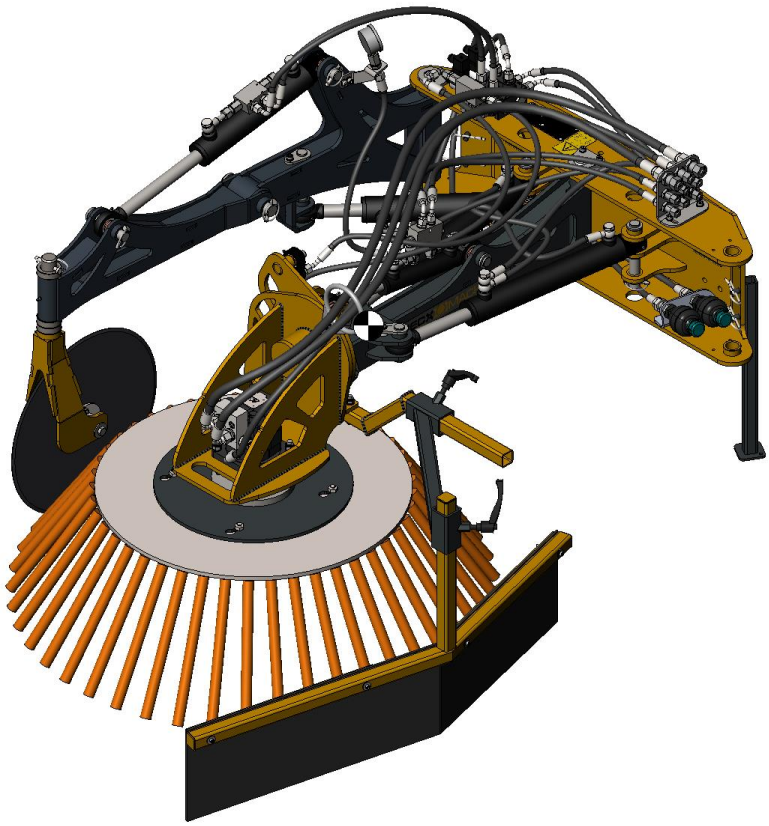
Weed brush - Edge cutter

OBKS90-45

User manual



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This manual is a translation of the original Dutch version.

Preface

The Becx Machines weed brushes with edge cutter are specially designed and exclusively intended for removal of weeds from pavements safely and efficiently and leave a professional visual result.

The operator can hydraulically control all turning and swivelling functions from his cabin. Thanks to the many adjustment options, most grass edges and pavements to be brushed are no problem for this machine. This also contributes positively to the machine's productivity.

The brush and edge trimmer can also be used separately: So either brush or edge cutter only.

The design is such that the edge cutter can be mounted either on the right (standard) or on the left hand side of the machine. In this manual, only the right-hand version is shown.

This manual is intended for users and maintenance personnel and has been compiled with care. However, if it is not possible to find a clear answer to your question, please contact your supplier's technical service department.

- Read this manual carefully before you start to use the weed brush. Always follow the safety instructions set out in chapter 2.
- Always read the operating instructions for the tool carrier used carefully before putting it into operation. Always observe the safety requirements listed in the operating instructions.
- One copy of this manual must be kept with weed brush and must be available to the user. All important servicing sessions and any comments must be recorded and retained by the servicing company.
- The user is responsible for selecting a suitable tool carrier for the weed brush and for ensuring that the weed brush is properly attached and connected.

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Certificate of conformity (IIa) (copy)

We:

Becx Machines B.V.
De Sonman 35
5066 GJ Moergestel
The Netherlands

declare entirely under our sole responsibility, that this product:

Description:	Becx weed brush
Type:	OBKS90-45
From serialnumber:	**9**045-046-03

to which this declaration applies, complies with the provisions of the Directives:

Machinery Directive	2006/42/EG

Complies with the following standards:

NEN-EN-12100	Safety of machinery. Basic definitions, general design principles.
NEN-EN 4413	Hydraulics – Safety requirements for hydraulic and pneumatic systems and their components.
NEN-EN-ISO 14121-1	Safety of machinery - risk assessment.

Director; Erwin Hommen

Moergestel, The Netherlands

Date: 15 April 2017

List of symbols

For all operations and situations, where operator and/or technician safety is involved and care must be taken, the following symbols have been used in this user manual:

	**Warning!**
	**Explanation.**

1. Technical data

Technical data		
General		
Hydraulic oil filtering requirements	10	Micron
Required hydraulic oil quality	HV-46 or similar	
Required grease quality	NLGI 2	
Dimensions and weights		
Width min.	1100	mm
Width max.	1750	
Length	1850	mm
Height	850	mm
Brush mean diameter	900*	mm
Cutting disk diameter	450*	
* subject to wear		
Dead weight	270	kg
Attachment information		
Mounting face	730x280	mm
Mounting hole pattern	360x190, 4x ø17	mm
Vertical force on attachment point (Fo)	3.000	N
Tipping moment (Mo)	+/- 1600	Nm
Hydraulic connections		
Maximum operating pressure	200	bar
Maximum Oil flow	45	L/min
Oil flow for basis speed (150 rpm)	30	L/min
Maximum brush speed	450	rpm
Direction of rotation	CCW	
Required connections		
Pressure and return hoses	15L - M22x1,5 (2x)	
Drain hose	12L - M18x1,5 (1x)	
Hydraulic function hoses	10L – M16x1,5 (2x* of 6x)	
Maximum pressure on drain line	2	bar
Switchable 12V functions	2	

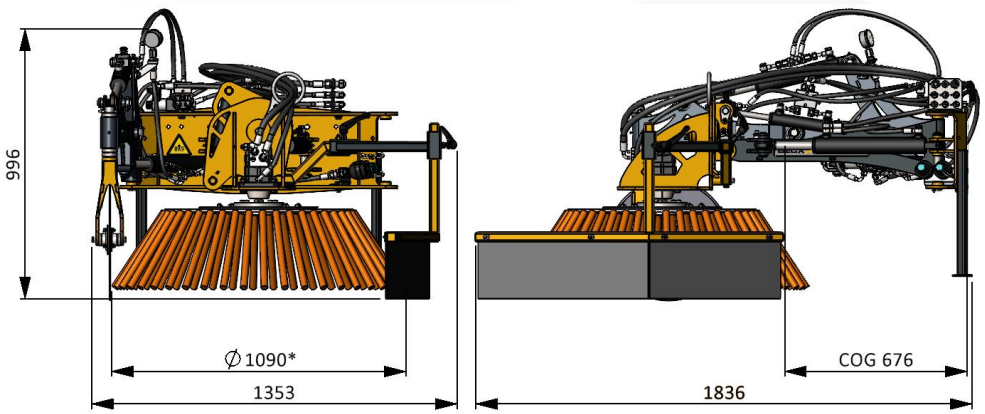


Figure 1: Dimensions and location centre of gravity (COG).

2. Safety

2.1 General

- No modifications may be made to the hedge trimmer.
- It is the user's responsibility to ensure that the correct tool carrier and support arm are used.

The following points are particularly important here:

- The maximum pressure and oil flow (speed) must not be exceeded. Exceeding this may result in damage to the equipment and injury to bystanders.
- The tool carrier must have sufficient strength and stability to safely absorb the forces and moments caused by the hedge trimmer under all conditions.

2.2 During operation

- The system may only be used for the intended work.
- Consult the manual of the tool carrier for the noise levels generated. As this will be considerably higher than that of the weed brush itself, the noise level of the tool carrier is decisive in determining whether hearing protection is required.
- If persons or animals are present or approach in the working area (approx. 5m around the machine), stop immediately and stop the weed brush.
- If excessively heavy traffic from passers-by restricts the progress of the work too much, consideration can be given to cordoning off the work area.
- If the weed brush starts making a different noise and/or vibrating, it should be stopped immediately and the weed brush stopped. Only when the cause is found and removed may work be resumed.

	• Inspection and maintenance work should be carried out in a timely manner. • During inspection, maintenance or cleaning, the implement carrier must be switched off. • Local working and safety regulations must always be followed. • To prevent damage to the system, switching on and off should always be done at low speed. Depending on the tool carrier used, this is at idle speed or at the minimum oil flow.

2.3 Operating personnel

	• Operating personnel must be over 18. • Persons must only carry out jobs for which they are trained. This applies to both maintenance work and normal operations. • If the operating personnel identify errors or risks or disagree with the safety measures, this should be reported to the owner or chief operating officer.

2.4 Warning symbols

	**Read manual before operation!**
	**Caution!** Ensure that nobody is in the danger zone of the machine.
	**Caution!** Entrapment hazard!

3. Component description

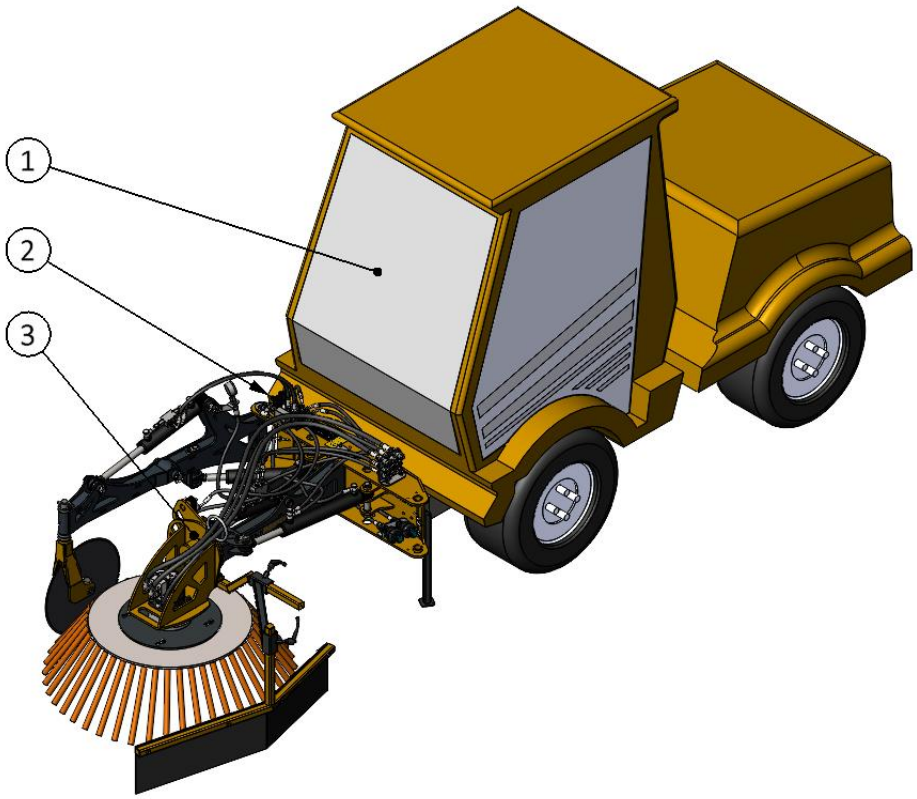


Figure 2: Overview.

	Element	Description
1	Tool carrier	• The tool carrier is not part of the delivery. It is the user's responsibility to use a tool carrier suitable for the weed brush.
2	Connector	• Depending on the implement carrier used, a specific connector may be used to connect brush unit to the implement carrier. This item can therefore be part of the delivery, but is not discussed further in this manual.
3	Weed brush unit / Edge cutter	• Everything the user of this machine needs to know is described in this user manual.

3.1 Mechanical components

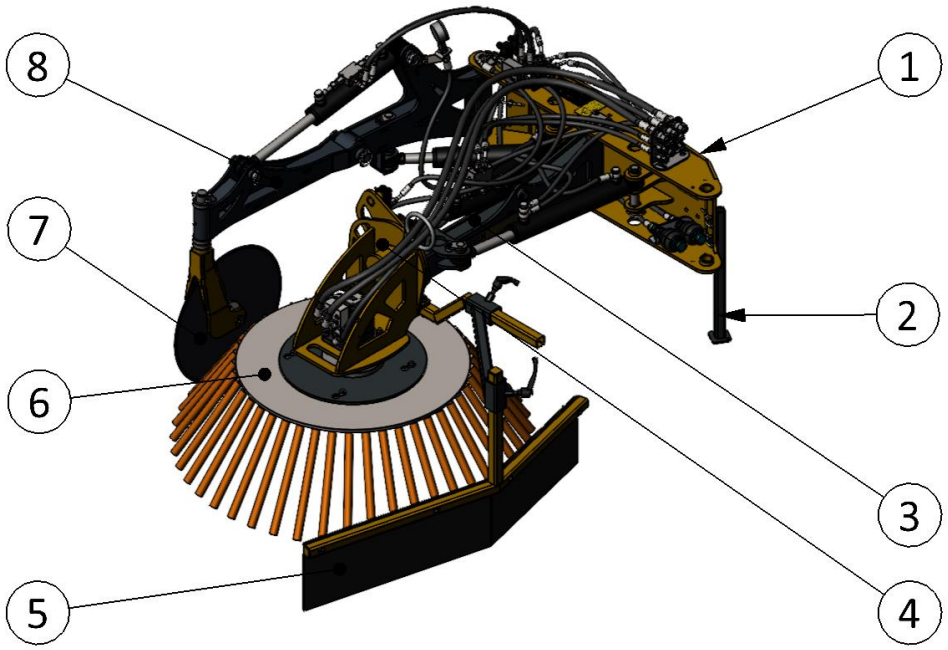


Figure 3: Overview of mechanical components.

	Element	Description
1	Mounting plate	• This plate has a standardized hole pattern, with which the machine can be mounted to a tool carrier directly or in combination with an additional connector.
2	Support legs	• Attach the support legs before putting the machine in storage. • Remove the support legs once the weed brush is attached to a tool carrier or mount them downside up.
3	Swivel arm	• Using the swivel arm, the brush can be moved both left and right.
4	Brush head	• The brush head in which the brush motor is mounted can be hydraulically tilted forward and left/right relative to the swivel arm, allowing optimum brush adjustment.

	Element	Description
5	Mud flap	• The mud flap prevents weed debris from being thrown in the wrong direction from the brush. • The desired position can be adjusted with clamping bolts (pos. 6).
6	Brush	• The brush rubs the weeds out of the pavement so that they become completely loose from the surface. • If the brush is worn out, it can easily be replaced. To do this, the mounting nuts have to be loosened, after which the brush can be removed from the holder. • Mount the new brush in the reverse order.
7	Edge cutter arm	• Using the arm, the edge cutter can be moved left-right as well as up-down. • The complete arm can be mounted on the right (standard) or left.
8	Edge cutter	• One lets the blade slice through the grass next to the pavement so that the part of the grass growing over the pavement is cut loose.

3.2 Hydraulic components

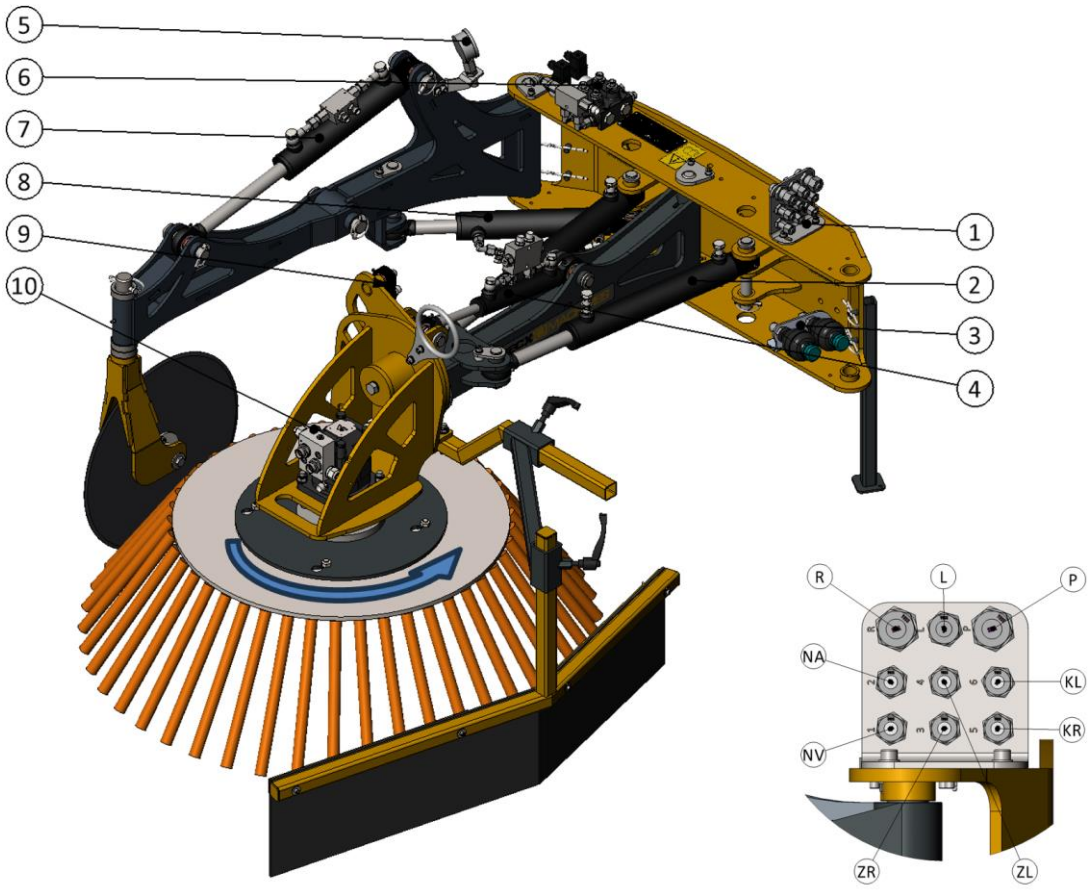
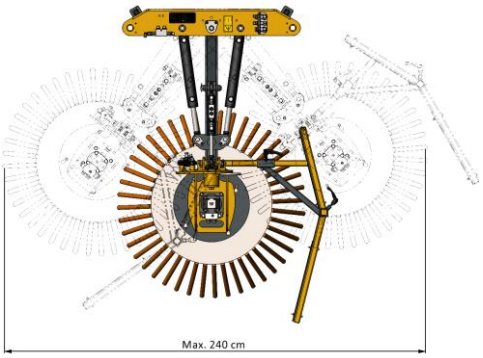
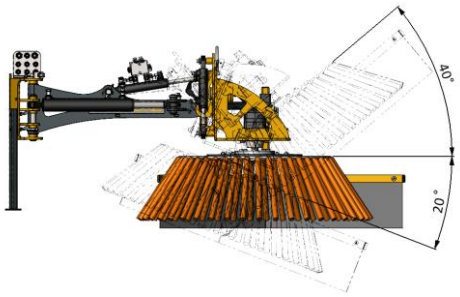
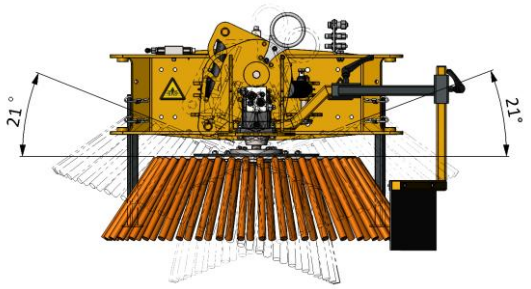


Figure 4: Overview hydraulic components, direction of rotation and connections.

	Element	Description
1	Hydraulic bulkhead couplings	• Pressure (P) and Return (R) connection 15L. • Case drain (L) connection 12L. • NA/NV incline brush backward / forward connection 10L • ZL/ZR swivel brush left / right connection 10L • KL/KR tilt brush counter-clockwise / clockwise + cylinder functions through 8/3-valve connection 10L: - Unactivated: KL/KR tilt brush counter-clockwise / clockwise - Valve 1 activated: ZL/ZR swivel cutter left / right - Valve 2 activated: HO/HN lift cutter up/down

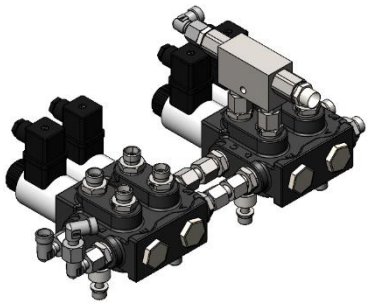
	Element	Description
2	Slewing cylinders	• These cylinders allow the brush to swivel left and right. 
3	Accumulators	• Two accumulators allow the edge cutter arm to move with some spring and follow the grass edge.
4	Inclination cylinder	• This cylinder allows the brush to be inclined forwards / backwards. 
5	Pressure gauge	• The pressure gauge gives an indication of the back pressure the blade gives against the pavement or sloping track driven by the tool carrier. When set correctly, the pressure gauge indicates virtually no pressure.
6	8/3-valve	• This valve allows 3 hydraulic functions to be controlled with 1 double-acting function of the implement carrier. The valve is equipped with 2 control slides, each of which must be energised by an external 12V signal. - Unpowered, the brush tilt cylinder can be operated; - If valve 1 is energised the swing cylinder of the edge trimmer; - If valve 2 is energised the lifting cylinder of the edge trimmer. - If both valves are energised simultaneously, the oil goes to valve 1.

	Element	Description
7	Lifting cylinder Edge cutter	• This cylinder allows the edge cutter to be moved up and down. The cylinder is fitted with a double-acting check valve.
8	Slewing cylinder Edge cutter	• This cylinder allows the edge cutter to be moved left and right and adjusted. The load on this cylinder can be read on the pressure gauge. Two accumulators provide the cylinder with a certain degree of spring force, allowing the cutting blade some freedom of movement.
9	Tilting cylinder	• This hydraulic cylinder allows the brush to be tilted CW or CCW. 
10	Hydraulic motor with safety valve	• The hydraulic motor directly drives the brush. The direction of rotation seen from above is counter clockwise (CCW). • This valve allows the hydraulic motor to coast after the oil supply has been turned off. This prevents damage to the motor. Run out time is approx. 3 sec. • Pressure setting on P side: 200 bar. • Pressure setting on R side: 25 bar*. *** ATTENTION!** **With option BEC-MP90-006 'directional valve', the pressure relief valve on the T-side is also set to 200 bar. As a result, the brush run out time is much shorter.** **Before reversing the direction of rotation the brush must have stopped completely first. Switching direction while running will result in damage to the hydraulic motor.** **It is the operator's responsibility to reverse the direction of rotation ONLY after the brush has come to a complete standstill.**

3.3 Options

Extra 8/3-valve block
(art.no. BEC-MP9045-004)
For when the implement carrier does not have enough double-acting valves and 2 or 3 additional hydraulic functions need to be controlled.

For this option, however, the implement carrier should be equipped with two extra switchable 12V on/off connections to switch the valve.

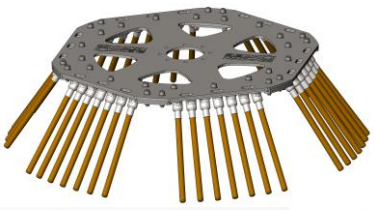


Flow controller
(art. no. BEC-MP90-005)

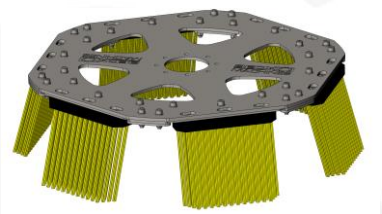
For when oil flow for the implement from the implement carrier is not adjustable.

Reversing valve direction of rotation
(art.nr. BEC-MP90-006)
If two rotation directions are required for the brushes. This option does require the implement carrier to be equipped with a switchable 12V on/off connection to switch the valve.

Segmented brush steel
(art.nr. BEC-MP90-010)
A steel weed brush made of 6 detachable segments. A worn or damaged segment can easily be changed on site with hand tools.

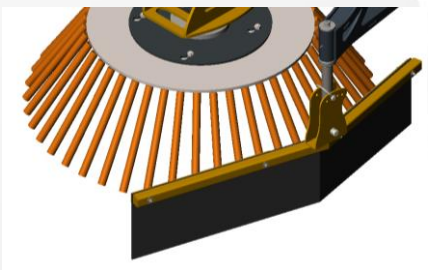


Segmented brush plastic
(art.nr. BEC-MP90-011)
A plastic weed brush made of 6 detachable segments. A worn or damaged segment can easily be changed on site with hand tools.



Mud flap in cutting arm
(art. no. BEC-MP9045-015)

If an adjustable splash guard is desired.
This replaces the blade of the edge cutter and can be mounted and used on either the left or right side.



3.4 Hydraulic circuit diagram

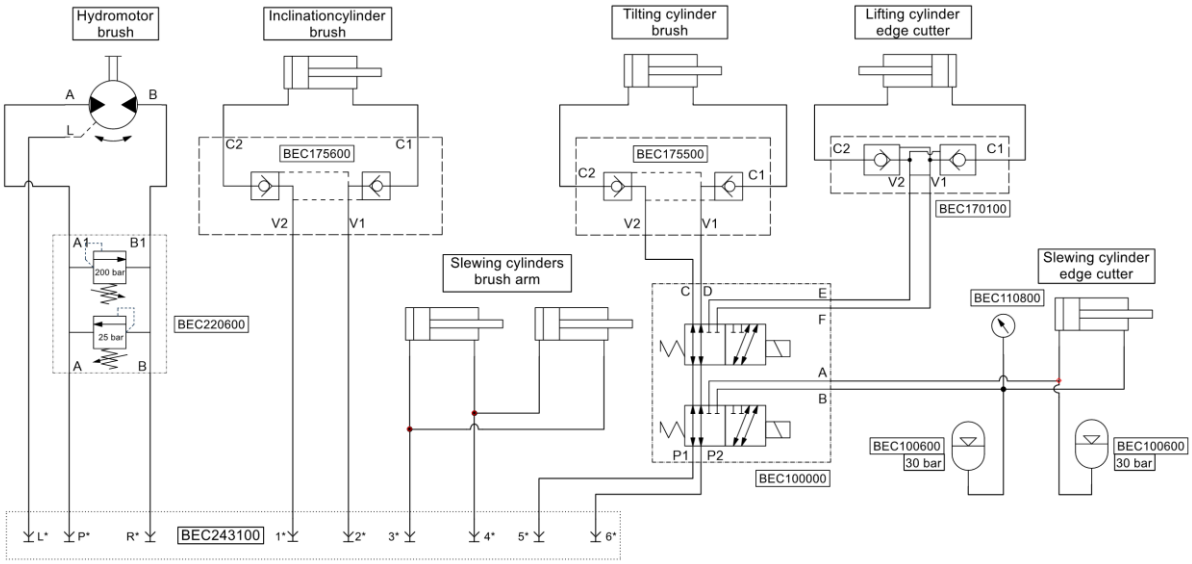


Figure 5: Hydraulic circuit diagram base version.

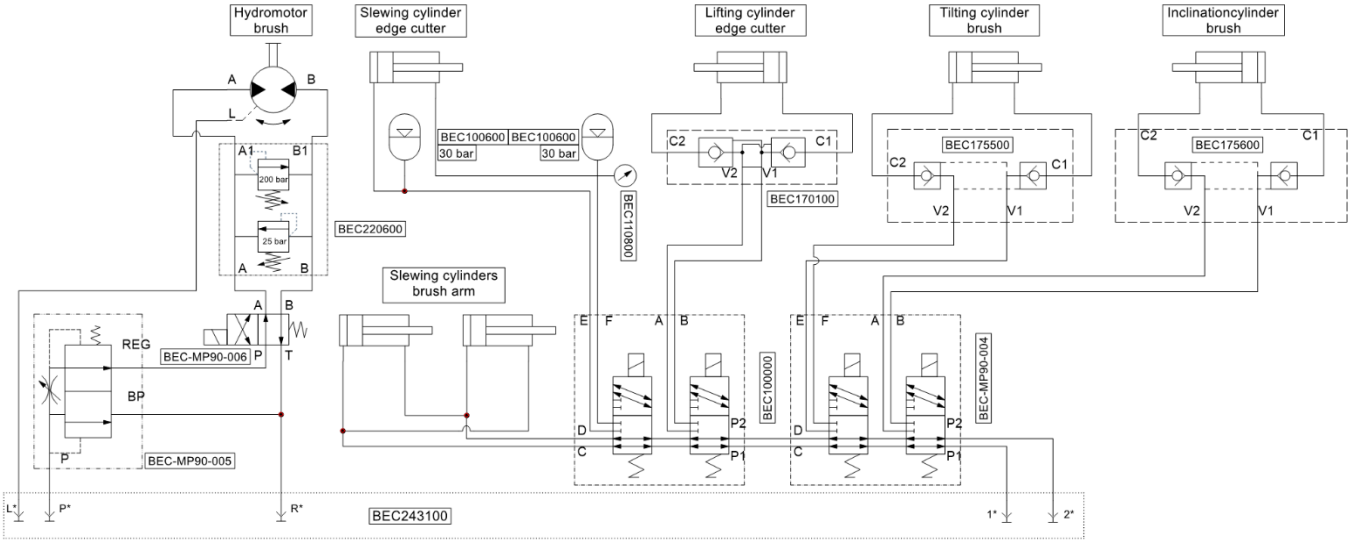


Figure 6: Hydraulic circuit diagram base version including all options.

3.5 Electric circuit diagram

Only to control the coils of the optional valves, a simple circuit will have to be built based on 12V direct current.

In any case, make sure the circuit is protected by a fuse.

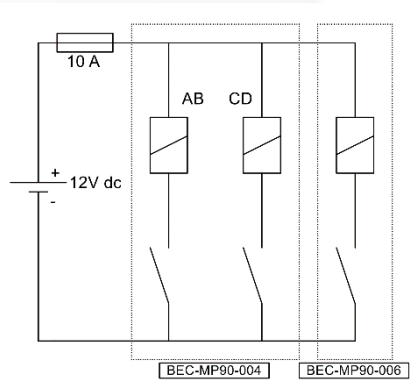


Figure 7: Electric circuit diagram.

4. Operation

4.1 Preparing the weed brush for use

	What to do	Action	Result
1	Choose the right tool carrier 	Mechanical requirements • Ensure that the tool carrier is sufficiently strong and stable for the weed brush. See the technical data for weight, maximum vertical load and tipping moment occurring in the mounting point. Hydraulic requirements • Ensure that the maximum pressure and oil flow are not exceeded. • Ensure that the correct (quick) couplings are fitted for oil pressure, return and leakage lines.	Failure to comply with the specified values may result in damage to the installation and injury.
2	Mechanical connection	• Attach the implement to the tool carrier with minimum 4x M16 - 8.8. • See section 5.3 for the correct tightening torque.	
3	Hydraulic connection	• Connect the quick connectors for the pressure/return and leakage oil lines. • Connect the hoses for the cylinder functions as described in section 3.2. • See the implement carrier manual for the correct connection positions.	

	What to do	Action	Result
4	Set oil supply and brush speed	• Set the tool carrier's oil supply so that the maximum pressure and speed cannot be exceeded. • See the manual of the implement carrier for instructions. • Set brush speed to approx. 150 rpm as basic speed. Depending on the working conditions, the speed can be increased or decreased.	
5	Adjust the brush And edge cutter	• Using the various adjustment options, you can adjust the brush and edge cutter to achieve the optimum setting. • Never work with the brush when it is lying flat on the ground due to excessive wear. But circumstances and experience of the user are decisive in this. • As a guideline, approx. ¼ of the brush should touch the ground. But circumstances and user experience are decisive. • Take care that the brush and the edge cutter do not damage each other. • Brushing against the edge cutter is allowed, but make sure the brush does not touch the edge cutter more than just barely.	

4.2 Performing weed brushing operations

	What to do	Action	Result
1	Check the installation	• Check the speed of the brush motor (150 rpm). This is sufficient for good results in most cases, but lowering or increasing the speed may be necessary depending on conditions. • Check that the brush motor runs vibration-free and there are no abnormal noises. • If any deficiency is found in one of the above points, it must be rectified before putting the weed brush into use.	
2	Transit to work site	• Always switch off the brush motor at times when it is not in use.	
3	Switch on the brush motor	• For detailed instructions, see the tool carrier manual. • To avoid damage to the installation, it is important to switch on the weed brush at the lowest possible speed. After switching on, you can speed up if required.	Switching on or off at high speed leads to high loads in the system.
4	Position the brush 	• For detailed instructions, refer to the manual of the tool carrier. • **Make sure there are no persons in the working area.**	
5	Brushing	• Drive the tool carrier over the pavement carefully. • Too much pressure on the ground causes a high level of load and wear on the brush. Adjust the brush so that the desired result is achieved with as little pressure as possible.	
	Edge cutting	Adjust the edge cutter to achieve the desired result without the pressure gauge showing excessive pressure.	

	What to do	Action	Result
6	**Stop work in the following situations !!** 	• If persons or animals are present or about to enter the work area. • The weed brush makes a different sound or starts vibrating.	**Failure to stop in time in the aforementioned situation could lead to serious injury.**
7	Switch off the weed brush	• When the work is finished, the weed brush should be switched off. • For detailed instructions, see the implement carrier manual. • **For option BEC-MP90-006 'Reversing valve': Switch off the brush preferably at the lowest possible brush speed.** • **It is the operator's responsibility not to reverse the direction of rotation until the brush has come to a complete stop.**	Switching on or off at high speed leads to high loads in the system. **Reversing direction of rotation without first stopping the brush will result in damage to the hydraulic motor.**

5. Maintenance

- When replacing or repairing parts, only components supplied or approved by the manufacturer should be used.
- If work is carried out on the installation, always disconnect the power supply from the implement. This can be done by disconnecting the hydraulic hoses.
- Only persons with proven knowledge of mechanical and hydraulic installations through training and/or experience may carry out maintenance work.
- The implement may be hosed down with a high-pressure cleaner. However, never spray directly on hydraulic components.
- Always grease the machine immediately after cleaning.

5.1 Daily maintenance

	What to do	Action
1	Lubricate pivot points	• Lubricate the grease nipples on the pivot points. • Lubricate the ball heads of the cylinders.

5.2 Weekly maintenance

	What to do	Action
2	Retighten fasteners	• Retighten nuts and bolts (see 5.4).
3	Visual inspection	• Check the construction and hydraulic components visually for damage, cracks and tears.
4	Retighten Taperlock	• After the first 4 working hours, retighten (48 Nm) the sets screws of the taperlock bush on the motor shaft and check them regularly thereafter (see figure 8)!
5	Clean	• Clean the machine at the end of the working week, before the machine is put into storage.

5.3 Annual maintenance

	What to do	Action
1	Inspect	• Check structural parts for damage, cracks and play. • Check hydraulic parts for leaks and damage to hoses.

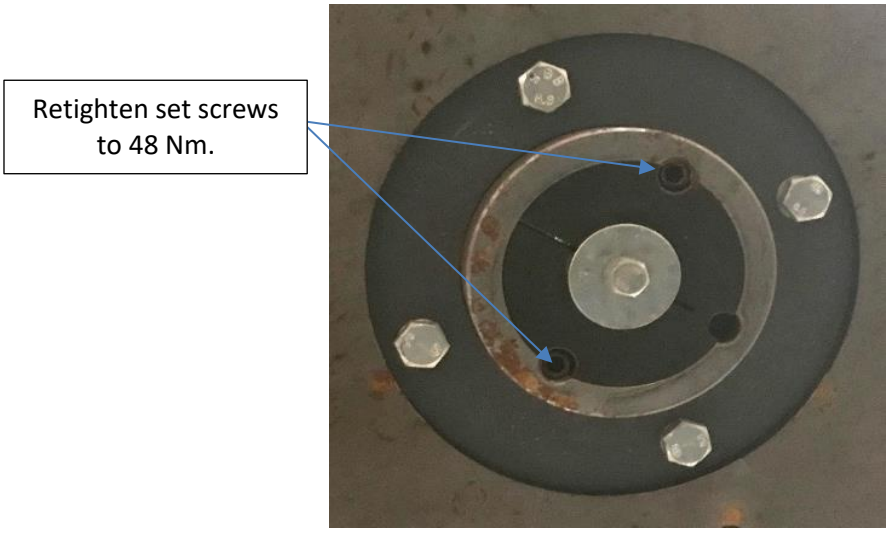


Figure 8: Taperlock bush connection.

5.4 Torque settings

Torque values in the table are given in Nm.

These can be used when tightening and checking screw connections.

In most cases, the strength classes are indicated on the bolt head.

If in doubt, contact your supplier...

		Grade		
		8,8	**10,9**	**12,9**
Thread	**M8**	25	35	42
	M10	50	70	85
	M12	87	123	147
	M14	138	194	235
	M16	211	299	358
	M18	289	412	490
	M20	412	579	696

6. Failure analysis

	Failure	Solution
1	After switching on, the brush motor does not rotate.	• Check that the hydraulic hoses are correctly connected.
2	The machine works but has no / insufficient brushing power.	• Check that the direction of rotation of the motor is correct. If this is not the case, it can be changed by changing the pressure and return hoses using the quick connectors. • If the BEC-MP90-006 'Reversing valve' option is fitted, the pressure relief valve must be set to 200 bar on both the P and T sides.

If the fault cannot be solved with the recommendations from the table above, consult your dealer or service department.

7. Storage

The storage location is preferably dry, stable and flat. Placing the machine on a pallet is advised due to its manageability.

8. End of life

When parts are replaced or at end-of-life, care should be taken to ensure that all materials are disposed of, destroyed or reused in a 'legally' responsible and environmentally friendly manner.

9. Logbook

Good insight into the technical condition of a machine is of great importance to use a machine efficiently and sustainably. We therefore advise every user of a Becx machine to keep a written record of inspections, maintenance and repairs.

A tool for this can be the following table. Tip: Write Machine and serial number in the boxes reserved for future reference.

Type:		**Serialnumber:**
Date	**Executed by**	**Activities/Peculiarities**