

FlexTrack 45



Operating instructions,

Carriage

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1. Proper use

The FlexTrack 45 is a rail carriage designed to establish groove and fillet welds with or without oscillation using MIG/MAG or CMT torches with handle diameter of 16-35 mm. The carriage can be fixed on straight, flexible orbital, and orbital rails. It can travel horizontally, vertically, and orbitally, which is enable for welding in almost all positions.

IMPORTANT! When using vacuum bridges, the workpiece must not be preheated!

1.1 Secure carriage against falling

In vertical operation, the rail construction must be secured with a load securing device with a locking function, to prevent it from falling. The load securing device must be designed for the total weight of the rail construction with carriage. The manufacturer accepts no liability for any damage to persons or property, resulting from vertical use of the carriage without a load securing device.

1.2 Improper use

Any use of the machine other than for its intended purpose shall be deemed improper use. This includes:

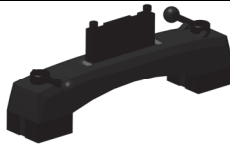
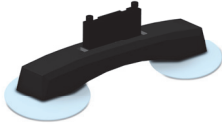
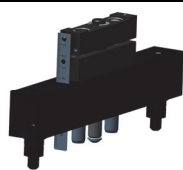
- Using flexible (unreinforced) rails on flat surfaces
- Using vacuum bridges on preheated workpieces
- Use over head
- Use as lifting tool (Transporting or maneuvering loads, animals, people)
- Standing on the machine or using it as a work platform
- Use as a storage surface for tools
- Use outside the permitted technical operating limits
- Use in hazardous areas

2. Technical data

Power supply	24 V DC, 100 W	
Travel direction	Forward, backward (along the rail)	
Drive	Gear motor with gear and rail guide	
Guiding mechanism	4 guide rollers	
Rail type	Rigid, L = 1884mm	
	Flexible, L = 1884mm (inner/outer curvature radius at least 1500/1100mm)	
	Orbital (for pipes Ø200–1560mm)	
	Sectional (for pipes Ø1560–3360mm)	
Rail fixing	Magnetic bridge, resistive bridge	
Minimum workpiece type and thickness	Ferromagnetic steel of 5 mm	
Torch type	MIG/MAG, CMT	
Torch diameter	16-35 mm	
Welding direction	Horizontal	
	Vertical	
	Orbital (180° from bottom to top)	
Travel speed	5–150 cm/min horizontally	
	5–135 cm/min vertically	
Direction change / stop	Stops after reaching the limit switch	
	Changes direction after reaching the limit switch	
End crater filling	0–5 s	
Torch position adjustment range	up-down	28 mm
	left-right	28 mm
Oscillation	OSC type	linear
	OSC modes	straight, trapezoid, triangle, rectangle
	OSC offset	0–50 mm
	OSC amplitude	2–30 mm
	OSC speed	5-400 cm/min
	OSC dwell time	left
center		0–3 s
right		0–3 s
Maximum pulling force	450 N (horizontally) 300 N (vertically)	
Dimensions with OSC	543 (L) × 352 (W) × 304 (H)	
Dimensions without OSC	480 (L) × 314 (W) × 334 (H)	
Carriage weight with OSC (without remote control)	14.5 kg	
Carriage weight without OSC (without remote control)	12.5 kg	
Remote control weight	1.5 kg	
Control box without cable	5,3 kg	
Welding device cable	1,5 kg	

3. Weight of bridges and rails

Magnetic bridge	2.5 kg
Vacuum bridge	1.6 kg
Magnetic bridge with distance block	2.7 kg
Vacuum bridge with distance block	1.8 kg
Magnetic bridge with distance block and fixing mechanism	3.4 kg
Magnetic bridge with fixing mechanism	3.2 kg
Screw feet bridge with distance block and fixing mechanism	1.5 kg
Screw feet bridge with fixing mechanism	1.3 kg
Vacuum bridge with distance block and fixing mechanism	2.6 kg
Vacuum bridge with fixing mechanism	2.4 kg
Rigid rail 1884 mm	11 kg
Flexible rail 1884 mm	5.5 kg
Flexible rail 1695 mm	4.8 kg
Flexible rail 1130 mm	3.3 kg
Ring rail Ø200-300 mm	8.8 kg
Ring rail Ø300-480 mm	11 kg
Ring rail Ø480-660 mm	14 kg
Ring rail Ø660-840 mm	16 kg
Rail segment Ø840-1020 mm	19 kg
Rail segment Ø1020-1200 mm	22 kg
Rail segment Ø1200-1380 mm	24 kg
Rail segment Ø1380-1560 mm	27 kg

MAGNETIC BRIDGE		For magnetic workpieces. Heat resistant up to 180°C (356 °F). Adjustable magnetic force.
VACUUM BRIDGE (2 Versions)		For non-magnetic workpieces. A vacuum pump is required. Version 1: Heat resistant up to max. 80° (176°F) Version 2: Heat resistant up to max. 250°C (480°F).
SCREW FEET BRIDGE		Recommended for rigid ring rails up to 840 mm (33.1 in) diameter.

4. Safety precautions

1. Before starting, read Operator's Manual and complete proper occupational safety and health training.
2. Carriage must be used only in applications specified in Operator's Manual.
3. Carriage must be complete and all parts must be genuine and fully operational.
4. Power supply specifications must conform to those specified on rating plate.
5. Power supply socket must be equipped with grounding pin.
6. Never carry Carriage by cord or yank it to disconnect plug from socket. It can cause power cord to break and result in electric shock.
7. Untrained bystanders must not be present near Carriage.
8. Before starting, check condition of Carriage and electrical installation, including power cord, plug, control panel, guiding rollers, and gear.
9. Keep Carriage dry. Exposing it to rain, snow, or frost is prohibited.
10. Keep work area well lit, clean, and free of obstacles.
11. Never use Carriage near flammable fluids or gases, nor in explosive environments.
12. Make sure gear and guiding rollers are clean and not damaged.
13. Mount carriage only on the supplied rails.
14. Transport and position Carriage using carrying handles.
15. Do not stay below Carriage placed at heights.
16. Plug power cord into power supply only when power switch on the control box is set in lower position.
17. Keep sockets clean. Do not use compressed air for cleaning.
18. Mounting torches other than specified in technical data is prohibited.
19. Mount cables in cable holder. They must be suspended to avoid damage and reduce carriage load.
20. Operating in PD (horizontal overhead) and PE (overhead) welding positions, as well as on curvatures with inner/outer radius lower than 1500/1100 mm is prohibited.
21. When operating at heights, use safety line to protect Carriage from dropping.

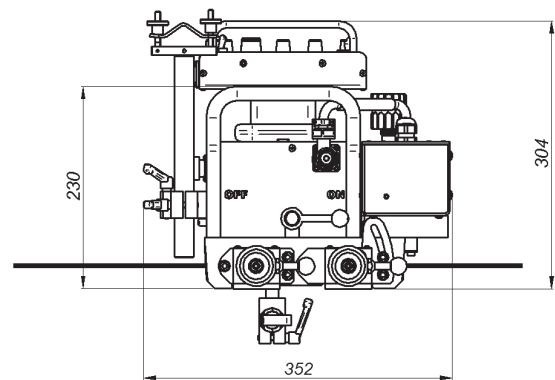
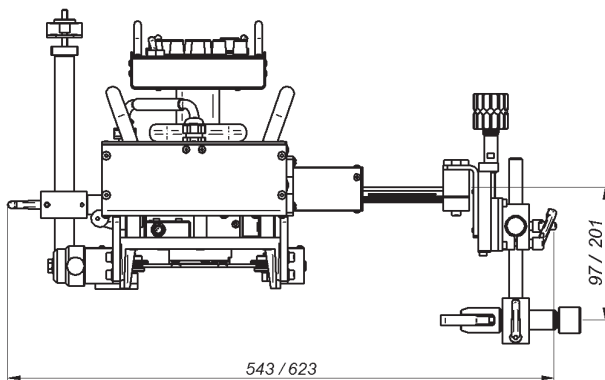
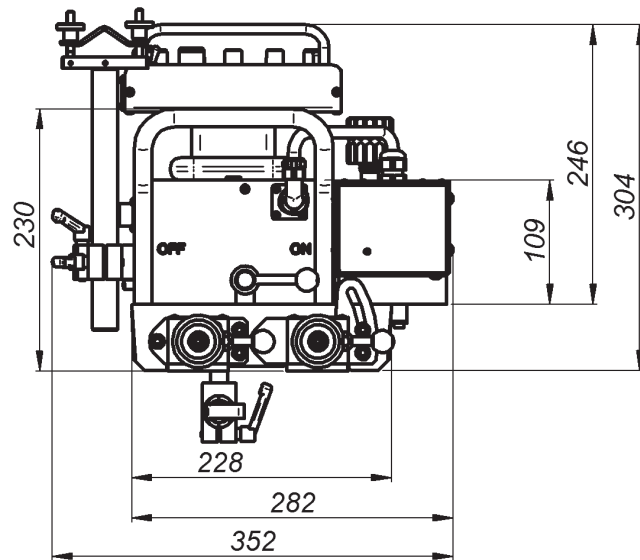
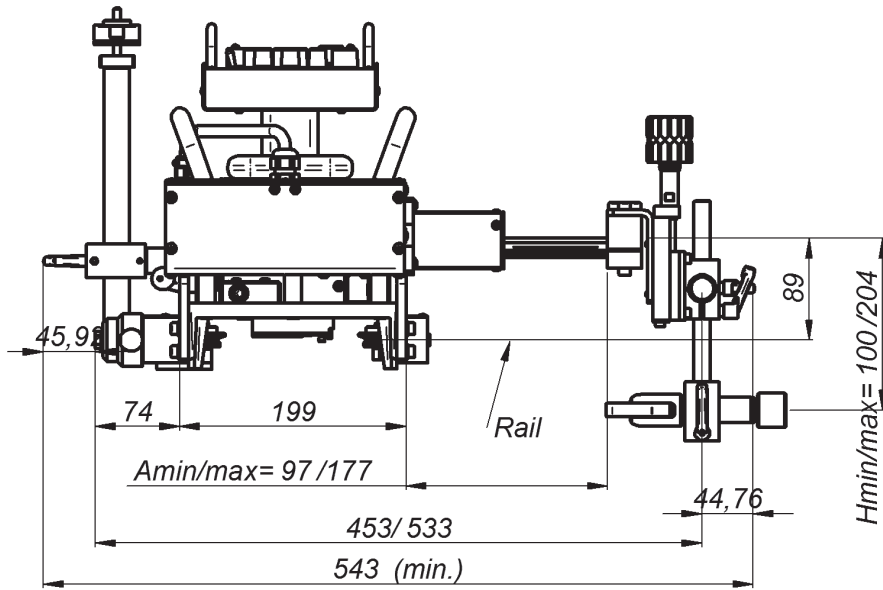
22. Always use eye protection (helmet, shield, and screen), hearing protection, gloves, and protective clothing during operation. Do not wear loose clothing.
23. Before every use, inspect Carriage to ensure it is not damaged. Check whether any part is cracked or improperly fitted. Make sure to maintain proper conditions that can affect Carriage operation.
24. Never try to manually stop motion of Carriage. For this purpose set travel direction switch in neutral position.
25. Never toggle engaging lever to OFF if Carriage is unprotected from dropping.
26. Perform maintenance only when Carriage is unplugged from power supply.
27. Perform all repairs only in service center appointed by seller.
28. If Carriage falls on hard surface, from height, is wet, or has other damage that could affect technical state of Carriage, stop operation and immediately send Carriage to service center for inspection.
29. Never leave Carriage unattended during operation.
30. Remove from worksite and store in isolated and dry location when not in use.



Safety rules must be closely observed.

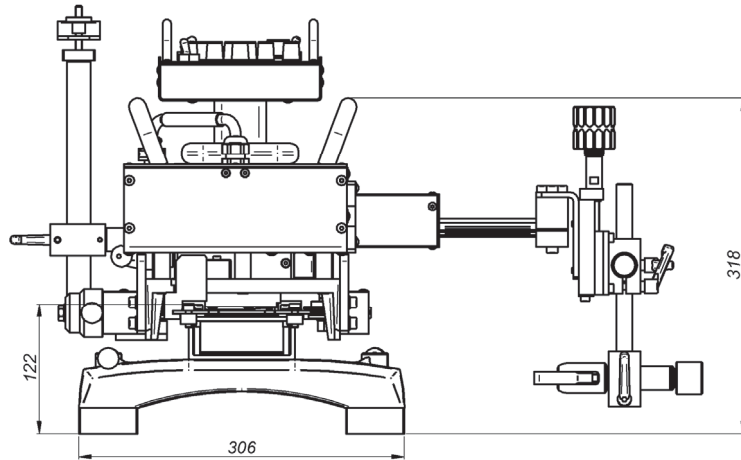
5. Dimensions of carriage with oscillation

All measurements in mm.

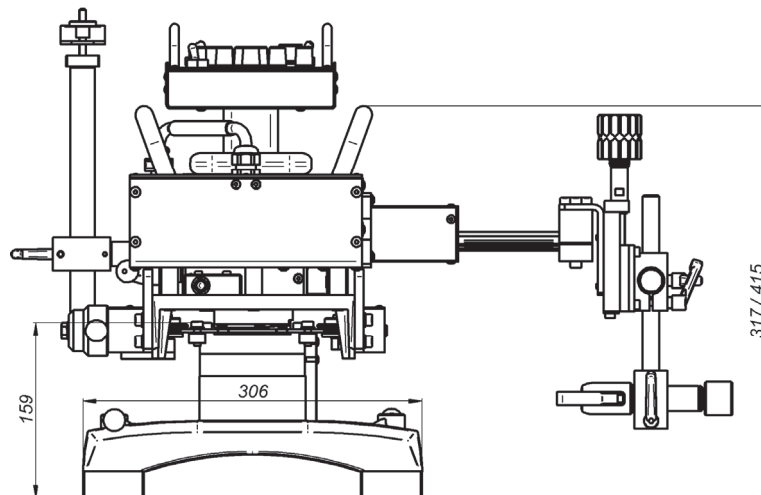


Carriage on a flexible track

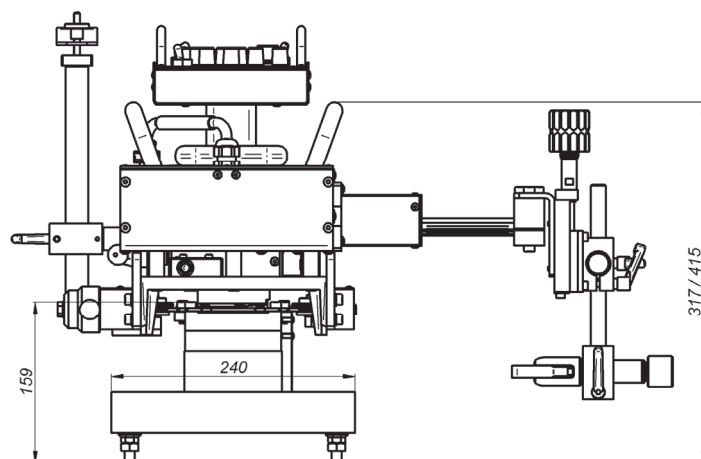
Carriage with magnetic bridge on a straight rigid track:



Carriage with magnetic bridge, with support and fixing mechanism:

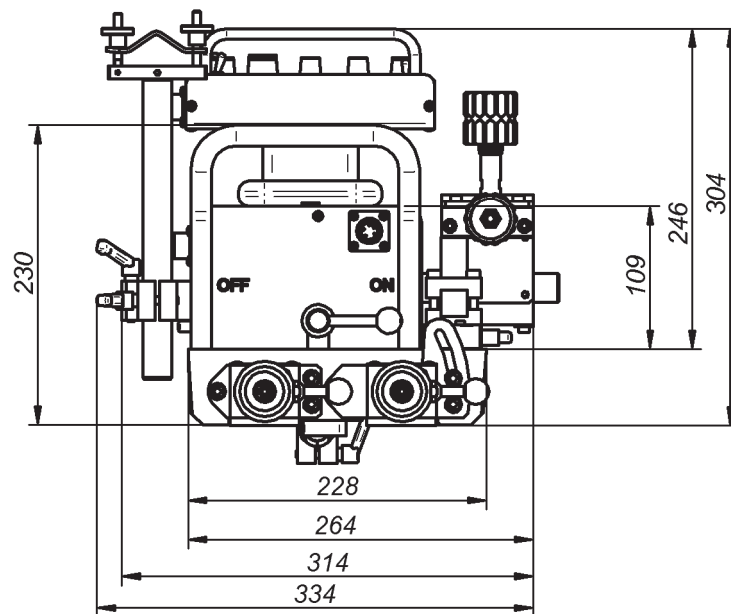
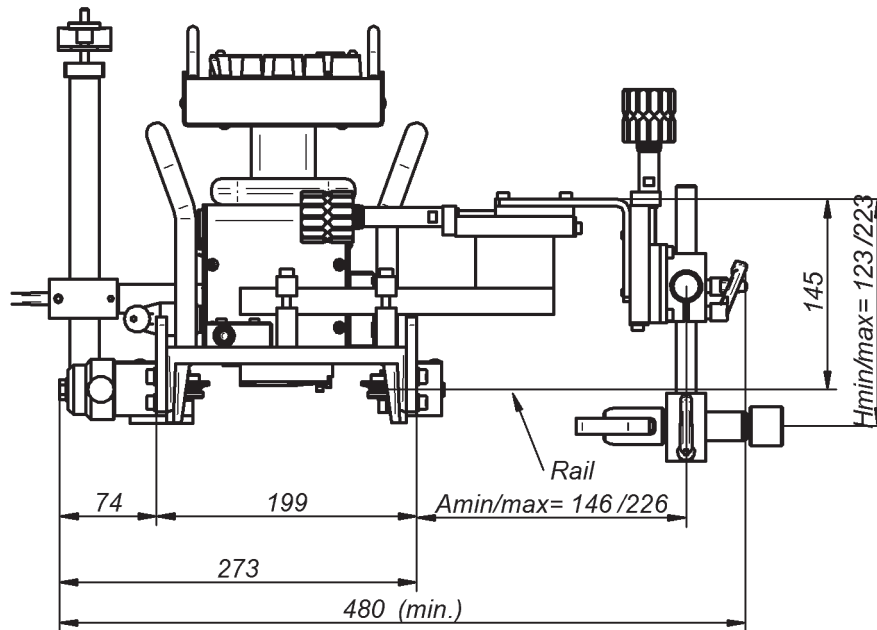


Carriage with screw-feet bridge, with supporting unit and fixing mechanism:

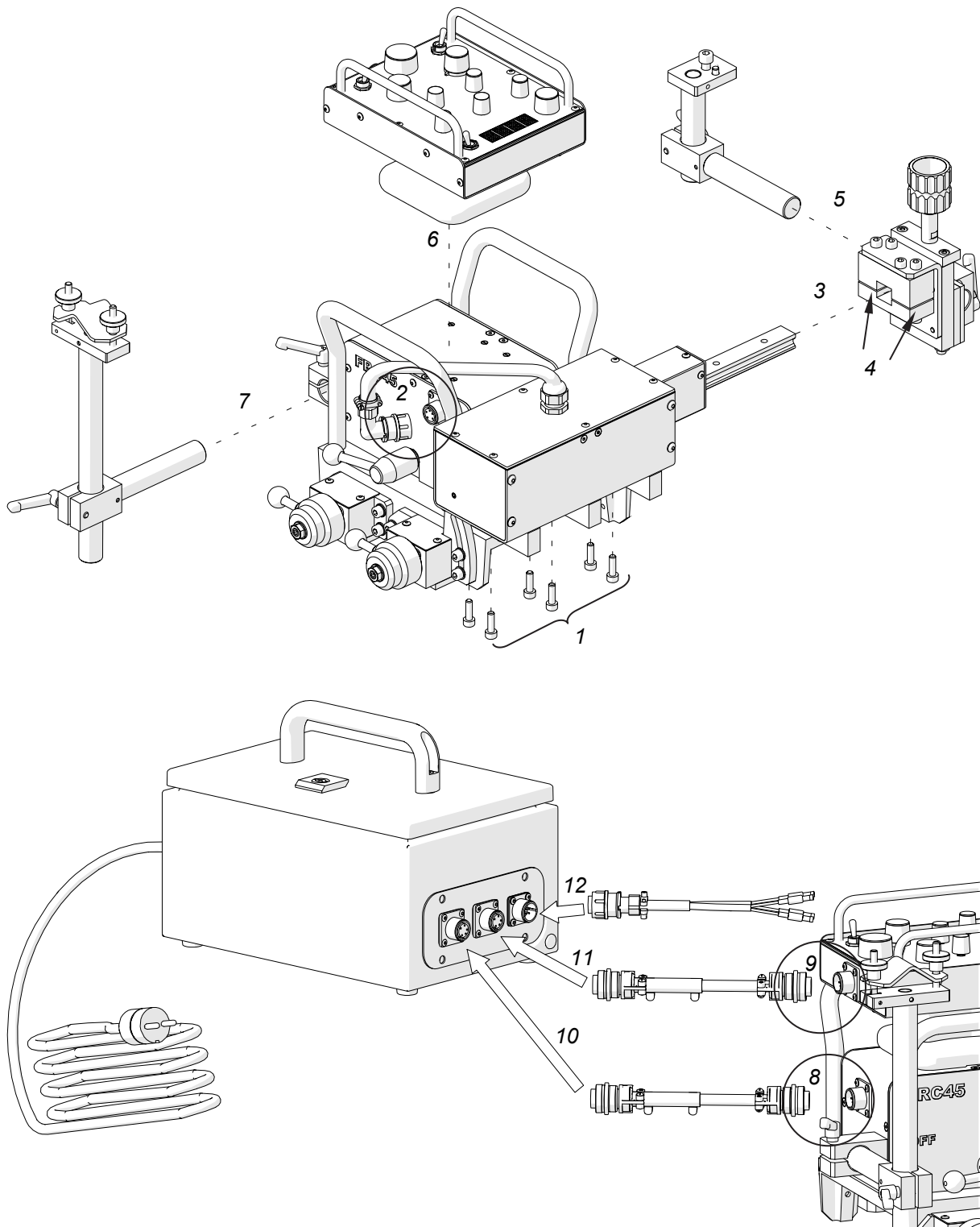


6. Dimensions of carriage without oscillation

All measurements in mm.



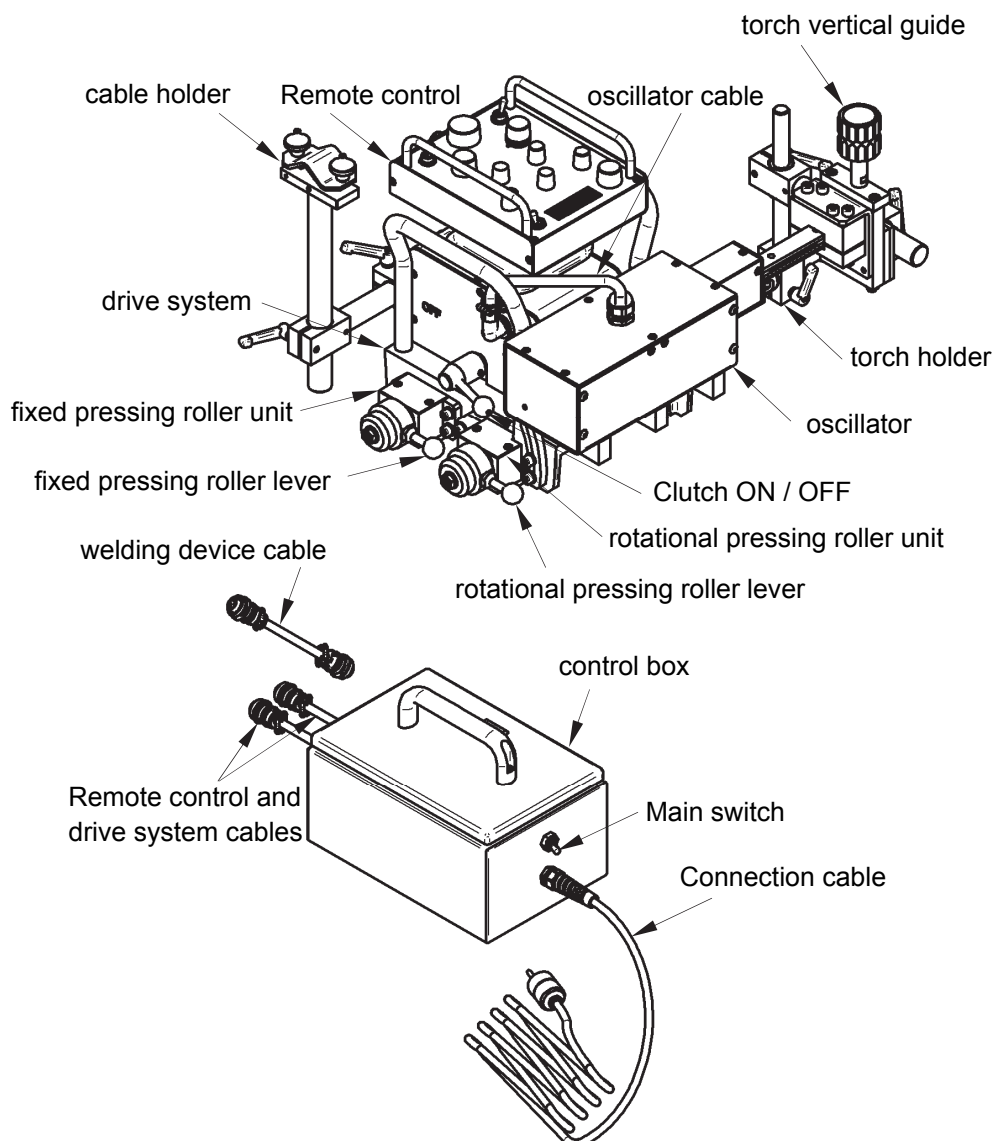
7. Assembling carriage for the first time



8. Description of carriage with oscillation

The carriage with oscillation consists of a drive system, pressing roller units, oscillation, cross slide, torch holder, remote control, and a control box. The drive system comprises a gear motor that drives the gear. The fixed roller unit lever and rotational roller unit lever are used for fixing the carriage by clamping four hardened steel rotational rollers to the guide using disk springs.

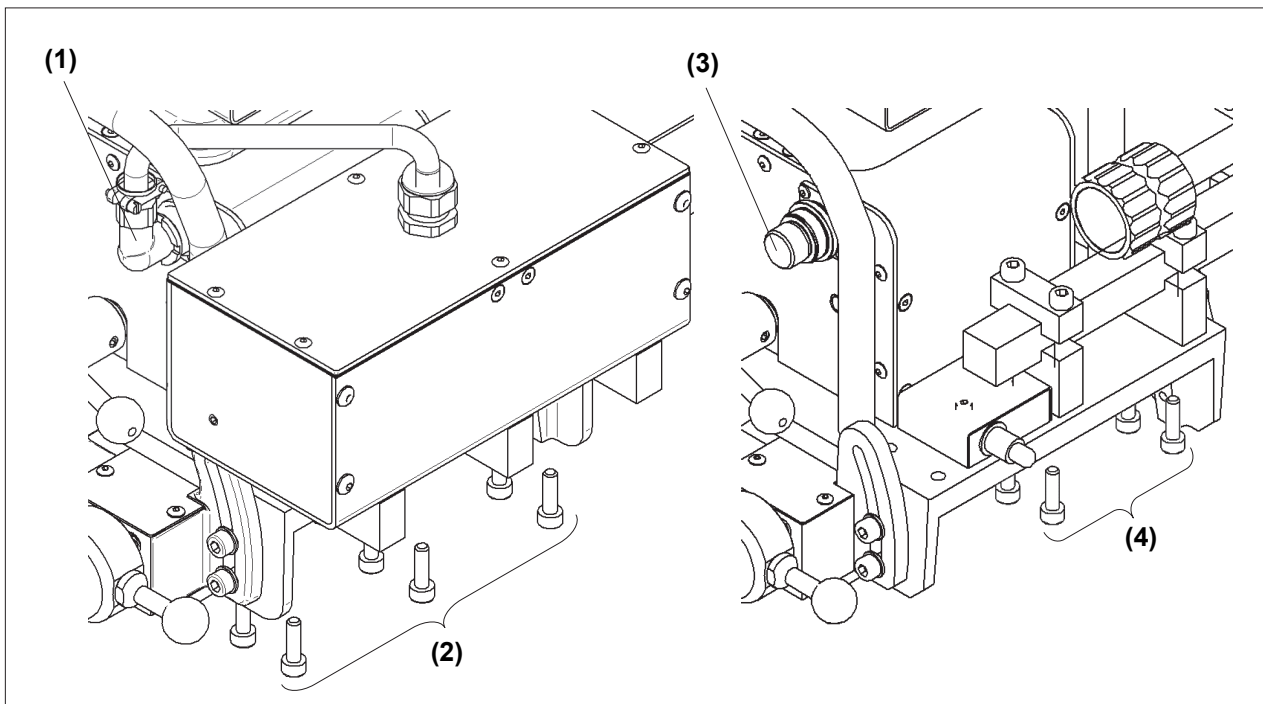
The clutch enables the gear to engage or disengage with the holes of the hardened spring steel rail guide. The cross slide enables for precise control of the torch position in both horizontal and vertical axis. The carriage travels according to parameters programmed on the controller. The controller with the magnetic foot can be positioned on the carriage, on the pipe, on flat ferromagnetic surfaces, or can be hold in hands. The controller enables for programming and adjusting all welding parameters as well as positioning of the torch during welding. The control box assures communication between the controller and the welding device.



9. Description of carriage without oscillation

To dismantle the oscillation unit, proceed according to the following instructions:

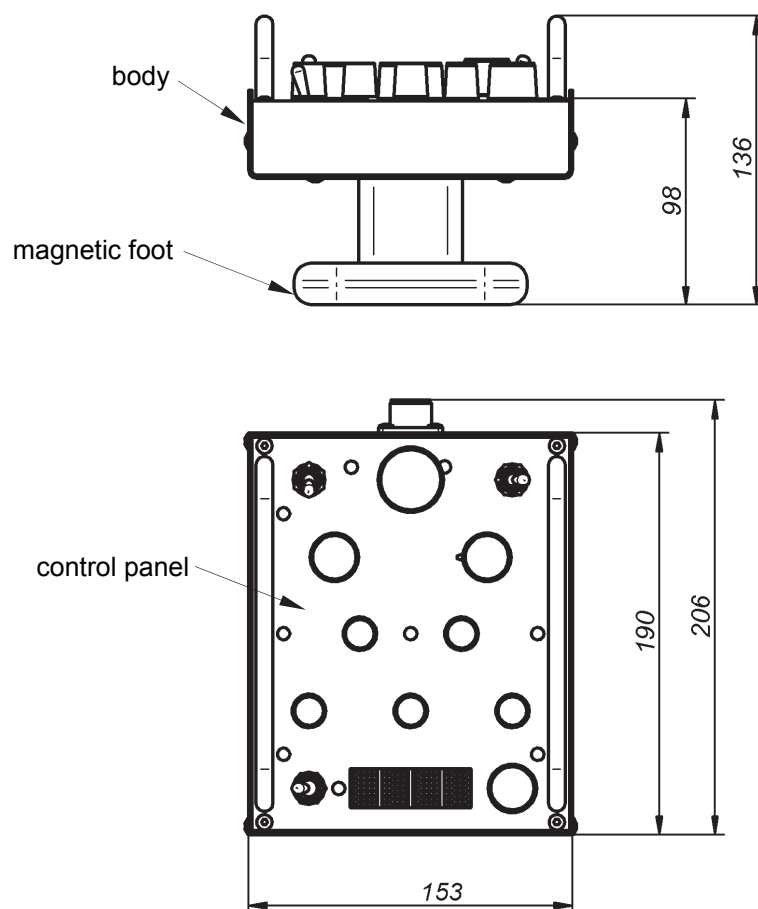
1. Unplug the oscillation cable.
2. Dismount the oscillation unit by unscrewing six M6 screws.
3. Screw the cap onto the oscillator socket.
4. Mount the guide arm in place of the oscillation unit.

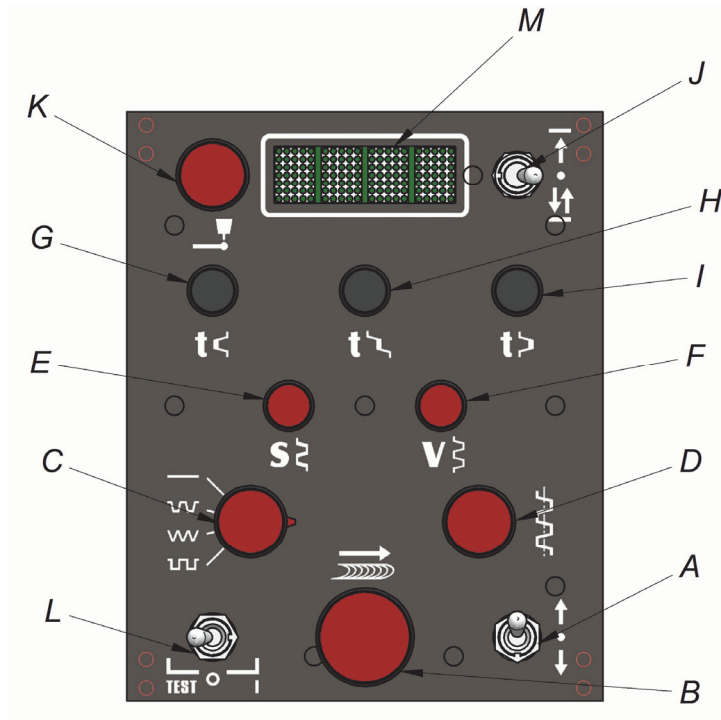


10. Remote control

The remote control consists of a magnetic foot, an aluminum body, and a control panel. It can be fixed to the drive system or to the ferromagnetic surface and is used to program and control all parameters of the carriage.

Four position display shows current and adjusted operating parameters. Additionally it indicates if the stoppage of the carriage or oscillator has been triggered by the limit switches.





Description:

A – Travel direction switch with neutral (middle) ‘stop’ position.

B – Travel speed adjustment (5–150 cm/min).

C – Oscillation modes: no oscillation, trapezoid, rectangular or triangular.

D – OSC offset

E – OSC amplitude (2–30 mm).

F – OSC speed (5–400 cm/min).

G – OSC dwell time left (0–3 s).

H – OSC dwell time middle (0–3 s).

I – OSC dwell time right (0–3 s).

J – Direction change/stop: changes direction or stops, when limit switch gets activated

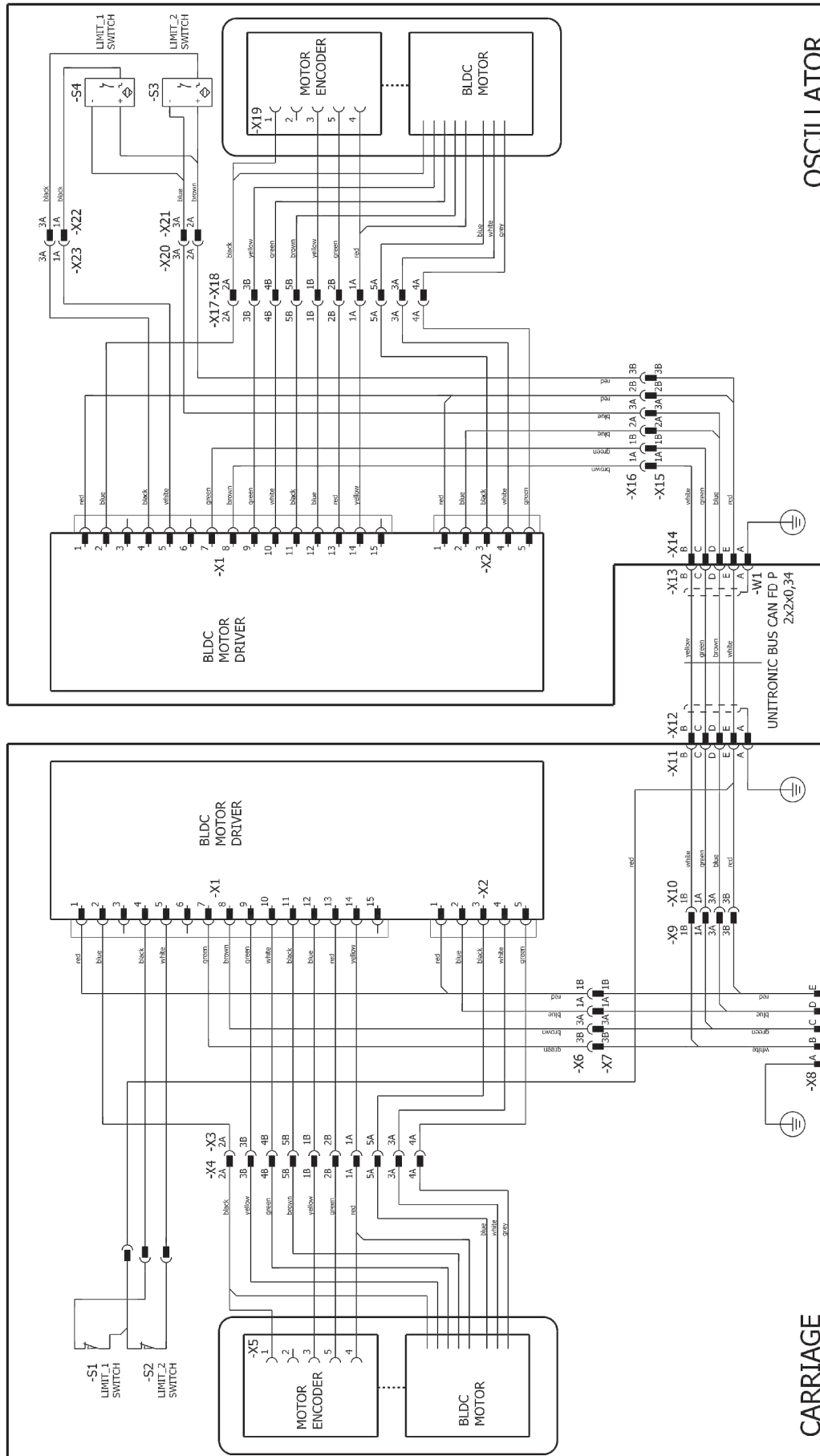
K – End crater filling (0–5 s).

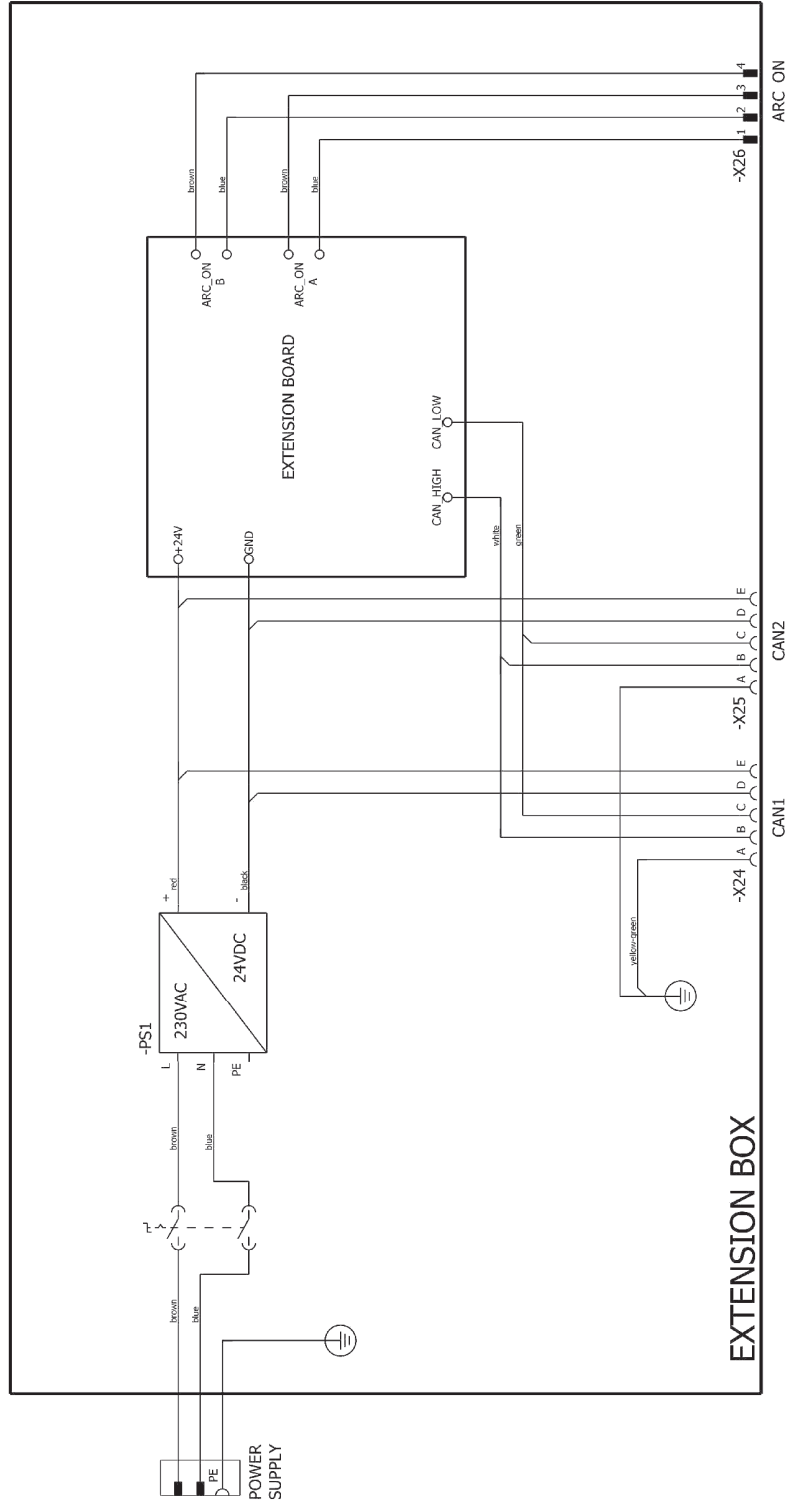
L – Welding modes: Test (left position), No Arc (middle pos.) Arc (right pos.)

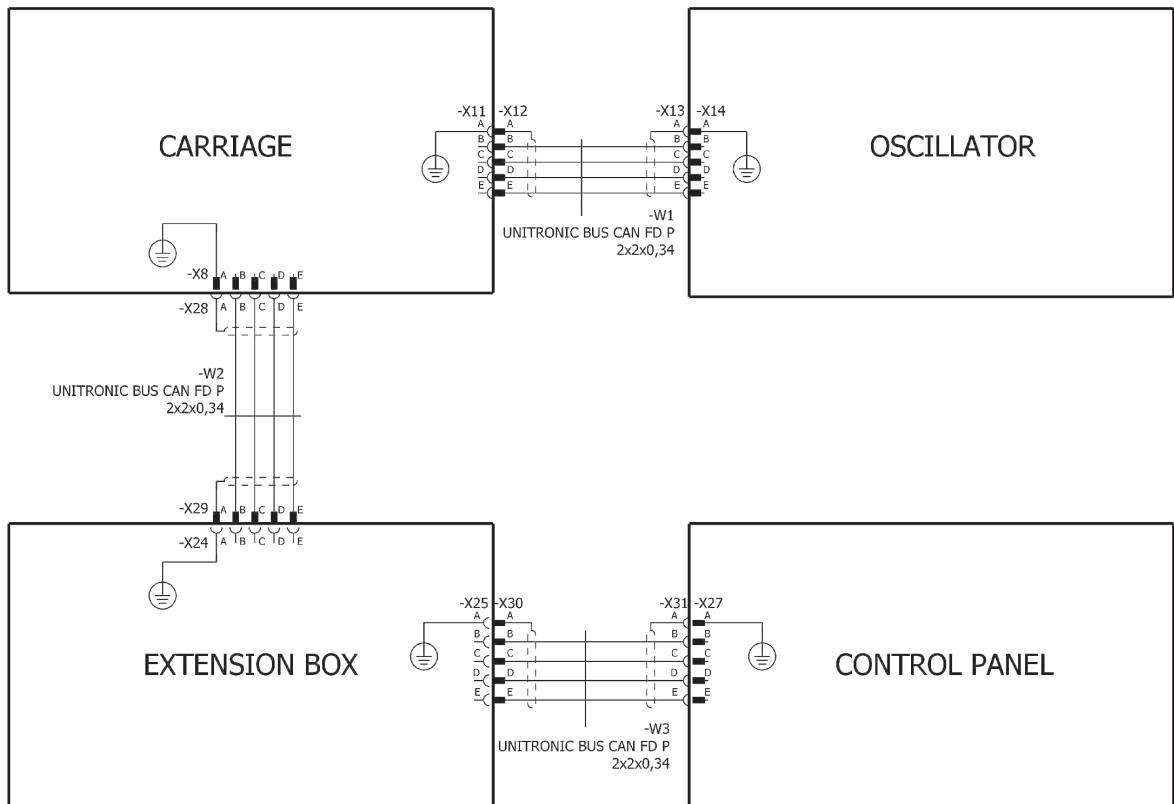
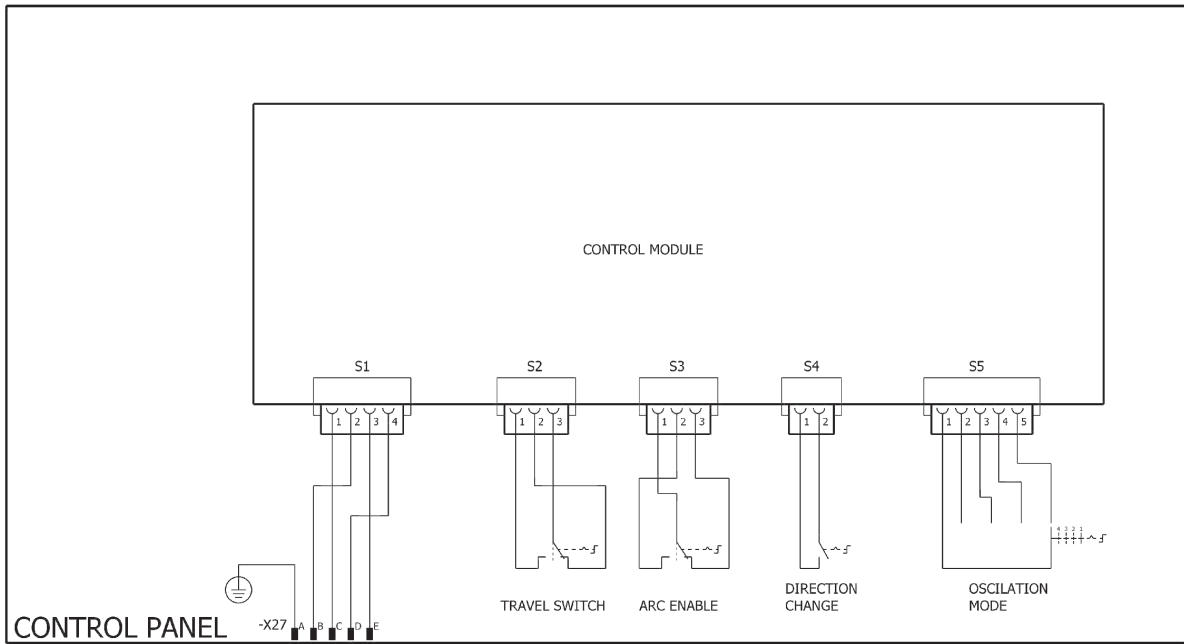
M – 4-position numeric display. Indication selectable between metric or imperial measure units.

Note: To change the value of a parameter, press the required button lightly. Once it is pressed, the current value of the parameter will show on the display along with the corresponding symbol of the parameter.

11. Wiring diagrams



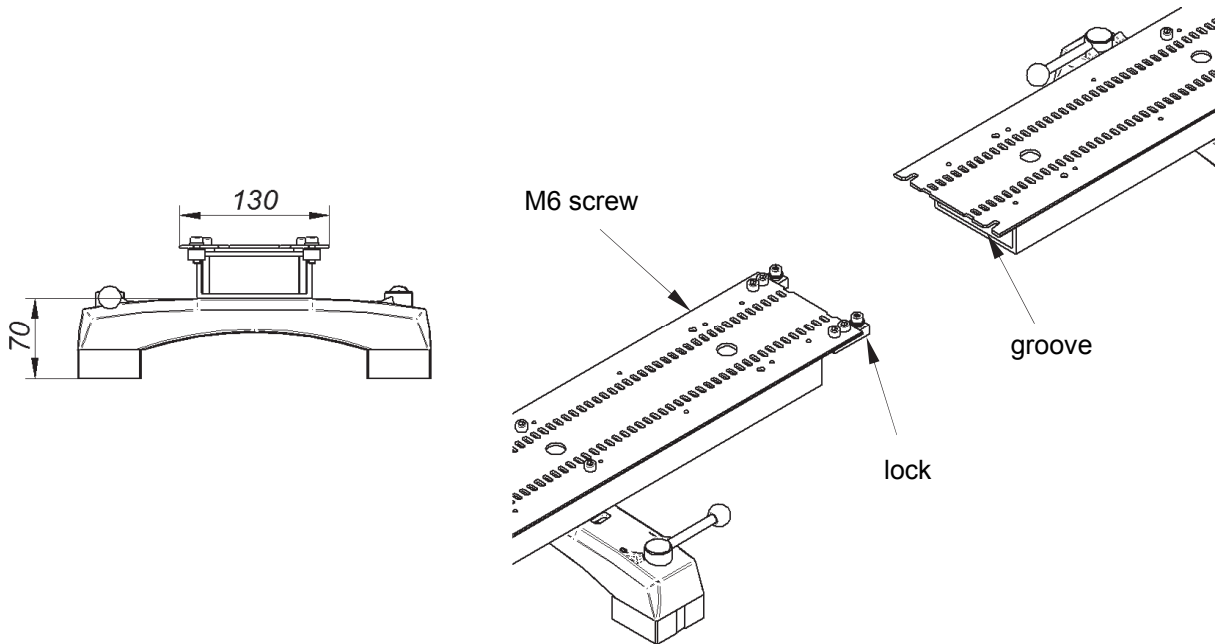




12. Straight rails

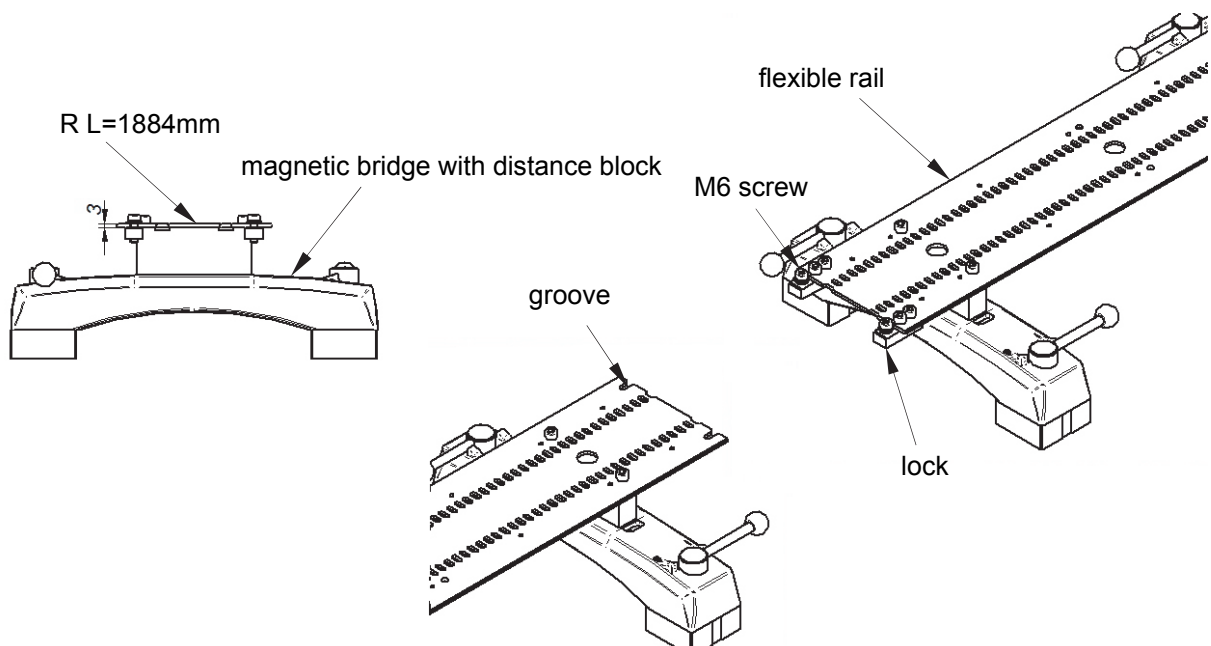
1.3 Straight rigid rail

The rigid rail consists of a guide made of the harden spring steel fixed using rivets to an aluminum profile. M6 screws are used to assemble the unit to magnetic bridges as well as to interconnect the rail segments.



1.4 Straight flexible rail

The straight flexible rail consists of a guide made of harden spring steel mounted on the basic magnetic bridges (without fixing mechanism) with a distance block. Place the rail on ferromagnetic steel with thickness of at least 5 mm and minimum curvature inner/outer radius of 1500/1100 mm.

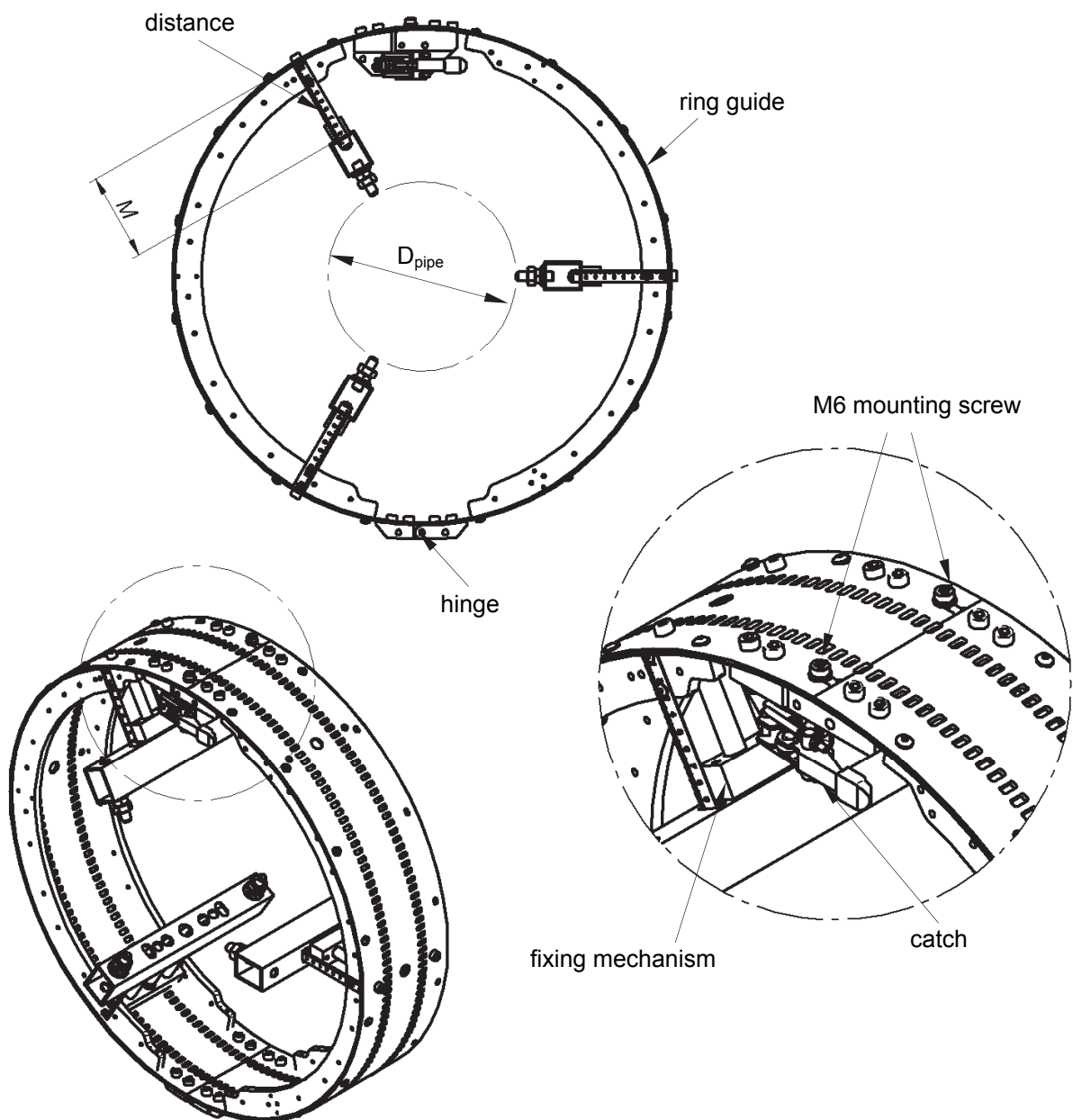


13. Ring rail

1.5 Closed ring rail

It consists of two ring guides mounted from one side by a hinge and by a catch from the other side. The guides contain a 0-58 mm radial adjustment mechanism coupled with the magnetic bridge or screw feet bridge. The rail is designed for pipe diameters of 200 to 840 (4 units).

The required distance 'M' must be read from Table 1.

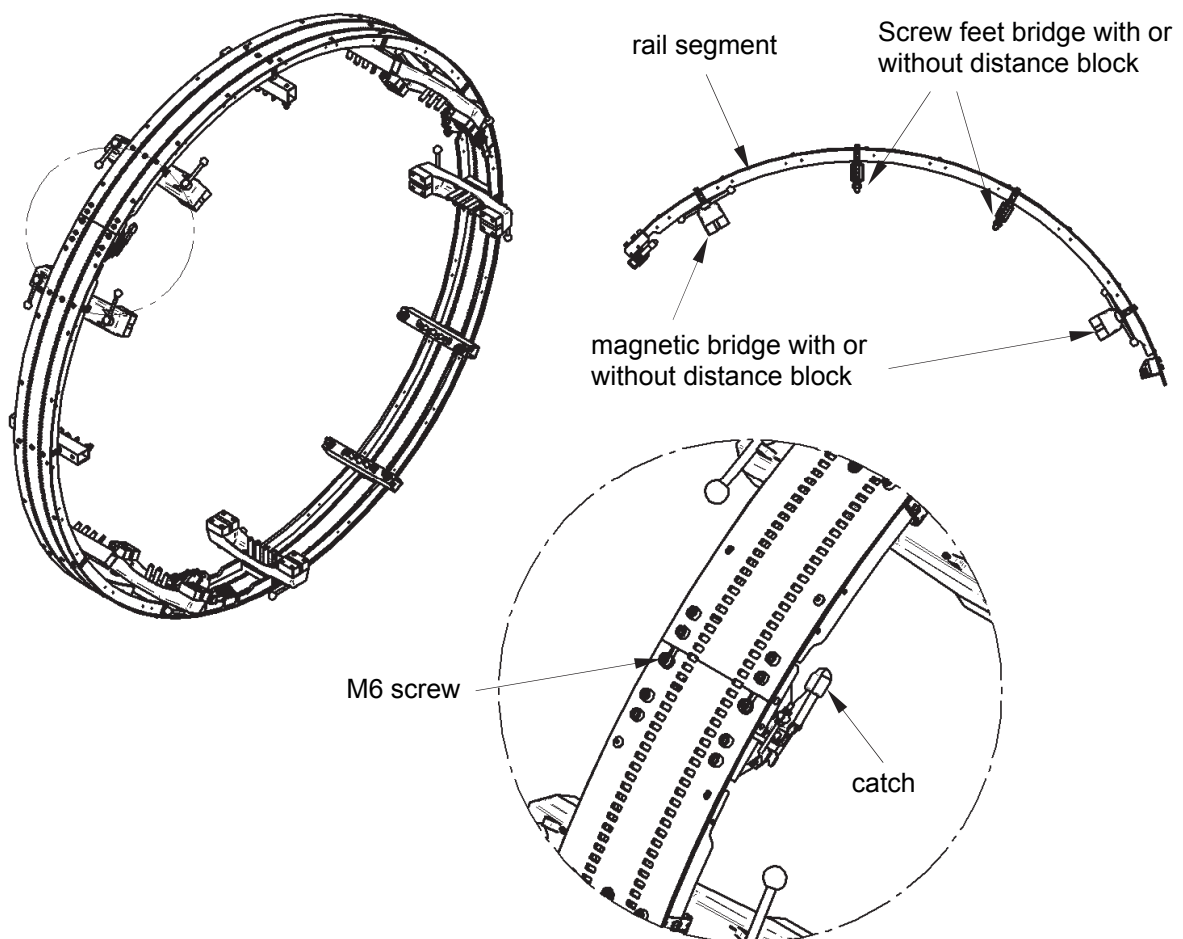


1.6 Sectional ring rail

It consists of rolled rings fixed from both sides using M6-screwed catches. Magnetic bridges are located at both ends with resistive units in between. The number of segments must be selected according the following table:

DIAMETER	SEGMENTS	BRIDGES
200 - 300 mm (7.9 - 11.8 in)	2	3
300 - 480 mm (11.8 - 18.9 in)	2	4
480 - 660 mm (18.9 - 26 in)	2	6
660 - 840 mm (26 - 33.1 in)	2	8
840 - 1020 mm (33.1 - 40.2 in)	3	9
1020 - 1200 mm (40.2 - 47.2 in)	3	12
1200 - 1380 mm (47.2 - 54.3 in)	3	15
1380 - 1560 mm (54.3 - 61.4 in)	4	16

The fixing mechanism enables for radial adjustment of 0–58 mm. The sectional ring rail is designed for pipe diameters of 840–1560 mm (4 units). The required distance 'M' must be read from Table 1.



1.7 Sectional flexible rails for pipes

The flexible rail for pipes consists of a combination of flexible guide segments. Segments are available in the following lengths:

Segment type	Length
I	1130 mm (44.5 in)
II	1695 mm (66.7 in)
III	1884 mm (74.2 in)

Combining these guide segments enables use on pipes made of hardened spring steel mounted using the 0–58 mm radial fixing mechanism with the magnetic or resistive bridge.

The rail is designed for pipe diameters of 1560–3360 mm (10 units).

The number of segments depends on the pipe diameter:

DIAMETER	SEGMENTS	BRIDGES
1560 - 1740 mm (61.4 - 68.5 in)	3x type I 1x type II	18
1740 - 1920 mm (68.5 - 75.6 in)	3x type III 1x type I	18
1920 - 2100 mm (75.6 - 82.7 in)	3x type III 1x type II	20
2100 - 2280 mm (82.7 - 89.8 in)	3x type III 2x type I	21
2280 - 2460 mm (89.8 - 95.9 in)	5x type II	25
2460 - 2640 mm (95.9 - 103.9 in)	3x type III 2x type II	25
2640 - 2820 mm (103.9 - 111 in)	5x type II 1x type I	25
2820 - 3000 mm (111 - 118.1 in)	6x type II	28
3000 - 3180 mm (118.1 - 125.2 in)	3x type III 3x type II	30
3180 - 3360 mm (125.2 - 132.3 in)	6 x type III	30

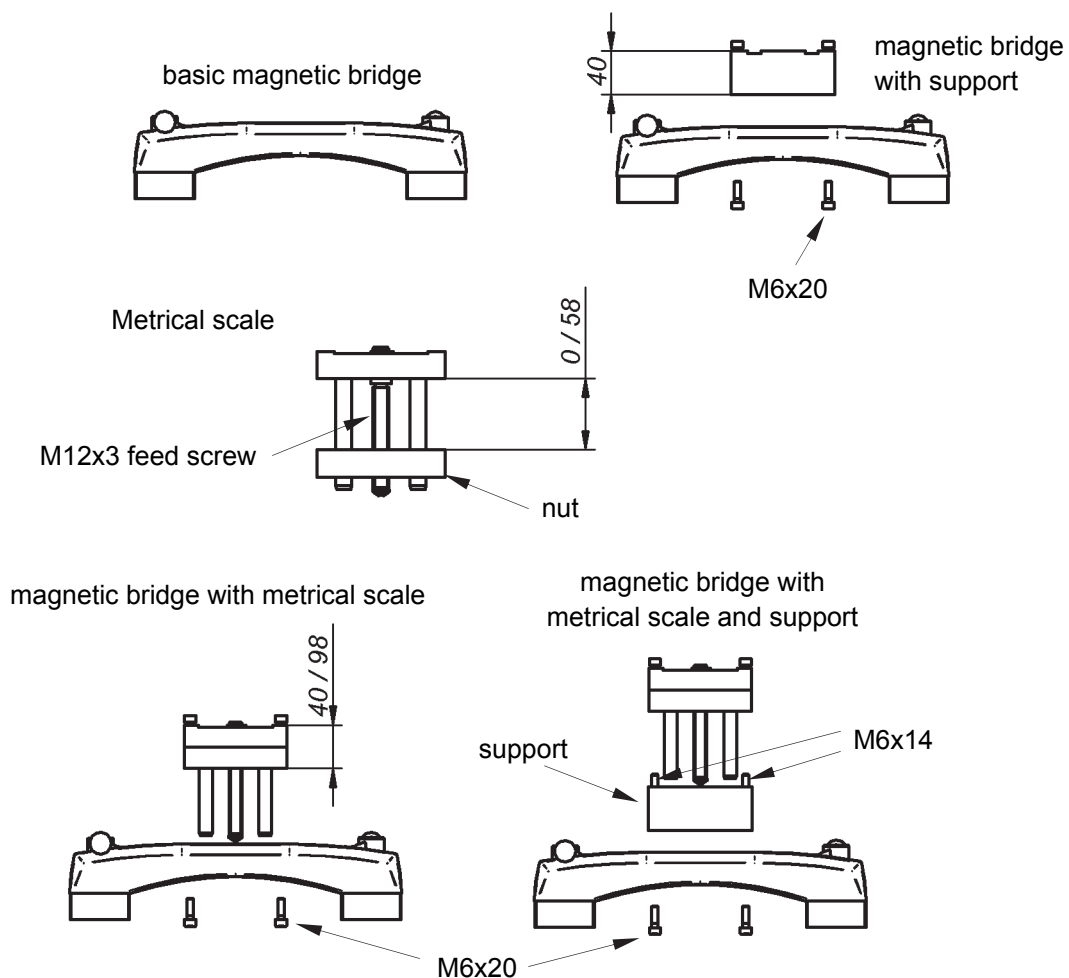
The distance 'M' to set on the pitch must be read from Table 1.

14. Magnetic bridges and metrical scale

Magnetic bridges are designed for fixing the guides (rigid, flexible, or orbital) to ferromagnetic materials. The basic version of the magnetic bridge consists of an aluminum body, two magnetic blocks with permanent magnets, and levers for fixing to the surface (when in position '1'). Thanks to its modular structure, the bridge can be easily extended to a version with the fixing mechanism using two M6x20 screws.

The fixing range is 58 mm, while using the distance block further extends the range by 40 mm.

The maximum holding force of one magnetic bridge is 1500 N.

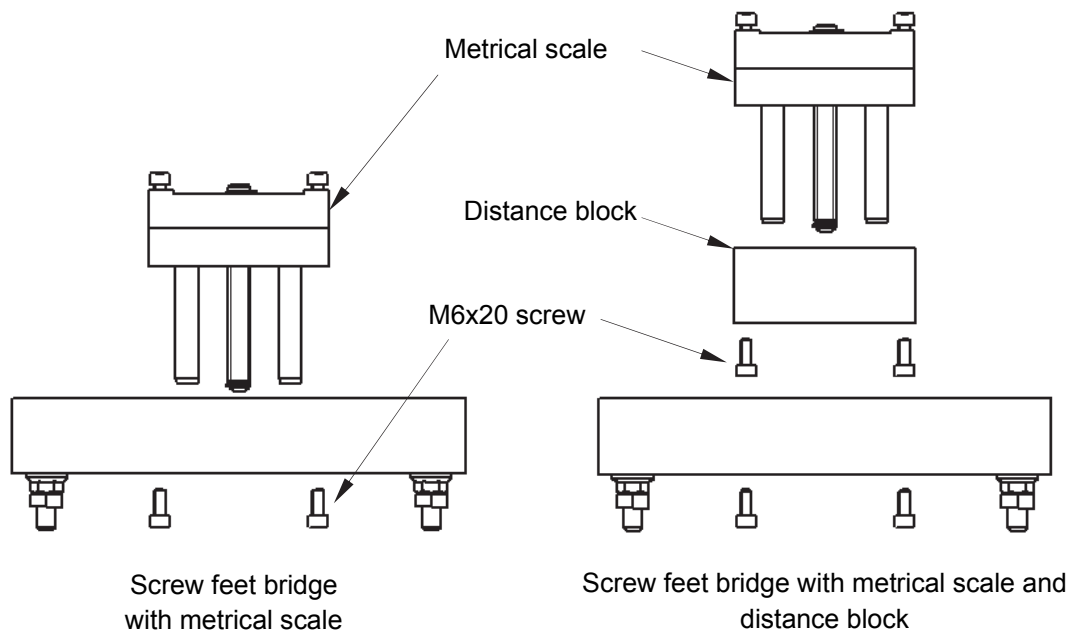


The fixing mechanism is designed for moving the magnetic/screw feet bridges radially inside the pipe for mounting or dismounting. Use 5 mm hex wrench to rotate the M12x3 feed screw which will move the nut along the pins to the distance of 0–58 mm. Fasten the mechanism to the magnetic bridge using two M6x20 screws to enable adjustment and clamping onto the pipe.

15. Screw feet bridge with or without distance block

Screw feet bridges are designed for mounting the (sectional) orbital guide on pipes. Thanks to its modular structure, the bridge can be easily extended to a version with the distance block, using M6x20 screws. The screw feet bridge consists of a mounting bar and the metrical scale.

The fixing range is 58 mm, while using the distance block further extends the range by 40 mm.



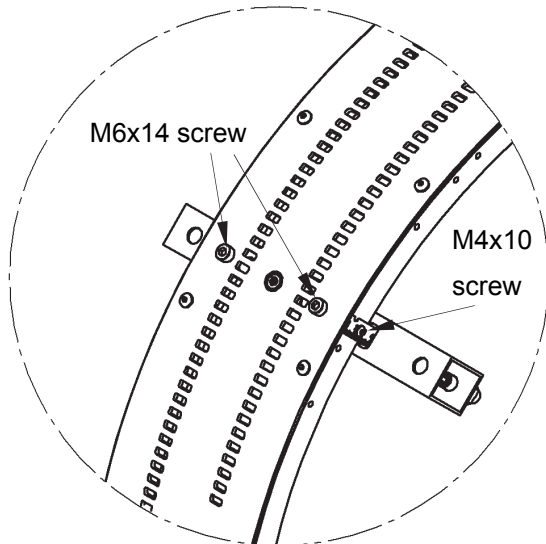
To assemble the screw feet bridge with the fixing mechanism or with the support, or the metrical scale with the support, use two M6x14 screws.

The bridge must be assembled only when dismantled from the track.

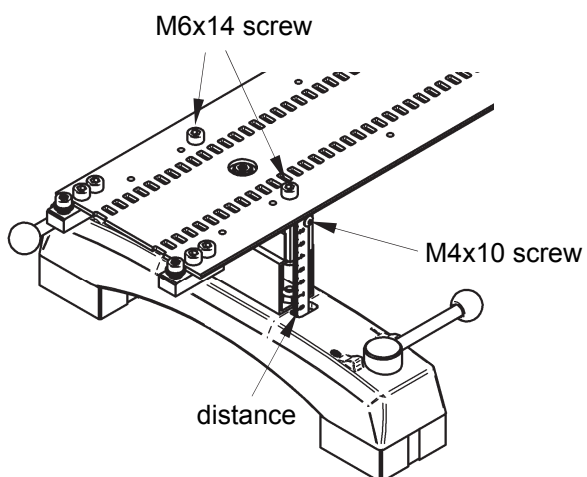
16. Mounting of bridges

1.8 Mounting on orbital rails

Mount the bridge to the track, using two M6x14 screws.
Set the distance to the fixing mechanism with two M4x10 screws.
Read the recommended number of bridges to be used from Table 1.

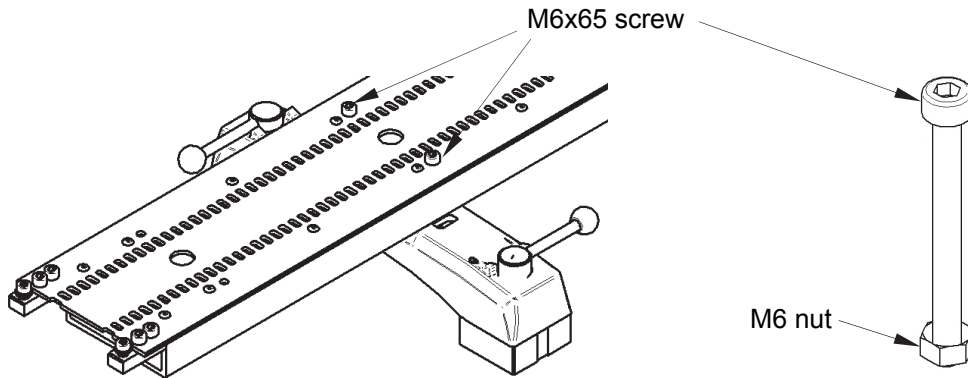


1.9 Mounting on rail segment



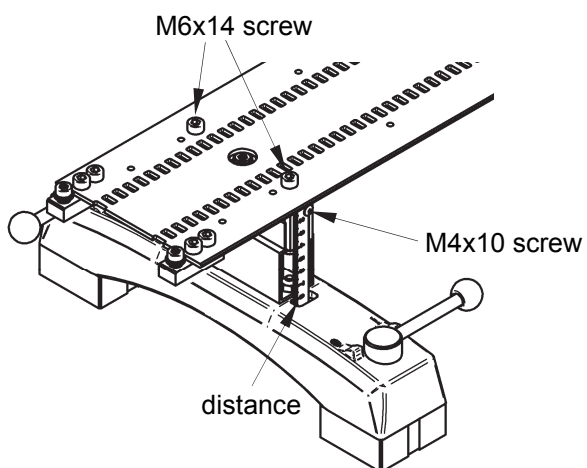
1.10 Mounting on rigid rail

Mount bridge to the rigid rail, using two M6x65 screws and lock with two M6 nuts. Use 3 bridges for every 1884 mm of rigid rail segment.



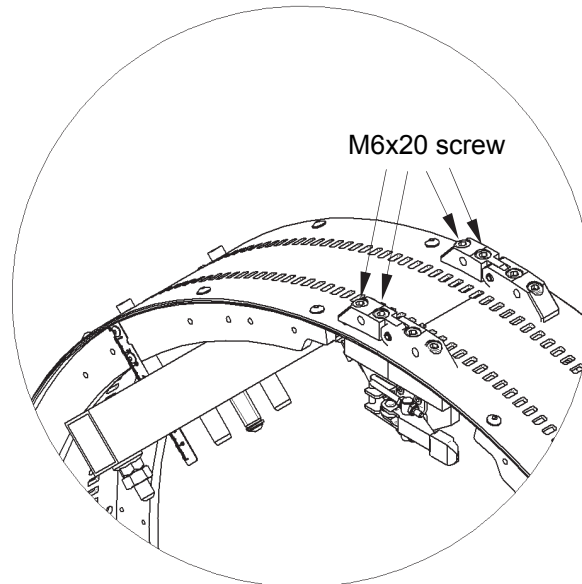
1.11 Mounting on flexible rail

Mount bridge to the flexible rail, using two M6x14 screws. Set the distance with two M4x10 screws. Use 5 bridges for every 1884 mm of flexible track segment.

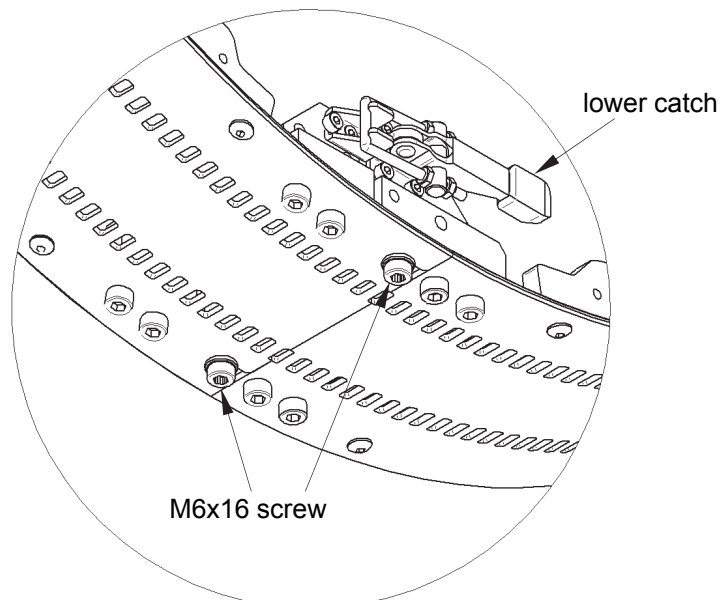


17. Assembling an orbital track

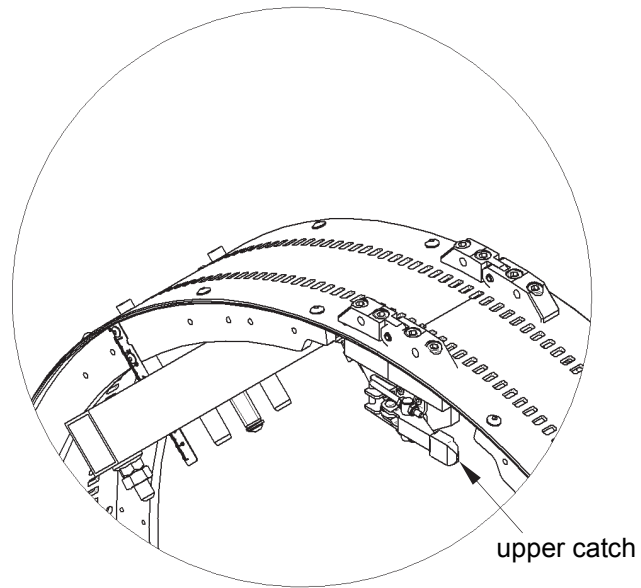
Place two rail segments together on a flat surface.
Slightly tighten four M6x20 screws (see picture).



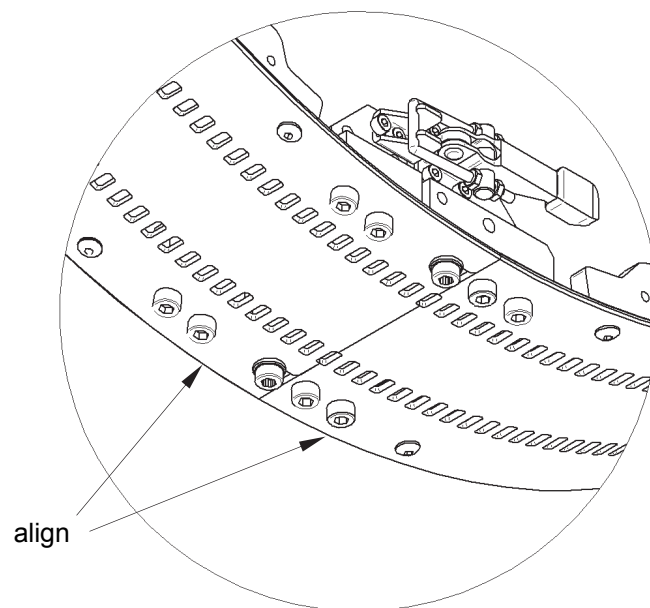
Lock the lower catch.
Slightly tighten two M6x16 screws.



Lock the upper catch.



If necessary, align both rail segments together.



Finally, tighten all mentioned M6 screws.

18. Preparing for operation on straight rail

- Set power switch in lower position, arc ignition switch to '0'
- Set travel direction switch in middle position
- Set the clutch and the levers of the roller units to OFF
- Loosen the M6x20 mounting screws of the rotational roller unit from both sides and set the rotational rollers in horizontal position.
- Remove remote control. The carriage must be mounted on the rail without remote control!

Mount the carriage on the guide according to the following instructions:

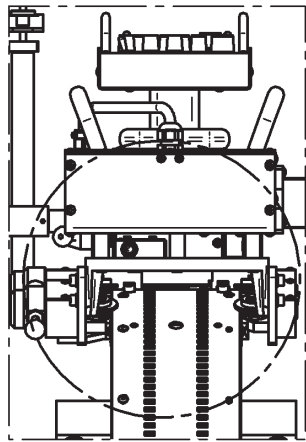
- a) Position the carriage on the rail.
 - b) Hold the carriage using the carrying handle and toggle to ON the lever of the rotational roller unit and then the lever of the fixed roller unit (proceed in reverse order when dismounting).
 - c) By holding the carrying handle, move the carriage along the rail and simultaneously rotate the engaging lever slowly to ON to position the gear teeth into the holes of the guide.
- Plug the cables of the controller, drive system, oscillator, and welding device into the proper sockets.
 - Mount the torch in holder and secure with the knob
 - Put the torch cable into the cable holder, secure with the knobs, and fix the holder in a required position.

19. Preparing for operation on the orbital rail

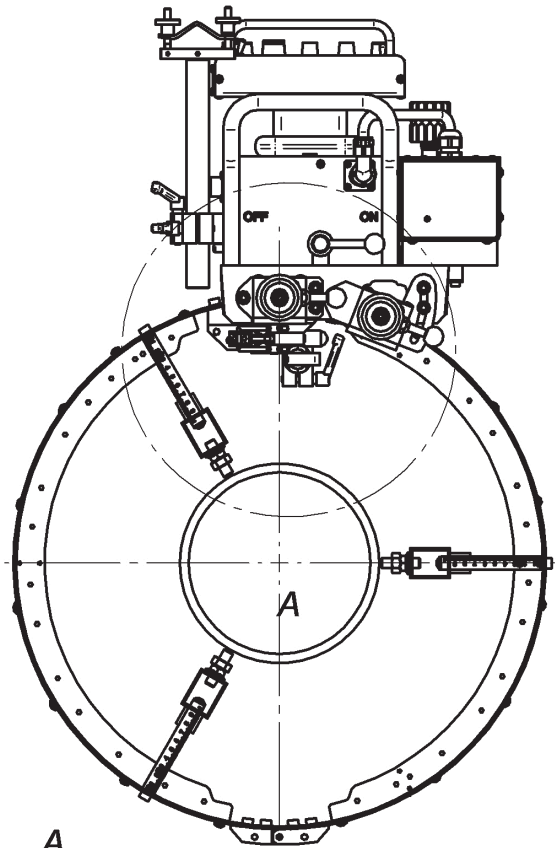
- Set the power switch in lower position, arc ignition switch to '0'
- Set travel direction switch in middle position, while the clutch and the levers of the roller units to OFF.
- Loosen the three M6x20 screws mounting the rotational roller unit from both sides.
- Remove the remote control! The carriage must be mounted on the rail without remote control.
-

Mount the carriage on the guide according to the following instructions:

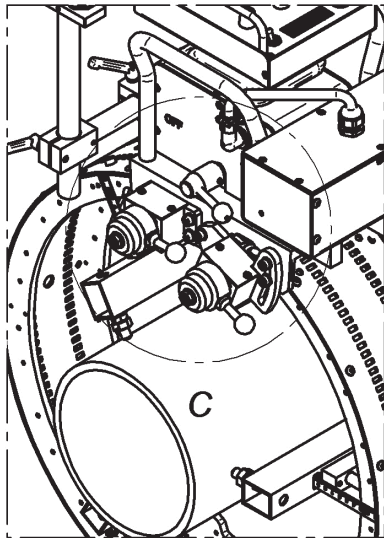
- a) Position the carriage on the top of the rail.
 - b) Rotate rotational and fixed roller units in a way to rest the rotational roller on the guide.
 - c) Toggle to ON the lever of the rotational roller unit and then the lever of the fixed roller unit (proceed in reverse order when dismounting).
 - d) Tighten three M6 mounting screws from both sides.
 - e) By holding the carrying handle, move the carriage along the rail and simultaneously rotate the engaging lever slowly to ON to position the gear teeth into the holes of the guide.
 - f) To mount the carriage again on the same rail, hold the carrying handle with one hand and toggle to ON the lever of rotational roller unit and then the lever of the fixed roller unit (proceed in reverse order when dismounting).
 - g) By holding the carrying handle, move the carriage along the rail and simultaneously rotate the engaging lever slowly to ON to position the gear teeth into the holes of the rail.
- Plug the cables of the controller, drive system, oscillator, and welding device into the proper sockets.
 - Put the torch in holder and secure with the knob.
 - Put the torch cable into the cable holder, secure with the knobs, and fix the holder in the required position.



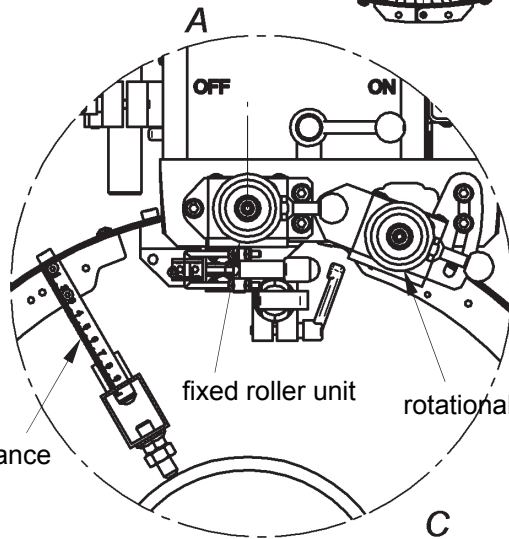
B



A



C



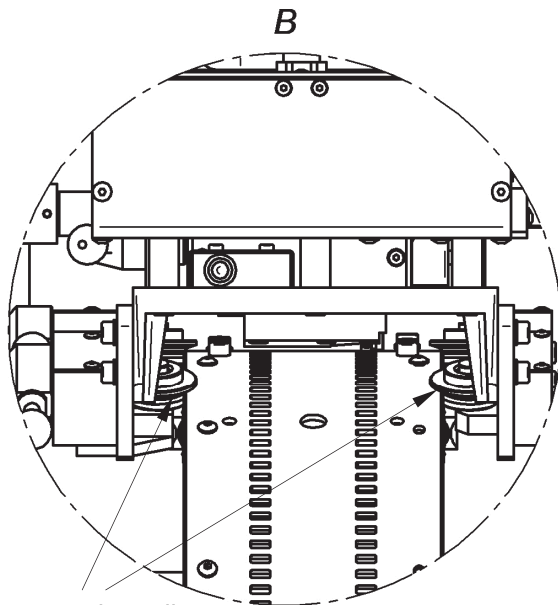
A

OFF ON

fixed roller unit

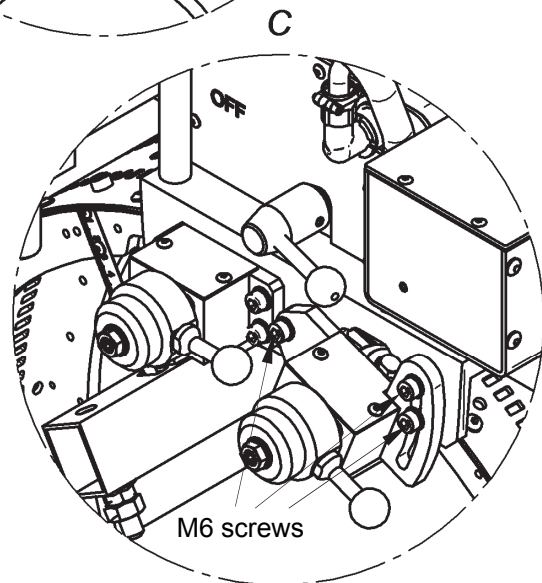
rotational roller unit

distance



B

pressing roller



C

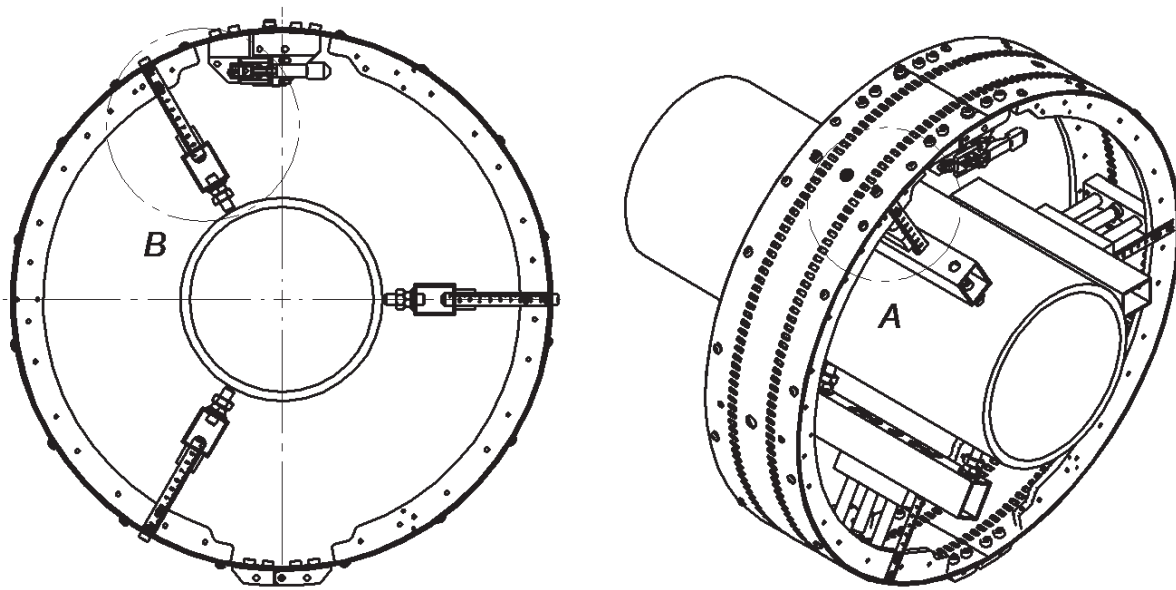
M6 screws

20. Positioning the orbital rail onto pipe

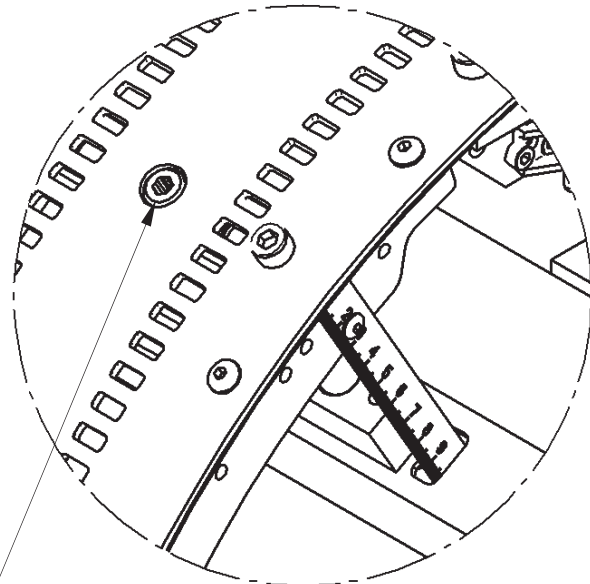
Mount the orbital rail on the pipe in open configuration (unlocked catch and loosed screws).

Toggle the levers of the magnetic bridges to '0'.

Set the radial position of the magnetic and screw feet bridges, according to the 'M' value from Table 1 by rotating the adjusting screw.

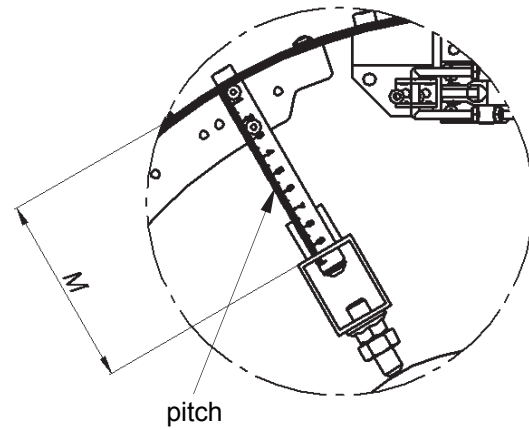


A



M12x3 feed screw

B



pitch

Table 1. Positioning of the orbital rail onto pipe

Orbital track for diameters [mm]	Pipe diameter D_p [mm]	Min. pipe diameter for bridge with distance block D_{pmin} [mm]	Max. pipe diameter for bridge with distance block D_{pmax} [mm]	Min. pipe diameter for bridge without distance block D_{pmin} [mm]	Max. pipe diameter for bridge without distance block D_{pmax} [mm]	Recommended number of screw feet / magnetic bridges	Distance M	Required $V_{carriage}$ [cm/min] = $D_{track} \cdot V_{welding} / D_{pipe}$
200-300	200-300	192	308			3	$196-0.5 \cdot D_p$	$537 \cdot V_w / D_p$
300-480	300-400	295.6	411.6			4	$245-0.5 \cdot D_p$	$718 \cdot V_w / D_p$
	380-480			375.6	491.6		$285-0.5 \cdot D_p$	
480-660	480-580	475.5	591.5			6	$335-0.5 \cdot D_p$	$900 \cdot V_w / D_p$
	560-660			555.5	671.5		$375-0.5 \cdot D_p$	
660-840	660-760	655.5	771.5			8	$425-0.5 \cdot D_p$	$1080 \cdot V_w / D_p$
	740-840			735.5	851.5		$465-0.5 \cdot D_p$	
840-1020	840-940	835.4	951.4			9	$515-0.5 \cdot D_p$	$1260 \cdot V_w / D_p$
	920-1020			915.4	1031.4		$555-0.5 \cdot D_p$	
1020-1200	1020-1120	1015.3	1131.3			12	$605-0.5 \cdot D_p$	$1440 \cdot V_w / D_p$
	1100-1200			1095.3	1211.3		$645-0.5 \cdot D_p$	
1200-1380	1200-1300	1195.2	1311.2			15	$695-0.5 \cdot D_p$	$1620 \cdot V_w / D_p$
	1280-1380			1275.2	1391.2		$735-0.5 \cdot D_p$	
1380-1560	1380-1480	1375.1	1491.1			16	$785-0.5 \cdot D_p$	$1800 \cdot V_w / D_p$
	1460-1560			1455.1	1571.1		$825-0.5 \cdot D_p$	

$\Phi 1560-\Phi 6060$ (flexible segments)								
1560-1740	1560-1660	1555	1671			18	$875-0.5 \cdot D_p$	$1980 \cdot V_w / D_p$
	1640-1740			1635	1751		$915-0.5 \cdot D_p$	
1740-1920	1740-1840	1735	1851			18	$965-0.5 \cdot D_p$	$2160 \cdot V_w / D_p$
	18290-1920			1815	1931		$1005-0.5 \cdot D_p$	
1920-2100	1920-2020	1915	2031			20	$1055-0.5 \cdot D_p$	$2340 \cdot V_w / D_p$
	2000-2100			1995	2111		$1095-0.5 \cdot D_p$	
2100-2280	2100-2200	2095	2211			21	$1145-0.5 \cdot D_p$	$2520 \cdot V_w / D_p$
	2180-2280			2175	2291		$1185-0.5 \cdot D_p$	
2280-2460	2280-2380	2275	2391			25	$1235-0.5 \cdot D_p$	$2700 \cdot V_w / D_p$
	2360-2460			2355	2471		$1275-0.5 \cdot D_p$	
2460-2640	2460-2560	2455	2571			25	$1325-0.5 \cdot D_p$	$2880 \cdot V_w / D_p$
	2540-2640			2535	2651		$1365-0.5 \cdot D_p$	
2640-2820	2640-2740	2634	2750			28	$1415-0.5 \cdot D_p$	$3060 \cdot V_w / D_p$
	2720-2820			2714	2830		$1455-0.5 \cdot D_p$	
2820-3000	2820-2920	2814	2930			30	$1505-0.5 \cdot D_p$	$3240 \cdot V_w / D_p$
	2900-3000			2894	3010		$1545-0.5 \cdot D_p$	
3000-3180	3000-3100	2994	3110			30	$1595-0.5 \cdot D_p$	$3420 \cdot V_w / D_p$
	3080-3180			3074	3190		$1635-0.5 \cdot D_p$	
3180-3360	3180-3280	3174	3290			30	$1685-0.5 \cdot D_p$	$3600 \cdot V_w / D_p$
	3260-3360			3254	3370		$1725-0.5 \cdot D_p$	
3360-3540	3360-3460	3354	3470			33	$1775-0.5 \cdot D_p$	$3780 \cdot V_w / D_p$
	3440-3540			3434	3550		$1815-0.5 \cdot D_p$	
3540-3720	3540-3640	3534	3650			33	$1864-0.5 \cdot D_p$	$3960 \cdot V_w / D_p$
	3620-3720			3614	3730		$1904-0.5 \cdot D_p$	
3720-3900	3720-3820	3714	3830			35	$1954-0.5 \cdot D_p$	$4140 \cdot V_w / D_p$
	3800-3900			3794	3910		$1994-0.5 \cdot D_p$	
3900-4080	3900-4000	3894	4010			36	$2044-0.5 \cdot D_p$	$4320 \cdot V_w / D_p$
	3980-4080			3974	4090		$2084-0.5 \cdot D_p$	

4080-4260	4080-4180	4074	4190			38	2134-0,5*Dp	4500*Vw/Dp
	4160-4260			4154	4270		2174-0,5*Dp	
4260-4440	4260-4360	4254	4370			40	2224-0,5*Dp	4680*Vw/Dp
	4340-4440			4334	4450		2264-0,5*Dp	
4440-4620	4440-4540	4434	4550			41	2314-0,5*Dp	4860*Vw/Dp
	4520-4620			4514	4630		2354-0,5*Dp	
4620-4800	4620-4720	4613	4729			43	2404-0,5*Dp	5040*Vw/Dp
	4700-4800			4693	4809		2444-0,5*Dp	
4800-4980	4800-4900	4793	4909			45	2494-0,5*Dp	5220*Vw/Dp
	4880-4980			4873	4989		2534-0,5*Dp	
4980-5160	4980-5080	4973	5089			45	2594-0,5*Dp	5400*Vw/Dp
	5060-5160			5053	5169		2624-0,5*Dp	
5160-5340	5160-5260	5153	5269			48	2674-0,5*Dp	5580*Vw/Dp
	5240-5340			5233	5349		2714-0,5*Dp	
5340-5520	5340-5440	5333	5449			48	2764-0,5*Dp	5760*Vw/Dp
	5420-5520			5413	5529		2808-0,5*Dp	
5520-5700	5520-5620	5513	5629			50	2854-0,5*Dp	5940*Vw/Dp
	5600-5700			5593	5709		2894-0,5*Dp	
5700-5880	5700-5800	5693	5809			51	2944-0,5*Dp	6120*Vw/Dp
	5780-5880			5773	5889		2984-0,5*Dp	
5880-6060	5880-5980	5873	5989			53	3034-0,5*Dp	6300*Vw/Dp
	5960-6060			5953	6069		3074-0,5*Dp	

Configuration of flexible segments

	Dp[mm]	Number of rail L=1884	Number of rail L=1695,6	Number of rail L=1130,4
1	1560-1740	-	3	1
2	1740-1920	3	-	1
3	1920-2100	3	1	-
4	2100-2280	3	-	2
5	2280-2460	-	5	-
6	2460-2640	3	2	-
7	2640-2820	-	5	1
8	2820-3000	-	6	-
9	3000-3180	3	3	-
10	3180-3360	6	-	-
11	3360-3540	-	7	-
12	3540-3720	6	-	1
13	3720-3900	6	1	-
14	3900-4080	6	-	2
15	4080-4260-	6	1	1
16	4260-4440	6	2	-
17	4440-4620	6	1	2
18	4620-4800	6	2	1
19	4800-4980	6	3	-
20	4980-5160	9	-	-
21	5160-5340	6	3	1
22	5340-5520	9	-	1
23	5520-5700	9	1	-
24	5700-5880	9	-	2
25	5880-6060	9	1	1

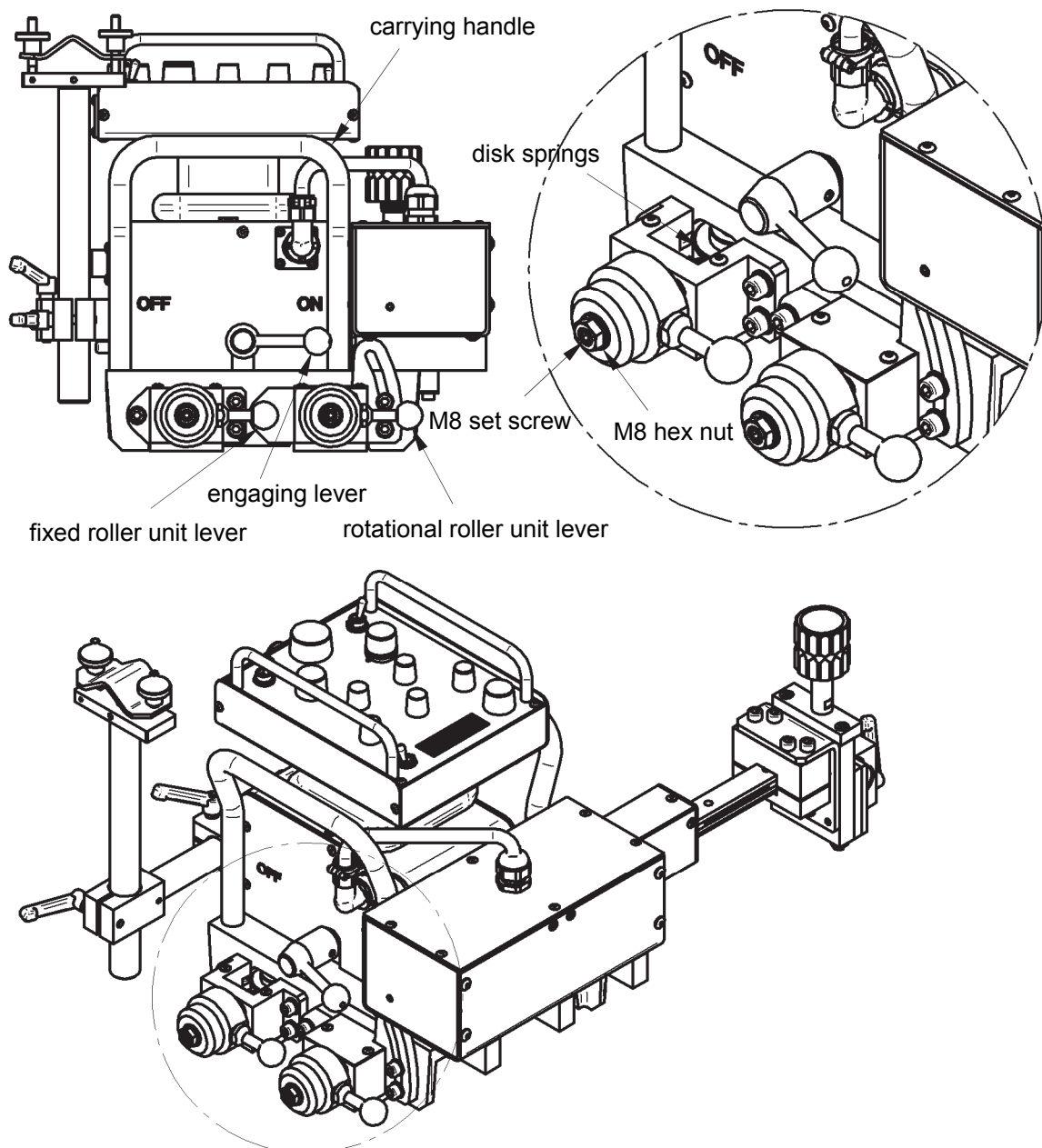
21. Adjusting pressing force of rollers

The guiding rollers are pressed to the guide by disk springs. Adjust the pressing force by proceeding as follows:

- a) Loosen the M8 nut.
- b) Tighten the M8 set screw.
- c) Tighten the nut.

Prevent the springs from locking.

IMPORTANT! Minimum clearance of 0,6 mm (maximum force) is achieved by tightening the M8 screw maximally and then loosening by half rotation.



22. Mounting rail onto the pipe

Before positioning a rail onto the pipe, position the magnetic or resistive bridges in a proper distance from the rail guide according to Table 1.

To change the value of 'M' on the pitch, rotate the M12x3 feed screw on the fixing mechanism using 5 mm hex wrench.

IMPORTANT! Right rotation increases the distance from the pipe (dismounting), while left rotation decreases the distance and mounts the rail on the pipe.

1.12 Mounting ring rail

- a) Set one or two bridges to the 'M' value of 2 mm lower than Table 1 recommends, which will allow the rail to be mounted onto the pipe.
- b) Place the ring rail in open configuration (with mounting catch unlocked and two M6 screws loosened) onto the pipe.
- c) Mount the catch and tighten two M6 screws.
- d) Press the bridges to the pipe by rotating the M12x3 feed screw left to achieve the recommended 'M' value on the pitch. If the rail is not mounted tight, increase the 'M' value.
- e) Place the carriage onto the rail with the rotational rollers set according to information from the point "Preparing to operation on the orbital rail".
- f) Manually or mechanically rotate the carriage by one full turn to check whether the torch is in a constant distance from the pipe that will enable proper operation. If the distance is not constant, correct the value of 'M' on appropriate bridges.

1.13 Mounting sectional rail (two persons required)

- a) Set one bridge to the 'M' value of 2 mm lower than Table 1 recommends, which will allow the rail to be mounted onto the pipe.
- b) Place the rail segment in open configuration (with magnetic bridges in position OFF and two M6 set screws loosened) in required position and toggle the magnetic bridge levers to ON.
- c) Place the next rail segment in open configuration (with levers of magnetic bridges in position OFF and two M6 set screws loosened) onto the pipe in a way to contact the faces of both rail guides. Then, mount the catch, tighten two M6 screws, and toggle the magnetic bridge levers to ON.
- d) Assemble consecutive segments in the same way.

- e) Press the bridges to the pipe by rotating the M12x3 feed screw left to the recommended value of 'M' on the pitch. If the rail is not mounted tight, increase the 'M' value.
- f) Place the carriage onto the rail with the rotational rollers set according to information from the point "Preparing to operation on the orbital rail".
- g) Manually or mechanically rotate the carriage by one full turn to check whether the torch is in a constant distance from the pipe that will enable proper operation. If the distance is not constant, correct the value of 'M' on appropriate bridges.

1.14 Mounting flexible rail onto pipe (two persons required)

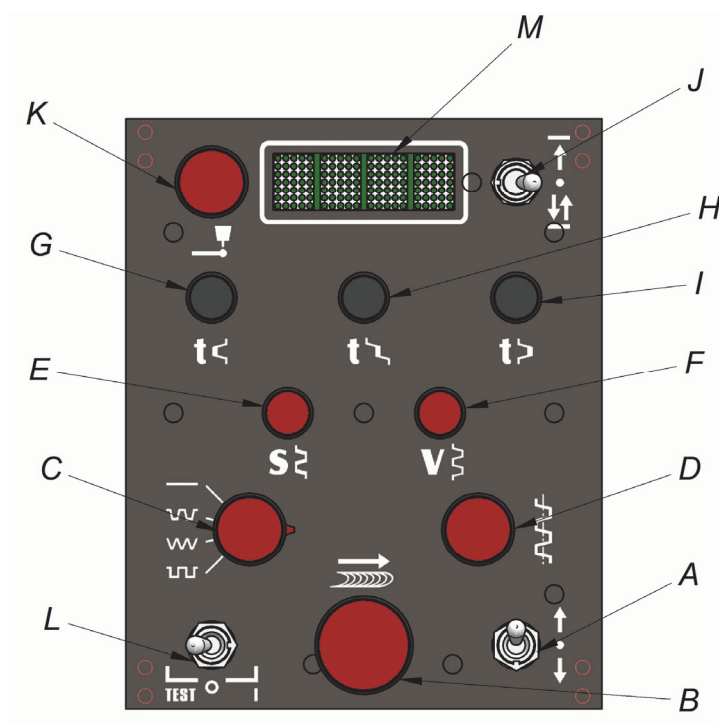
- a) Set one bridge to the 'M' value of 2 mm lower than Table 1 recommends, which will allow the rail to be mounted onto the pipe. Length and number of rails are also specified in Table 1.
- b) Place the rail segment in open configuration (with magnetic bridges in position OFF and two M6 set screws loosened) onto the pipe in required position and by pressing the guide to the pipe, toggle the magnetic bridge levers to ON.
- c) Place the next rail segment in open configuration (with magnetic bridges in position OFF and two M6 set screws loosened) onto the pipe in a way to contact the faces of both rail guides.
- d) Tighten two M6 screws.
- e) Press the guide to the pipe and toggle the magnetic bridge levers to ON.
- f) Assemble consecutive segments in the same way.
- g) Press the bridges to the pipe by rotating the M12x3 feed screw left to the recommended value of 'M' on the pitch. If the rail is not mounted tight, increase the 'M' value.
- h) Place the carriage onto the rail with the rotational rollers set according to information from the point "Preparing to operation on the orbital rail".
- i) Manually or mechanically rotate the carriage by one full turn to check whether the torch is in a constant distance from the pipe that will enable proper operation. If the distance is not constant, correct the value of 'M' on appropriate bridges.

23. Usage

1.15 Saving a program

The controller allows you to define up to 9 welding programs.
The single program contains the values of the following parameters:

- Travel speed (knob B)
- Oscillation amplitude (E)
- Oscillation speed (F)
- Left oscillation dwell time (G)
- Middle oscillation dwell time (H)
- Right oscillation dwell time (I)
- Crater filling (K)



Rotate a proper knob right to increase the value of a parameter and rotate it left to decrease the value. Once set, the value of the parameter is shown on the display for a while. Pressing the knob shows the set value.

Saving the current parameters to memory:

Set the travel direction switch A to neutral position

Set the limit switch function switch J to lower position

Simultaneously press and hold the travel speed adjustment knob B and the crater fill K knobs for 4 seconds

A notice "memX" will appear on the display. "X" means the number of the program to save the current parameters to.

Rotate the travel speed knob B to change the number and press the knob to apply the choice.

1.16 Loading a program

The controller has a factory preset read-only “mem0” program, which contains operational parameters of the carriage and oscillator.

To load a previously saved program, „memX” string must be shown on the display, where X is the number of a recently used program.

Switch the main switch on control box off and on again.

Rotate the travel speed button (B), to select a required program number.

To load the parameters and apply the choice, press the button (B).

1.17 Operation

The carriage can operate with or without the oscillator. To operate without the oscillator, dismount it according to instructions from point “Design of the carriage without oscillator”. Plug the power cord of the control box into the power supply and turn on the power by toggling the power switch to upper position. Then the controller will automatically check for the oscillator connected to the oscillation socket, which will be confirmed on the display.

Position the torch at the starting point of the welding and set required process parameters or load them from a saved program. If the travel direction switch A is set to middle position, toggling the lever to position TEST will enable the arc for a while (toggle the lever to ‘I’ to enable constant welding).

Then, set a direction of travel using the travel direction switch A, which will start movement of the carriage with the programmed parameters. If the arc ignition switch L is set to position ‘0’, the carriage will move according to the programmed parameters but without welding. At this moment the display will show the current travel speed of the carriage. All parameters can be readjusted during operation.

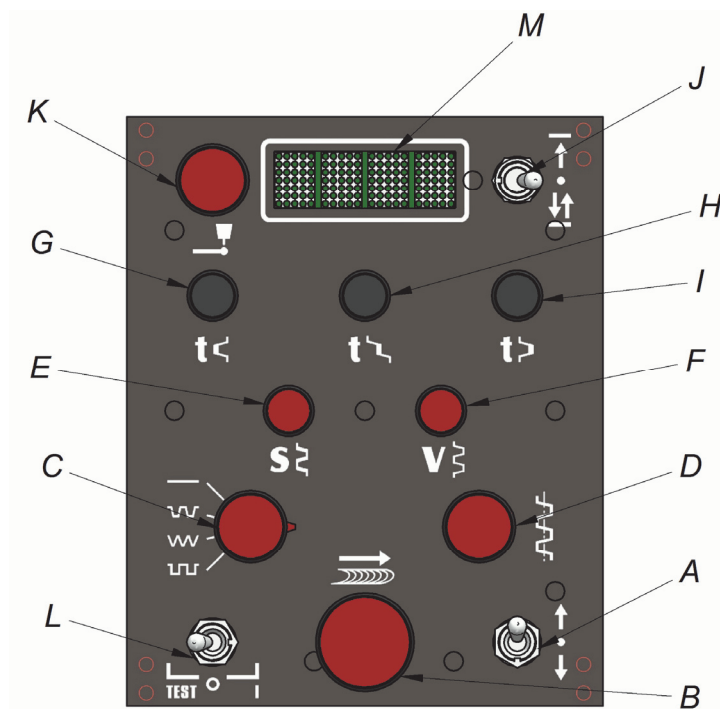
The carriage will stop after reaching a limit switch (if the switch J is set in upper position; the oscillator will also stop) or when you toggle the travel direction switch A to middle position. If the switch J is set in lower position, then after reaching the limit switch the oscillation will stop and the carriage will start travelling in the opposite direction. In such case you can quickly increase the travel speed to maximum by pressing and holding the travel speed adjustment knob B for 2 seconds.

If an error occurs, the display will show “ErrX” message, where X is the number of the error.

Once the operation is finished, turn off the power and unplug the carriage from the power supply.

1.18 Changing the measurement system

To change the measurement display from metric to imperial and vice versa, proceed as follows:



Switch the main switch on control box in position O.

Press the buttons G and I simultaneously and hold them pressed.

Switch on the main switch on control box (position I). The actual measurement (inch or cm) is shown on display (M).

Choose the required measurement by turning button B.

Press button B, to accept and save your change.

1.19 Alarm codes

The carriage can indicate the occurrence of various events and errors. If an alarm occurs, the display will show one of the following codes.

Event code	Description	Additional information
cLs-	Carriage negative limit switch active. The carriage reached the track limit switch.	Use the travel direction switch (A) to release the limit switch.
cLs+	Carriage positive limit switch active. The carriage reached the track limit switch.	
oLs-	Oscillation negative limit switch active. The oscillator arm reached its end position.	Use the oscillation arm stroke knob (D) to release the limit switch.
oLs+	Oscillation positive limit switch active. The oscillator arm reached its end position.	
cm	Metric system active	See point 22.4 for how to change the measurement system.
inch	Imperial system active	
mem0...9	Save/load a program from memory	See point 22.1 and 22.2 for additional information about saving and loading programs.

Error code	Description	Solution
err1	CAN communication systems initialization error.	Eliminate short circuit between wires or communication ports.
err2	Communication error between the remote control and carriage.	Tighten connectors if loose. Replace communication wires if damaged.
err3	Communication error between the remote control and oscillation	
err4	Communication error between the remote control and control box.	
err5	Save/load error. Possible damage of the remote control memory.	Contact your FRONIUS service technician.
err6	Operating temperature level exceeded. Ambient temperature is too high.	Operate in lower ambient temperature.
err7	Motor controller error.	Contact your FRONIUS service technician.
err8	Oscillation controller error.	Contact your FRONIUS service technician.
err9	Control box controller error.	Contact your FRONIUS service technician.

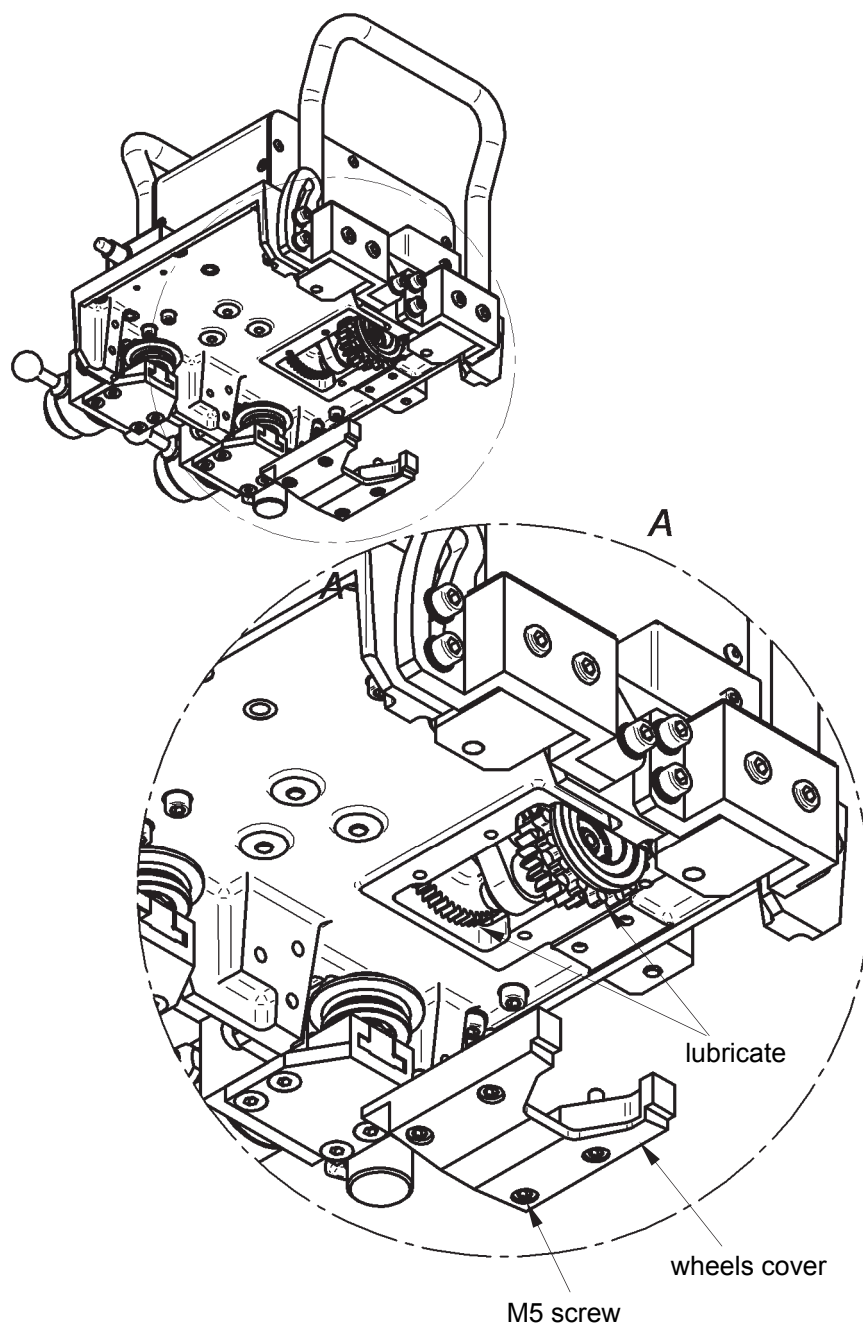
24. Maintenance

After every use, remove the carriage from the rail and use a brush or soft cloth to clean the guides of the oscillator, guiding rollers, and gear (do not use compressed air for cleaning).

1.20 Lubricating drive system gear

Dismount the wheels cover by unscrewing four M5 screws, clean the gear using brush, and lubricate the gear with EP2 grease.

IMPORTANT! Perform lubrication once a month.



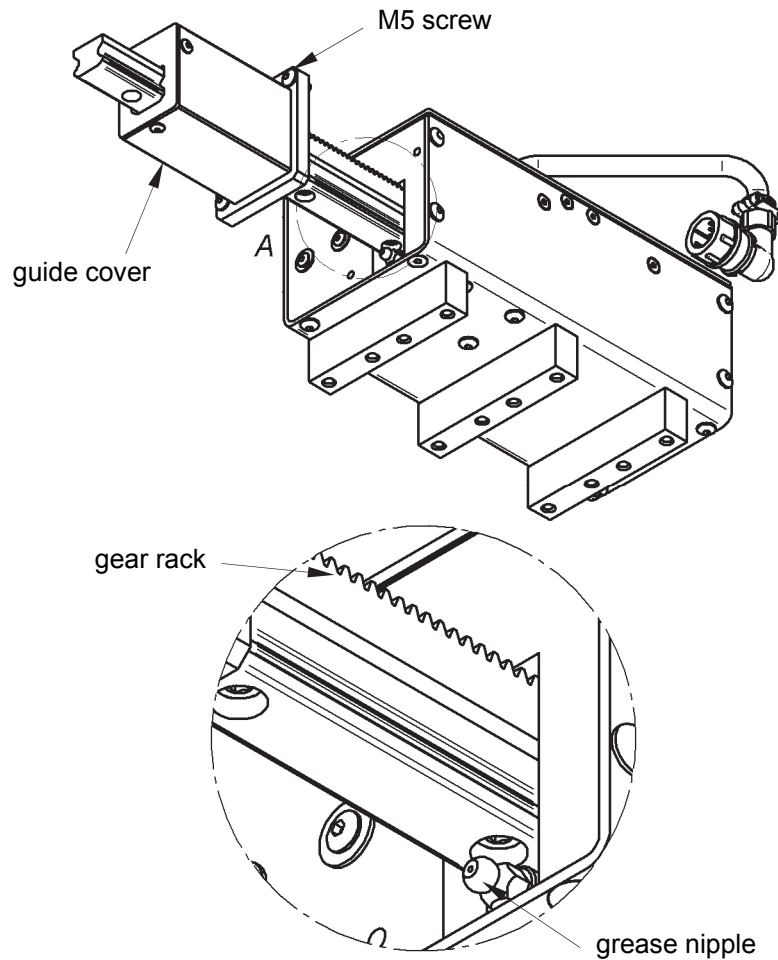
1.21 Lubricating oscillator gear rack

Move out the arm maximally.

Remove the guide cover from the oscillator by unscrewing three M5 screws.

Use a brush to clean the gear rack, and lubricate the gear rack near the oscillator body with EP2 grease.

IMPORTANT! Perform lubrication once a month.



1.22 Lubricating oscillator rolling guide

Remove the guide cover from the oscillator by unscrewing three M5 screws.

Use a lubricator with head diameter of 12 mm to introduce 2 g of EP2 grease into the grease nipple.

IMPORTANT! Perform lubrication every six months.



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