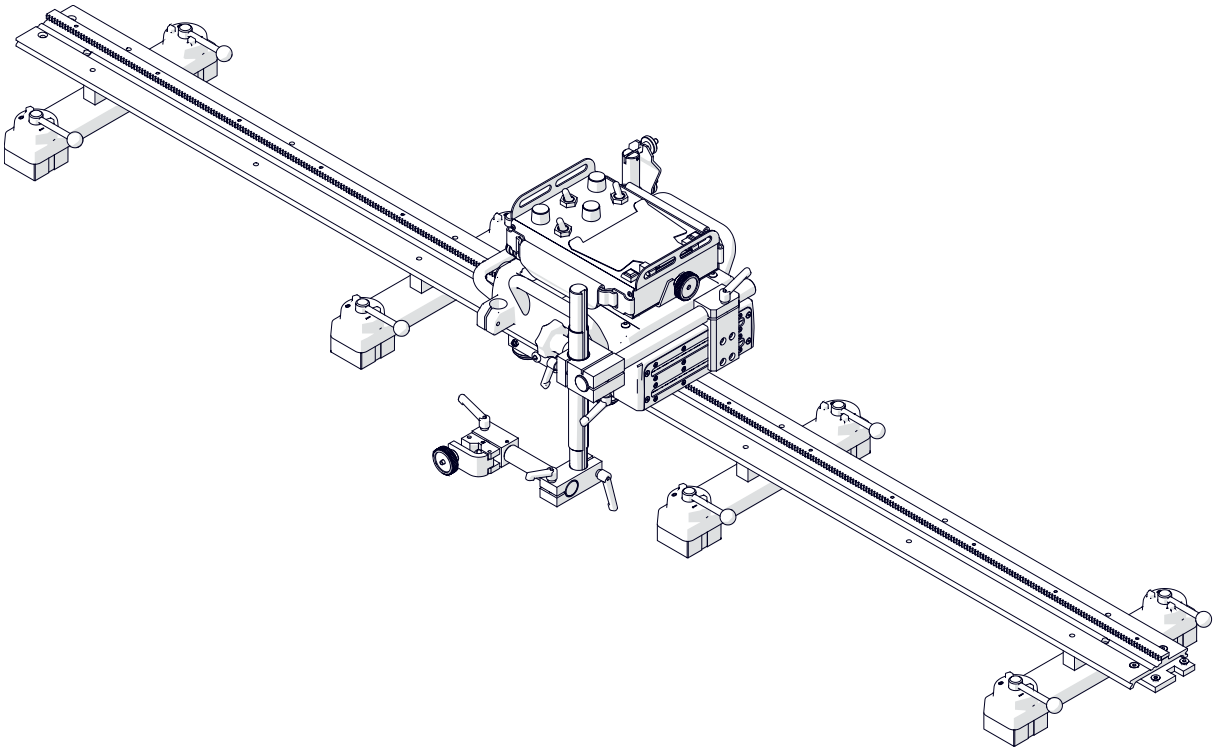
INDUSTRIAL PRODUCTS ®

RAIL TITAN

WELDING CARRIAGE

OPERATOR'S MANUAL



BEFORE USE, ENSURE EVERYONE USING THIS MACHINE READS AND UNDERSTANDS
ALL SAFETY AND OPERATING INSTRUCTIONS IN THIS MANUAL .

Serial #..... Date of Purchase.....

Ver: 1.03 22/05/2023

LIMITED WARRANTY

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This warranty is void if the item has been damaged by accident, neglect, improper service or other causes not arising out of defects in materials or workmanship. This warranty does not apply to machines and/or components which have been altered, changed, or modified in any way, or subjected to overloading or use beyond recommended capacities and specifications. Worn componentry due to normal wear and tear is not a warranty claim. Goods returned defective shall be returned prepaid freight to ITMS or agreed repair agent, which shall be the buyer's sole and exclusive remedy for defective goods. ITMS accepts no additional liability pursuant to this guarantee for the costs of travelling or transportation of the product or parts to and from ITMS or the service agent or dealer, such costs are not included in this warranty.

Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure and to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

THE MANUFACTURER RESERVES THE RIGHT TO MAKE IMPROVEMENTS AND MODIFICATIONS TO DESIGN WITHOUT PRIOR NOTICE.

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1. GENERAL INFORMATION

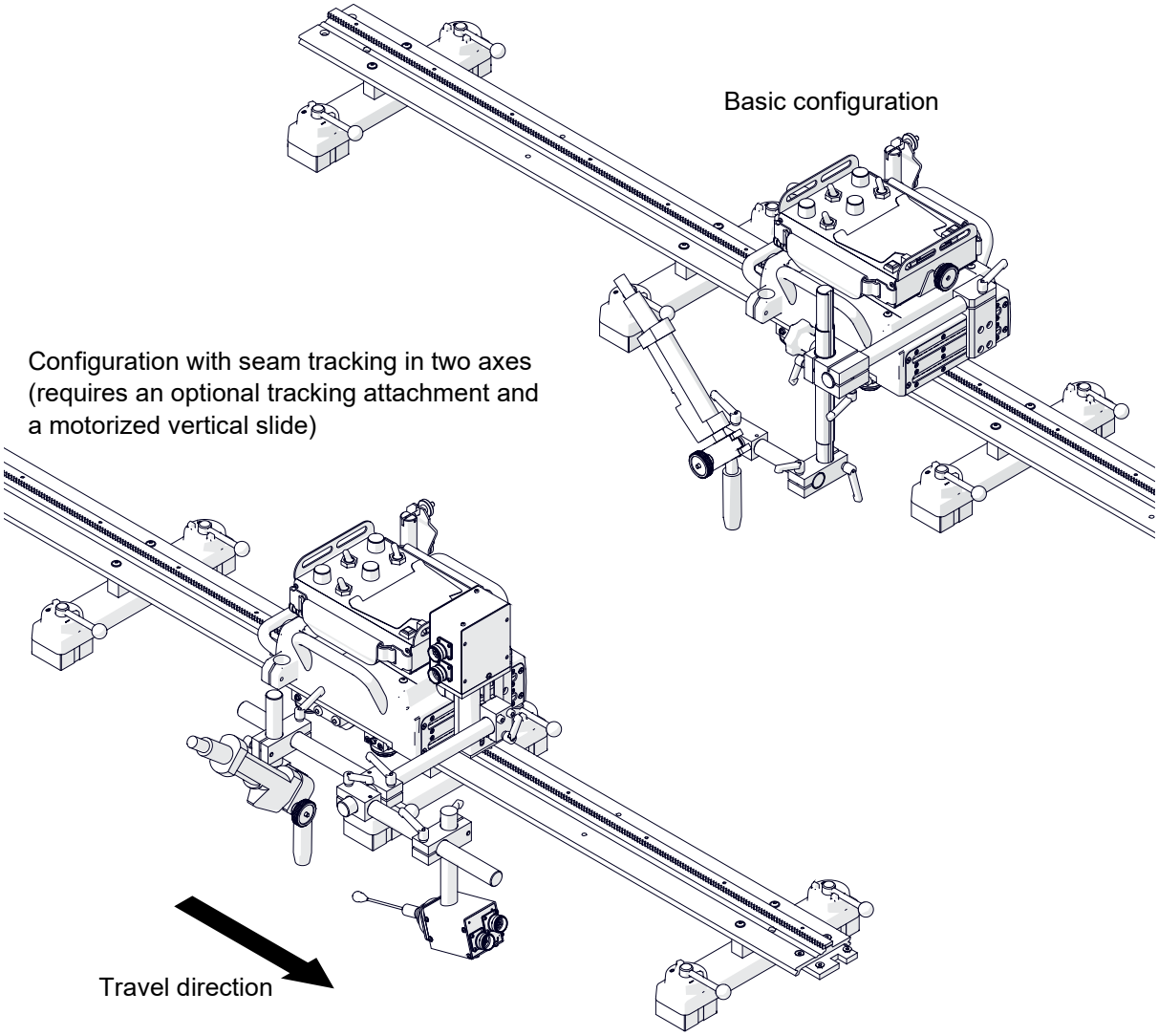
1.1. Application

The Rail Titan is a track carriage designed to make butt and fillet welds with or without oscillation and to cut. The carriage allows MIG/MAG, TIG, oxy-fuel, or plasma torches. The track is clamped with magnetic units to ferromagnetic surfaces that are flat or curved.

Accessories allow using torches with a larger diameter, guiding the carriage on a hi-flex, semi-flex, rigid, or ring track, and tracking the welding seam. Using a vacuum track system allows the track to be clamped to surfaces that are non-ferromagnetic.

The machine is designed for use by a professional operator only.

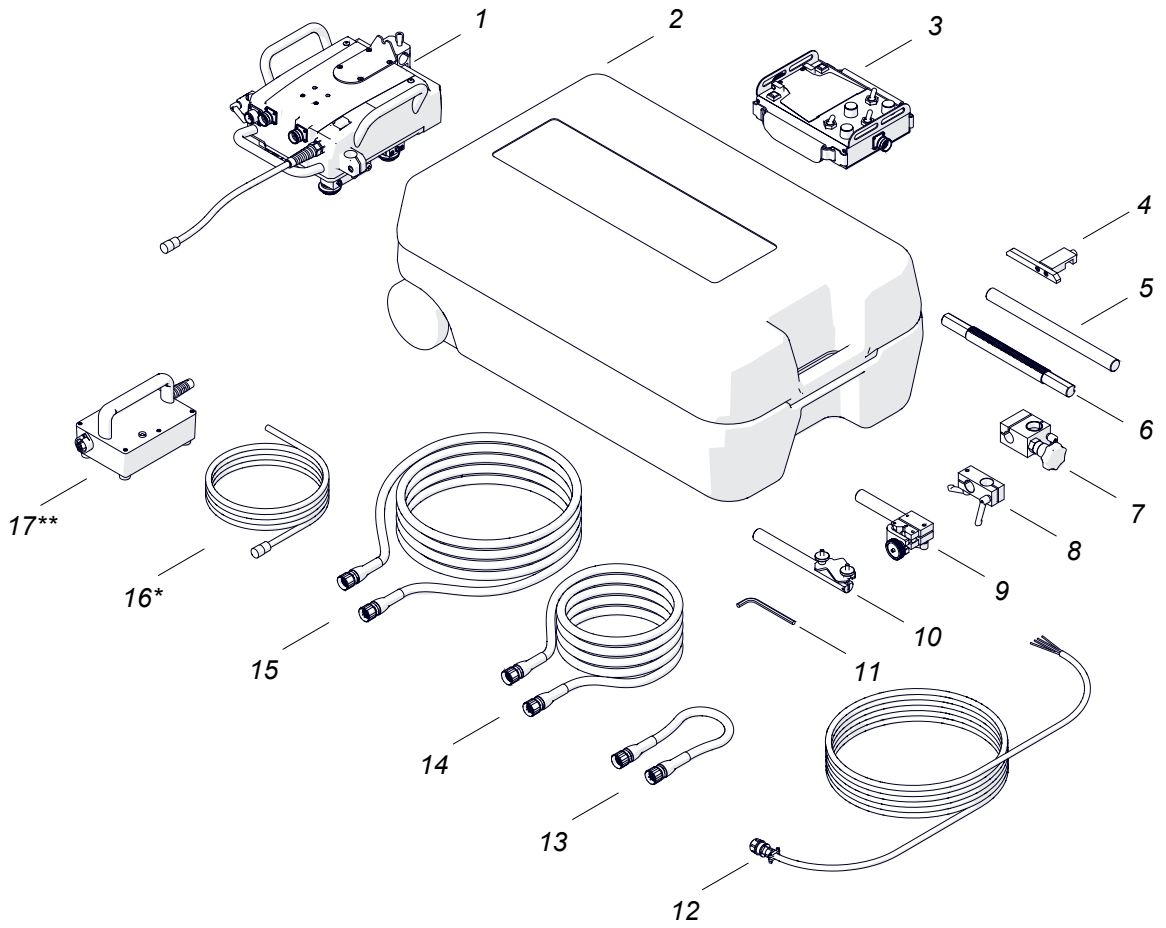
Two intended configurations are shown in the figure.



1.2. Technical data

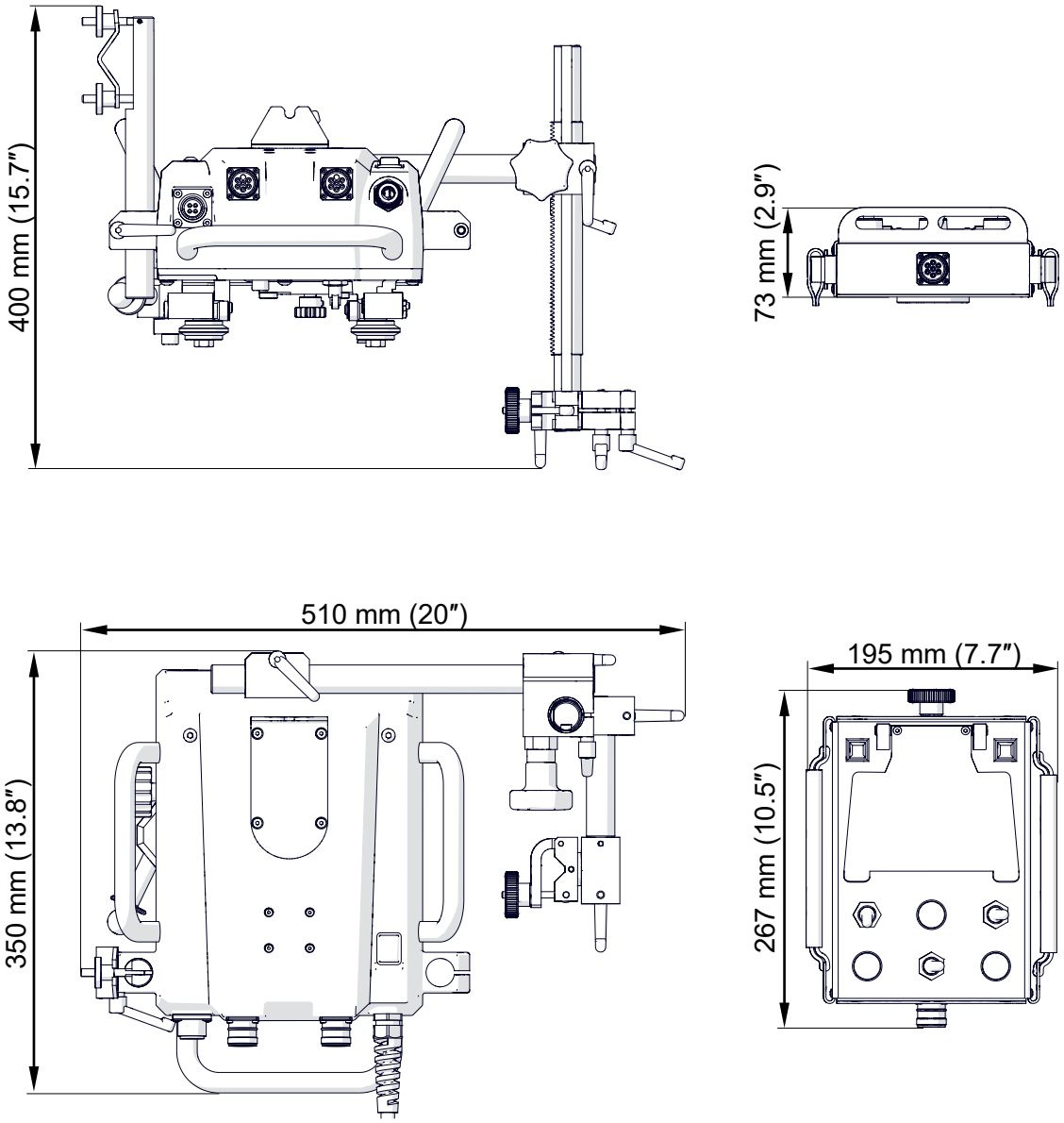
Voltage			1~ 100–240 V, 50–60 Hz 1~ 42 V, 50–60 Hz
Power			120 W
Welding position (according to EN ISO 6947 and AWS/ASME)		Horizontal	PA/1F/1G PB/2F PC/2G PD/4F PE/4G
		Vertical	PF/3G PG/3F (contact your dealer) PG/3G
Diameter of round workpiece	Ring tracks (OD)		200 mm (8″) – 3 m (10 ft)
	Hi-flex tracks (OD)		Minimum 1.5 m (5 ft)
	Hi-flex tracks (ID)		Minimum 3.4 m (11 ft)
	Custom rolled tracks (OD)		3–10 m (10–32 ft) (contact your dealer)
	Semi-flex tracks (OD)		Minimum 10 m (32 ft)
Torch type			MIG/MAG, TIG, oxy-fuel, plasma
MIG/MAG torch diameter			16–22 mm (0.63–0.87″)
Minimum workpiece thickness for magnetic clamping			5 mm (0.2″)
Horizontal pulling force			400 N
Vertical pulling force			315 N
Horizontal speed			0–250 cm/min (0–98 in/min)
Vertical speed			0–250 cm/min (0–98 in/min)
Oscillation type			Linear
Weld path			Straight, triangle, trapezoid, square
Oscillation width			0.1–11.8 cm (0.04–4.5″)
Oscillation speed			10–200 cm/min (5–78 in/min)
Oscillation dwell time at center and on ends			0–5 s
Maximum oscillator pulling force			100 N
Minimum path curve radius		Outer	200 mm (7.9”)
		Inner	1750 mm (68.9”)
Required ambient temperature			0–50°C (32–122°F)
Maximum allowed ambient humidity non-condensing			80%
Protection level			IP 20
Weight (with remote control)			13 kg (29 lbs)

1.3. Equipment included

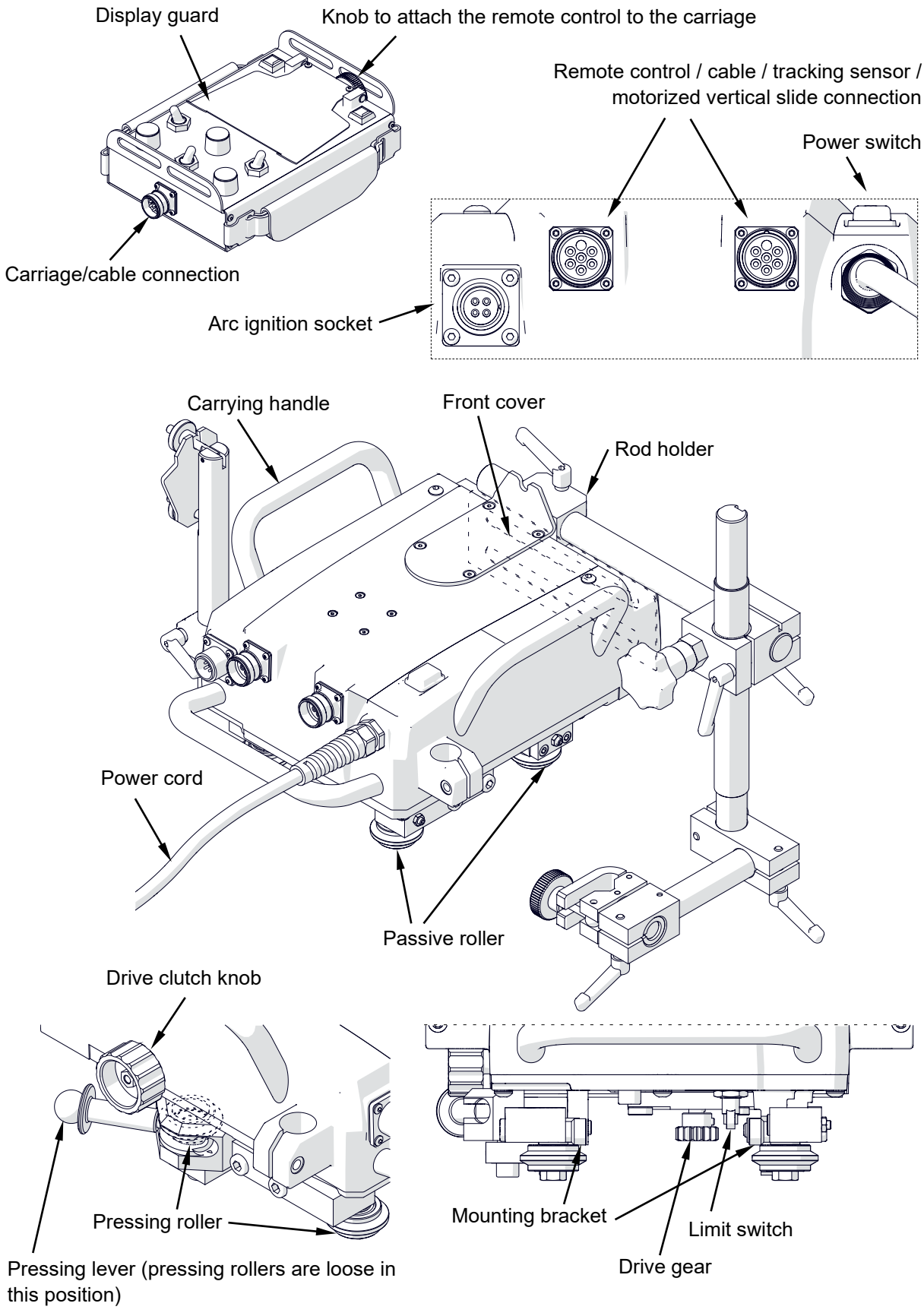


1	Carriage	1 unit
2	Plastic box	1 unit
3	Remote control	1 unit
4	Contact block	1 unit
5	Rod 300 mm (12″)	1 unit
6	Rack 300 mm (12″) with 180 mm (7″) adjustment	1 unit
7	Rack holder	1 unit
8	Clamping block with levers	1 unit
9	Short rod torch holder with clamp	1 unit
10	Cable anchor	1 unit
11	Hex wrench 6 mm	1 unit
12	Arc ignition cable 6.5 m (21 ft)	1 unit
13	Cable 0.5 m (1.5 ft)	1 unit
14	Cable 3 m (10 ft)	1 unit
15	Cable 5 m (16.5 ft)	1 unit
16	Power cord 3 m (10 ft) ** only for Rail Titan 100–240 V*	1 unit
17	Power supply *** only for Rail Titan 42 V*	1 unit
–	Operator's Manual	1 unit

1.4. Dimensions



1.5. Design


Display guard
Knob to attach the remote control to the carriage
Remote control / cable / tracking sensor / motorized vertical slide connection
Power switch
Carriage/cable connection
Arc ignition socket
Carrying handle
Front cover
Rod holder
Power cord
Passive roller
Drive clutch knob
Pressing roller
Pressing lever (pressing rollers are loose in this position)
Mounting bracket
Limit switch
Drive gear

2. SAFETY PRECAUTIONS

1. Before use, read this Operator's Manual and complete a training in occupational safety and health.
2. Use only in applications specified in this Operator's Manual.
3. Make sure that the carriage, remote control, and other equipment have all parts. Make sure that all parts are genuine and not damaged.
4. Make sure that the specifications of the power source are the same as those specified on the rating plate.
5. Do not carry the carriage, remote control, and other equipment by cables. Do not pull the cables. This can cause damage and electric shock.
6. Keep untrained bystanders away from the carriage.
7. Before each use, ensure the correct condition of the carriage, power supply, remote control, and other equipment, power source, cables, connections, rollers, and gear.
8. Before each use, make sure that no part is cracked or loose. Make sure to maintain correct conditions that can have an effect on the operation of the carriage.
9. Keep the carriage, remote control, and other equipment dry. Do not expose them to rain, snow, or frost.
10. Keep the worksite well lit, clean, and free of obstacles.
11. Do not use near flammable materials, 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.
15. Connect the cables only after you set the power switch to 'O'.
16. Keep the sockets clean. Do not use high pressure during cleaning.
17. Install only torches whose diameter matches the diameter of the torch holder.
18. Hang the cables to decrease the load applied on the carriage.
19. Do not bend the hi-flex track to a radius less than 0.75 m (2.5 ft).
20. Do not bend the semi-flex track to a radius less than 5 m (16.5 ft).
21. Use the rigid track only on flat surfaces.
22. At heights, protect the carriage and the track from falling. To do this, use chains (not included) to attach the leftmost and rightmost magnetic units of the hi-flex,

semi-flex or rigid track to a stable structure. To protect the carriage, attach a chain to a carrying handle. Make sure that the chains are not loose.

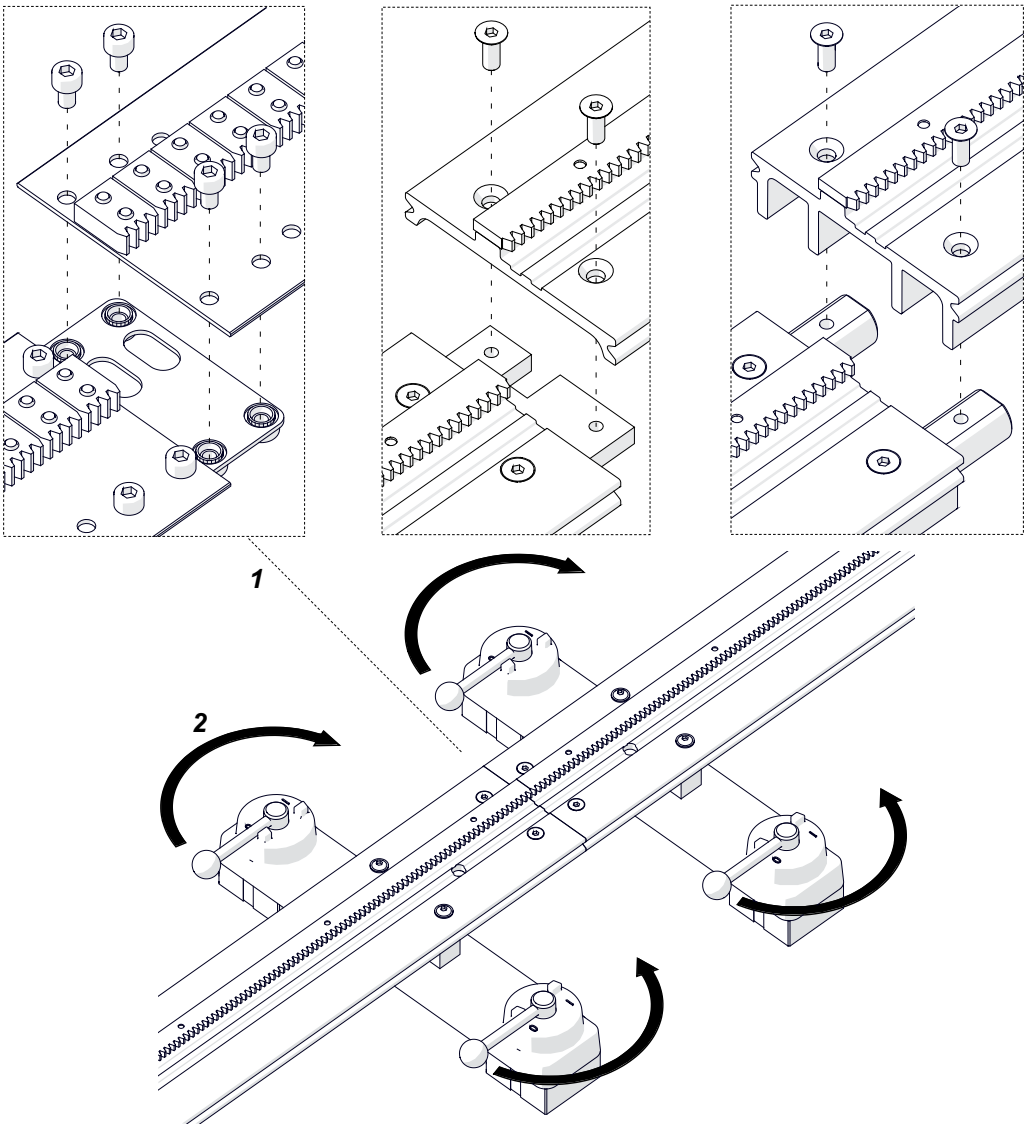
23. Do not stay below the carriage or the track that is put at heights.
24. Use eye protection (helmet, shield, and screen), ear protection, gloves, and protective clothing. Do not use loose clothing.
25. Do not stop the carriage by hand. To stop, set the direction switch to 'O'.
26. Do not touch moving parts, and do not put fingers in the front cover holes.
27. Do the maintenance only after you unplug the carriage from the power source.
28. Repair only in a service center appointed by the seller.
29. If the carriage falls, is wet, or has any damage, stop the work and immediately send the carriage to the service center for check and repair.
30. Do not leave the carriage unattended during work.
31. If you are not going to use the carriage, remove it from the worksite and keep in a safe and dry place.

3. STARTUP AND OPERATION

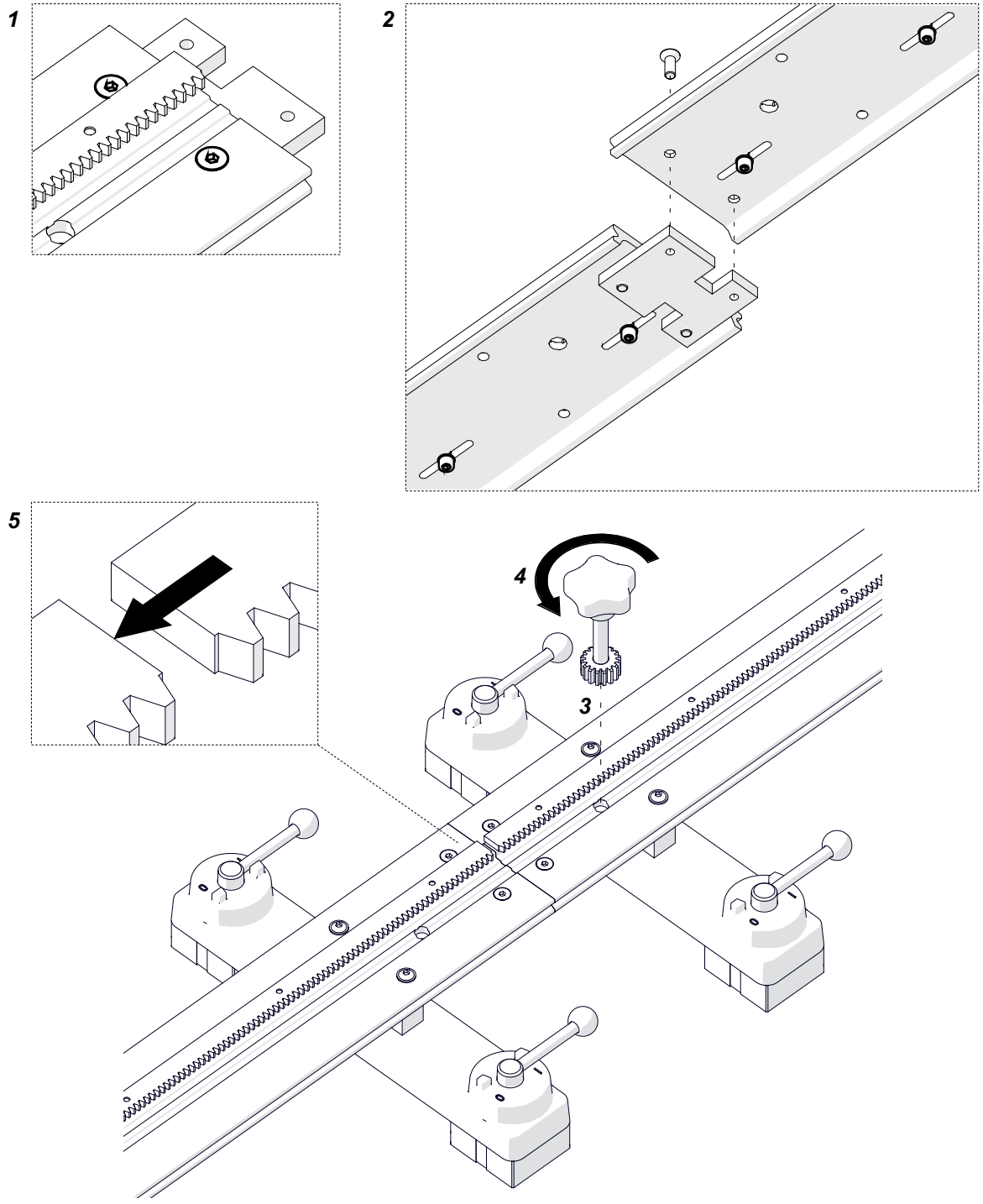
3.1. Assembling the hi-flex, semi-flex, or rigid track

Attach magnetic units to the rail, and put it on the workpiece. Use the 4 mm or 5 mm hex wrench to attach more rails (*1*). Then, set the levers of the magnetic units to 'I' (*2*). This will clamp the rails to the surface.

When working in PC/2G welding position, put the rails so that the teeth of the racks point down.

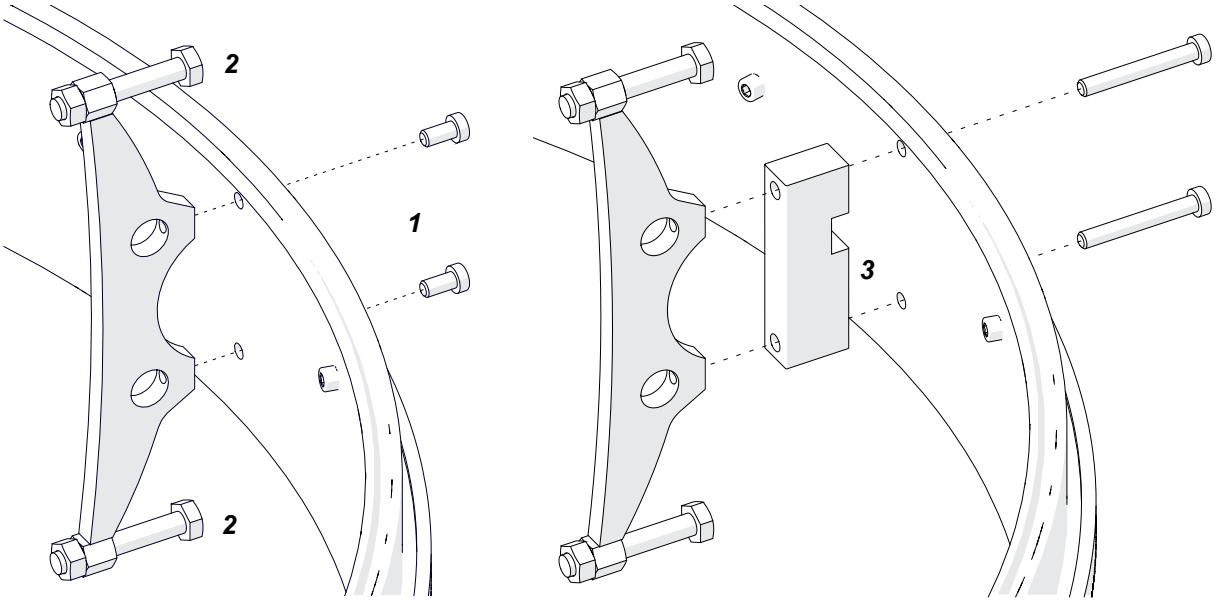


If a semi-flex rail is put on a curve, before you attach more rails use the 4 mm hex wrench to loosen the screws of the connecting plates (*1*) and of the racks (*2*). Next, attach the rails, clamp them with levers, and then tighten the connecting plates. Put the rack adjustment tool (not included) into 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*).

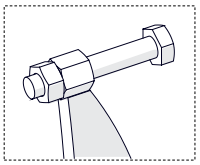


3.2. Assembling the ring track

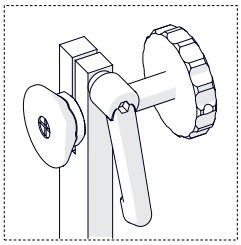
Select the track that matches the outer diameter of the round workpiece. Use the 4 mm hex wrench to attach the supports to the rails (*1*). Next, on all supports, move back the bolts (*2*, or screws) as much as possible. To clamp the track to the workpiece with a smaller diameter, you can use brackets (*3*). But this will decrease the stiffness of the clamping.



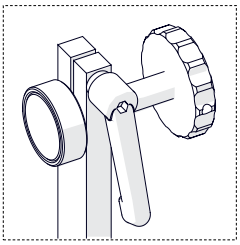
Bolt
25 mm (1″) adjustment range



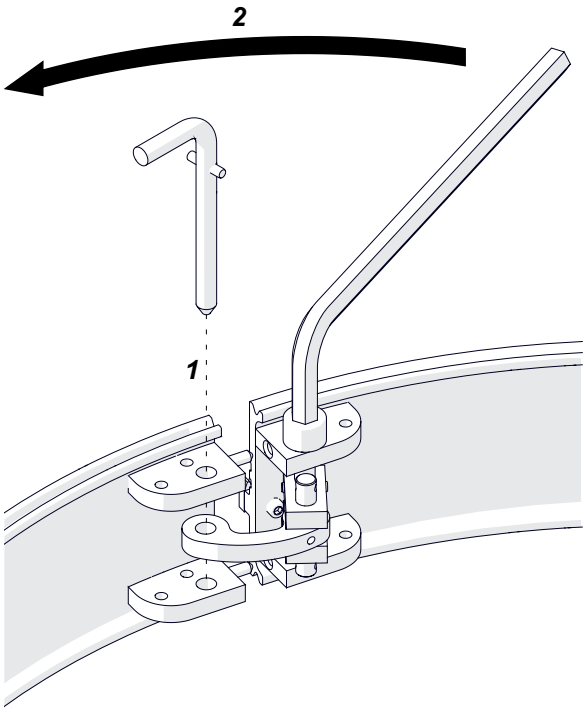
Screw with plastic foot
25 mm (1″) adjustment range



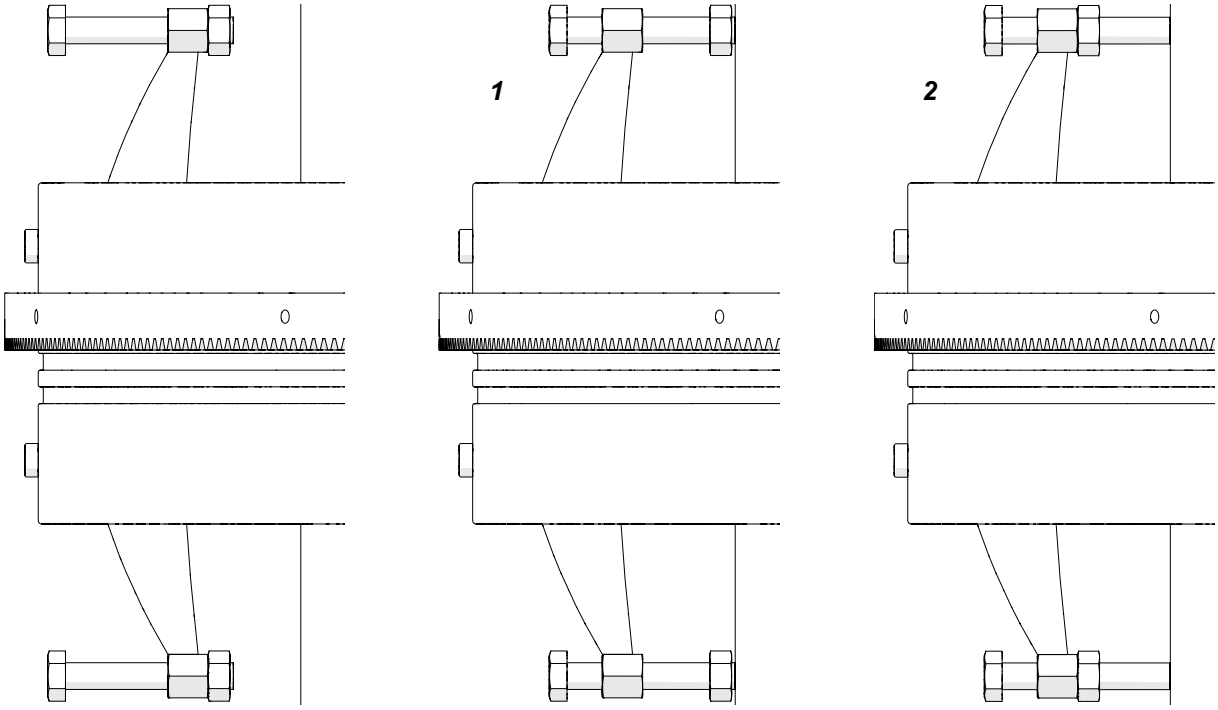
Screw with magnet
25 mm (1″) adjustment range



Put the workpiece vertically, and then put the rails onto the workpiece so that the teeth of the racks point down. Next, for all rails, use the 12 mm hex wrench to set the hinge as shown. Then, put the lock pin through the holes (*1*), and then rotate the wrench (*2*) to connect the rails.

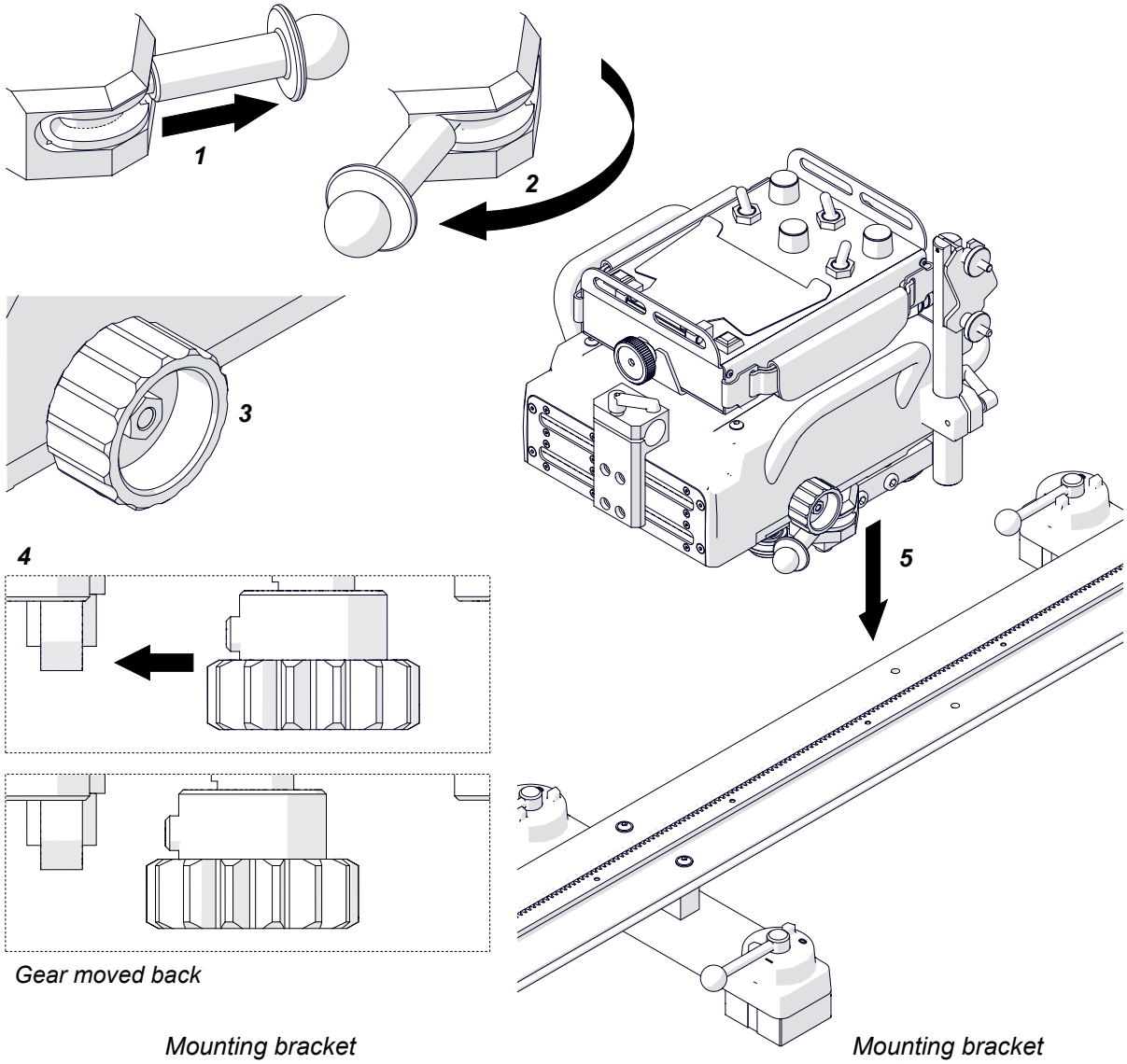


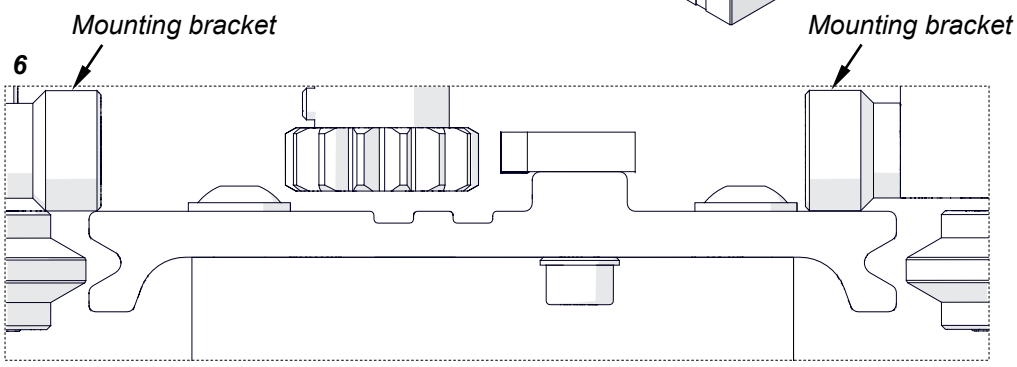
Use the 13 mm flat wrench to adjust the bolts (or the screws by hand) until they are in contact with the workpiece (*1*). Adjust each support equally to make the track concentric to the workpiece. Lock the supports with the nuts (*2*) or levers.



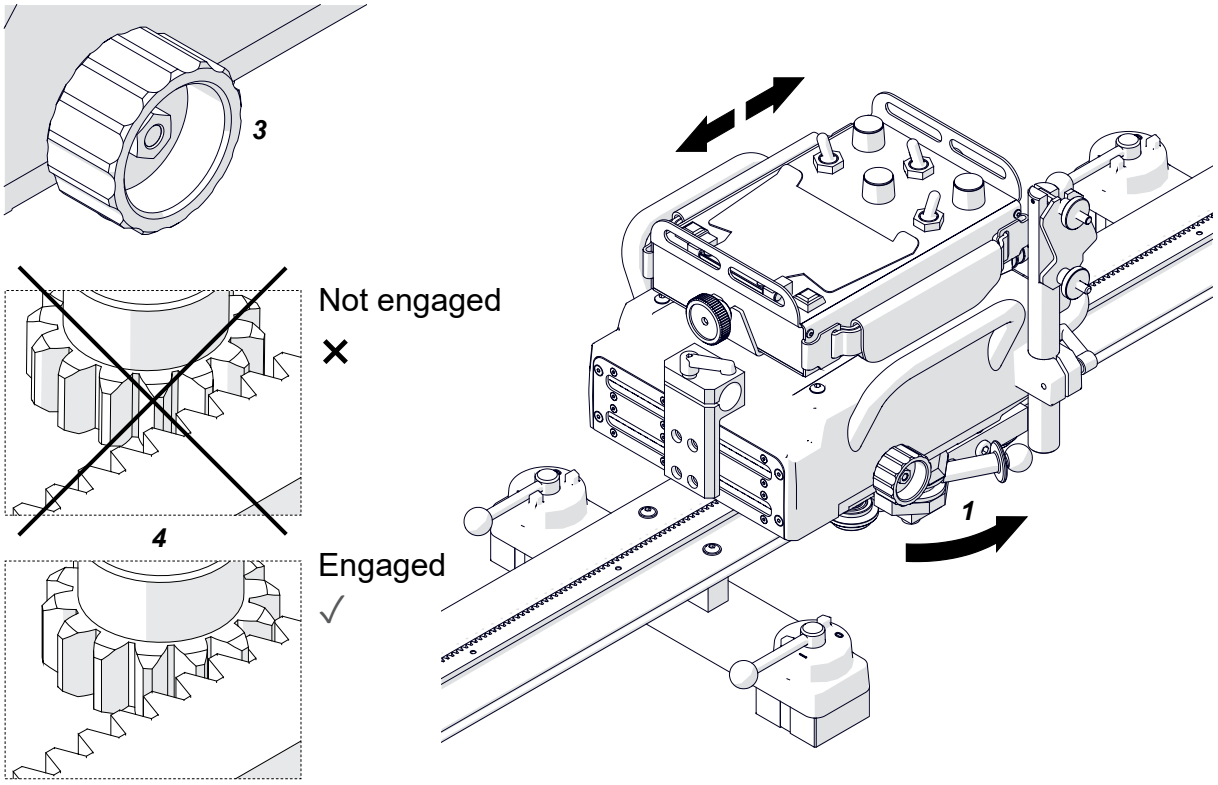
3.3. Positioning on a straight track

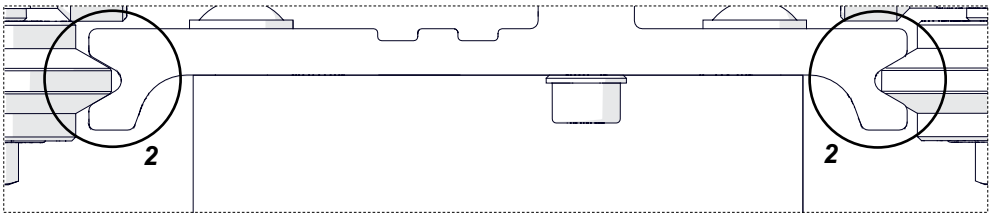
Set the power switch, arc ignition switch, oscillation switch, and direction switch to 'O'. Pull the lever lock (*1*). Next, set the lever to OFF (*2*), and loosen the knob (*3*) fully to move back the gear (*4*). Then, put the carriage so that the mounting brackets are on the rail (*5*, *6*).





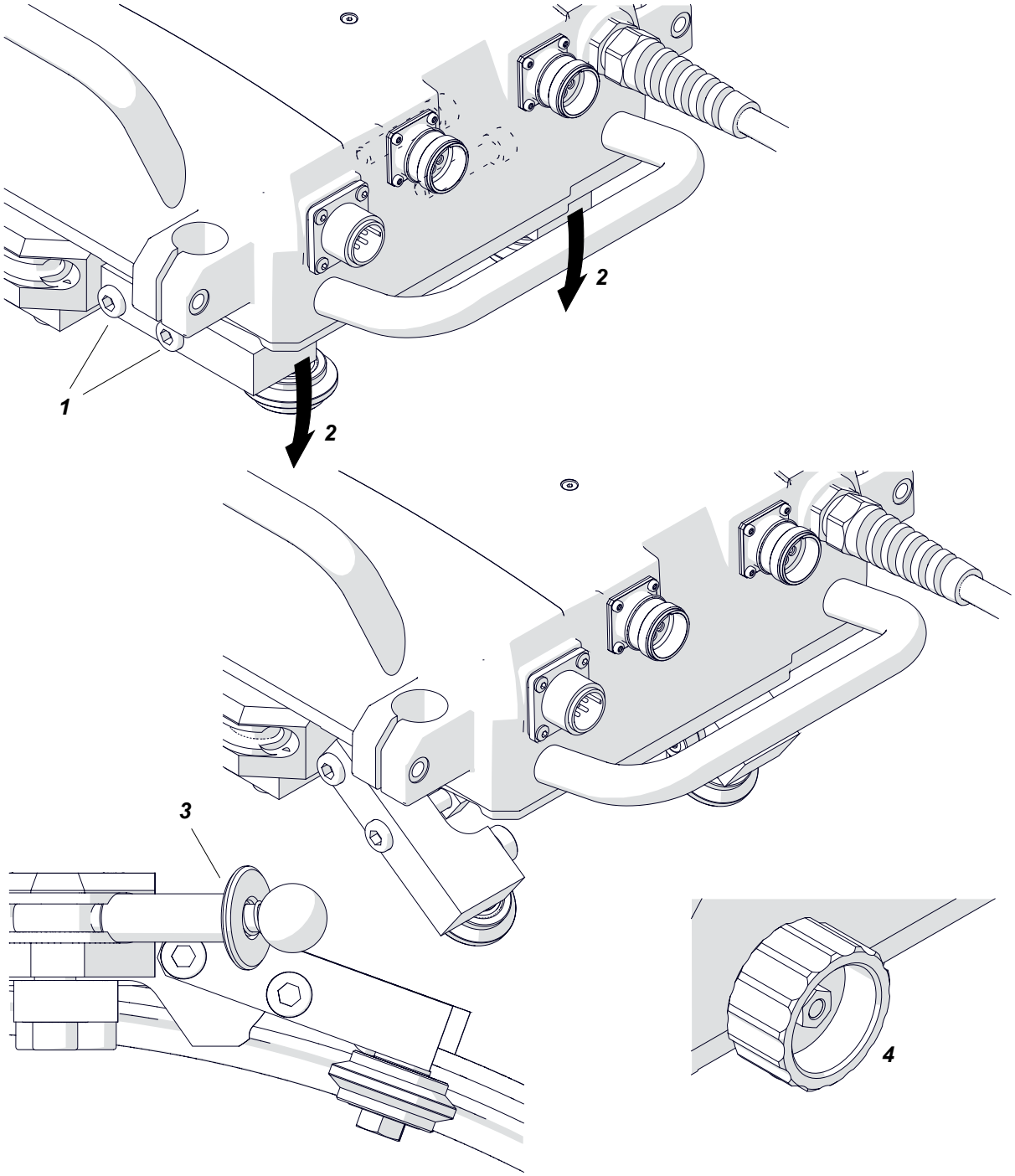
Set the lever to ON (*1*) to put the rollers into the grooves (*2*). Tighten the knob (*3*) to engage the gear of the carriage with the rack of the rail (*4*). Keep a small backlash between the gear and the rack. Move the carriage slightly back and forth to make sure that there is a backlash.





3.4. Positioning on a curved track

Use the 6 mm hex wrench to loosen four screws (*1*), and then put the carriage on the track. Rotate two roller brackets (*2*) to put the rollers into the grooves, and then set the levers to ON (*3*). Next, move the carriage back and forth to make sure that it moves smoothly. Then, tighten the screws (*1*) and use the knob (*4*) to engage the gear with the rack as described in "Positioning on a straight track".

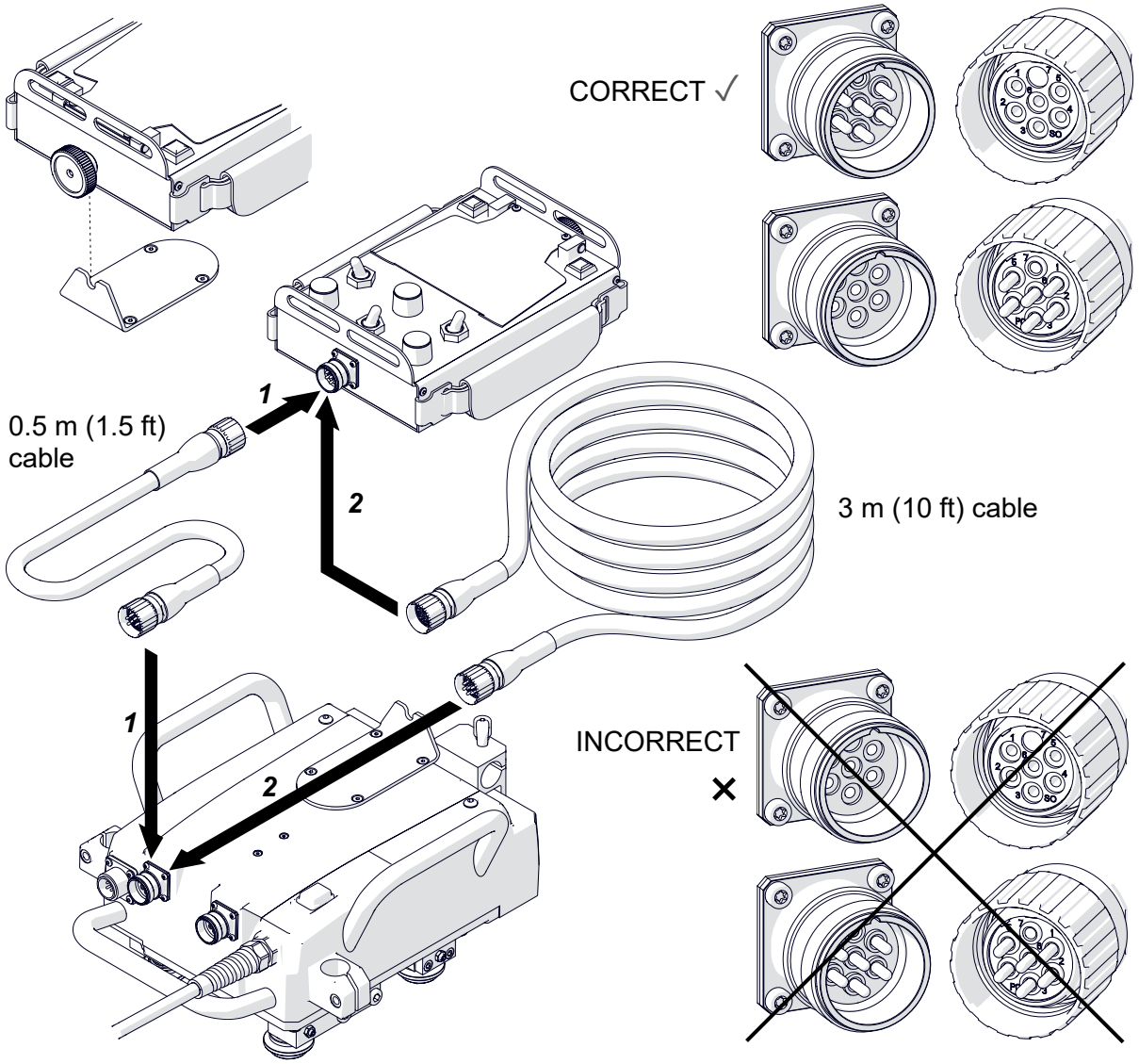


3.5. Preparing and connecting

At heights, protect the carriage and the track from falling. To do this, use chains (not included) to attach the leftmost and rightmost magnetic units of the hi-flex, semi-flex or rigid track to a stable structure. To protect the carriage, attach a chain to a carrying handle. Make sure that the chains are not loose.

Use the 0.5 m (1.5 ft) cable to connect the remote control to the carriage (*1*), if the remote control will be put onto the carriage, or use the 3 m (10 ft) / 5 m (16.5 ft) cable (*2*). Then, connect the carriage to the power source and put the torch and torch cables into the holders.

Make sure that the cables are correctly connected. Connect the plugs marked in red to the sockets marked in red.

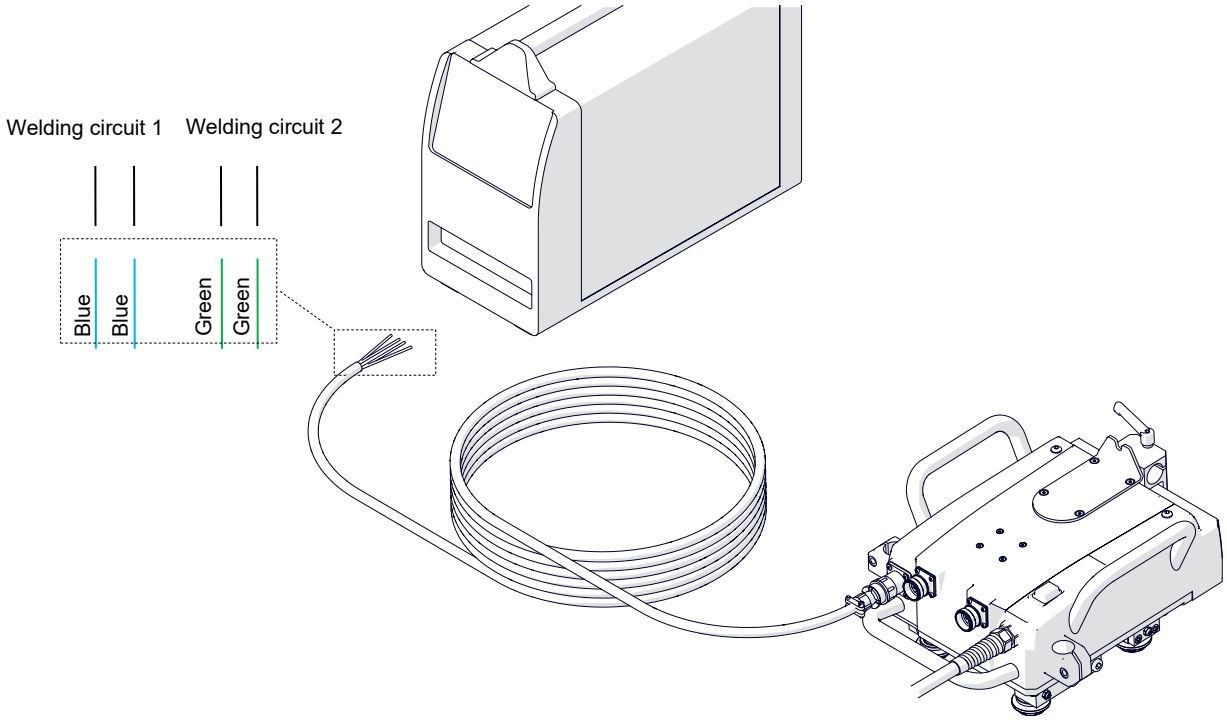


3.6. Connecting to the welding circuits

Before connecting, read the operator's manual of the welding source. Connect the arc ignition cable only to the remote control socket of the welding source.

Do not connect the carriage to sockets other than the remote control socket.

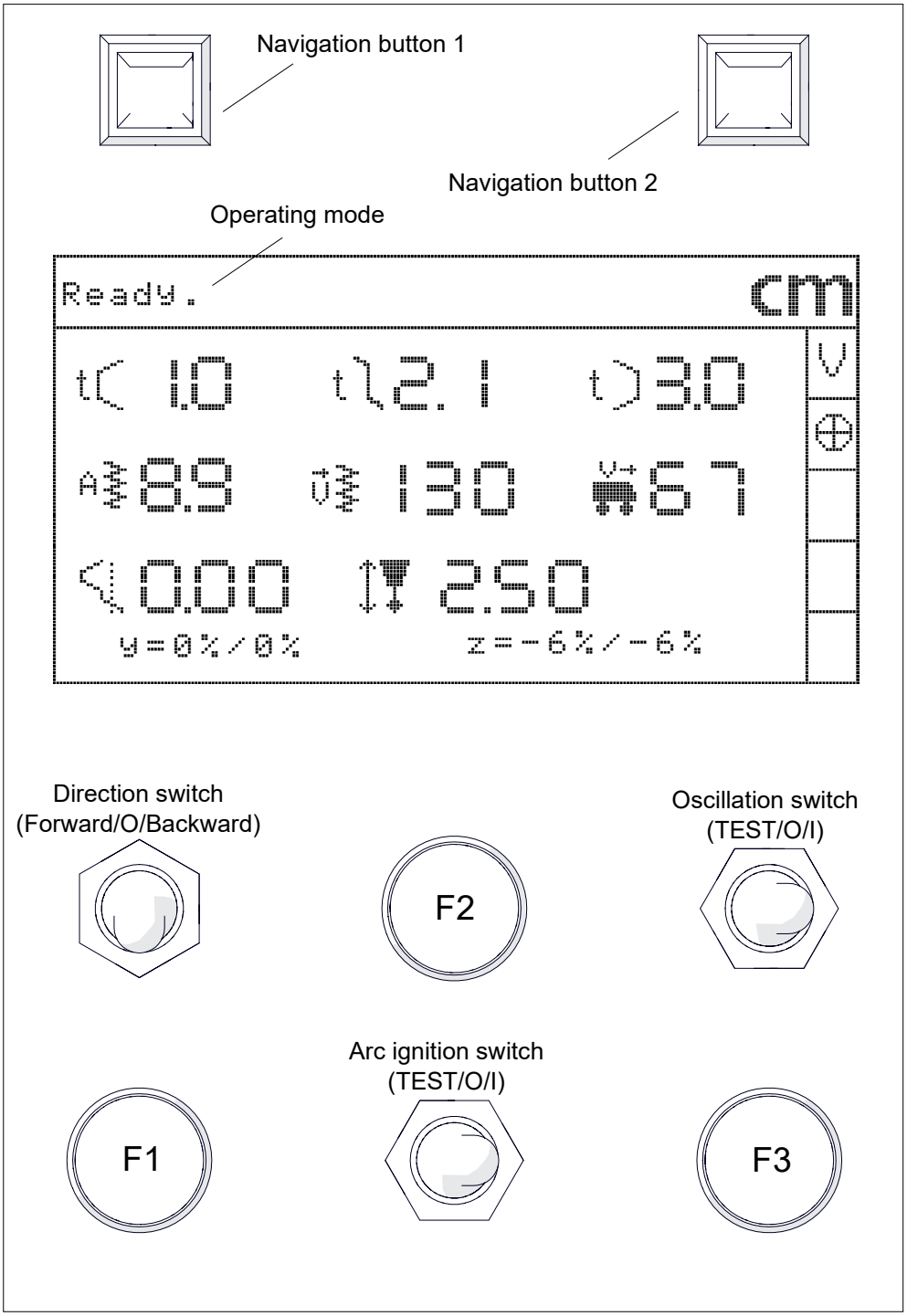
The carriage can control two torches by using the arc ignition cable plugged into the arc ignition socket. To do this, refer to the diagram and connect one blue-jacketed wire to one terminal of the welding circuit. Then, connect the other blue-jacketed wire to the other terminal of the same circuit. To control the second torch, connect the green-jacketed wires to the terminals of the second welding circuit.



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

3.7. Operating

Set the power switch to 'I' to turn on the carriage. To pause loading to check the firmware version, press and hold one of the navigation buttons. After you release the button, the control system loads and the main screen shows.



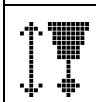
Tab. 1 explains the symbols shown on the right of the main screen.

Tab. 1. Symbols of connected modules

Symbol	Description
	Motorized vertical slide (option).
	Tracking sensor (option).

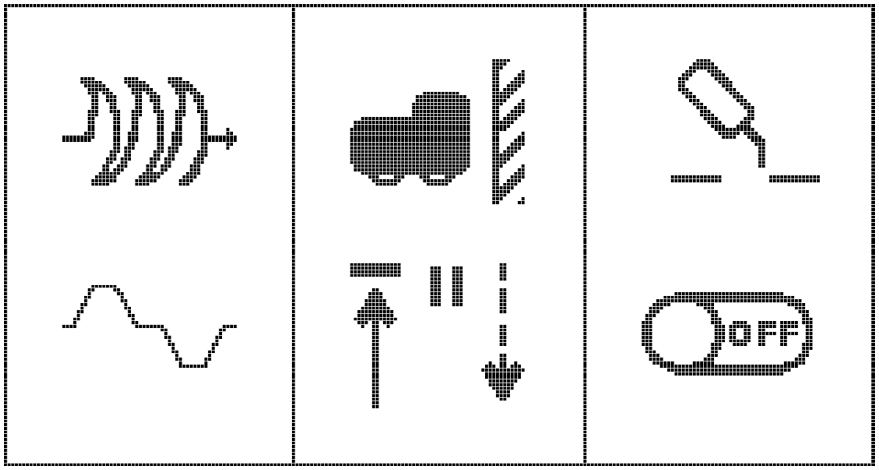
Use the knobs to set the required parameters (Tab. 2). Rotate to the right to increase the value of the parameter. Rotate to the left to decrease the value.

Tab. 2. Parameters shown on the main screen

Parameter	Value	Description	Method of control
	0–5 s [step: 0.1] (with tracking off) 0.2–5 s [step: 0.1] (with tracking on)	Oscillation dwell time in left position.	Press and hold  and rotate F1
	0–5 s [step: 0.1]	Oscillation dwell time in center position.	Press and hold  and rotate F2
	0–5 s [step: 0.1] (with tracking off) 0.2–5 s [step: 0.1] (with tracking on)	Oscillation dwell time in right position.	Press and hold  and rotate F3
	0.1–11.8 cm 0.04–4.5 in [step: 0.1/0.01]	Oscillation width.	Press and release F1 (activates SHIFT) and rotate F1
	10–200 cm/min 5–78 in/min [step: 5/1]	Oscillation speed (when the vertical slide is not connected).	Rotate F2
		Oscillation speed (when the vertical slide is connected).	Press and release F2 (activates SHIFT) and rotate F2
	0–250 cm/min 0–98 in/min [step: 1/0.5]	Carriage speed.	Rotate F3
		Travel the carriage with the maximum speed in the direction set by the direction switch.	Press and hold F3 when the arc ignition switch is set to 'O'
	From –5.6 to +5.6 cm From –2.2 to +2.2 in [step: 0.02/0.01]	Oscillation offset.	Rotate F1
	From –2.5 to +2.5 cm From –1 to +1 in [step: 0.02/0.01]	Torch height (when the vertical slide is connected).	Rotate F2

Parameter	Value	Description	Method of control
	From –100 to 100%	Sensor rod tilt in the axis Y (current/initial).	Current tilt is adjusted automatically. Initial tilt is set when the rod of the sensor is tensioned.
	From –100 to 100%	Sensor rod tilt in the axis Z (current /initial).	Current tilt is adjusted automatically. Initial tilt set when the rod of the sensor is tensioned.
	cm inch	Unit of measure.	Rotate F3 in the correct setup screen.

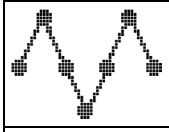
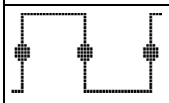
To set the rest of the parameters, make sure that the direction switch is set to 'O'. Next, press and hold the two navigation buttons for three seconds to show the first setup screen.

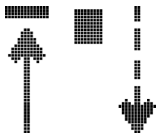
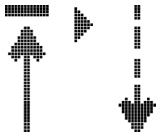
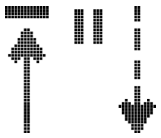
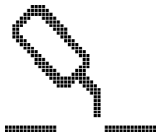
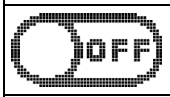
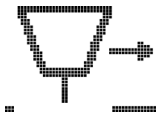
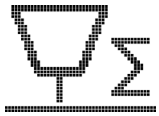


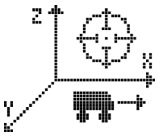
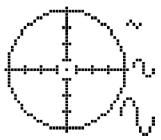
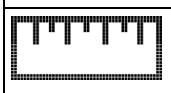
To go to the next setup screen, press the right navigation button. To go to the previous setup screen, press the left navigation button.

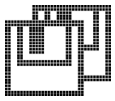
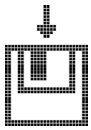
Use the knobs to set the required values of parameters (Tab. 3).

Tab. 3. Parameters shown on the setup screens

Parameter	Value	Description	Method of control
		Weld path.	Rotate F1
		Triangle. The carriage travels only during oscillation. During oscillation dwell time, the carriage stops to fill the crater.	
		Trapezoid. The carriage travels at all times, also during oscillation dwell time.	
		Square. The carriage travels only during oscillation dwell time in left and right position. During oscillation, the carriage stops. During oscillation dwell time in center position the carriage fills the crater.	

Parameter	Value	Description	Method of control
		Behavior when the limit switch is activated.	Rotate F2
		Stops the carriage and arc. To continue, set the direction switch to 'O'. This travels the carriage back by 10 mm (0.5 in) and removes the information symbol.	
		Stops the arc and travels the carriage back to the initial position from where the move started. To continue after the carriage reaches the initial position, set the direction switch to 'O'. This removes the information symbol.	
		Stops the carriage and arc. To continue, do 1 or 2. 1) Press F1, F2, or F3 to travel the carriage back to the initial position from where the move started. 2) Set the direction switch to 'O' to travel the carriage back by 10 mm (0.5 in).	
		Stitch welding.	Rotate F3
		Off. The carriage welds continuously.	
		On. Activates parameters of stitch welding. Do not set them to zero if you want to weld continuously. Instead, set stitch welding to OFF.	
	0–100 cm 0–40 in [step: 0.1]	Weld length (parameter available only when the stitch welding is set to ON).	Rotate F1
	OR		
	0–100 cm 0–40 in [step: 0.1]	Space before welding.	Press, hold, and rotate F1
	0–100 cm 0–40 in [step: 0.1]	Space between welds (only for stitch welding).	Rotate F2
	100–999 cm 40–400 in ∞ [step: 1/0.5]	Total length. After reaching the total length the carriage acts as if the limit switch is activated.	Rotate or press F3
	0–10 cm 0–4 in [step: 0.1]	Backweld length (parameter available only when the stitch welding is set to ON).	Rotate F1
	OR		
	0–30 s [step: 0.1]	Crater fill time before welding.	Press, hold, and rotate F1

Parameter	Value	Description	Method of control
	0–5 s [step: 0.1]	Crater fill time at weld end (parameter available only when the stitch welding is set to ON).	Rotate F2
	OR		
	0–30 s [step: 0.1]	Crater fill time after welding.	Press, hold, and rotate F2
		Behavior of the arc ignition relay while filling the crater (only for stitch welding).	Rotate F3
		Off. Welding source decreases the current of the arc while filling the crater. Set the crater fill time higher or equal to the time of the current lowering that is set at the welding source.	
		On. Welding source uses full current while filling the crater.	
		Automatic tracking of the welding seam (control of parameter possible only when the tracking sensor is used). When Z, YZ (require the motorized vertical slide), or Y is set, you can adjust the initial torch position from the main screen with F1.	Rotate F1
		Off. The welding seam will not be tracked automatically. However, you can adjust the torch position in the Y axis from the main screen during welding (also in the Z axis when the motorized vertical slide is used). Operating mode: TRK: OFF.	
		Automatic tracking in the Y axis only. Operating mode: TRK: Y.	
		Automatic tracking in the Z axis only. Operating mode: TRK: Z.	
		Automatic tracking in the Y and Z axis. Operating mode: TRK: YZ.	
	OR		
		Sensitivity of the tracking system.	
		Normal.	Press, hold, and rotate F1
		Low. The torch adjusts slower to the welding seam.	
		High. The torch adjusts faster to the welding seam.	
	cm inch	Unit of measure. Metric or imperial.	Rotate F3

Parameter	Value	Description	Method of control
	1–10	Loads the settings saved under the selected number. Number 1 is factory default.	Rotate F1
	Default, Filler, Linear, Root, Segment, Top	Name to describe the settings.	Press, hold, and rotate F1
	1–10	New number to save the settings.	Rotate F2
		Saves all the current settings under the selected number.	Press F2
		Saves all the current settings under the number shown in  .	Press F3

To go back to the main screen, press and hold the two navigation buttons for three seconds.

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

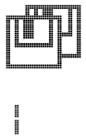
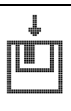
If the arc ignition switch is set to 'I', the torch starts welding immediately after you select a travel direction.

Use the direction switch to select a direction of travel. Then, the travel starts with the set parameters. Then, the status changes from Ready to Running. You can adjust the parameters from the main screen at any time with the knobs. You can adjust the parameters from the setup screens only when the carriage is stopped.

To stop the travel, set the direction switch to 'O'.

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

3.8. Loading, saving, and updating the settings

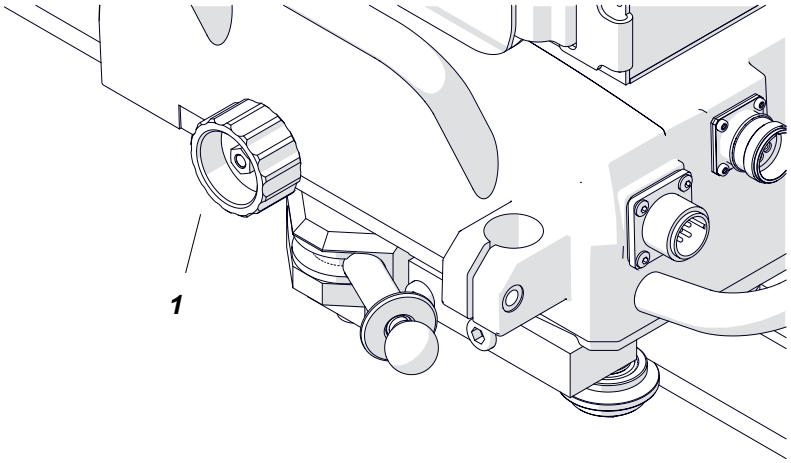
Set the direction switch to 'O'.			
Press and hold the two navigation buttons for three seconds. The first setup screen will show.			
Press the right navigation button to go to the shown setup screen. The number in indicates the current settings.			
Loading			
Rotate F1 to load the settings saved under the selected number.			
Press and hold the two navigation buttons for three seconds to go back to the main screen.			
Saving			
(Optional) Press, hold, and rotate F1 to select a name (Default, Filler, Linear, Root, Segment, Top).			
Rotate F2 to select a number from 1 to 10.			
Press F2 to save all the current settings under the selected number.			
Press and hold the two navigation buttons for three seconds to go back to the main screen.			
Updating			
Press F3 to save all the current settings under the number shown in .			
Press and hold the two navigation buttons for three seconds to go back to the main screen.			

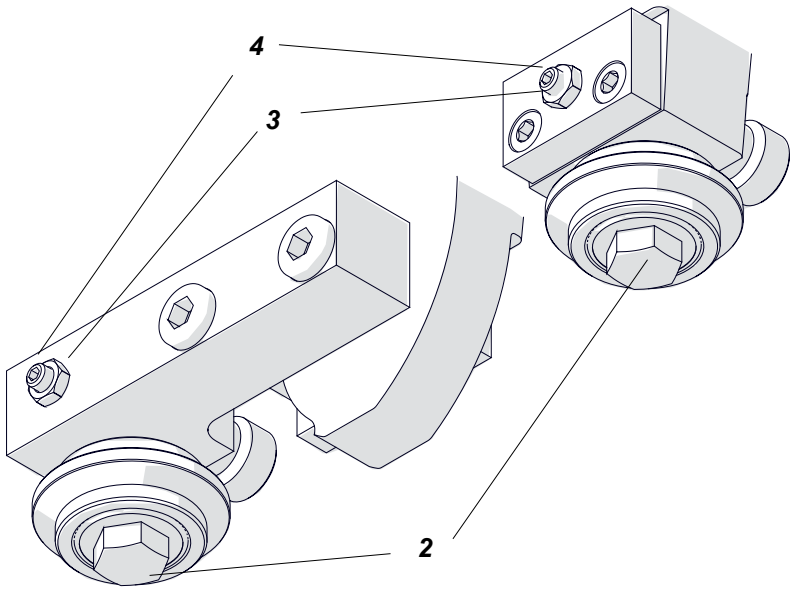
3.9. Adjusting the pressure of rollers

If the resistance during the travel is too little or too much, loosen the knob (*1*). At the opposite side of the carriage, use the 13 mm and 8 mm flat wrenches to loosen the bolts (*2*) and nuts (*3*). Next, use the 2.5 mm hex wrench to adjust the screws (*4*), and then tighten the bolts (*2*).

Move the carriage along the track. If the resistance is still incorrect, repeat the above steps.

If the carriage moves smoothly, use the 2.5 mm hex wrench to prevent rotation of each screw (*4*). Then, use the 8 mm flat wrench to tighten the nuts (*3*).



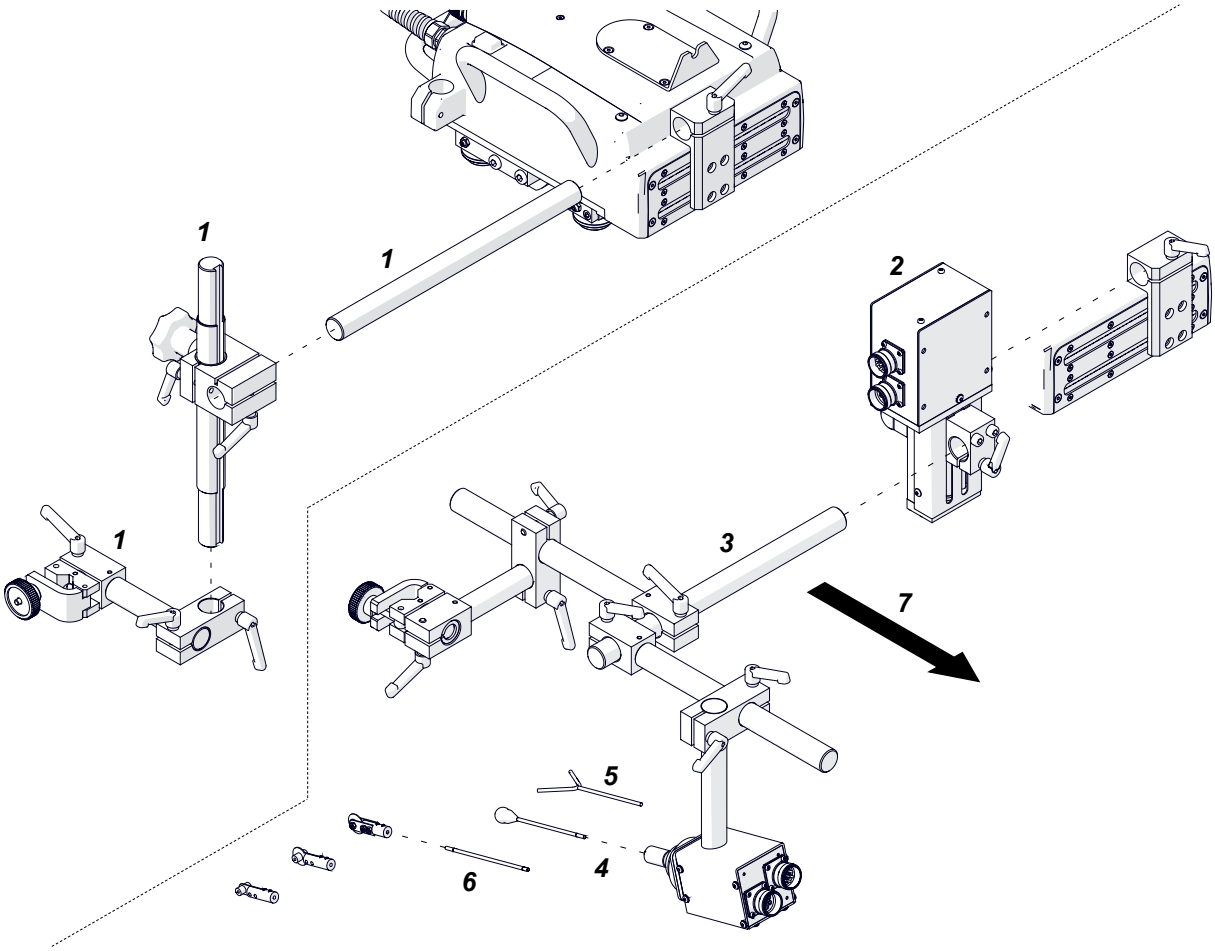


3.10. Adapting for seam tracking (option)

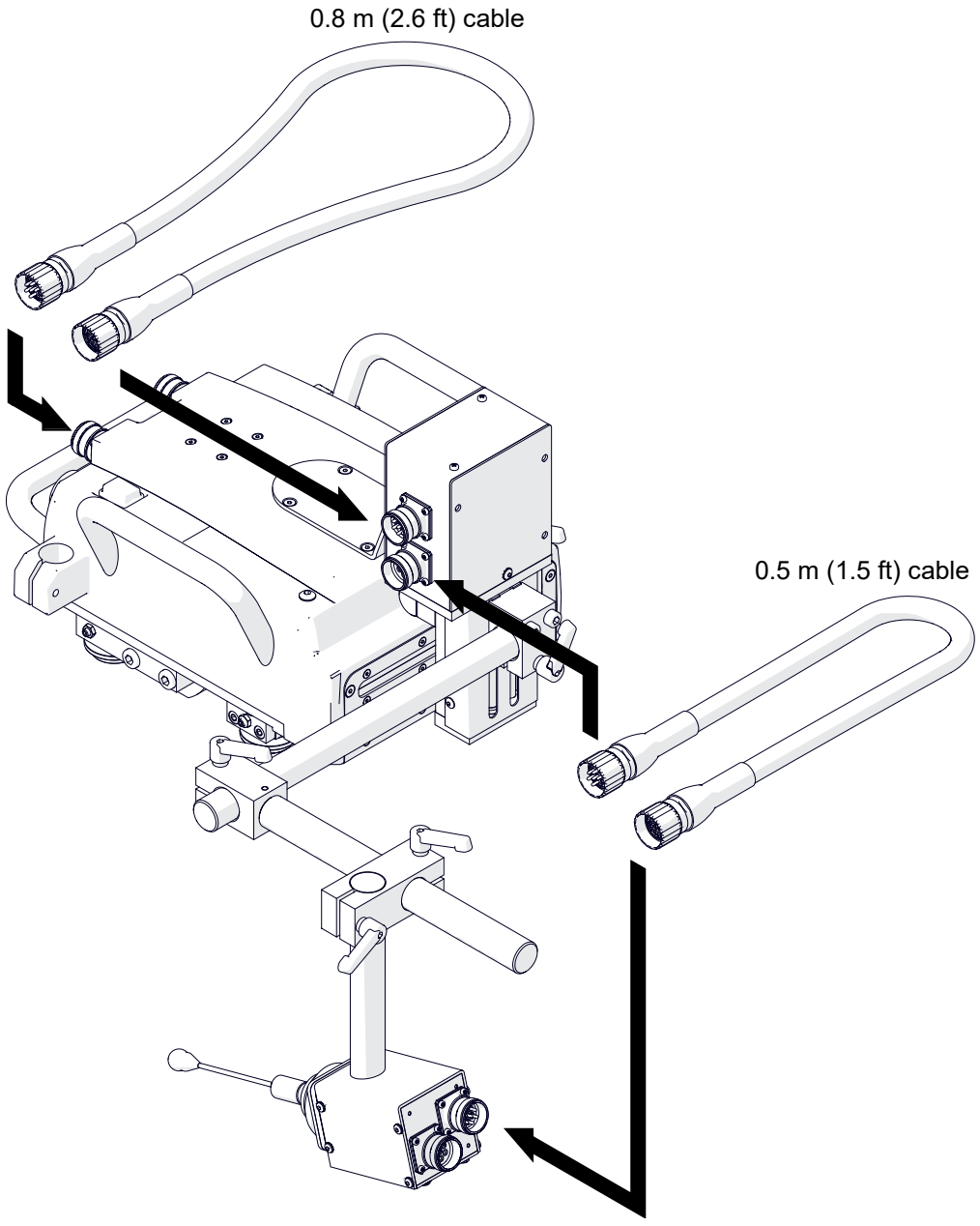
Remove all parts from the rod holder (*1*) and install the motorized vertical slide (*2*). Then, assemble the attachment (*3*).

To use a different sensor tip, use the 2 mm hex wrench and remove the installed sensor rod (*4*). Next, install a sensor rod with fork tip (*5*). You can also use the 1.5 mm hex wrench to attach one of three tips to a separate rod (*6*), and then install the rod into the sensor.

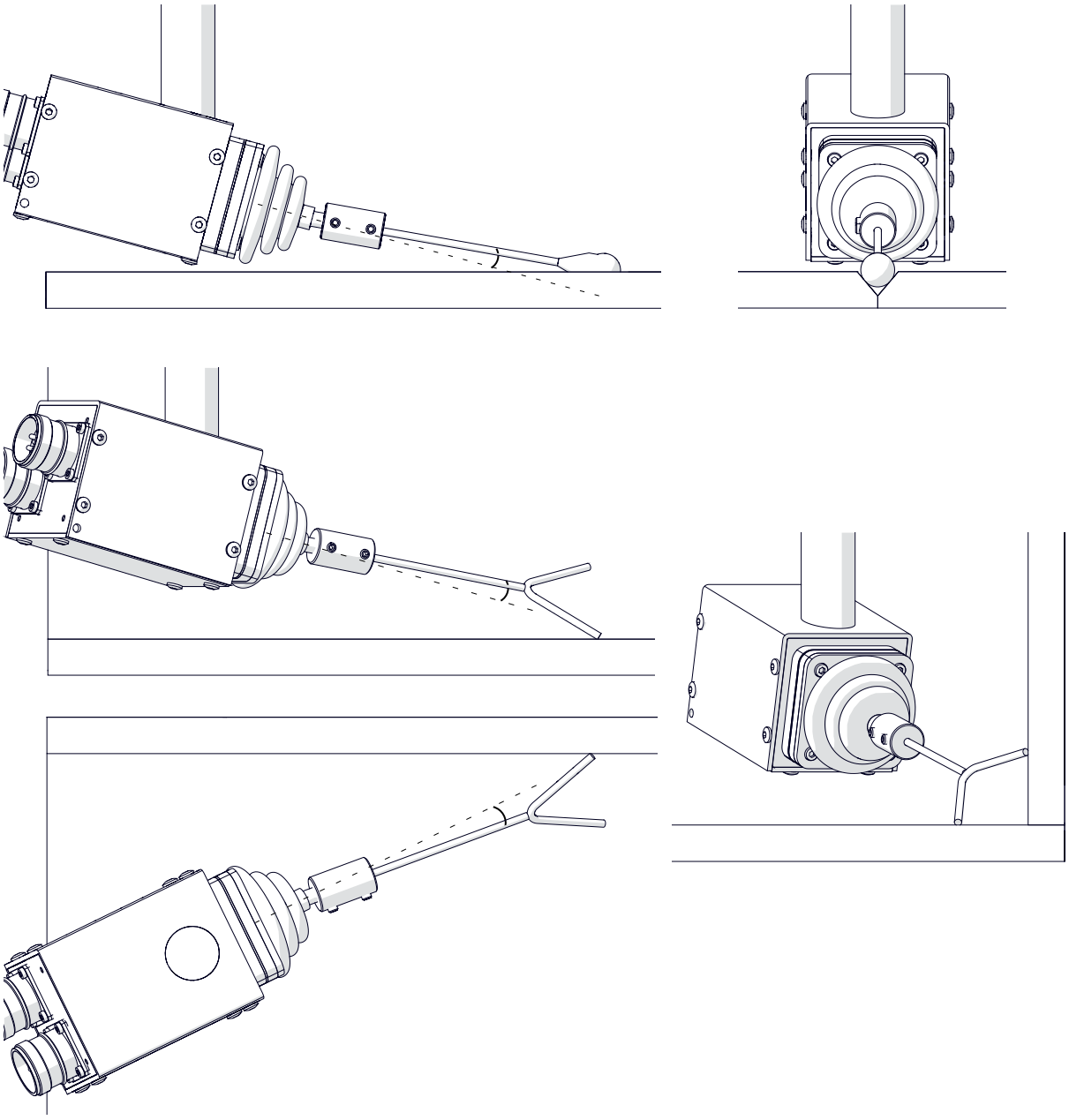
Make sure that the carriage travels in the direction (*7*) to be able to track the seam correctly.



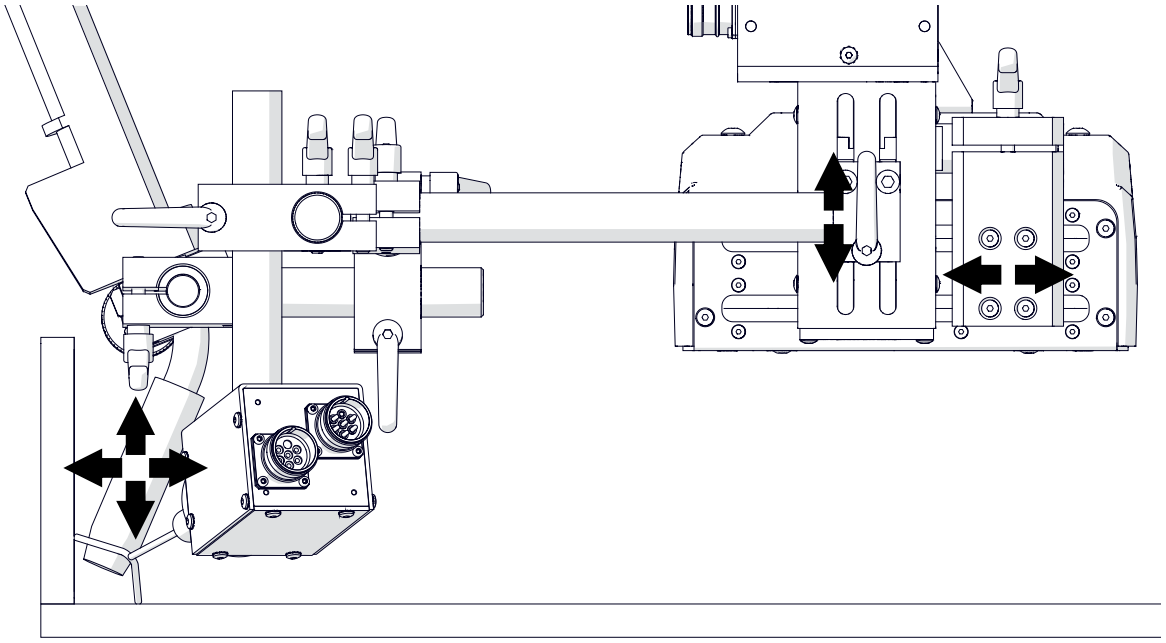
Use the 0.8 m (2.6 ft) cable to connect the motorized vertical slide to the carriage. Then, use the 0.5 m (1.5 ft) cable to connect the sensor to the vertical slide. If the vertical slide is not used, connect the sensor to the carriage with the 1 m (3 ft) cable.



Install the torch into the torch holder. Then, tilt the rod of the sensor against the workpiece so that there is tension in the rod. Next, put the tip as shown.



The figure shows how the tracking system works. When the tip of the sensor moves, the system senses any small change in position of the seam. Then, the oscillator, the vertical slide, and the torch, are moved to maintain the correct position above the seam.



3.11. Troubleshooting

Message	Problem	Solution
INFO #1	Limit switch activated during travel.	Set the direction switch to 'O'.
	Limit switch active when powering.	Loosen the drive clutch knob to disengage the gear. Move the carriage until the limit switch is released.
WARNING #1	Direction switch not set to 'O' when powering.	Set the direction switch to 'O'.
WARNING #3	Arc ignition switch set to TEST when powering.	Set the arc ignition switch to 'O'.
WARNING #4	Oscillation switch set to TEST when powering.	Set the oscillation switch to 'O'.
WARNING #5	Sensor tip fell out of the weld groove when tracking and arcing.	Set the direction switch to 'O'. Make sure that the tension in the rod of the sensor is correct. Use the correct tip for the application.
ERROR #1	No communication.	Make sure that all cables are connected correct.
	Controller failure.	Contact service center for check and repair.
ERROR #2	Motor overload.	Adjust the position of the cables so that they do not block the carriage. Remove obstacles that block the carriage or the drive gear.

4. MAINTENANCE

Each day:

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

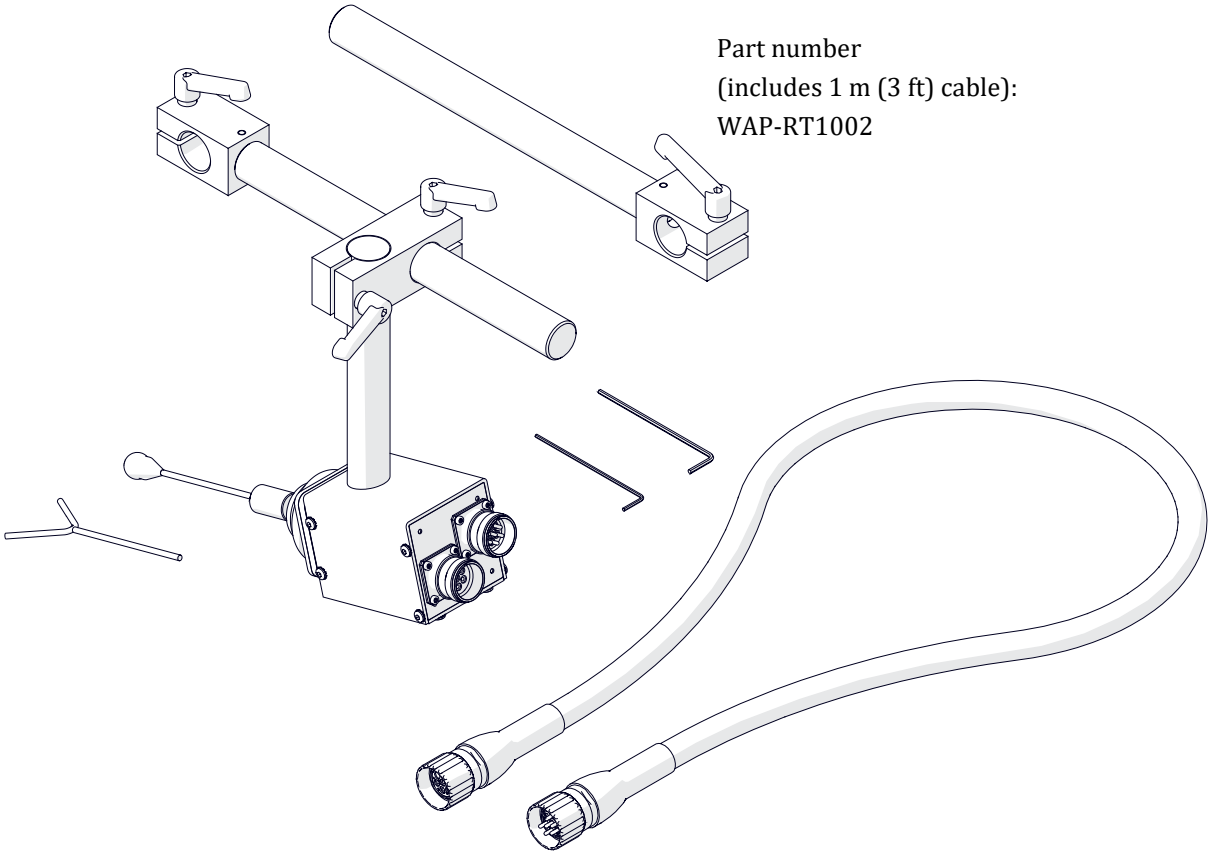
Each month:

1. Make sure that the knobs and the switches work as intended. Replace if they are loose or damaged.
2. Examine cables and replace if damaged.
3. Tighten screws if loose.

5. ACCESSORIES

5.1. Seam tracking attachment

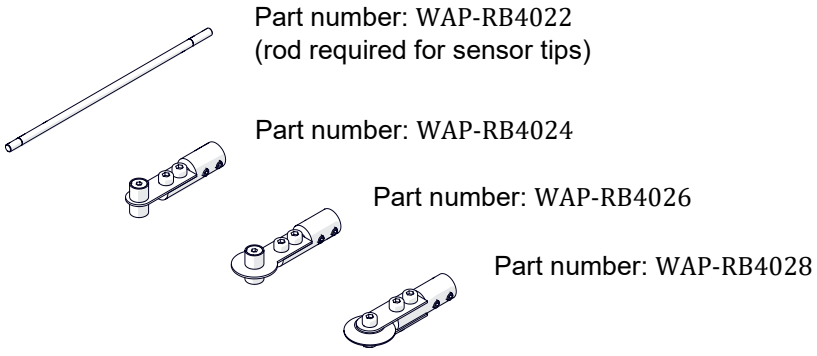
Allows the carriage to track the welding seam.



Part number
(includes 1 m (3 ft) cable):
WAP-RT1002

5.2. Tracking sensor tips

Allow seam tracking in various applications.



Part number: WAP-RB4022
(rod required for sensor tips)

Part number: WAP-RB4024

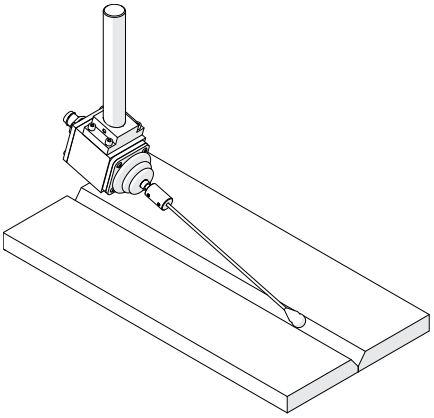
Part number: WAP-RB4026

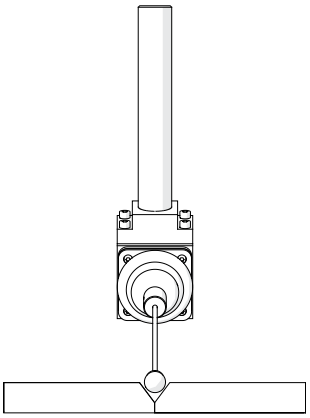
Part number: WAP-RB4028

5.2.1. Description of tips for tracking system

Ball tip

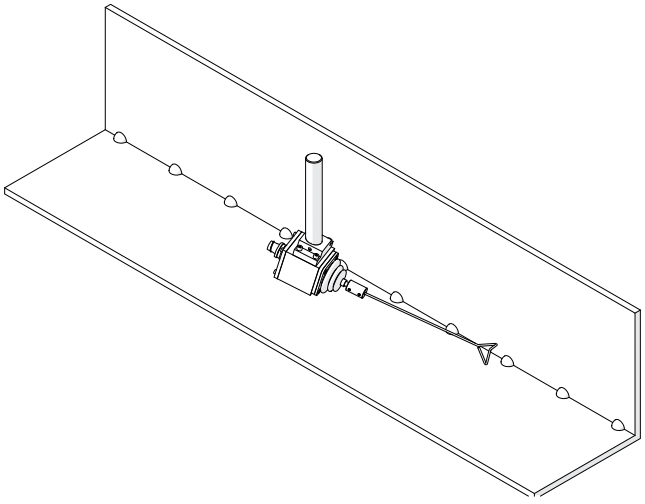
Used for tracking of butt and fillet welds without tacking. The geometry of joint prepared for welding must allow for stable ball movement.

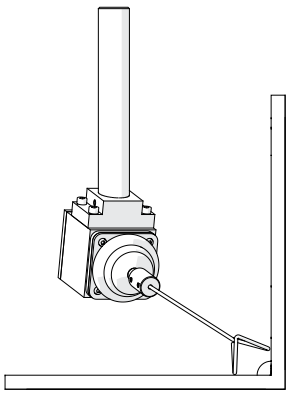




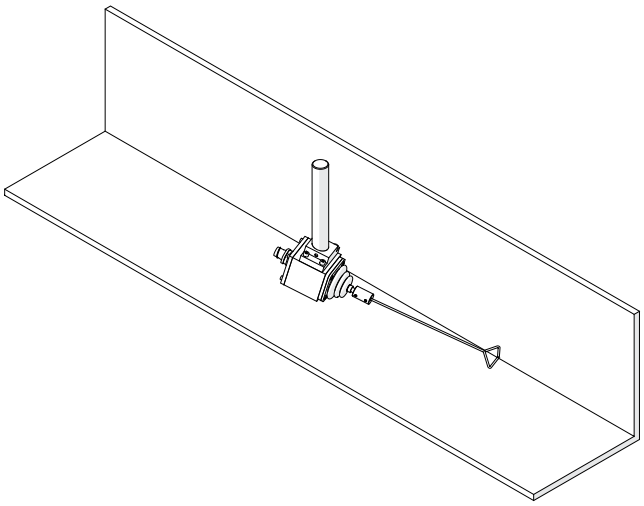
Bent tip

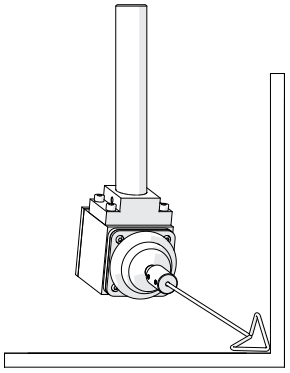
Used for tracking of fillet welds with tacking.





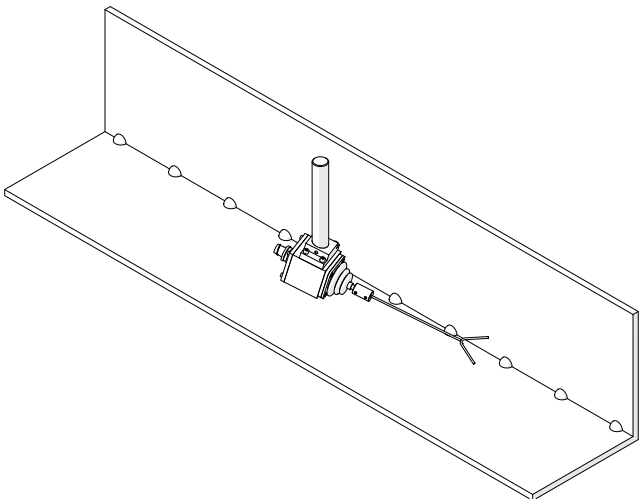
After proper positioning it may be also used for fillet welds without tacking.

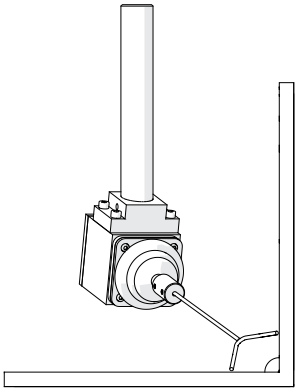




Fork tip

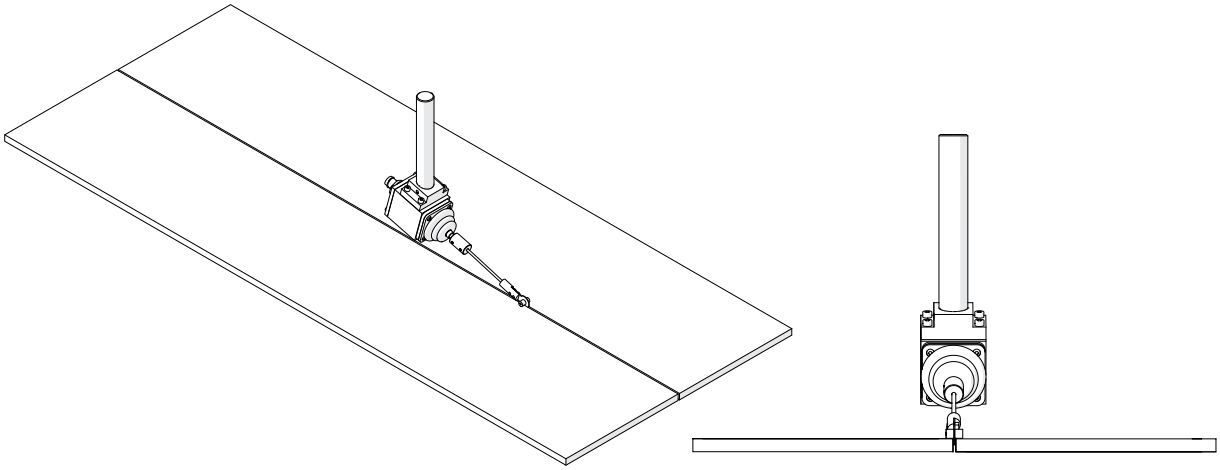
Used for tracking of fillet welds with tacking and for multi-run welding.





Adapter tips

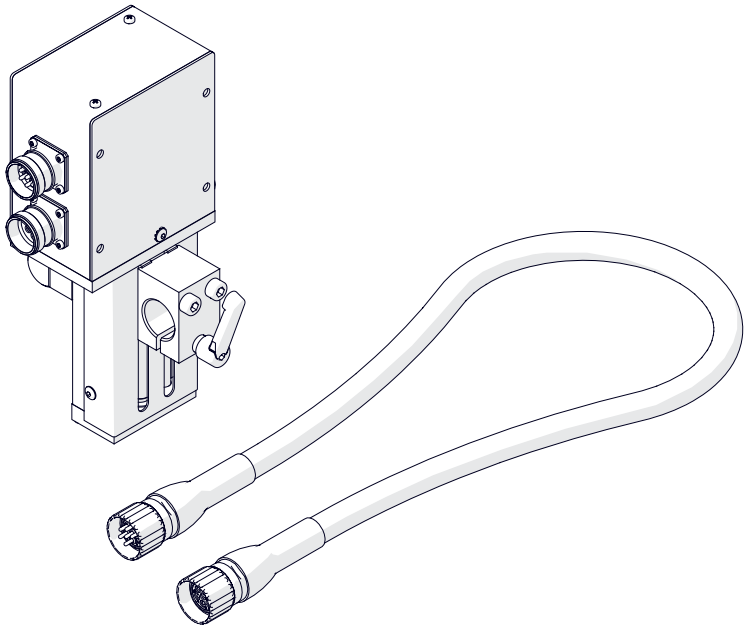
Used for tracking of butt welds of small dimensions not allowing for using the ball tip. In such case no tacking should be used.



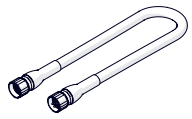
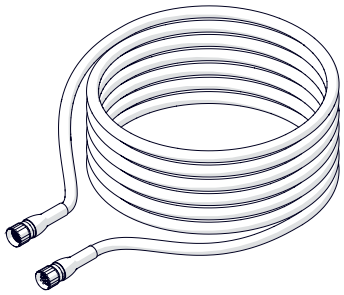
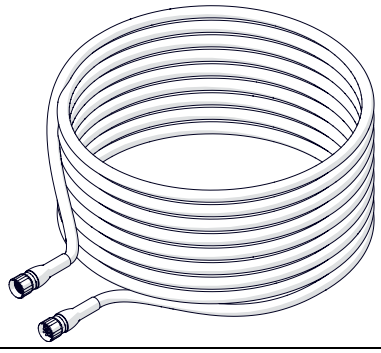
5.3. Motorized vertical slide

Allows the vertical position of the torch to be controlled.

Part number
(includes 0.8 m (2.6 ft) cable):
WAP-RT1001

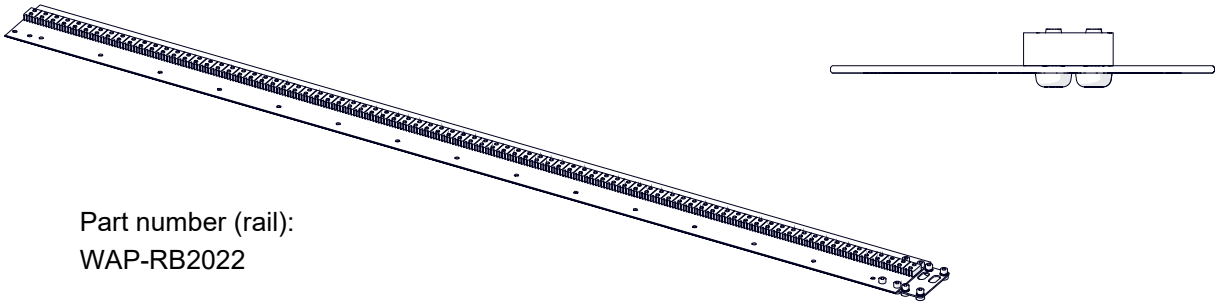


5.4. Cables

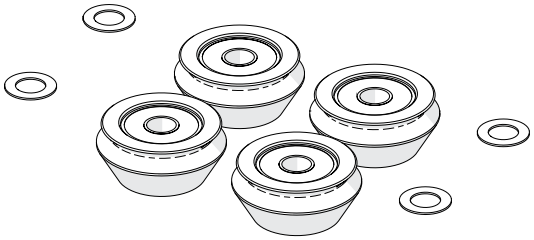
Cable 0.5 m (1.5 ft)	
	Required for connecting the motorized vertical slide to the tracking sensor. Part number: PWD-0654-06-00-00-0
Cable 10 m (33 ft)	
	Part number: PWD-0654-08-00-00-1
Cable 25 m (82 ft)	
	Part number: PWD-654-08-00-00-2

5.5. Hi-flex track

Allows guiding the carriage along a curve. The length of a single rail is 1.52 m (5 ft). The minimum bend radius is 0.75 m (2.5 ft). Use with 8 magnetic units or 8 narrow magnetic units. If you need to use more units, use narrow magnetic units.

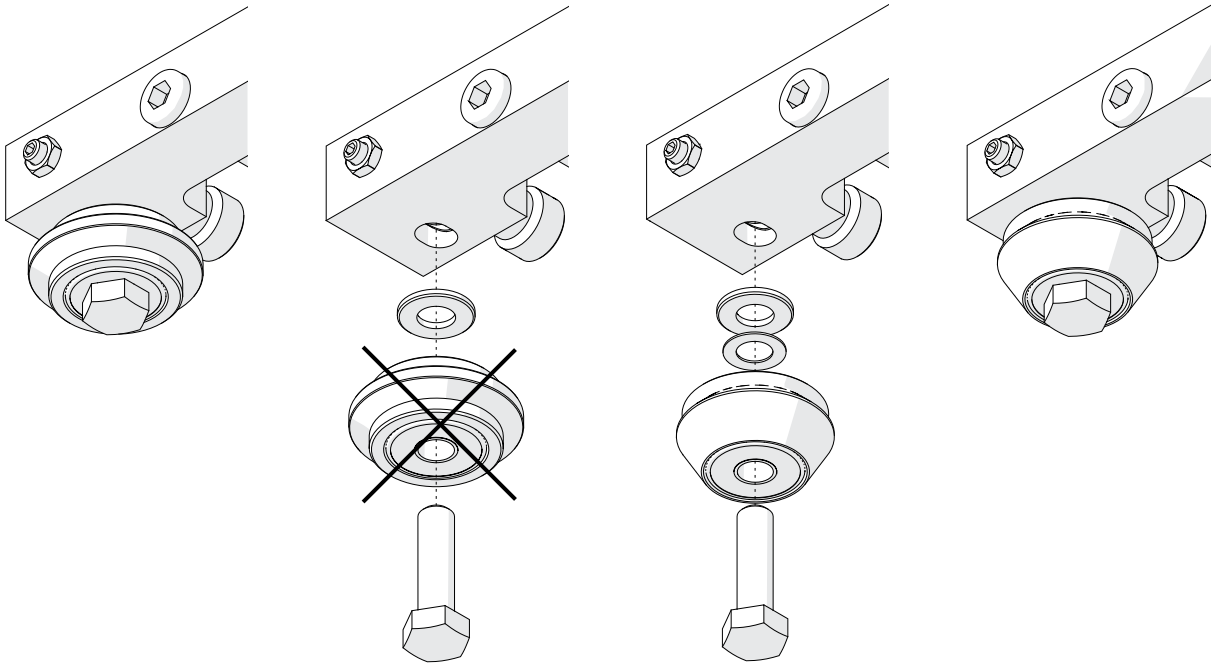


Part number (rail):
WAP-RB2022



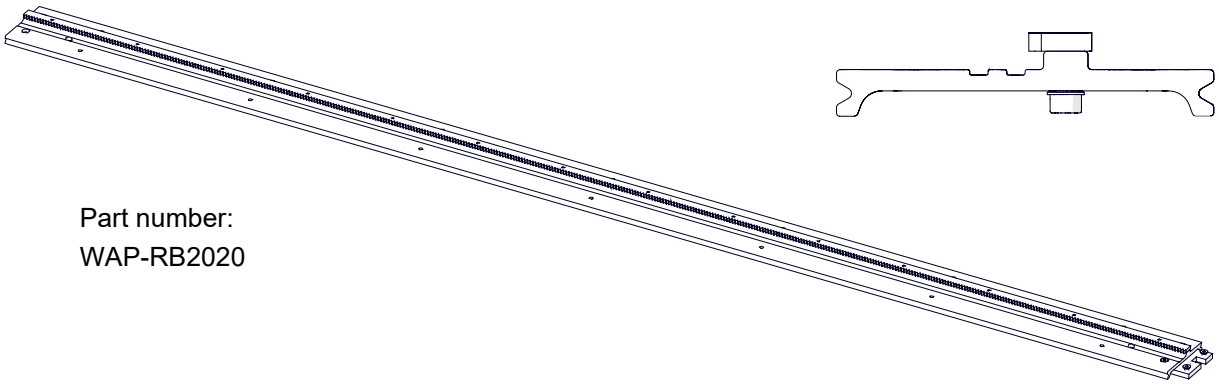
Part number (rollers for hi-flex track):
WAP-RB2024

Use the 13 mm flat wrench to remove the standard rollers and install the rollers for hi-flex track.



5.6. Semi-flex track

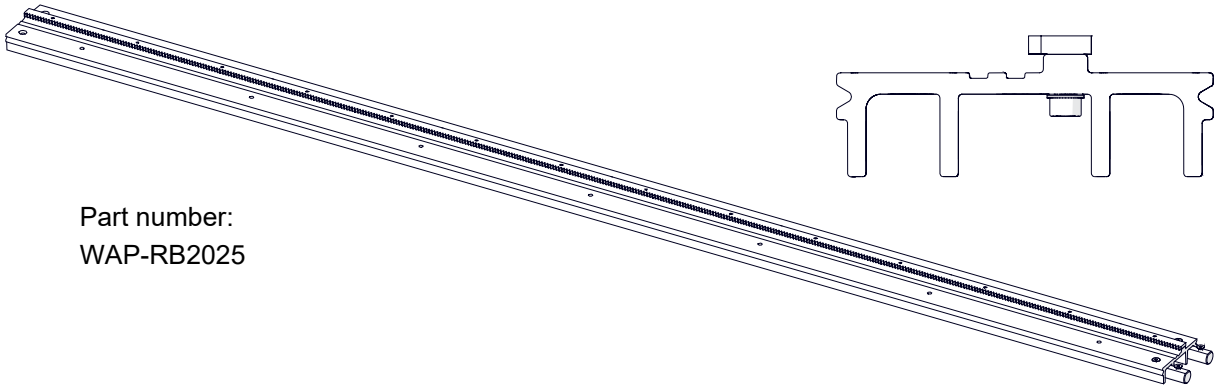
Allows guiding the carriage along a curve. The length of a single rail is 2 m (6.5 ft). The minimum bend radius is 5 m (16.5 ft).



Part number:
WAP-RB2020

5.7. Rigid track

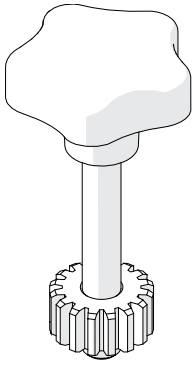
Allows guiding the carriage along a straight line. The length of a single rail is 2 m (6.5 ft).



Part number:
WAP-RB2025

5.8. Rack adjustment tool

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

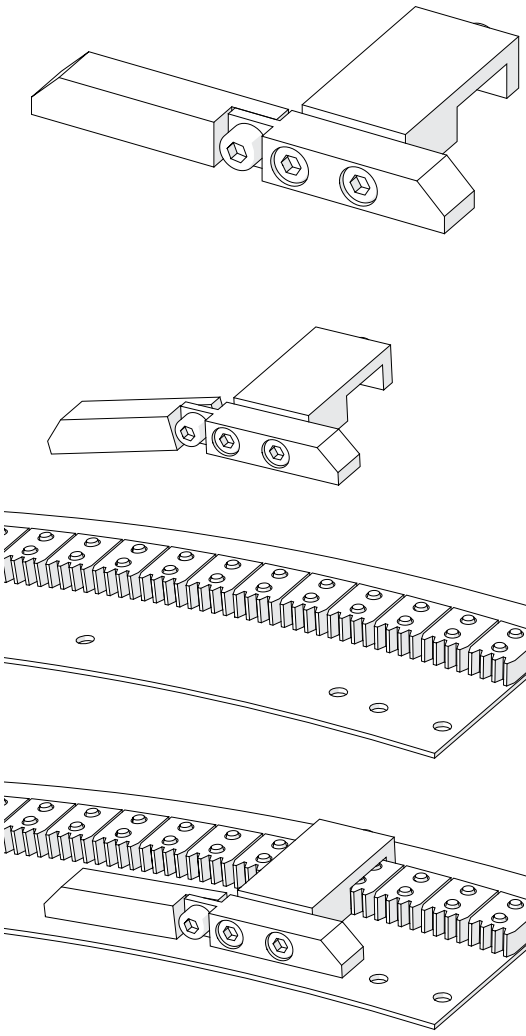


Part number:
WAP-RB2310

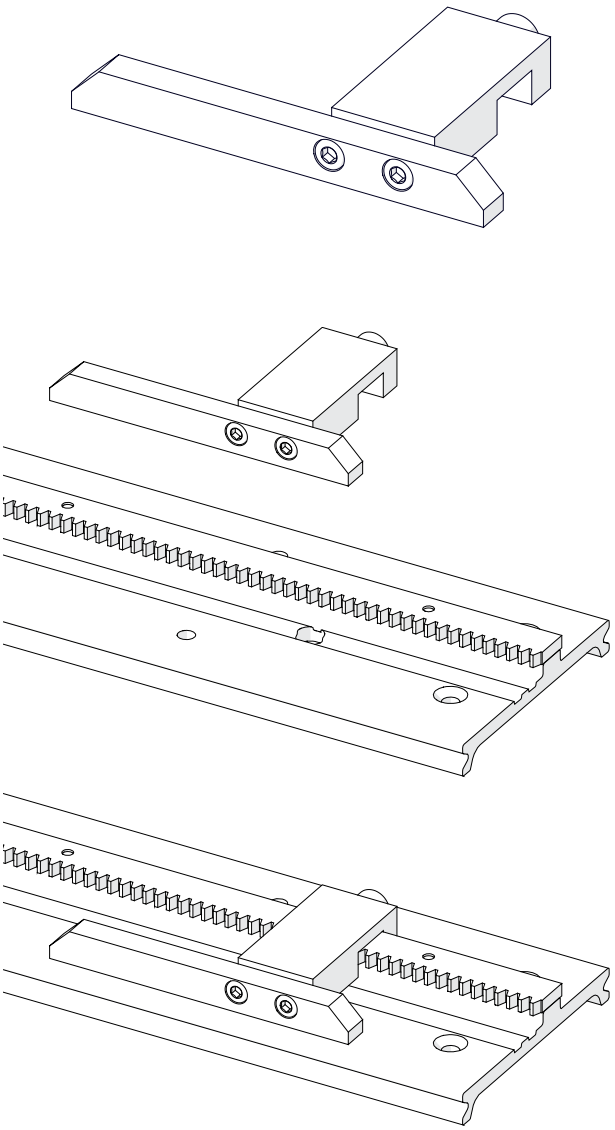
5.9. Contact block

Protects the carriage from falling off a track with open ends. When the carriage comes into contact with the block, the limit switch is activated. Use two blocks to close the track and limit the travel path to a section.

Part number
(for hi-flex track):
ZDR-0673-08-00-00-0



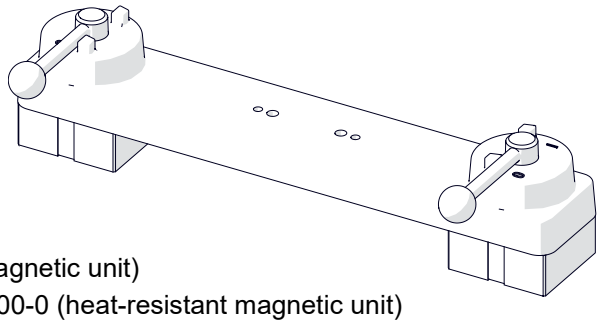
Part number
(for semi-flex and rigid track):
WAP-RB4040



5.10. Magnetic units

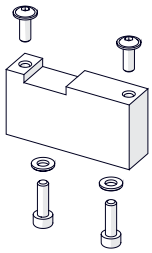
5.10.1. Magnetic unit

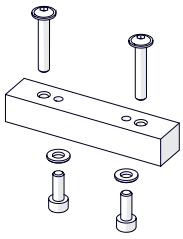
Allows clamping a hi-flex, semi-flex, or rigid track to ferromagnetic surfaces.



Part number:
WAP-RB2010 (magnetic unit)
ZSP-0475-93-00-00-0 (heat-resistant magnetic unit)

Part number (bracket for hi-flex and semi-flex track):
WAP-RB2040

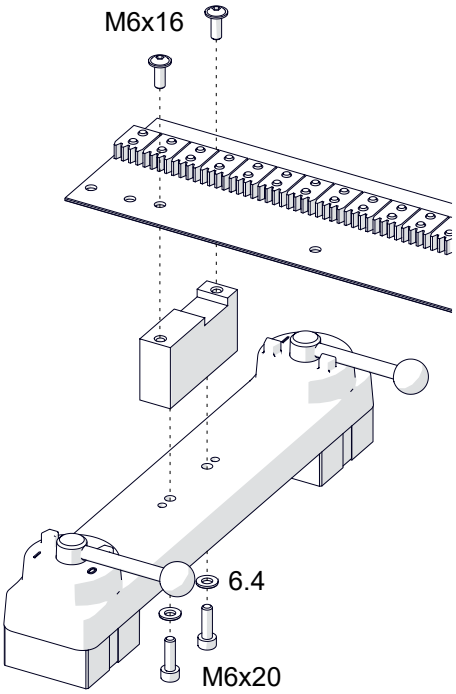


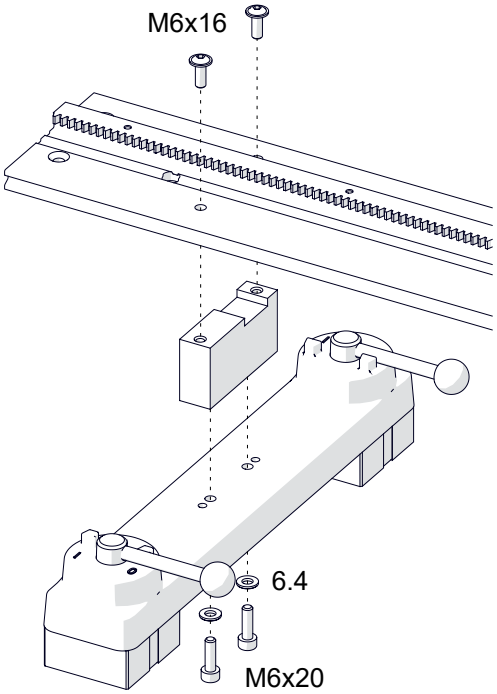


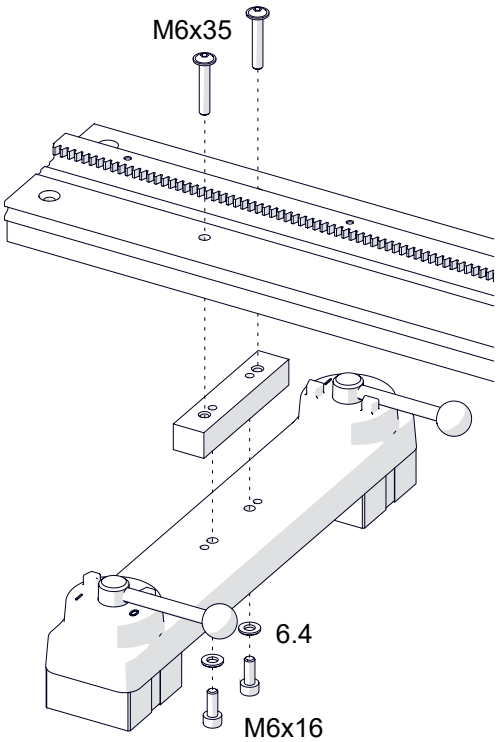
Part number (bracket for rigid track):
WAP-RB2026

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 the tracks as shown.


M6x16
6.4
M6x20

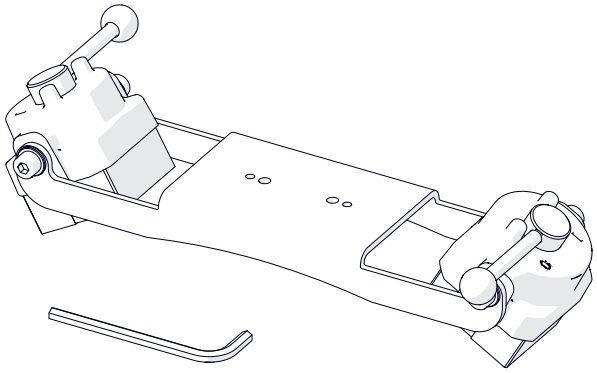

M6x16
6.4
M6x20


M6x35
6.4
M6x16

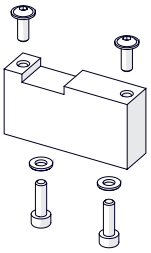
5.10.2. Pivoting magnetic unit

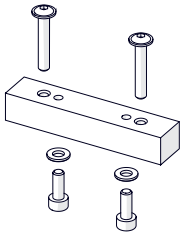
Allows clamping a hi-flex, semi-flex, or rigid track to ferromagnetic surfaces that are concave or convex, to pipes with outer diameters of at least 800 mm (31.5″), and to surfaces that differ in height up to 80 mm (3.1″).

Part number:
WAP-RB2016

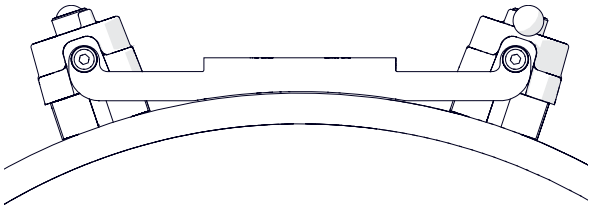


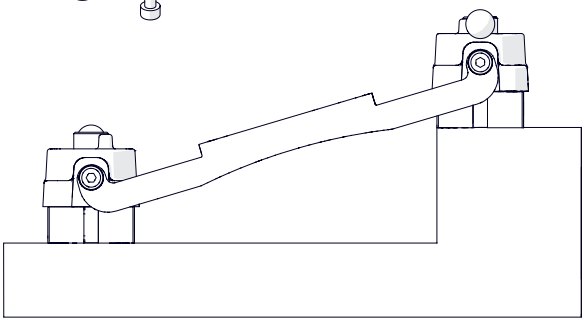
Part number (bracket for hi-flex and semi-flex track):
WAP-RB2040





Part number (bracket for rigid track):
WAP-RB2026





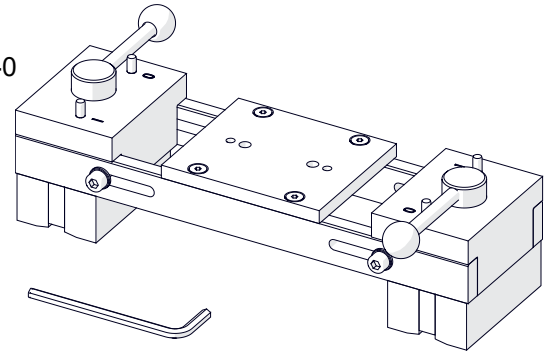
Holding force on a 5 mm (0.2″) thick surface	Temperature
100% (1200 N)	20°C (68°F)
75% (900 N)	80°C (176°F)
50% (600 N)	120°C (248°F)

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.

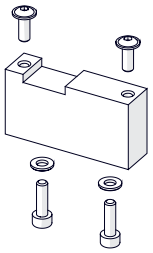
5.10.3. Spacing-adjustable magnetic unit

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

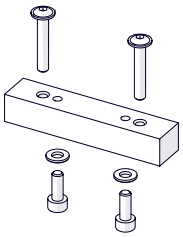
Part number:
ZSP-0523-19-00-00-0

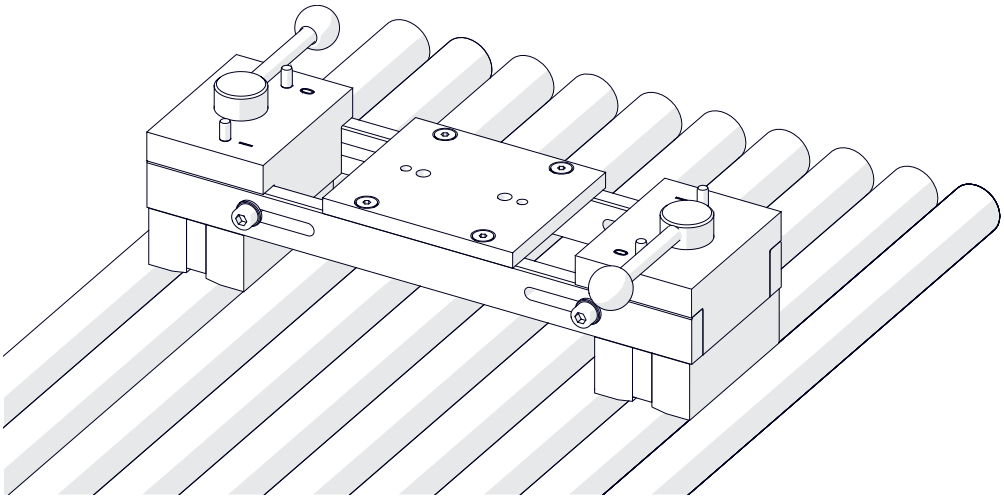


Part number (bracket for hi-flex and semi-flex track):
WAP-RB2040



Part number (bracket for rigid track):
WAP-RB2026





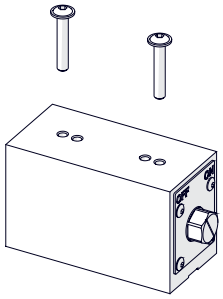
Holding force on a 5 mm (0.2″) thick surface	Temperature
100% (1200 N)	20°C (68°F)
75% (900 N)	80°C (176°F)
50% (600 N)	120°C (248°F)

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.

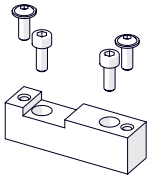
5.10.4. Narrow magnetic unit

Allows clamping a hi-flex, semi-flex, or rigid track to ferromagnetic surfaces.

Part number:
WAP-RB2015

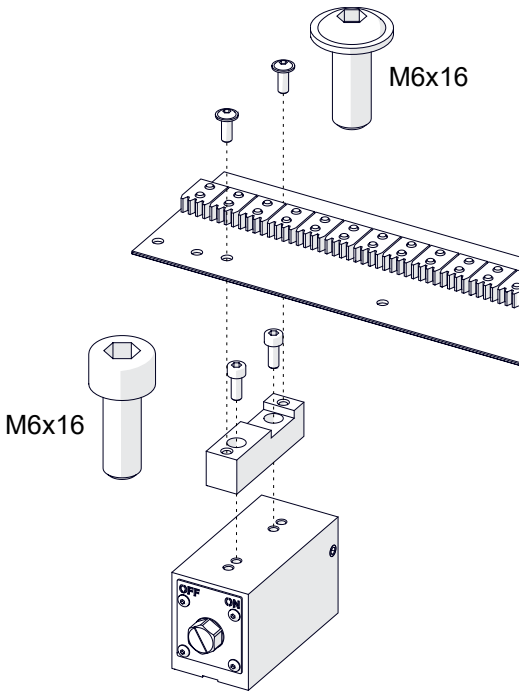


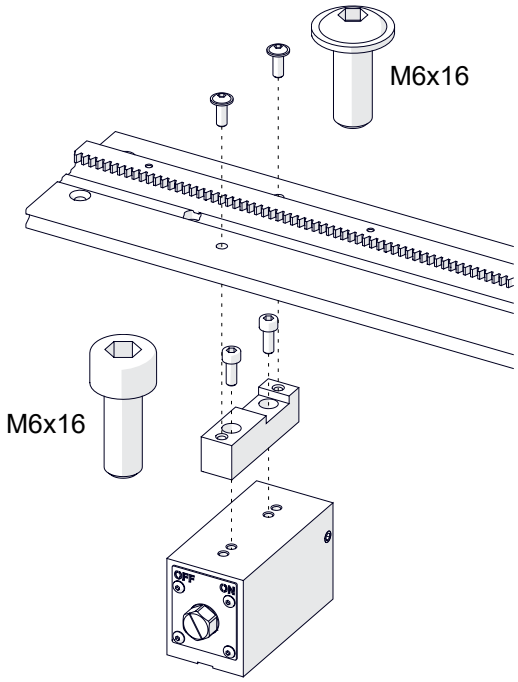
Part number (bracket for hi-flex and semi-flex track):
WAP-RB2045

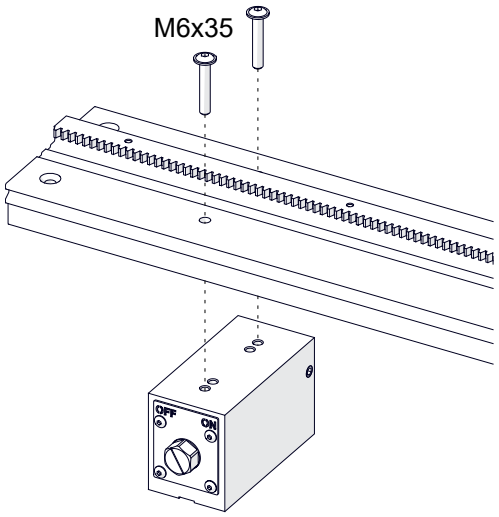


Holding force on a 5 mm (0.2″) thick surface	Temperature
100% (1000 N)	20°C (68°F)
75% (750 N)	80°C (176°F)
50% (500 N)	120°C (248°F)

Use the 4 mm hex wrench to attach the unit to the tracks as shown.





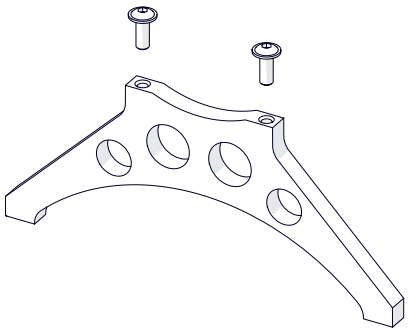


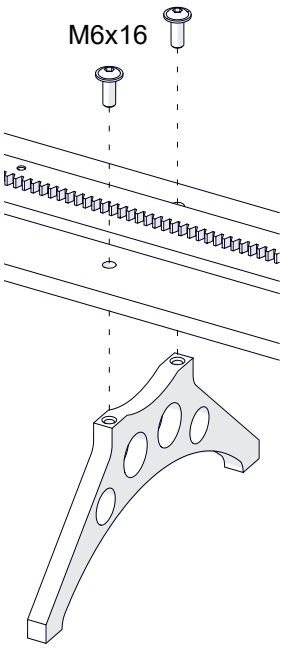
To clamp the unit to the surface, use the 17 mm flat wrench (not included) and set the side screw to ON.

5.11. Semi-flex track support

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

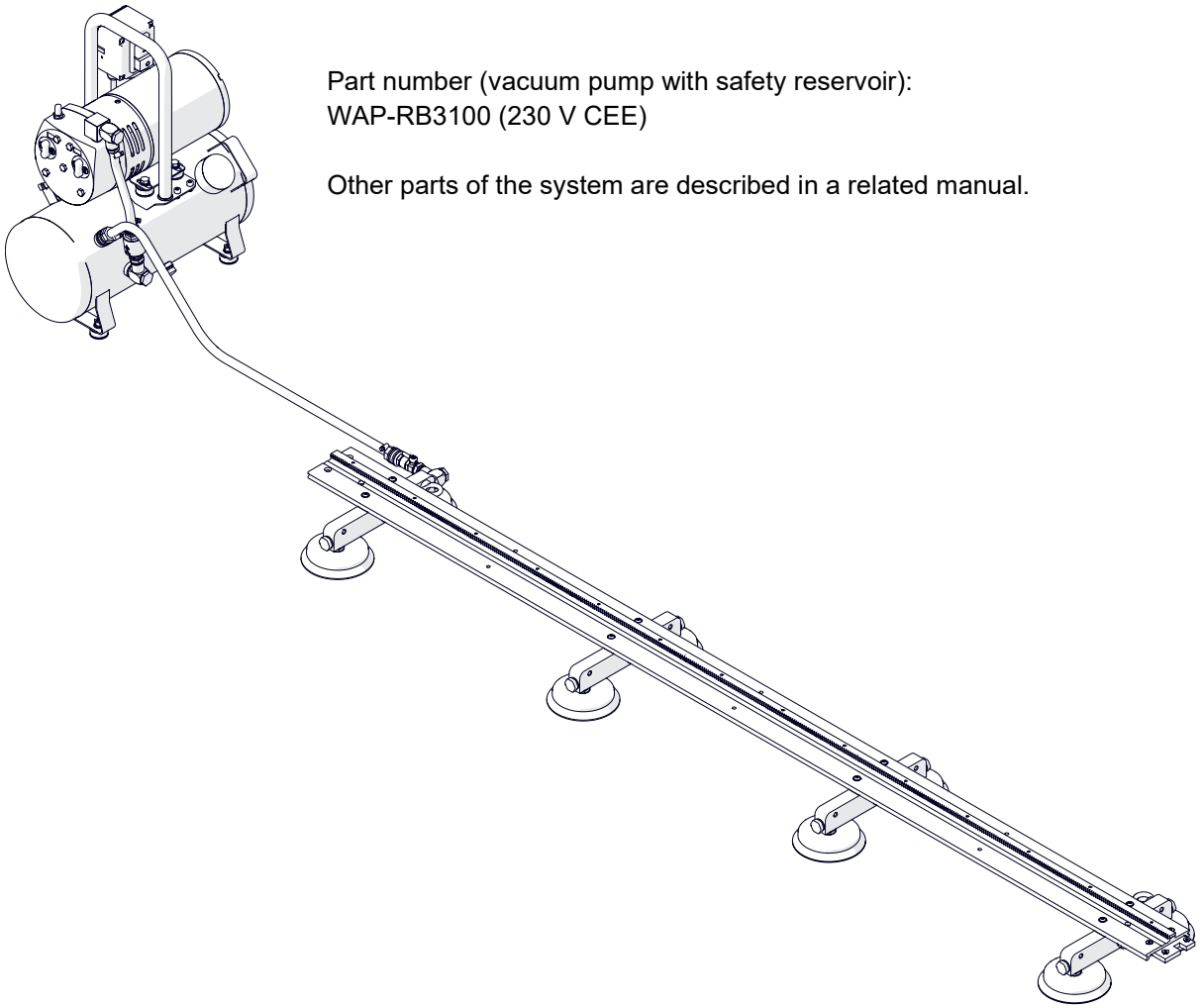
Part number:
WAP-RB2030





5.12. Vacuum track system

Allows clamping a hi-flex, semi-flex, or rigid track to non-ferromagnetic surfaces.

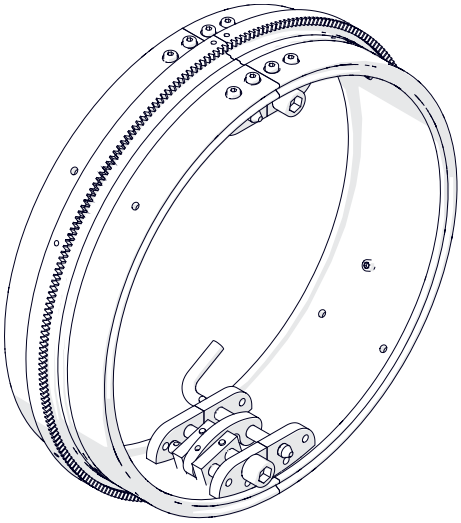


Part number (vacuum pump with safety reservoir):
WAP-RB3100 (230 V CEE)

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

5.13. Ring tracks

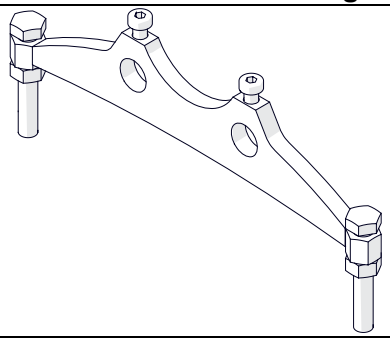
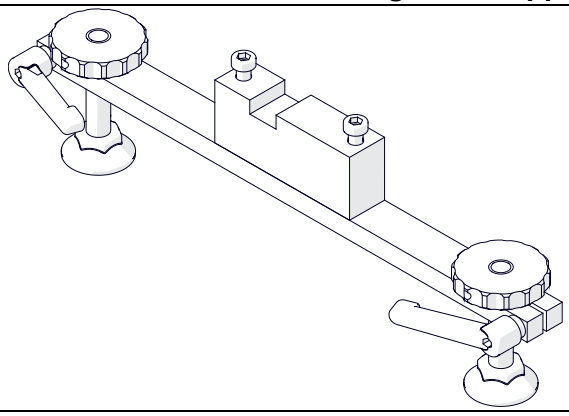
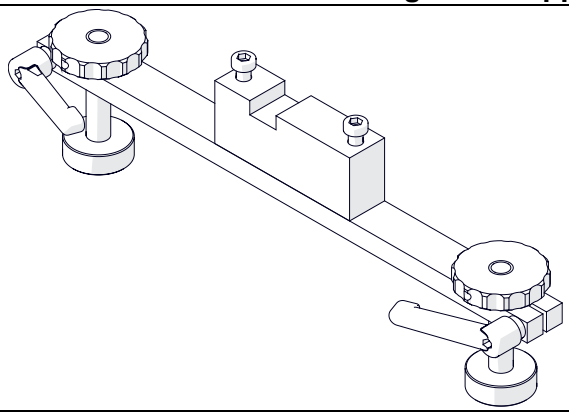
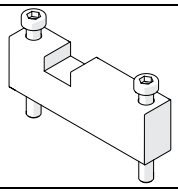
Allow welding of round workpieces with the outer diameters from 200 mm (8″) to 3000 mm (120″). Clamped to the workpiece with supports. You can use brackets to clamp the track to workpieces with diameters smaller by 50 mm. The tracks consist of two, three, or four rails. Tracks not shown in the table are available on request.



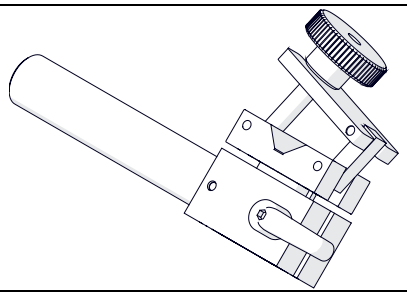
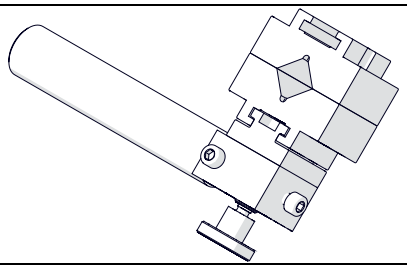
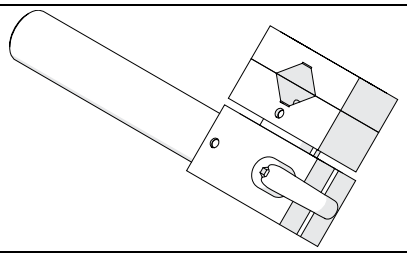
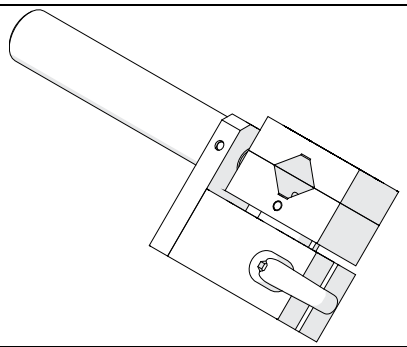
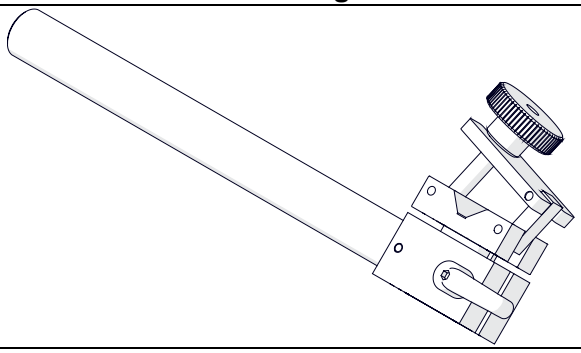
Workpiece outer diameter (without brackets)		**Part number**	**Rails**	**Ring track supports required**
Min. [mm]	**Max.** [mm]			
200	250	WAP-RB2052	2	4
250	300	WAP-RB2056	2	4
300	350	WAP-RB2058	2	4
350	400	TRO-0523-21-00-00-0	2	4
400	450	WAP-RB2060	2	6
450	500	TRO-0523-24-00-00-0	2	6
500	550	WAP-RB2062	2	6
550	600	TRO-0523-26-00-00-0	2	6
600	650	WAP-RB2064	2	6
650	700	TRO-0523-28-00-00-0	2	6
700	750	WAP-RB2066	2	6
750	800	TRO-0523-30-00-00-0	2	6
800	850	WAP-RB2068	2	6
850	900	TRO-0523-32-00-00-0	2	6
900	950	WAP-RB2070	2	8
950	1000	TRO-0523-34-00-00-0	2	8
1000	1050	WAP-RB2072	2	8
1050	1100	TRO-0523-36-00-00-0	3	9
1100	1150	WAP-RB2074	3	9

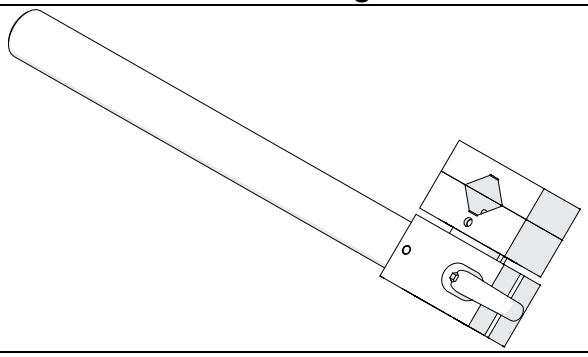
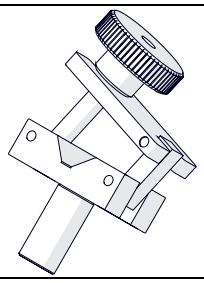
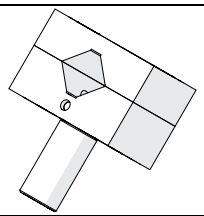
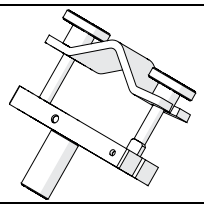
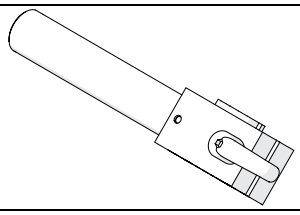
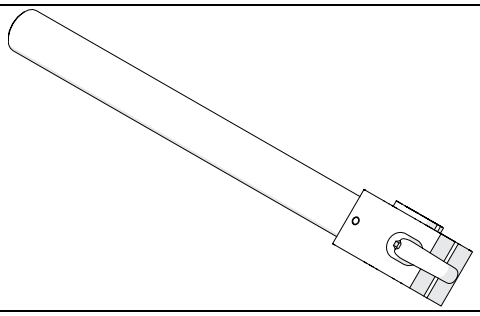
Workpiece outer diameter (without brackets)		**Part number**	**Rails**	**Ring track supports required**
Min. [mm]	**Max.** [mm]			
1150	1200	TRO-0523-38-00-00-0	3	9
1200	1250	WAP-RB2076	3	9
1250	1300	TRO-0523-40-00-00-0	3	9
1300	1350	TRO-0523-41-00-00-0	3	12
1350	1400	TRO-0523-42-00-00-0	3	12
1400	1450	TRO-0523-43-00-00-0	3	12
1450	1500	TRO-0523-44-00-00-0	3	12
1500	1550	TRO-0523-45-00-00-0	3	12
1550	1600	TRO-0523-46-00-00-0	3	12
1600	1650	TRO-0523-47-00-00-0	3	12
1650	1700	TRO-0523-48-00-00-0	3	12
1700	1750	TRO-0523-49-00-00-0	3	12
1750	1800	TRO-0523-50-00-00-0	3	12
1800	1850	TRO-0523-51-00-00-0	3	12
1850	1900	TRO-0523-52-00-00-0	3	15
1900	1950	TRO-0523-53-00-00-0	3	15
1950	2000	TRO-0523-54-00-00-0	3	15
2000	2050	TRO-0523-55-00-00-0	3	15
2050	2100	TRO-0523-56-00-00-0	4	16
2100	2150	TRO-0523-57-00-00-0	4	16
2150	2200	TRO-0523-58-00-00-0	4	16
2200	2250	TRO-0523-59-00-00-0	4	16
2250	2300	TRO-0523-60-00-00-0	4	20
2300	2350	TRO-0523-61-00-00-0	4	20
2350	2400	TRO-0523-62-00-00-0	4	20
2400	2450	TRO-0523-63-00-00-0	4	20
2450	2500	TRO-0523-64-00-00-0	4	20
2500	2550	TRO-0523-65-00-00-0	4	20
2550	2600	TRO-0523-66-00-00-0	4	20
2600	2650	TRO-0523-67-00-00-0	4	20
2650	2700	TRO-0523-68-00-00-0	4	20
2700	2750	TRO-0523-69-00-00-0	4	20
2750	2800	TRO-0523-70-00-00-0	4	20
2800	2850	TRO-0523-71-00-00-0	4	20
2850	2900	TRO-0523-72-00-00-0	4	20
2900	2950	TRO-0523-73-00-00-0	4	20
2950	3000	TRO-0523-74-00-00-0	4	20
3000	3050	TRO-0523-75-00-00-0	4	20

5.14. Ring track supports and bracket

Ring track support with bolts	
	Part number: WAP-RB2210
Ring track support with plastic feet	
	Part number: WSP-0654-12-00-00-0
Ring track support with magnets	
	Part number: WAP-RB2208
Ring track bracket	
	Part number: DYS-0523-14-14-00-0

5.15. Torch holders, clamps, and rods

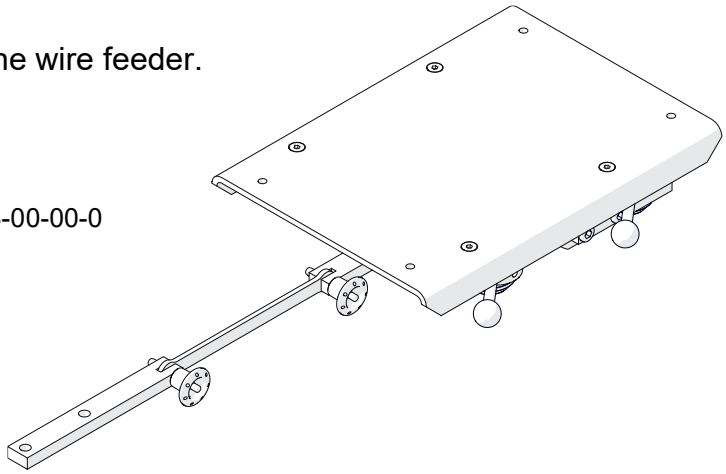
Short rod torch holder with clamp 16–22 mm	
	Part number: UCW-0754-07-00-00-0
Quick-release short rod torch holder with clip 16–22 mm	
	Part number: UCW-0523-84-00-00-0
Short rod torch holder with clip 16–22 mm	
	Part number: UCW-0476-27-00-00-0
Short low rod torch holder with clip 16–22 mm	
	Part number: WAP-L4090
Long rod torch holder with clamp 16–22 mm	
	Part number: UCW-0752-07-00-00-0

Long rod torch holder with clip 16–22 mm	
	Part number: UCW-0466-22-00-00-0
Torch clamp 16–22 mm	
	Part number: ZRZ-0752-07-01-00-0
Torch clip 16–22 mm	
	Part number: WAP-G2160
Torch clamp 22–35 mm	
	Part number: WAP-L4040
Short rod	
	Part number: WAP-G2050
Long rod	
	Part number: WAP-L4030

5.16. Transport attachment

Allows transporting the wire feeder.

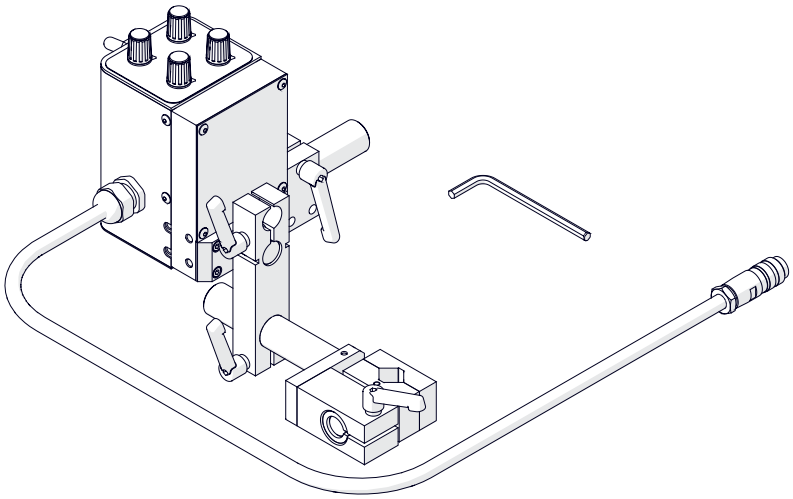
Part number:
PEP-0523-93-00-00-0



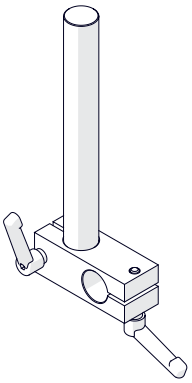
5.17. Pendulum oscillator

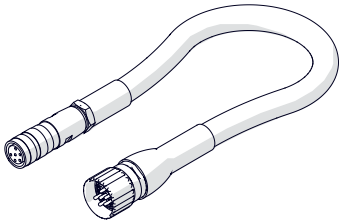
Allows pendulum oscillation of MIG/MAG torches with the diameter of 16–22 mm (5/8–7/8″).

Part number:
WA-OSC8



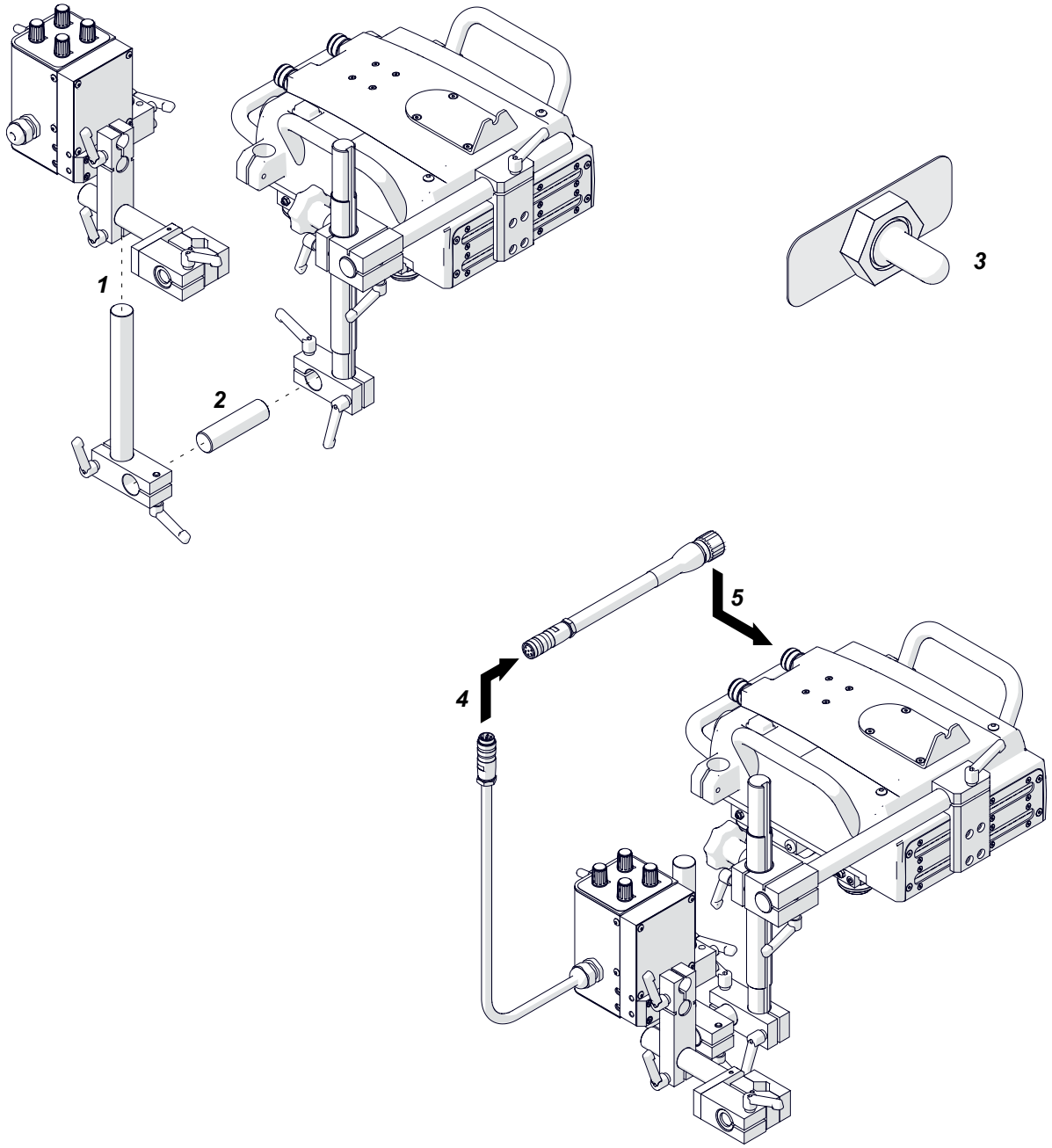
Part number:
KLM-0236-00-16-00-0 (203 mm rod)
WAP-RB2280 (clamping block)





Part number:
PWD-0654-10-00-00-0 (adapter)

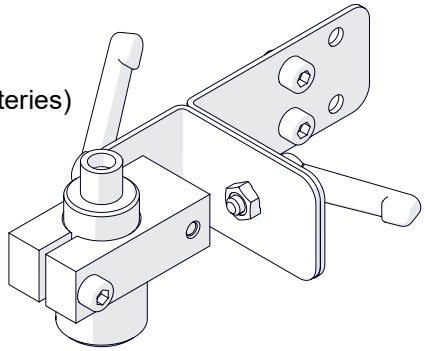
Assemble the oscillator with a 203 mm (8″) rod and a clamping block (*1*). Use the 80 mm (3″) rod to put the oscillator onto the carriage (*2*). Next, set the switch to the middle position (*3*) and use the adapter to connect the oscillator to the carriage (*4*, *5*).

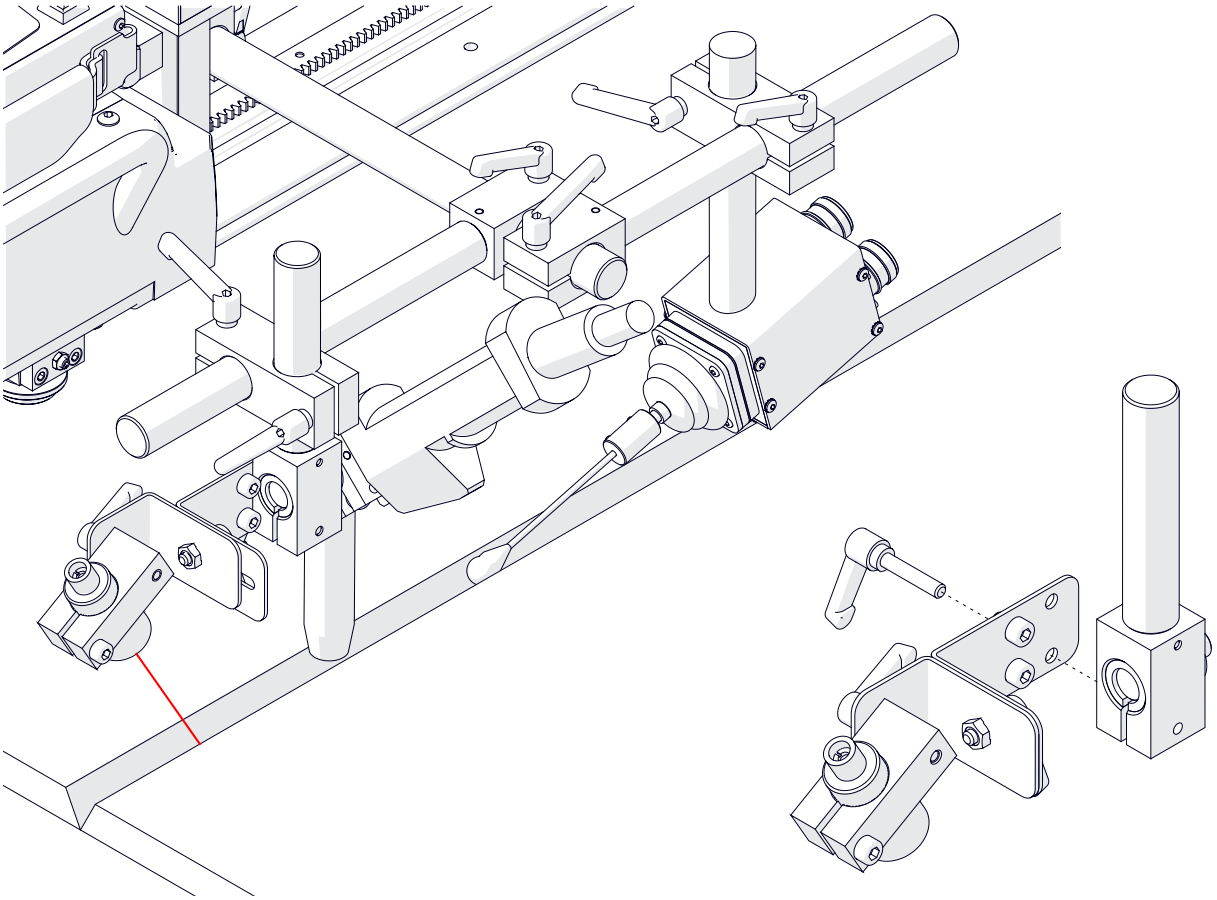


5.18. Laser pointer

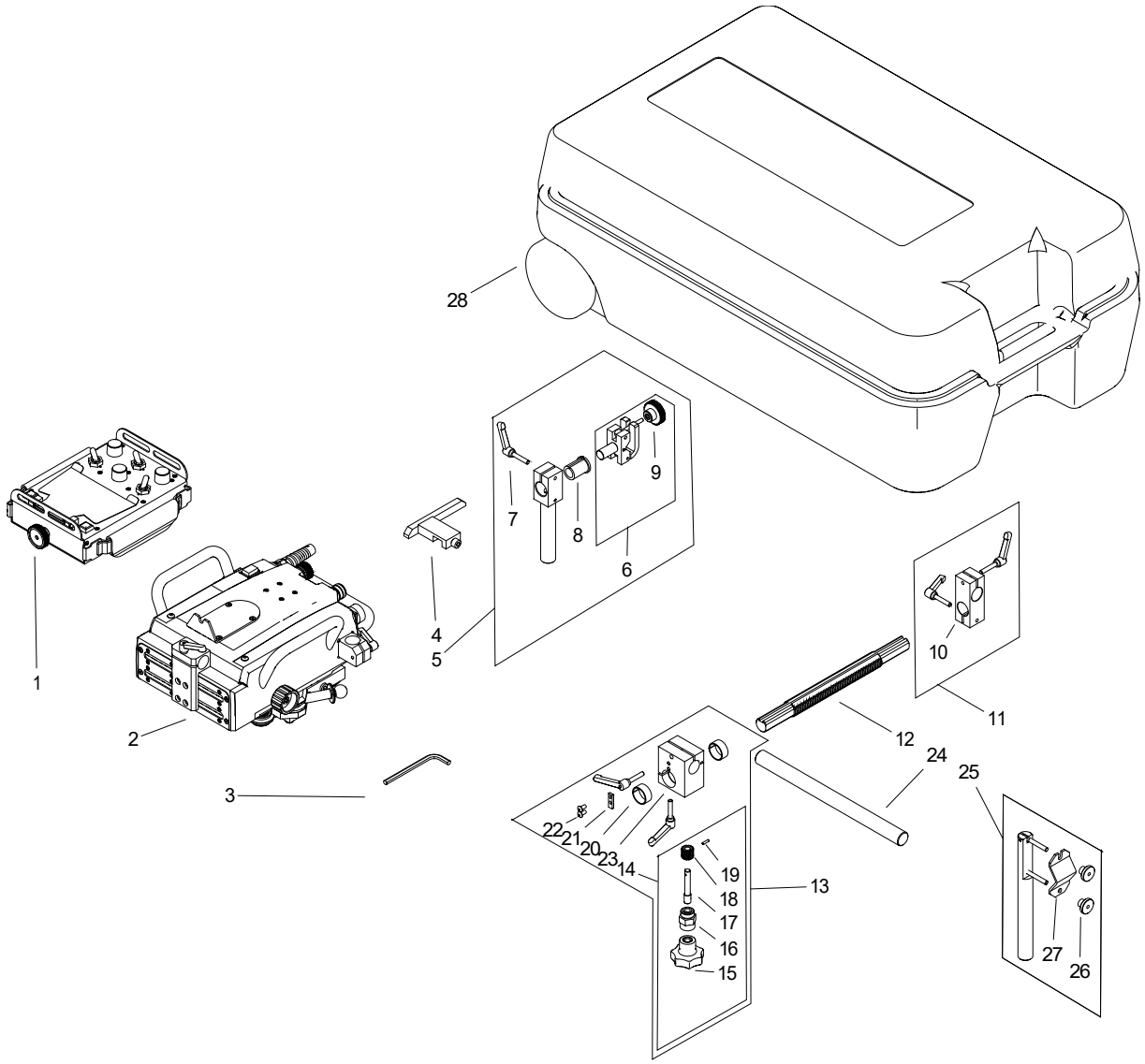
For aligning the track.

Part number:
WSK-0654-14-00-00-0
(includes two LR44 batteries)





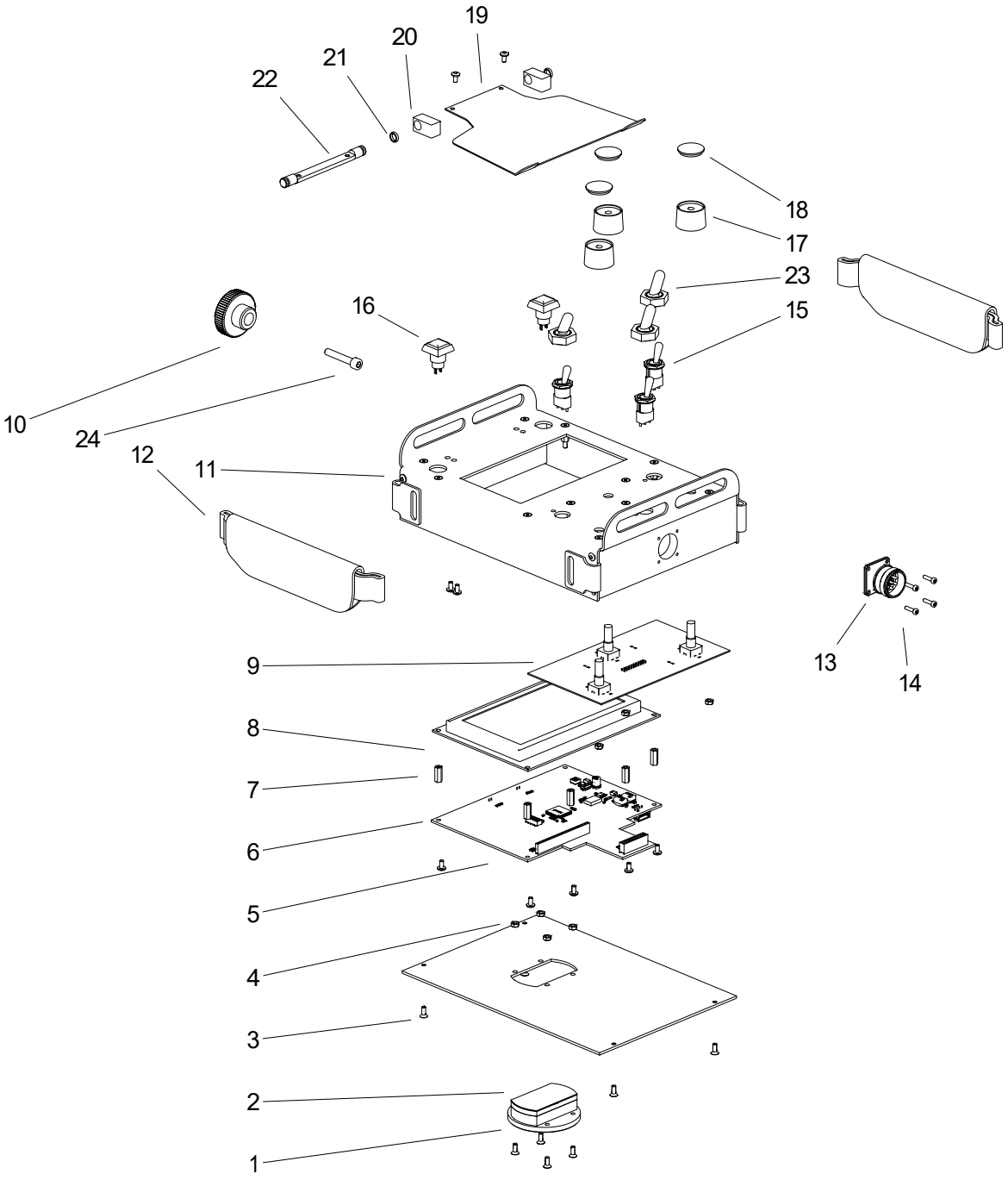
6.0 PARTS BREAKDOWN



ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	PNL-0654-03-00-00-0	CONTROL PANEL	1
2	ZSP-0654-01-00-00-0	DRIVE SYSTEM ASSY	1
3	KLC-000009	6 MM HEX WRENCH	1
4	ZDR-0523-76-00-00-0	CONTACT BLOCK	1
5	UCW-0476-20-00-00-0	SHORT ROD TORCH HOLDER ASSY	1
5*	UCW-0476-27-00-00-0	SHORT ROD TORCH HOLDER WITH CLIP ASSY	1
5*	UCW-0466-22-00-00-0	ROD TORCH HOLDER WITH CLIP ASSY	1
6	ZRZ-0466-04-01-00-0	QUICK TORCH HOLDER CLAMP 16-22	1
7	RKJ-000036	HENDLEVER M6-32	5
8	TLJ-0419-04-02-03-0	INSULATION TUBE	1
9	PKT-0466-04-01-10-0	KNOB	1
10	KST-0466-43-04-00-0	DOUBLE CLAMPING BLOCK	1
11	KST-0525-11-00-00-0	CLAMPING BLOCK	1
12	RAM-0523-17-00-00-0	GUIDE ARM	1
13	ZSP-0475-62-00-00-0	Slide	1
14	PKT-0475-62-02-00-0	KNOB	1
15	PKT-000039	KNOB D50xM10	1
16	ZLC-0475-62-02-01-0	THREAD JOINT	1
17	OSK-0475-62-02-02-0	PIVOT PIN	1

ITEM	PART NUMBER	DESCRIPTION	Q-TY
18	KOL-0475-62-02-03-0	GEAR Z16	1
19	KLK-000004	SPRING PIN 3x12	1
20	TLJ-0475-62-04-00-0	SELF-LUBRICATING SLEEVE 25x28x12	2
21	WPS-0475-62-03-00-0	KEY	1
22	WKR-000096	HEX SOCKET BUTTON HEAD SCREW M5x10	2
23	KRP-0475-62-01-00-0	HOUSING	1
24	WSP-0523-16-00-00-0	BRACKET	1
25	UCW-0654-02-00-00-0	CABLE ANCHOR	1
26	NKR-000121	KNURLED NUT M6	2
27	TRM-0219-06-16-00-0	CLAMP PLATE	1
28	SKR-0654-99-01-00-0	PLASTIC BOX - SERVICE	1
29*	PWD-0654-07-00-00-0	PANEL CABLE L=3m	1
30*	PWD-0654-08-00-00-0	TRANSMISION CABLE L=5m	1
31*	KBL-0466-17-00-00-0	ARC IGNITION WIRE L=6,5m	1
32*	PWD-0466-16-00-00-0	POWER CABLE 115V	1
32*	PWD-0466-18-00-00-0	POWER CABLE 230V	1
32*	PWD-0466-21-00-00-0	POWER CABLE 230V AUSTRALIA	1
32*	PWD-0466-28-00-00-0	POWER CABLE 230V G TYPE, UK	1
32*	PWD-0466-31-00-00-0	POWER CABLE 230V D TYPE, INDIA	1
33*	PWD-0654-06-00-00-0	PANEL CABLE	1

*not shown in the drawing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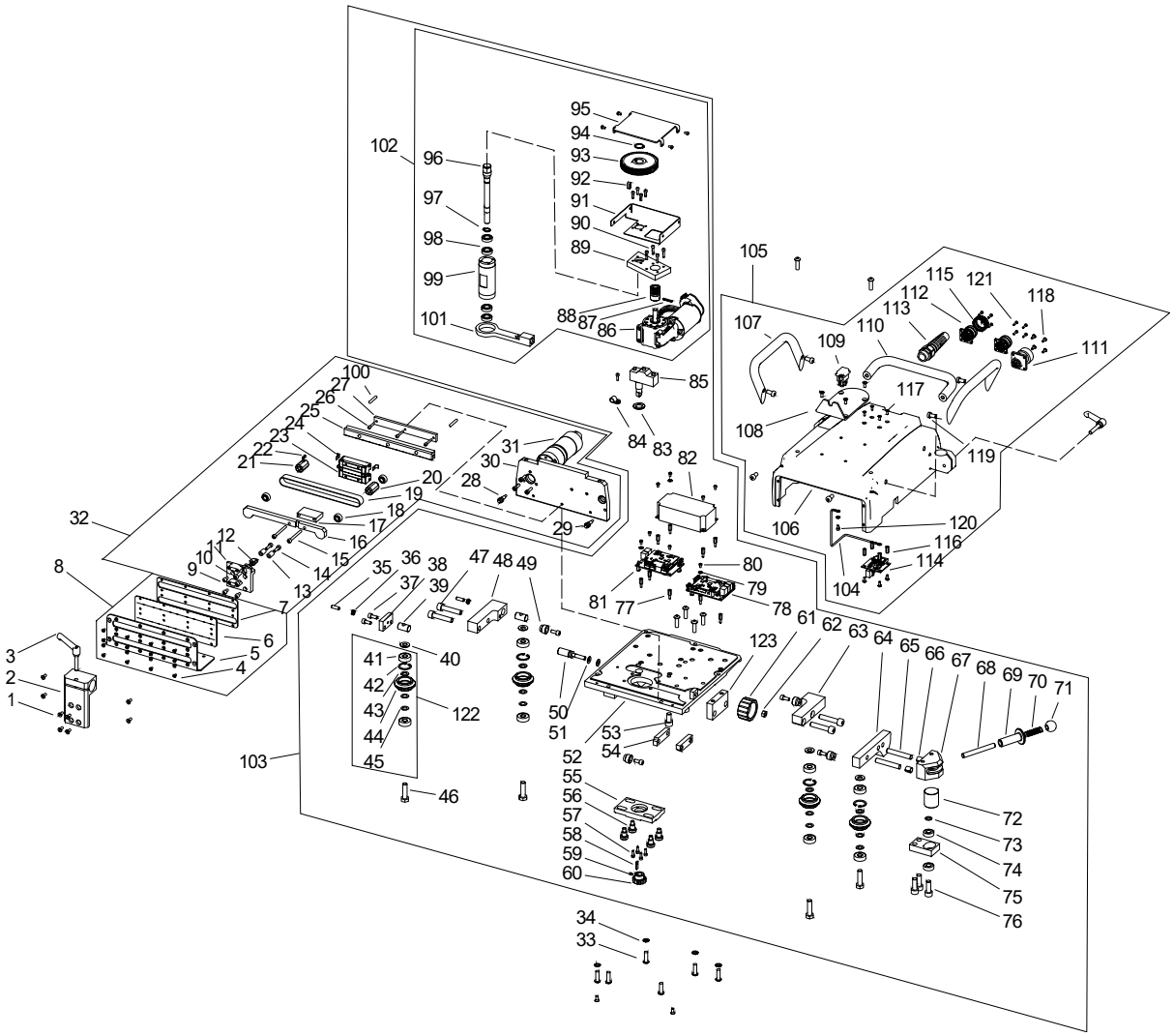
ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	WKR-000398	HEX SOCKET COUNTERSUNK HEAD SCREW M3x8	12
2	CHW-0523-03-07-00-1	MAGNETIC CLAMP	1
3	PLY-0523-03-01-00-0	BOTTOM PLATE	1
4	NKR-000009	HEX NUT M3	7
5	WKR-000286	HEX SOCKET BUTTON HEAD SCREW M3x6	12
6	MDL-0654-80-05-00-0	CONTROLLER MODULE	1
7	TLJ-000146	HEX SLEEVE M3/12	6
8	MDL-0523-03-03-00-0	PANEL MODULE	1
9	MDL-0523-03-10-00-1	ENCODER MODULE	1
10	PKT-0466-04-01-11-0	TORCH CLAMP KNOB	1
11	OBD-0654-99-02-00-0	HOUSING - SERVICE	1
12	RKJ-0523-03-12-00-1	HANDLE	2
13	WZK-0654-03-02-00-0	CONTROL PANEL WIRE SET	1
14	SRB-000401	TORX SOCKET HEAD CAP SCREW M2.5x10	4
15	WZK-0526-02-02-03-0	TRAVEL DIRECTION SWITCH WIRE SET	3
16	WZK-0523-03-13-00-1	NAVIGATION BUTTON WIRE SET	2
17	PKT-000041	KNOOB	3
18	PKR-000055	KNOOB COVER	3
19	OSL-0523-03-14-00-0	PANEL COVER	1
20	ZWS-0523-03-15-00-0	HINGE	2
21	PRS-000111	O-RING SEAL 5x1.5	2
22	OSK-0523-03-16-00-0	HINGE AXIS	1
23	OSL-000036	SWITCH COVER	3
24	SRB-000087	HEX SOCKET HEAD CAP SCREW M5x25	1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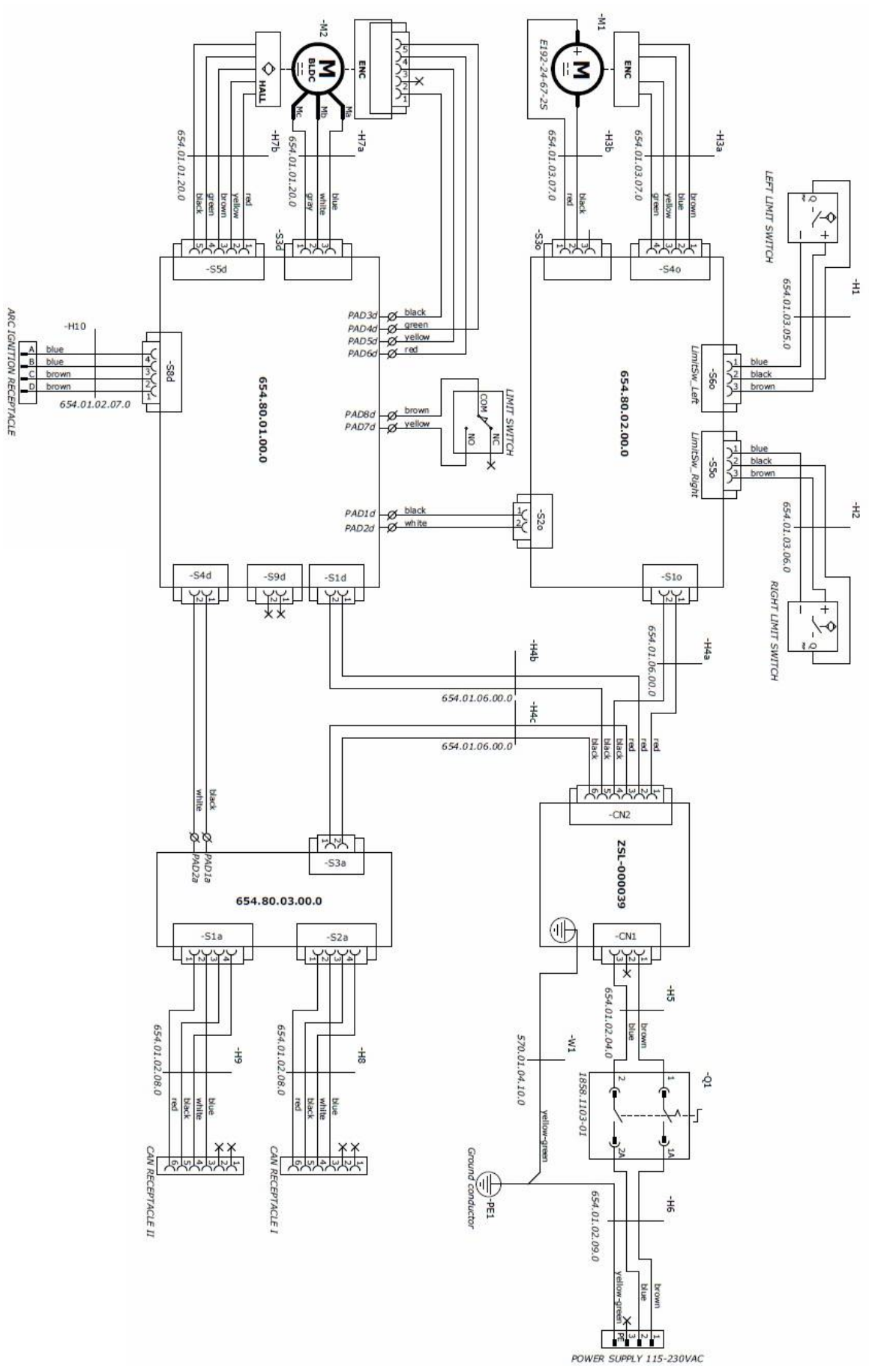
ITEM	PART NUMBER	DESCRIPTION	Q-TY
1	WKR-000130	HEX SOCKET COUNTERSUNK HEAD SCREW M4x10	14
2	UCW-0654-01-05-00-0	HOLDER	1
3	RKJ-000036	HANDLEVER M6-32	2
4	WKR-000349	HEX SOCKET COUNTERSUNK HEAD SCREW M3x6	16
5	OSL-0654-01-04-01-0	FRONT COVER	1
6	USZ-0654-01-04-02-0	SEAL	1
7	DCS-0654-01-04-03-0	SEAL HOLDER	1
8	OSL-0654-01-04-00-0	FRONT COVER ASSY	1
9	SRB-000074	HEX SOCKET HEAD CAP SCREW M4x8	4
10	SRB-000174	LOW HEAD SOCKET CAP SCREW M5x16	1
11	PLY-0654-01-03-02-0	MOUNTING PLATE	1
12	DCS-0523-02-19-00-0	BELT HOLDER	1
13	UCW-0523-02-09-00-0	BELT HOLDER	2
14	SRB-000063	HEX SOCKET HEAD CAP SCREW M4x14	5
15	SRB-000067	HEX SOCKET HEAD CAP SCREW M4x40	2
16	WSP-0523-02-06-00-0	BEARING BRACKET	1
17	DYS-0523-02-08-00-0	SPACER I	1
18	LOZ-000110	BALL BEARING 6x15x5	3
19	PAS-000009	TOOTHED BELT 140XL050	1
20	KOL-0654-01-03-04-0	GEAR WHEEL Z10	1
21	KOL-0654-01-03-03-0	MOTOR GEAR WHEEL Z10	1
22	WKR-000484	HEX SOCKET SET SCREW WITH FLAT POINT M3x3	2
23	PRW-000066	LINEAR GUIDE CARRIAGE	1
24	ZDR-0523-02-11-00-0	BUMPER	2
25	PRW-0654-01-07-00-0	LINEAR GUIDE	1
26	SRB-000377	HEX SOCKET HEAD CAP SCREW M3x20	3
27	DYS-0523-02-16-00-0	SPACER II	1
28	WZK-0654-01-03-06-0	RIGHT LIMIT SWITCH WIRE SET	1
29	WZK-0654-01-03-05-0	LEFT LIMIT SWITCH WIRE SET	1
30	PLY-0654-01-03-01-0	OSCILATOR PLATE	1
31	MTR-0654-01-03-07-0	OSCILATOR MOTOR	1
32	OSC-0654-01-03-00-0	OSCILATOR ASSY	1
33	WKR-000499	HEX SOCKET BUTTON HEAD SCREW M6x20	13
34	PDK-000176	EXTERNAL TOOTH LOCK WASHER 6.4	4
35	WKR-000077	HEX SOCKET SET SCREW WITH FLAT POINT M5x16	2
36	NKR-000034	LOW HEX NUT M5	2
37	SRB-000078	HEX SOCKET HEAD CAP SCREW M5x12	4
38	PLY-0523-01-01-02-0	RESISTING PLATE	1
39	NKR-0523-01-01-09-0	NUT	2
40	PDK-000022	ROUND WASHER 8.4	4
41	LOZ-000053	BALL BEARING 8x22x7	8
42	PRS-000014	INTERNAL RETAINING RING 22w	4
43	PDK-000173	WASHER 8x14x1	4
44	RLK-0341-01-02-01-0	PRESSURE ROLLER	4
45	PDK-000174	WASHER 8x14x0.1	8
46	SRB-000031	FULL THREAD HEX HEAD SCREW M8x30	4
47	SRB-000157	HEX SOCKET HEAD CAP SCREW M8x40	4
48	WSP-0523-01-01-05-0	LEFT BRACKET	1
49	ZDR-0523-01-01-08-0	BUMPER	4
50	SRB-0654-01-01-07-0	BOLT	1
51	SPR-000010	DISC SPRING 6.2x12.5x0.6	2

ITEM	PART NUMBER	DESCRIPTION	Q-TY
52	KRP-0654-01-01-01-0	HOUSING	1
53	SRB-000142	HEX SOCKET HEAD CAP SCREW M8x16	2
54	NKR-0654-01-01-18-0	NUT	2
55	PLY-0523-01-01-07-0	BOTTOM PLATE	1
56	SRB-0341-02-10-00-0	MOUNTING SCREW	4
57	SRB-000310	HEX SOCKET HEAD CAP SCREW M3x10	13
58	WPS-0341-02-01-10-0	KEY	1
59	WKR-000012	HEX SOCKET SET SCREW WITH DOG POINT M4x6	1
60	KOL-0341-02-01-09-0	DRIVE GEAR, T=14	1
61	PKT-0654-01-01-08-0	KNOB	1
62	NKR-000017	HEX NUT M6	1
63	WSP-0654-01-01-13-0	RIGHT BRACKET	1
64	SWK-0654-01-01-14-0	SLIDER	1
65	KLK-000093	DOWEL PIN 8n6x50	2
66	TLJ-000048	SLIDE BUSHING 8x10x12	4
67	KRP-0654-01-01-16-0	ECCENTRIC HOUSNG	1
68	DZW-0419-01-04-13-0	LEVER	1
69	ZTR-0654-01-01-19-0	LATCH	1
70	SPR-000065	SPRING	1
71	KUL-0466-13-00-00-0	LEVER BALL	1
72	MMS-0654-01-01-12-0	ECCENTRIC	1
73	PDK-0549-02-10-00-0	SPACER	1
74	LOZ-000151	BEARING BALL	2
75	CGN-0654-01-01-15-0	BAND	1
76	SRB-000150	HEX SOCKET HEAD CAP SCREW M8x22	3
77	TLJ-000051	HEX SLEEVE	9
78	MDL-0654-80-01-00-0	MAIN DRIVE MODULE	1
79	PDK-000058	EXTERNAL TOOTH LOCK WASHER 3.2	4
80	WKR-000180	CROSS RECESSED PAN HEAD SCREW M3x5	13
81	MDL-0654-80-02-00-0	OSCILATOR MODULE	1
82	ZSL-000039	POWER SUPPLY	1
83	PDK-000008	SMALL ROUND WASHER 13	1
84	OBJ-000004	CABLE CLAMP	1
85	MKP-000003	LIMIT SWITCH	1
86	MTR-0654-01-01-20-0	MAIN DRIVE MOTOR	1
87	KLK-000006	SPRING PIN 3x18	1
88	KOL-0496-01-02-11-0	MOTOR GEAR z16	1
89	PLY-0654-01-01-09-0	UPPER PLATE	1
90	SRB-000336	HEX SOCKET HEAD CAP SCREW M3x14	8
91	OSL-0654-01-01-11-0	BOTTOM WHEEL COVER	1
92	WPS-000009	PARALLEL KEY 5x5x12	1
93	KOL-0654-01-01-10-0	WHEEL	1
94	PRS-000004	EXTERNAL RETAINING RING 14z	1
95	OSL-0523-01-02-09-0	UPPER WHEEL COVER	1
96	WLK-0654-01-01-22-0	DRIVE SHAFT	1
97	PRS-000002	EXTERNAL RETAINING RING 10z	1
98	LOZ-000123	BEARING BALL 10x16x5	4
99	KRP-0654-01-01-21-0	SHAFT BODY	1
100	KLK-000029	DOWEL PIN 4m6x24	2
101	WDZ-0654-01-01-06-0	PISTON ROD	1
102	ZSP-0654-01-01-05-0	MAIN DRIVE ASSY	1
103	PDW-0654-01-01-00-0	CHASIS ASSY	1

ITEM	PART NUMBER	DESCRIPTION	Q-TY
104	WZK-0570-01-04-10-0	GROUND WIRE SET	1
105	OSL-0654-01-02-00-0	UPPER HOUSING ASSY	1
106	OSL-0654-01-02-01-0	UPPER HOUSING	1
107	UCW-0654-01-02-02-0	HOLDER	2
108	UCW-0654-01-02-03-0	PANEL HOLDER	1
109	WZK-0654-01-02-04-0	POWER SUPPLY WIRE SET	1
110	OSL-0654-01-02-06-0	WIRE COVER	1
111	WZK-0654-01-02-07-0	ARC WIRE SET	1
112	WZK-0654-01-02-08-0	SIGNAL WIRE SET	2
113	WZK-0654-01-02-09-0	POWER WIRE SET	1
114	MDL-0654-80-03-00-0	FILTER MODULE	1
115	PKR-000155	SPACER COVER	1
116	TLJ-000146	HEX SLEEVE M3x12	3
117	WKR-000398	HEX SOCKET COUNTERSUNK HEAD SCREW M3x8	4
118	WKR-000313	HEX SOCKET BUTTON HEAD SCREW M3x8	8
119	SRB-000198	HEX SOCKET LOW HEAD BOLT M6x12	6
120	SRB-000060	HEX SOCKET HEAD CAP SCREW M3x6	1
121	SRB-000401	TORX SOCKET HEAD CAP SCREW M2.5x10	8
122	RLK-0341-01-02-00-0	PRESSURE ROLLER ASSY	4
123	OPR-0654-01-01-17-0	SETTING	1

7.0 ELECTRICAL DIAGRAM

CARRIAGE WIRING DIAGRAM



PANEL WIRING DIAGRAM