

Operating Instructions

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain information for future reference.

BUEHLER MILLING CUTTERS

DESCRIPTION

Buehler Milling cutters were developed and precisely manufactured in the principality of Liechtenstein to meet the highest technical standards. These precision tools are used to remove obstructions such as roots, concrete, hard grease, and scaling from sewer lines. Since the Buehler milling cutters cleanly and gently remove protruding laterals at pipe junctures without damaging the line, they are ideal for pipe relining projects.

The Buehler milling cutters have a drive of tempered stainless steel and double sealed ball bearings that provide years of low maintenance operation. The milling heads have stainless steel bodies with bonded carbide bits and a diamond center bit. The turbine ring has fins that increase torque and provides straight tracking. This construction allows use with potable or clean recycled water. The water, supplied by a pressurized hose, drives the turbine and propels the milling cutter through the sewer line.

The Buehler milling cutters feature replaceable/interchangeable carbide bits and interchangeable propulsion/ rotating nozzles that reduce downtime and spare parts requirements to a minimum.

SPECIFICATIONS



Figure 1 – Type II Driver
Handles 4" Pipe
(Up to 12", with Conversions)

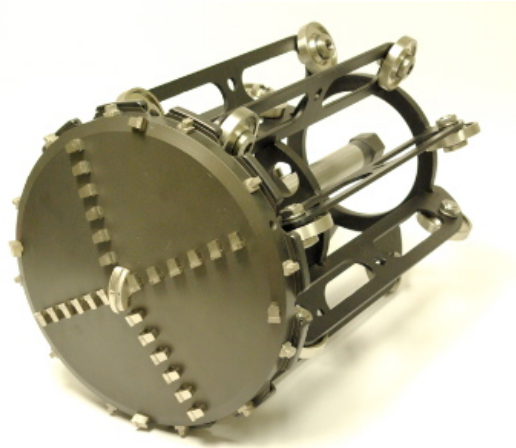


Figure 2 – Type VIII Driver
Handles 15" Pipe
(Up to 20", with Conversions)

SPECIFICATIONS (Continued)

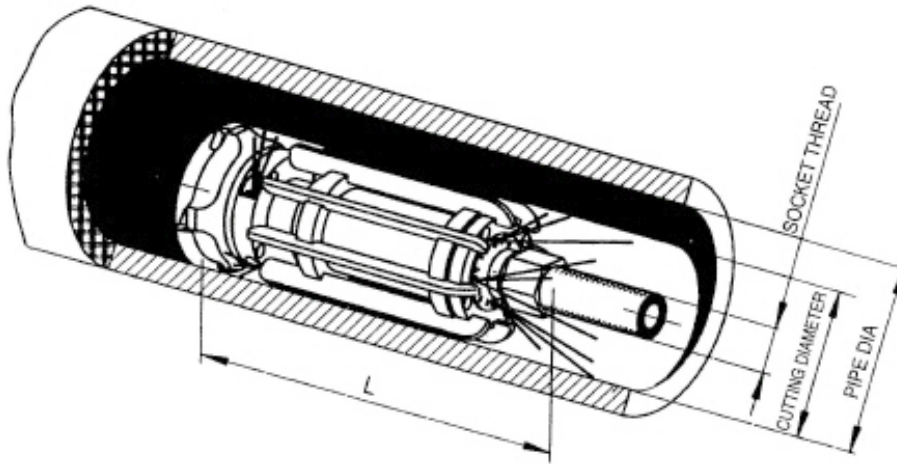


Figure 3 – Dimensional Drawing

<u>Cutter Type</u>	<u>Cutting Diam.</u>	<u>Pipe Diam.</u>	<u>No. of Bits</u>		<u>Hose Connection</u>	<u>Length (L)</u>	<u>Weight</u>
			<u>Carbide</u>	<u>Center</u>			
II	3.8"	4"	8	1	1" NPT	14"	18 lbs
IV/1	5.4"	6"	12	1	1" NPT	14"	26 lbs.
V/1	6.2"	8"	14	1	1" NPT	14"	30 lbs.
V	7.3"	8"	16	1	1" NPT	16"	35 lbs.
VI	8.9"	10"	24	1	1" NPT	16"	42 lbs.
VII	11.3"	12"	28	1	1" NPT	18"	42 lbs.
VIII	14.4"	15-16"	36	1	1" NPT	20"	80 lbs
X	17.0"	18"	40	1	1" NPT	29"	109 lbs
XII	19.0"	20"	44	1	1" NPT	29"	111 lbs

Pump Output Required: 60 GPM (minimum),
Operating Pressure: 1,600 – 1,800 PSI (at nozzle).

GENERAL SAFETY INSTRUCTIONS

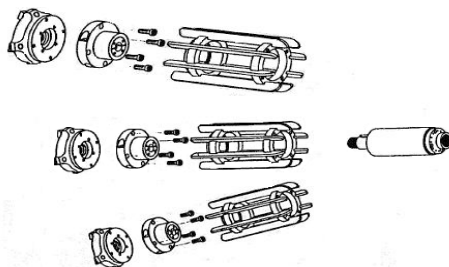
WARNING!

BUEHLER MILLING CUTTERS MUST NOT BE USED FOR ANY PURPOSE OTHER THAN THOSE FOR WHICH THEY WERE DESIGNED

1. For your own safety, read all of the instructions and precautions before operating tool.
2. The service staff must be trained in the proper operation of the tool.
3. Wear proper apparel. Do not wear loose clothing, rings, bracelets, or other jewelry which may get caught in moving parts of the tool.
4. Wear safety shoes with non-slip soles.
5. Wear safety glasses complying with United States ANSI Z87.1. Everyday glasses are NOT safety glasses.
6. Be alert and think clearly. Never operate tools when tired, intoxicated or when taking medications that cause drowsiness.
7. Before using the Buehler milling cutters, thoroughly flush and clean the sewer line.
8. **The Buehler milling cutter must only be used inside of sewer pipe lines. Use outside of a sewer line can result in personal injury and/or damage to tool and property.**
9. Tests of the cutter's operation are always conducted in a properly closed pipe and never in the open or in the manhole.
10. While installing the milling cutter for cleaning tasks, the operator must not remain in the danger area.
11. It is recommended that sewer inspection cameras be used to monitor the operation of the Buehler milling cutters.

ASSEMBLY

Buehler milling cutters come fully assembled. The only assembly required is when conversion sets are installed - to increase sewer line pipe size capabilities.



ASSEMBLY (Continued)

Figure 4 – Conversion Kits for Each Cutting Diameter

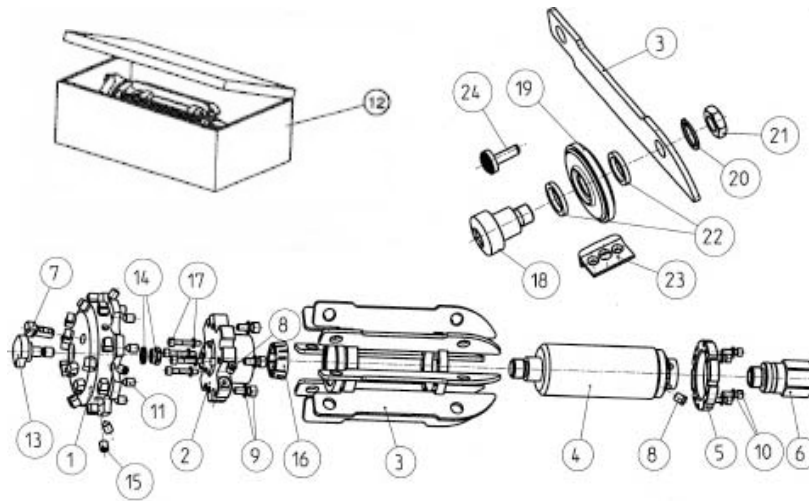


Figure 5 – Buehler Milling Cutter Parts

PARTS LIST (Refer to Figure 5)

<u>Ref. No.</u>	<u>Description</u>	<u>Conversion Set Information</u>
1	Cutter head	Bore varies according to pipe size.
2	Turbine	
3	Guide skid, fixed	Size varies according to pipe size.
4	Drive	Types II – VII same drive; Types VIII, X & XII same drive
5	Locking ring	Types IV/1 – VII same locking ring
6	Socket	Types V & VI same socket; Types VII & VIII same socket.
7	Carbide bit	Types II – VIII same carbide bit.
8	Nozzle	Types II – VII same nozzles.
9	Hex bolt, turbine	M6 x 20 mm. Types IV/1 – VII same M8 x 20 mm. bolt.
10	Bolt, locking ring	Types IV/1 – VII same M6 x 20 mm. bolt.
11	Bolt, carbide bit	M10 x 16 mm. Types II & III same M10 x 12 mm. bolt.
12	Tool box	
13	Center bit	Types II – VIII same center bit.
14	Nut, hex M12, LH	Types II – VIII same M12, LH, hex nut with lock washer.
15	Screw, M10	Types II – VIII same M10 x 12 mm. screw.
16	Adapter sleeve	Types II – VIII same adapter sleeve.
17	Hex bolt, adptr sleeve	Types II – VIII same M6 x 35 mm, bolt for adapter sleeve.
18	Hub	Types VII & VIII same hub.
19	Lock washer	Types VII & VIII same lock washer.
20	Spring lock washer	Types VII & VIII same spring lock washer.
21	Nut, hex M16	Types VII & VIII same M16 nut.
22	Felt lock washer	Types VII & VIII same felt lock washer.

PARTS LIST (Continued)

- | | | |
|----|---------------------|---|
| 23 | Protection shoulder | Types II – VIII same protection shoulder. |
| 24 | Diamond cutter | Types II – VIII same diamond cutter. |

INSTALLING CONVERSION SETS

1. Using an **SW 14** open end wrench, change the socket (Ref. No. 6).
2. Remove all four hex bolts (Ref. No. 9) on the rear of the turbine (Ref. No. 2) and carefully pull off the cutter head (Ref. No. 1).
3. Loosen the four hex bolts (Ref. No. 17) on the front of the turbine **two turns**. Place a ¼” diam. center punch against each hex bolt and hammer carefully until the adapter sleeve (Ref. No. 16) is loosened from the drive (Ref. No. 4).

WARNING: Do not completely remove the adapter sleeve from the drive!

4. Remove the turbine by using an **SW 14** hex wrench on the rear of the drive. If the turbine cannot be easily removed, repeat Step 3.
5. Unscrew the four bolts (Ref. No. 10) and remove locking ring (Ref. No. 5).
6. Detach drive from fixed skid (Ref. No. 3).
7. **When changing the skid and/or drive, make sure that the propulsion nozzles (Ref. No. 8) are positioned between the skid plates.**

OPERATION

CAUTION!

1. In order to ensure optimal operation of the Buehler milling cutter, it must be properly adjusted to the actual pipe inner diameter.
2. Before using the milling cutter, make sure that all bolts and nuts are tight.
3. Operate the milling cutter only with fresh or clean recycled water. Use of dirty water will damage the drive.
4. Make sure that all nozzles are clean and free of deposits.
5. The nozzles must be operated in accordance with current power requirements. The recommended operating pressure at the nozzle is **1,600 – 1,800 PSI**. The minimum flow rate is **60 GPM**.
6. Worn protection shoulders must be replaced immediately in order to prevent damage to the sewer line and/or the cutter head.
7. The skids and cutting heads are rigid, not flexible. Make sure that the skids and cutting heads are firmly assembled according to the actual inner diameter of the sewer line. Failing to do so may result in damaging the line and/or the milling cutter.
8. The sewer line must be reasonably straight and with no major offsets.
9. Guide the supply hose manually. Do not forcefully push it.

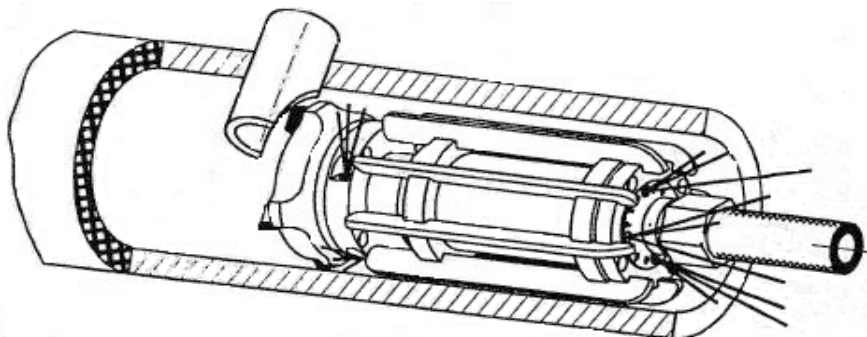
OPERATION (Continued)

10. Pay close attention to the sound of cutter operation. A consistent sound indicates consistent cutting.
11. If resistant material is encountered in the pipe, pull the sewer hose back a little to allow the drive to regain momentum. Repeat this procedure until the milling cutter can pass through this section of pipe smoothly without encountering obstacles.
12. After this is accomplished, move to the next obstruction. This ensures that no snags or kinks are created behind the milling cutter.
13. When working in cold weather, do not leave the milling cutter outdoors after the job is completed. Water in the cutter could freeze and damage the cutter.
14. The milling cutter must be checked for damage after each use. Any damage must be repaired promptly. Damaged carbide and center bits must be replaced, as the resulting centrifugal force can severely damage the cutter.
15. Worn protection shoulders must be replaced immediately in order to prevent damage to the sewer line and/or the cutter.
16. In order to prevent damage to the HP swivel joint, **DO NOT** pull up on the hose until the cutter has been completely removed from the sewer line.
17. Only original, factory-approved replacement parts may be used for repairs.
18. The manufacturer must be notified if malfunction or damage occurs to the milling cutter. Repairs may only be performed by the manufacturer or at approved service locations.

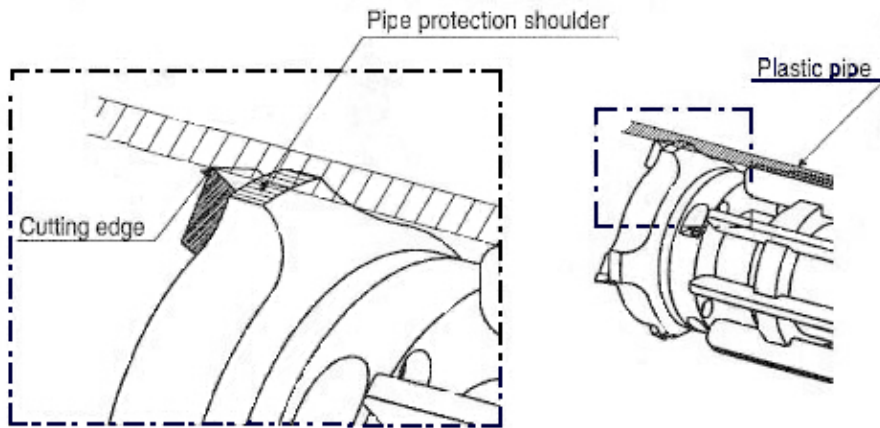
OPERATION

CLEANING PLASTIC PIPE and PLASTIC-LINED PIPE

1. Protection shoulders prevent grooves and damage to plastic and plastic-lined pipe.
2. Avoid excess clearance inside plastic and plastic-lined pipe.
3. Choose the milling cutter closest to the pipe inside diameter.
4. Guide hose manually.



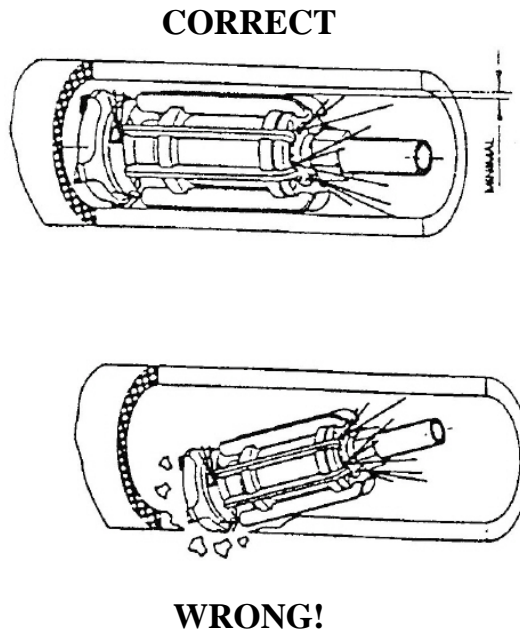
OPERATION (Continued)



Figures 6 – Protection Shoulders

PULLING BACK in PLASTIC PIPE and PLASTIC-LINED PIPE

When pulling back in plastic and plastic-lined pipe, follow the “Correct” method shown in Figure 7, below.



Figures 7 – Pulling Back in Plastic Pipe

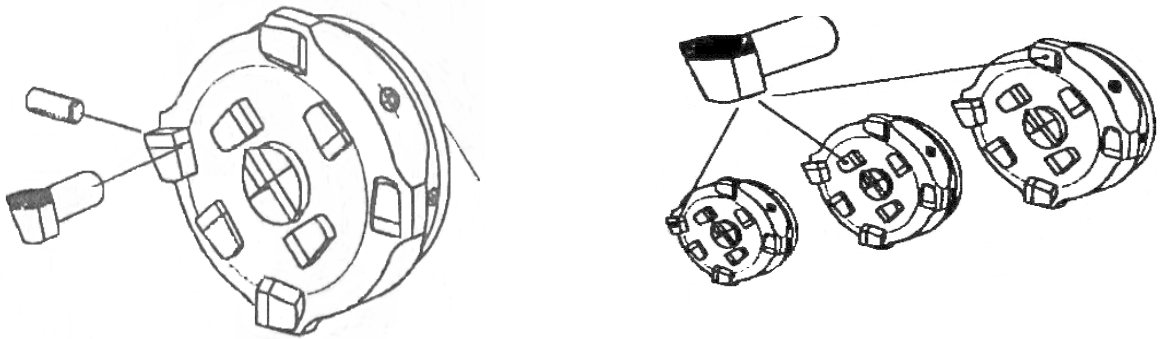
MAINTENANCE

The Buehler milling cutter is a low maintenance tool and does not require lubrication.

SWIVEL

1. Frequently check the HP Swivel joint to ensure that it is still screwed tightly into the cutter.
2. Also, test the HP Swivel joint to ensure that the swivel still moves smoothly with some resistance and that no friction within the bearings is evident.
3. To add grease to the internal parts of the HP Swivel, remove the set screw (s) on the outside of the swivel. Once this is done, the internal parts should be visible.
4. With a grease gun, add the necessary amount of grease so that the swivel turns easily with no friction or grinding of the bearings.
5. Insert both set screws back into the swivel and tighten with **Loctite® Blue Thread Lock**.

REPLACEABLE/INTERCHANGEABLE CARBIDE BITS

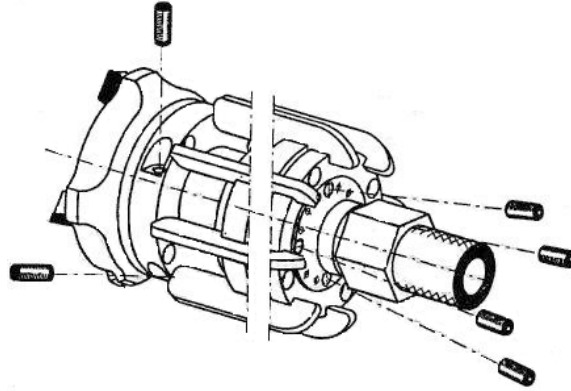


Figures 7 – Carbide Bits

Replaceable carbide bits cut downtime to a minimum.

Interchangeable carbide bits fit all sizes of milling cutter heads. Keeps spares to a minimum.

EXCHANGEABLE PROPULSION and ROTATING NOZZLES



Figures 8 – Exchangeable Nozzles

Exchangeable propulsion and rotating nozzles keeps spare parts requirements to a minimum.



Mannufacturer’s declaration according to the 89/392/EWG guideline for machines:

The milling cutter is not in itself a part that must be marked according to CE marking guidelines (89/392/EWG guideline).

The manufacturer declares that the models being marketed meet all security and health requirements in the EC guidelines, due to its conception and its construction.

LIMITED WARRANTY

USB SEWER EQUIPMENT CORPORATION ONE-YEAR LIMITED WARRANTY. Buehler Milling Cutters, models covered in this manual, are warranted by USB Sewer Equipment Corporation (USB SEC) to the original user against defects in materials or workmanship under normal use for one year after date of purchase. Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as USB SEC designates, shipping costs prepaid, will be, as an exclusive remedy, repaired or replaced, at USB SEC’s option. For limited warranty claim procedures, see “PROMPT DISPOSITION” below. This limited warranty gives purchaser specific legal rights which vary from jurisdiction to jurisdiction.

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LIMITED WARRANTY (Continued)

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