for semi-flexible track):
DYS-0582-10-00-00-0



Holding force on a 5 mm (0.2") thick surface	Temperature
100% (1000 N)	20°C (68°F)
75% (750 N)	80°C (176°F)
50% (500 N)	120°C (248°F)

Use the 4 mm hex wrench to attach the unit to a semi-flexible or rigid track as shown in the figures.

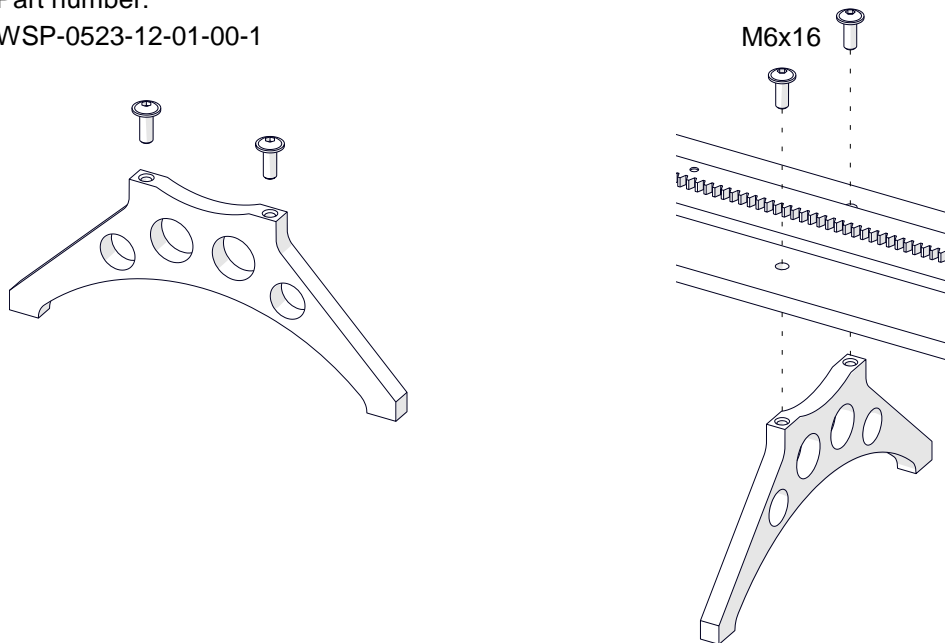


To clamp the unit to the surface, use the 17 mm flat wrench (not included) and set the side screw to ON.

5.5. Semi-flexible track support

Allows supporting a semi-flexible track by using the support instead of a magnetic unit. Use the 4 mm hex wrench to attach the support to a semi-flexible track.

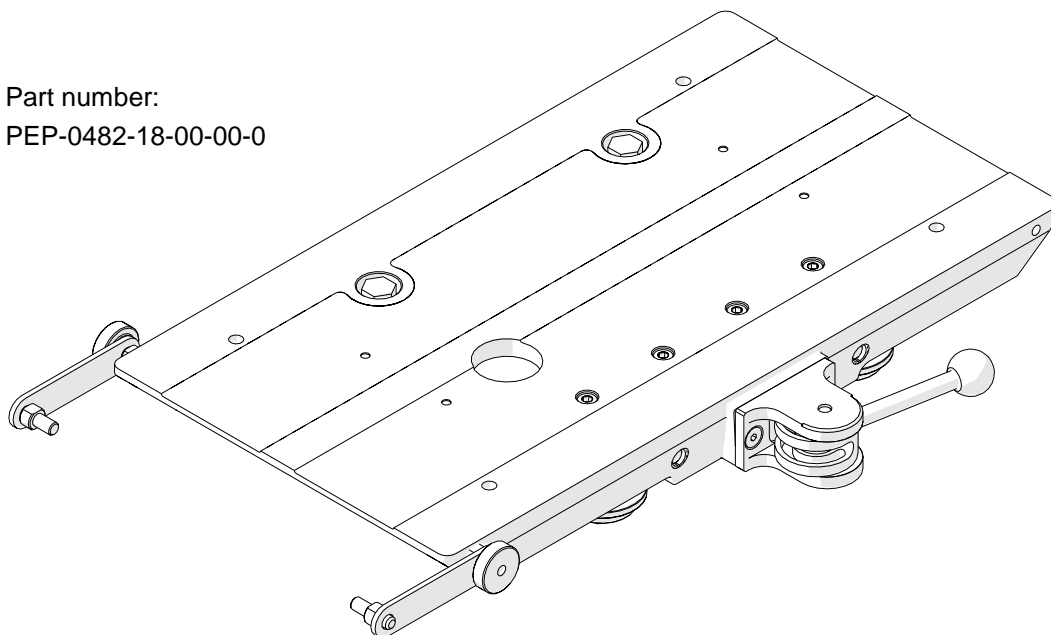
Part number:
WSP-0523-12-01-00-1



5.6. Transport attachment

Allows transporting the wire feeder.

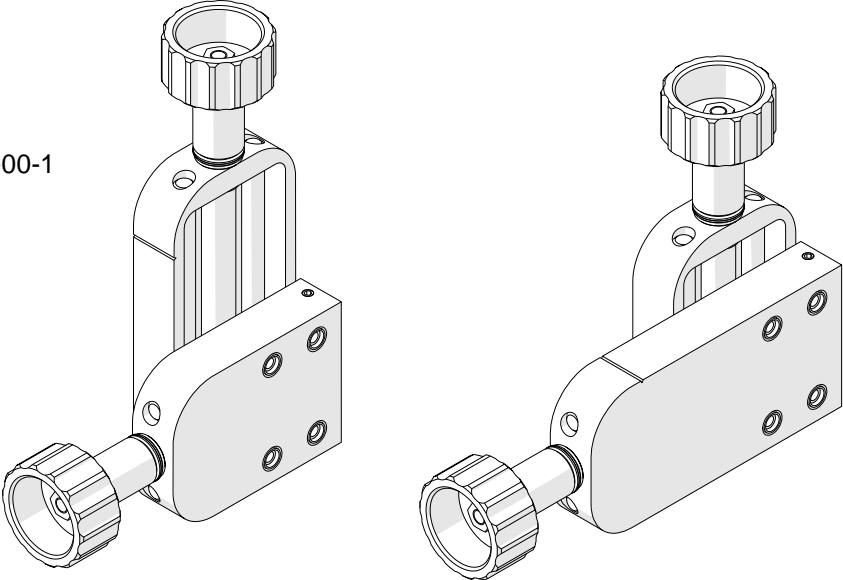
Part number:
PEP-0482-18-00-00-0



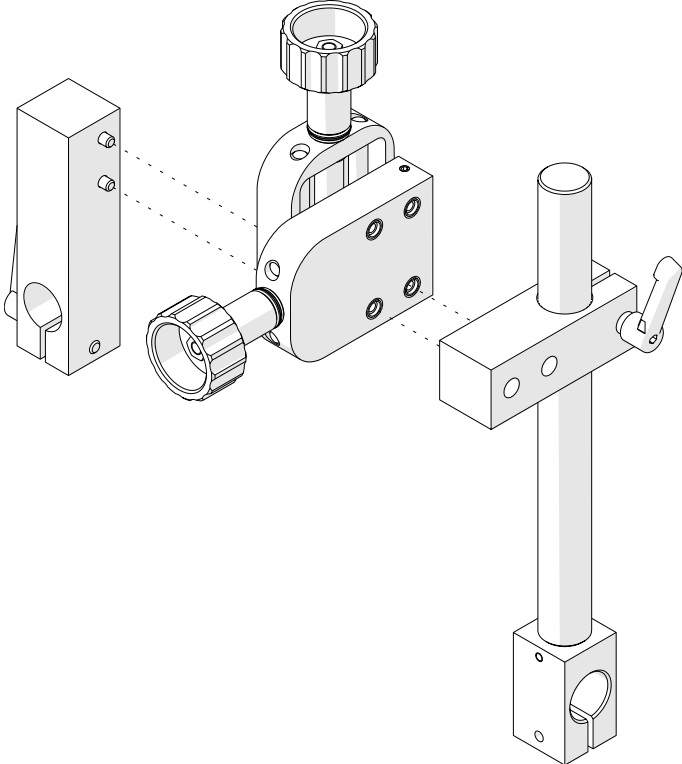
5.7. 76 mm cross slide

Extends either up-down or left-right adjustment range from 0–35 mm (0–1.38") to 0–76 mm (0–3").

Part number:
ZSP-0466-46-00-00-1

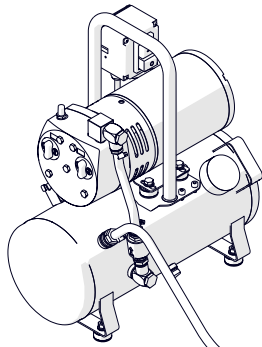


Install in place of the standard cross slide after unscrewing four screws with the 4 mm hex wrench.



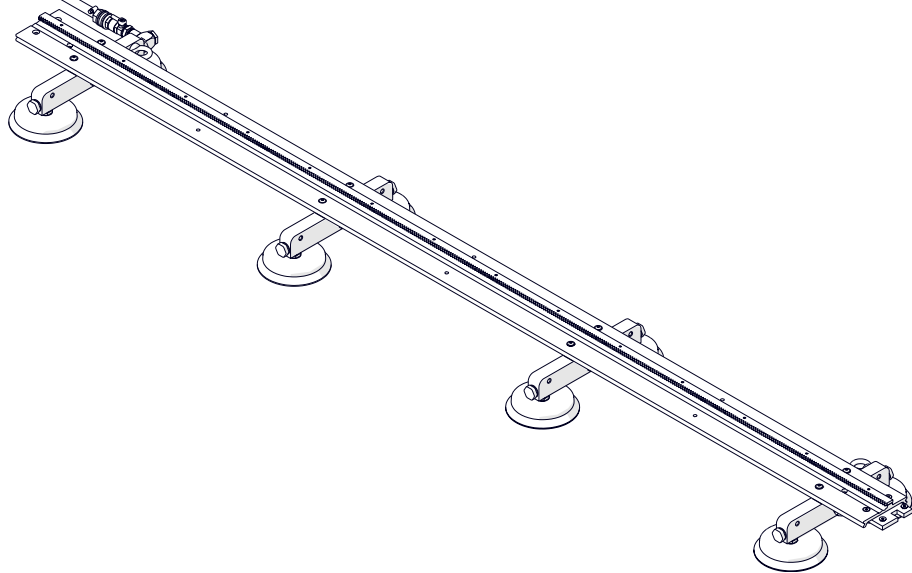
5.8. Vacuum track system

Dedicated to fixing the track to non-ferromagnetic surfaces.



Part number (vacuum pump with safety reservoir):
AGR-0541-10-10-00-0 (115 V UK)
AGR-0541-10-20-00-0 (230 V CEE)

Other parts of the system are described in a separate manual.

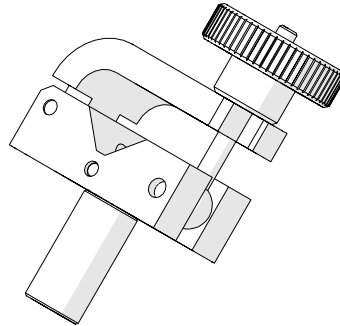


5.9. Torch clamps

5.9.1. 16–22 mm torch clamp

Allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").

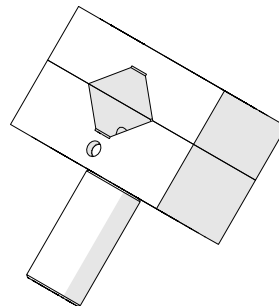
Part number:
ZRZ-0466-04-01-00-0



5.9.2. 16–22 mm torch clip

The clip allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").
Use the 4 mm hex wrench to tighten the torch in the clip.

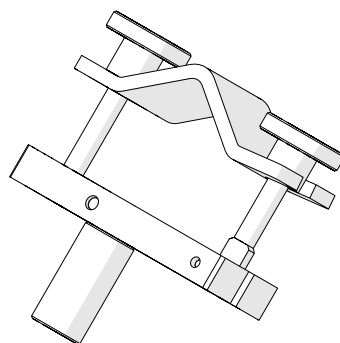
Part number:
ZCS-0476-06-01-00-0



5.9.3. 22–35 mm torch clamp

Allows using a torch with the handle diameter of 22–35 mm (0.87–1.38").

Part number:
ZRZ-0466-19-00-00-0

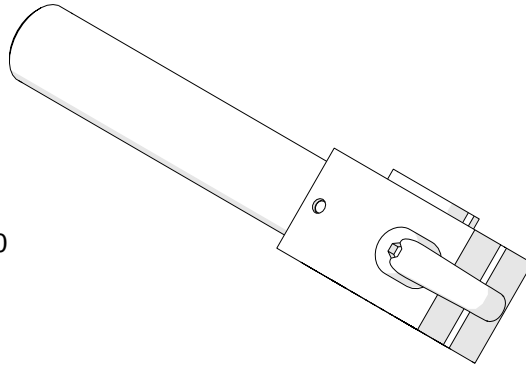


5.10. Rods

5.10.1. Short rod

Provides a 120 mm (4.7") reach.

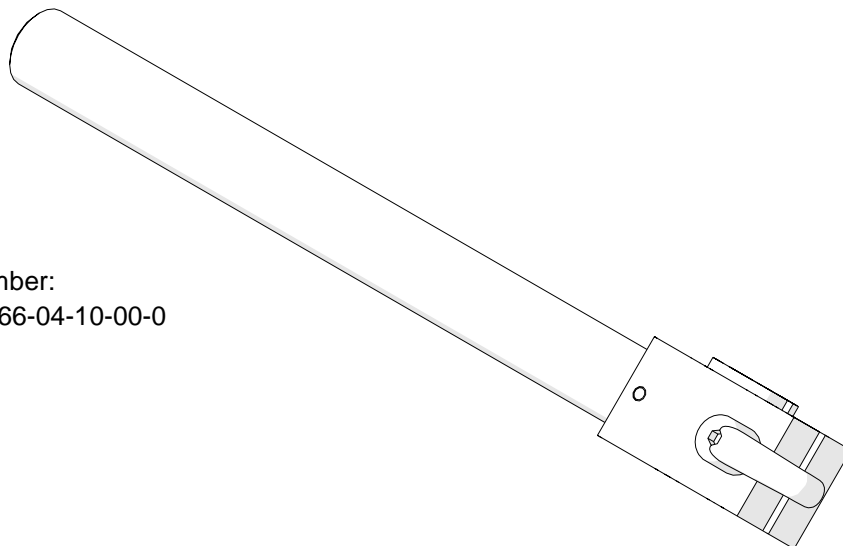
Part number:
WLK-0476-20-01-00-0



5.10.2. Long rod

Provides a 240 mm (9.4") reach.

Part number:
WLK-0466-04-10-00-0

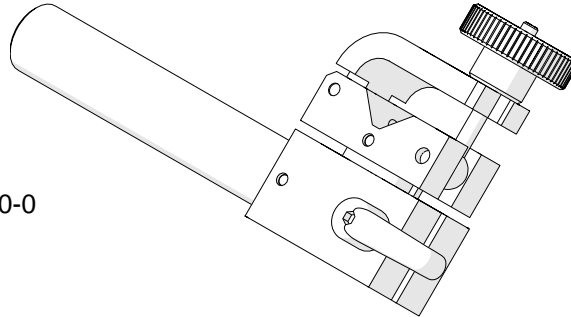


5.11. Torch holders

5.11.1. Short rod torch holder with clamp

Allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").

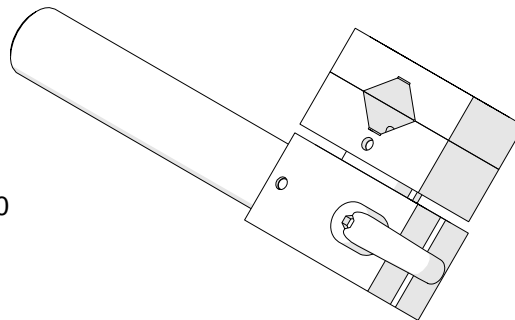
Part number:
UCW-0476-20-00-00-0



5.11.2. Short rod torch holder with clip

The holder allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").
Use the 4 mm hex wrench to tighten the torch in the clip.

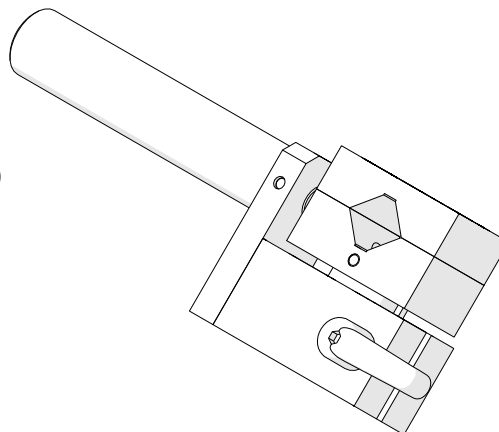
Part number:
UCW-0476-27-00-00-0



5.11.3. Short rod low torch holder with clip

The holder allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").
Use the 4 mm hex wrench to tighten the torch in the clip.

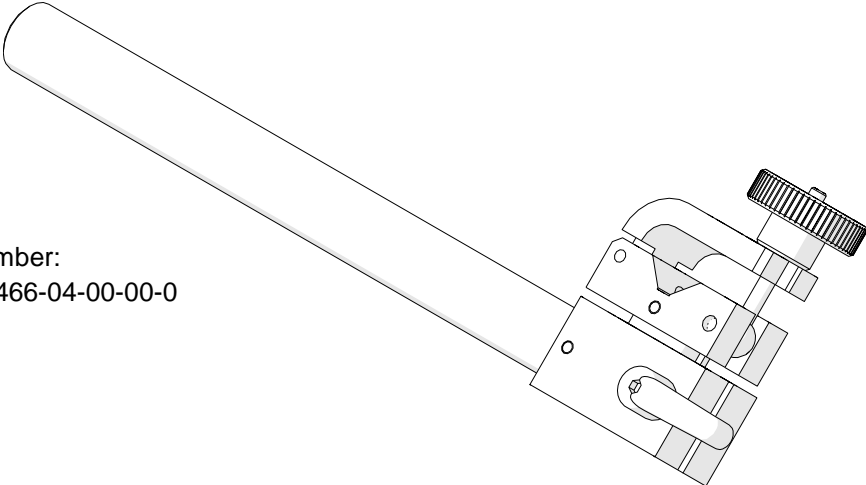
Part number:
UCW-0476-06-00-00-0



5.11.4. Long rod torch holder with clamp

Allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").

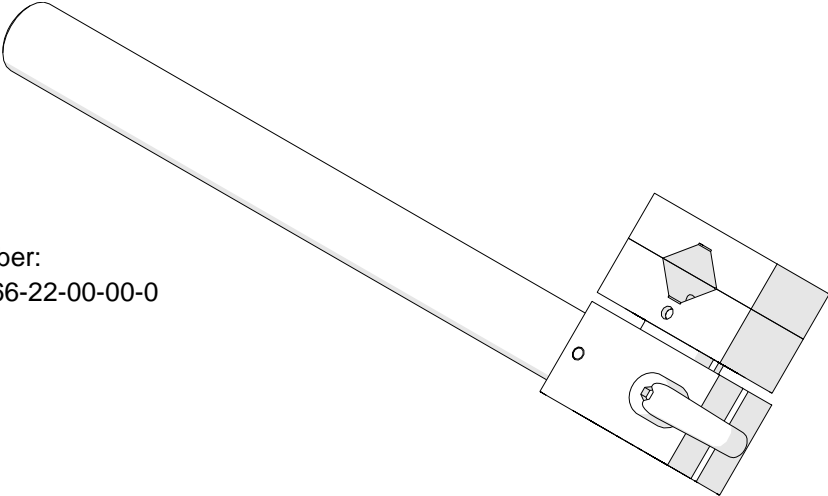
Part number:
UCW-0466-04-00-00-0



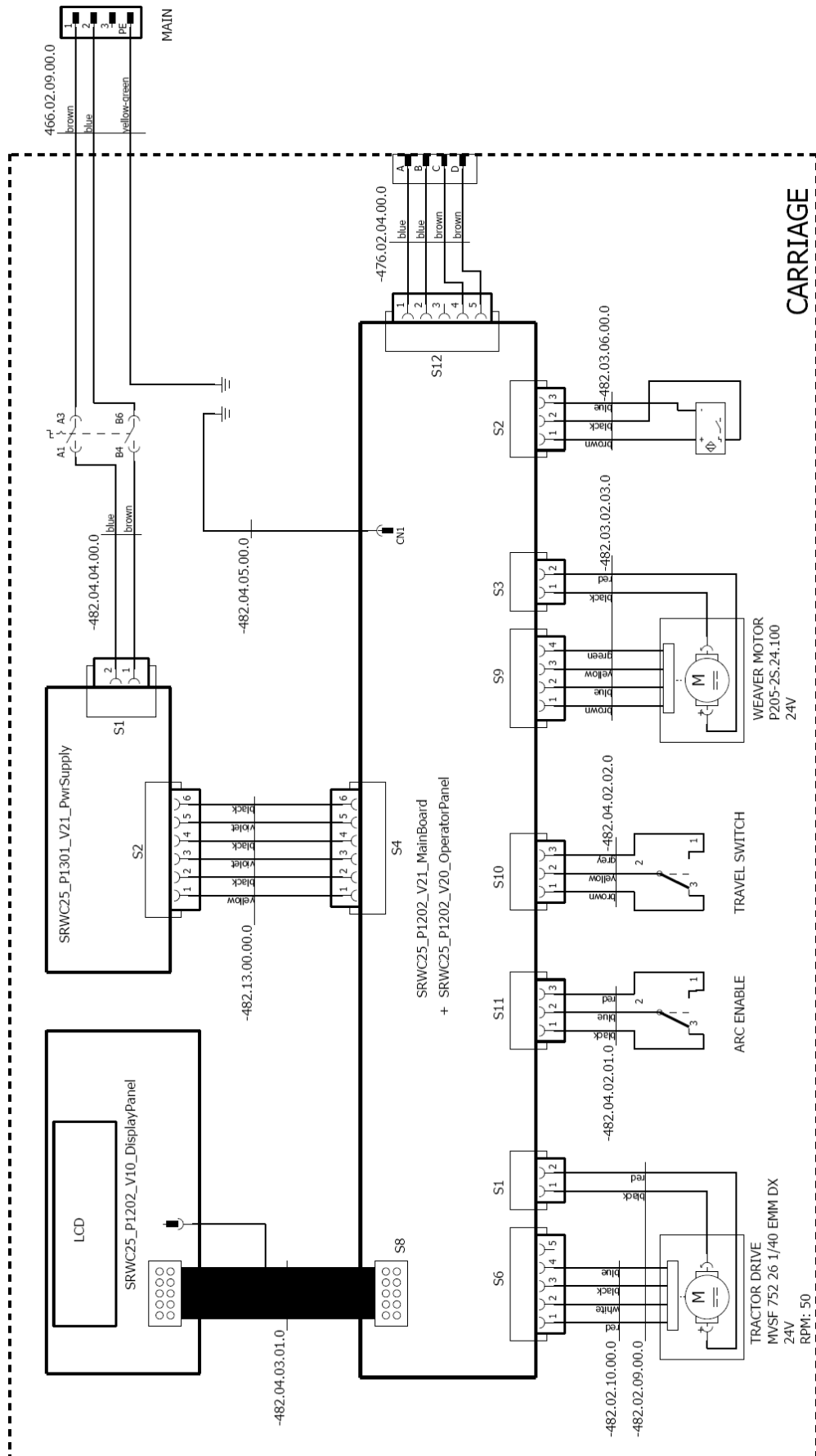
5.11.5. Long rod torch holder with clip

The holder allows using a torch with the handle diameter of 16–22 mm (0.63–0.87").
Use the 4 mm hex wrench to tighten the torch in the clip.

Part number:
UCW-0466-22-00-00-0



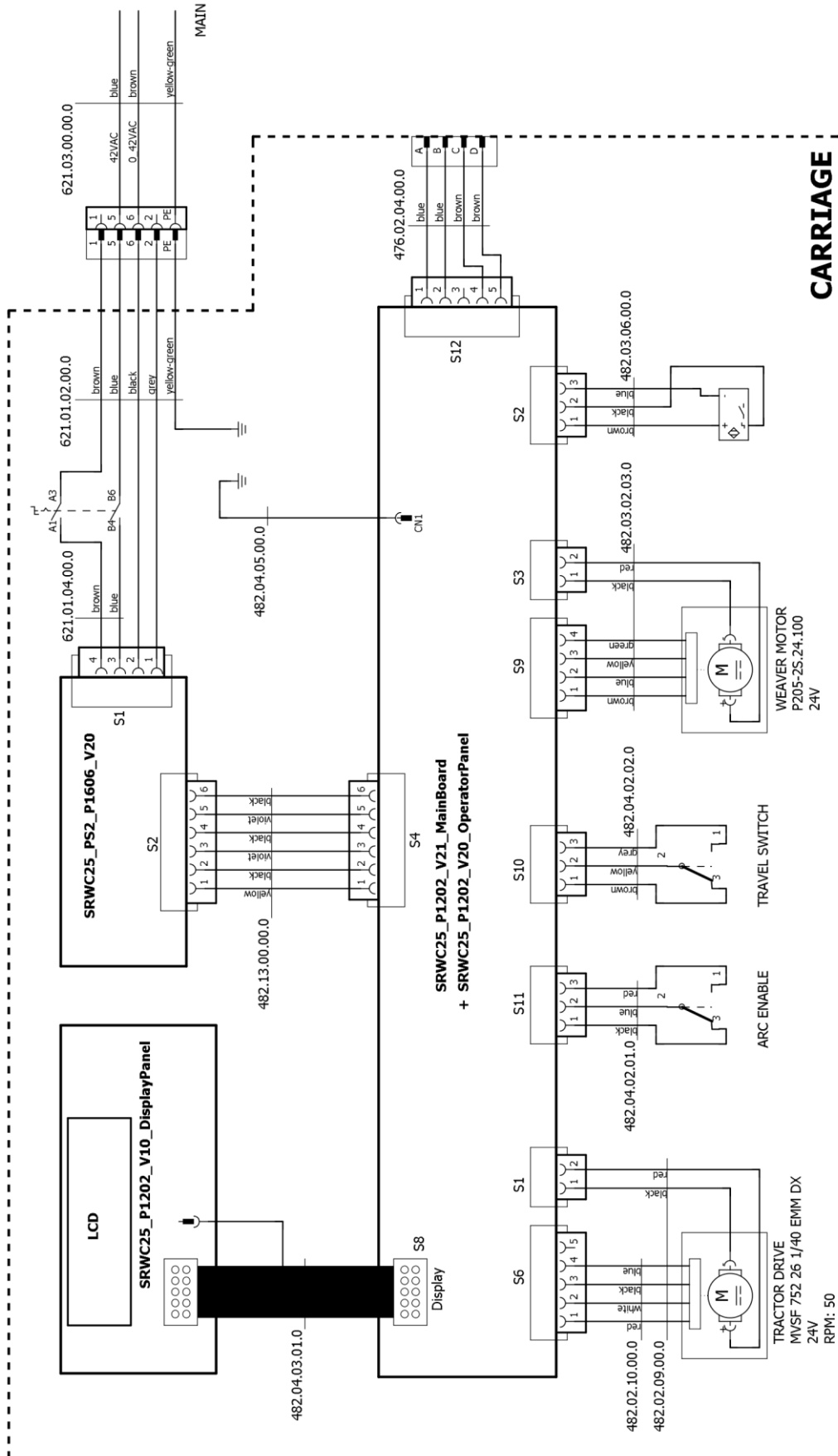
6. 115-230 V WIRING DIAGRAM



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7. 42 V WIRING DIAGRAM



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8. DECLARATION OF CONFORMITY

EC Declaration of Conformity

We

***JEI Group Ltd
Unit 21 Empire Business Park
Enterprise Way, Burnley
Lancashire, BB12 6LT***

declare with full responsibility that:

Rail Bull Welding Carriage

is manufactured in accordance with the following standards:

- EN 50144-1
- EN 60974-10

and satisfies safety regulations of the guidelines: 2004/108/EC, 2006/95/EC, 2006/42/EC.

Person authorized to compile the technical file:

David McFadden, Unit 21 Empire Business Park, Burnley



Burnley, 21 January 2013

David McFadden
Managing Director

9. WARRANTY CARD

WARRANTY CARD No.....

..... in the name of Manufacturer warrants the Rail Bull Welding Carriage to be free of defects in material and workmanship under normal use for a period of 12 months from the date of sale.

This warranty does not cover rollers as well as damage or wear that arise from misuse, accident, tempering, or any other causes not related to defects in workmanship or material.

Serial number

Date of sale

Signature of seller.....

2.16 / 13 May 2019

WE RESERVE THE RIGHT TO MAKE CHANGES IN THIS MANUAL WITHOUT NOTICE