JETTER PRO SUPPLY / TECHNICAL DOCUMENTS

KEG Micro Chain Cutter

Archived manufacturer manual | March 2014 edition

Historical reference - confirm your unit before use
This is a dated manufacturer manual, not confirmation of a current setup or approval for a particular unit. The original KEG pages follow without changes. Match the model, serial number and fitted equipment with JPS before using configuration-dependent procedures.

Model reference: 0020 0110 (Micro / Hummingbird)
Original edition: Version 3, March 2014

Known differences to confirm

Operating minimum. This 2014 manual lists 8 GPM and 1,200 PSI. The current catalog lists 8 GPM and 1,700 PSI. Confirm the requirements for the supplied unit; do not use the lower historical pressure as current setup guidance.

Pipe size and skids. The manual covers 2, 3 and 4 inch pipe. The current catalog also lists an optional 6 inch skid. The archived manual does not establish that expanded setup.

Model and components. This reference is for Micro part 0020 0110. It does not establish instructions for the separate Turbo Micro model. Historical kit lists do not confirm what is included with a supplied unit.

Get the setup checked

Send the model/serial number, photos of the unit and fitted parts, machine GPM and working PSI, hose inside diameter and length, pipe size, and expansion equipment. Confirm the exact unit and setup before operation.

Contact JPS: jetterprosupply.com/pages/contact

Historical warranty statements and kit contents in the manufacturer manual do not establish the supplied demo/used package or JPS sale terms.

Technical comparison: SBK-F26, printed page 44; original manual, page 12. The source dates and product specifications do not establish a serial-specific revision match.

Member

KEG Technologies, Inc.
Micro Chain Cutter
Manual



The Difference Is Performance!

Version 3
March 2014

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MISSION STATEMENT

KEG Technologies' commitment is to our customers and our industry by providing quality products supported through continuous education and technology improvement.

SCOPE

This manual is intended to provide the user with a comprehensive description of, and safe operation instructions and maintenance instructions for, sewer maintenance tools in the KEG Chain Cutter Family of products.

INTRODUCTION

You have purchased a high quality tool that can be used for removing deposits, scale and/or roots in pipes and sewers of all kinds. Careful use per these guidelines should afford accident free operation, efficient performance and long service life.

WARRANTY

Warranty Overview

- KEG offers a Limited Lifetime Warranty against Manufacturing Defects,
- Five (5) Years on all Ceramic Inserts,
- Three (3) Years on all Tool Bodies (Nozzles, Floor Cleaners, Chain Cutter/Running Axles) with replaceable inserts,
- Two (2) Years on Distance Plate Fin and Tube Assemblies. (Chain Cutter),
- Two (2) Years on Rotating Bodies (Chain Cutter/Rotor Nozzles),
- One (1) Year on Chain Cutter Skids and Distance Plates,
- One (1) Year on Swivels. (When shipped with Original Tool),
- One (1) Year on Tier 1 Nozzle, Steel Inserts and Holders,
- One Hundred Eighty (180) Days on Remanufactured Tools,
- Ninety (90) Days on NEW Replacement Warranty Items,
- **All KEG chain cutters shipped after January 1, 2007 are accompanied by a "birth certificate" that indicates the user and seller information, configuration details, serial number, etc.**

Wear Items – Not Under Warranty

- Nuts, Bolts and Washers
- Cross Cutters
- Rotating Nozzles
- Cutting Chains (Both Roller & Link)
- Chain Breakers
- Grease Guns
- Hand Tools
- Seals and/or Spacers

KEG Technologies offers a limited lifetime warranty on tools and items manufactured by KEG. This warranty applies against manufacturing defects. Limited warranties exist on all additional bodies, inserts and components. KEG Technologies will not warranty items against loss, failure and/or damaged due to: improper set-up, improper assembly, abnormal wear (e.g. dragging the tool), improper use (INCLUDING FAILURE TO CLEAN AND VIDEO BEFORE EACH USE OF THESE TOOLS), use outside of the design parameters of these tools, unauthorized modification of these tools, or failure to perform recommended maintenance.

SAFETY

Safe usage and operation of a KEG Chain Cutter is the main focus of this manual. Improper set-up, improper use, and use of the tool outside its intended design purposes **WILL** result in damage to the tool and/or injury to the operator(s) of the equipment.

Federal, State & Local Regulations

Safe work practices, environmental guidelines and standard operating practices must be adhered to at all times. Always use these tools in accordance with Federal, State, and Local regulations (e.g. OSHA and EPA regulations, traffic control and signage, local ordinances and safe work practices).

Signage

Always observe and follow the signage found on the tool box in which the unit is stored. At any time, should the signage become worn, faded, damaged or otherwise unreadable please contact KEG Technologies, Inc. for replacement decals. *Below, please find the safety signage found on the outside of the toolbox.*



Figure 1 - Clean and Video label



Figure 2 - Warning label

Design

The KEG chain cutter family incorporates both high rotational speeds and high rotational torque. The devices' combination of speed and torque gives these units the edge over other style cutters/scrapers. As many sewer equipment operators have not had extensive experience with this type of cutting device, proper care and use of the unit, plus adequate training in setup, maintenance, and operation of these tools is paramount to the safe use and life of the tool(s).

Modification and OEM Parts

Modification of the tool **WILL** result in operator, tool and/or infrastructure damage. Modification of the tool by persons other than KEG employees VOIDS the manufacturer's warranty. Use of non-OEM parts, without KEG Technologies' consent, will damage the unit or infrastructure, and void the manufacturer's warranty. Use of link style chain, without the consent and training by KEG Technologies' personnel, will damage the tool and infrastructure. Use of additional items (knockers) affixed to the ends of the roller chain, without the consent and training by KEG Technologies' personnel will damage the tool and infrastructure. ***Improper use of the tool in any of the above described way(s) relieves KEG of any and all liability or any other responsibility, both legal and monetary, for damage to infrastructure, equipment, or physical harm to any person operating or otherwise involved in the use of these tools.***

Cleaning and Inspection

Cleaning and visual inspection (specifically, by use a CCTV crawler or other types of sewer inspection camera systems) of the infrastructure prior to the use of a KEG chain cutter **is required** for multiple reasons.

- Cleaning removes material that may impede the movement of the unit through the infrastructure,
- Cleaning removes the small particulate material that may damage the unit's rotating element,
- Cleaning removes large materials that may abnormally wear the cutting chains, thus shorting the life expectancy of the chains,
- Visual inspection allows the user to see the real condition of the infrastructure. (e.g. off-set joints, line deformation and/or damage, protruding services, misaligned joints, lateral utility bores, etc.),
- Visual inspection allows the user to see what materials are present in the pipe conduit and that may be removed from the infrastructure,
- Visual inspection allows the user to verify the absence of foreign and/or unknown or undocumented infrastructure(s) passing through the line or lines to be cleared. (e.g. telecommunication cables, other fiber optic cable, gas and water lines, electrical services, etc.).

Warranty Disclaimer – Failure to Clean and Inspect Before Operations

Warning:

Failure to clean and visually inspect the infrastructure with a camera system prior to the operation of the chain cutter may result in damage and/or failure of the tool and/or infrastructure. Failure to follow these precautions may also result in the serious injury or death of the equipment operator as well. Use of the tool prior to cleaning and visual inspection of the pipe conduit will also void all warranties offered by KEG Technologies, Inc.

Set-up

Proper set-up is vital to safe operation of the chain cutter products. Improper setup, for the infrastructure size being worked, will result in damage and/or failure of the tool, and may also damage the infrastructure. Proper set-up of all the chain cutter products is further explained in the Set-Up and Operations section of this manual.

Maintenance

Proper and regular maintenance will further assure the safe operation and long life of the tool. If periodic maintenance is not performed on the unit, this lack of care will result in the tools failure to effectively operate, and shorten the expected life of the tool. *Failure to perform the recommended service/maintenance may void all warranties if it is determined by KEG that the tool(s) in question were not properly maintained.* Proper and recommended maintenance is further explained in the Maintenance Section of this manual.

Prior to Using A KEG Chain Cutter

- Flush the truck or trailer's water system, at full volume capacity (in GPM), without restriction, i.e. with no tool attached, for thirty (30) to sixty (60) seconds before every operation. This initial flushing removes sediment and /or rust that may have accumulated in the tank or hose during inactive periods,
- Visually inspect the chain cutter tool for damage, cracking, excessive wear, etc.,
- Set-up the tool for the diameter of the infrastructure (e.g. an 8" line requires an 8" set-up. ***NOTE: OPERATING A KEG CHAIN CUTTER IN A PIPE DIAMETER LARGER THAN THE MACHINE'S (e.g. 8" setup in 12" pipe, etc.) SETUP WILL ALLOW THE CUTTER TO WOBBLE WITHIN THE PIPE, BECOME UNBALANCED, AND MAY ALLOW THE CUTTER TO TURN SUFFICIENTLY IN THE PIPE TO APPLY TORQUE AGAINST ITSELF. THIS ACTION CAN CAUSE A CATOSTRAUPHIC FAILURE OF THE TOOL, DAMAGE TO SURROUNDING PIPE AND INFRASTUCTURE, VIDOE EQUIPMENT, AND MUST BE AVOIDED,***
- Verify that the rotating nozzles have sufficient clearance (approx. ¼") between the end of the nozzle and inner edge of the skid before engaging the tool under pressure,
- Check and ensure that the chains are of equal length on each side of the chain retainer,
- Check and ensure that the chain ends are the same configuration (i.e. Open/Open link or Closed/Closed link),
- Ensure that the chains do not extend more than three quarters of a link length beyond the skids,
- Check all fasteners' (nuts/bolts/washers, swivels, etc.) "tightness" prior to every usage of the tool,
- Place the tool fully in the pipe (a minimum of two feet inside the manhole) **prior** to engaging the water system. **Never operate the tool(s) at pressure outside the sewer line or in the open area of the manhole**,
- Reset the hose footage counter on the truck or trailer's hose reel prior to usage in a pipeline.

Start-up and Use

- Never operate the tool outside the confines of a pipe or in the open or bench area of the manhole,
- Engage the water system slowly, ensuring that the unit starts to "spin-up" (rotate properly and freely),

- Operate the water system at the recommended pressures prior to moving the tool,
- Do not allow the tool to be stationary while rotating for more that 5 seconds,
- Limit the travel of the tool to not more than two (2) feet per second,
- Engage the debris to be removed slowly,
- Move the tool "back and forth" while engaged in the debris,
- Never retrieve the tool without the water system in use and the chain cutter under power,
- Never allow the tool to exit the confines of the pipe in the "upper manhole", i.e. the next manhole away from the operator's station in the direction in which the tool is traveling in the pipeline,
- Never pass the cutter through an "upper manhole" under power,
- Clean and inspect the tool after each use.

PRODUCTS

Overview

All KEG Chain Cutters "spin" on a thin film of water, between the stator shaft and rotating element. A rotating bushing, inside the rotating element, protects the cutter from galling the stator or rotor due to steel-to-steel contact. *The use of oils or petroleum products to displace the residual water in the tool post usage IS NOT REQUIRED and will damage the cutter's rotational bushings, thus increasing the chance of tool failure. This practice will also void the KEG warranty on the tool.*

All KEG chain cutters are provided as a kit. Basic hand tools and sufficient spare wear items are provided with each cutter kit. This kit provides the user with tools and spares in order to configure/reconfigure the unit in the field, at the workbench, or at the jobsite.

All KEG chain cutters are shipped with fixed or adjustable skid assemblies, depending on the style cutter. In the Micro Cutter or Hummingbird series (½" swivel), the unit is shipped with one (1) fixed skid. In the Mini-Cutter series (½" or ¾" swivel), each unit is shipped with a set of three (3) fixed skids, one each in 4", 6" and 8" diameters. *It should be noted that the 4" skid in the Micro Cutter and Mini Cutter are not interchangeable!* Finally, the Super Cutter Plus 150 series and Super Cutter Plus 200 series are shipped with adjustable skid assemblies depending on the model cutter and the pipe diameter setup(s) purchased. Each unit is designed to pass through infrastructure with a single offset [(1)] of the pipe. *Design and configuration of the cutter skids are based upon the following rule of thumb.*

> ***Pipe / sewer diameter x 0.95 = adjustment diameter of skid assemblies***
> ***(Example: pipe diameter 12" x 0.95 = 11.4" adjustment diameter)***

Micro Chain Cutter

The Micro Chain Cutter, or Hummingbird, is KEG's latest addition to our chain cutter family. The Micro is suitable for ½" applications where light grease, scaling or vegetation is the major problem. As with all KEG cutters, cleaning and video inspection should take place **BEFORE** operating this unit. The Micro is supplied with one (1) 4" fixed skid and can be operated with or without this skid attached. See below for more information.

Mini Chain Cutter

KEG's Mini Chain Cutter is a long time staple of the Chain Cutter family. Our Mini Cutter is available with a ½" swivel or a ¾" swivel. The ¾" unit can also be operated with a 1" expander fitting to operate to flows up to 60 GPM. Mini Cutters are supplied with three fixes skids in the 4", 6", and 8" configurations.

Super Cutter Plus Series

The Super Cutter Plus (SCP) series is suitable for use with a number of different waters systems and hose sizes. The SCP series uses a set of five (5) skid and distance plate assemblies, unlike many other cutters/scrapers found in the marketplace. The use of five individual skid assemblies reduces the tilt angle(3), while still maintaining the unit's ability to pass through a single offset(1) in the pipe. With the use of special additional items these units can operate in a number of different pipe diameters above the basic kit configurations. This series of cutters also may be configured for operations in Egg-Shaped Pipe(2).

Since all sewer hose has a natural twist in its construction, the units are shipped with a high pressure swivel connection. This swivel allows the release of the twist without transferring it to the cutter. Periodic maintenance and inspection of the swivel, including lubrication with the grease gun provided by KEG, is necessary in order to ensure trouble free operations. *Lubricating the swivel is the only lubrication these tools require.*

Table 1 - Chain Cutter Pipe Size and Operating Ranges

Chain Cutter Type	Nominal Pipe Diameter (Inches)														Egg-shaped profile
	2	3	4	6	8	10	12	15	16	19	20	24	36	48	
Micro – Cutter (Hummingbird)	X	X	X												
Mini-Cutter			X	X	X										
Super Cutter Plus 150				X	X	X	X	X	X		X(2)	X(2)			X(2)
Super Cutter Plus 200					X	X	X	X	X	X	X	X(2)	X(2)	X(2)	X(2)
Super Nova 4000				X	X	X	X	X	X		X(2)	X(2)		X(2)	

(1) Single Offset – Infrastructure joint misalignment not greater than an infrastructure's single wall thickness

(2) Additional equipment required

(3) Tilt angle – The included angle measured when a single skid is in contact with the wall and allowed a side to side "rocking" motion

MICRO-CUTTER (HUMMINGBIRD)

This cutter is designed ONLY to be used in 2", 3" and 4" pipe diameters. The unit comes in only ½" NPT hose connections. The unit requires at least 8 GPM and 1200 PSI to be supplied by the water system. When the cutter is used in 2" and 3" pipelines, it does not require usage of its centering skid (However, in this configuration extreme care must be used in keeping the cutter in motion at all times. Allowing the cutter to remain stationary in this configuration can cause severe damage to the pipe of conduit). The unit is able to "self center" itself using the cutting chain and rotating nozzles. The unit is capable of passing through a 3" long sweep 90° elbow once the swivel is removed and connected directly to the hose. 4" pipe diameters require the use of the centering skid.

Table 2 - Micro-Cutter - Kit Contents

Part Number	Qty	Description
00200110	1	Micro Cutter Body
00200111	1	Skid Assembly - 4" for Micro Chain Cutter
00800010	1	Swivel Joint - HP - 1/2" NPT
00200021	1	Chain - Replacement - 6 ft.
00100175	3	Insert - M6 - Ceramic - Propulsion
00100175	3	Insert - M6 - Ceramic - Rotation
00100135	2	Insert - M8 - (**Blank**) - Skid Locking Screws
00800064	1	Chain Breaker
00800061	1	Pipe Plug ½"
00900032	1	4mm Allen Wrench
00900033	1	3mm Allen Wrench
00900035	1	Loc-Tite – Anti-Seize -Med. Strength - 10 ml Bottle
00900034	1	Loc-Tite, Blue non hardening
00800056-Micro	1	Tool Box for Micro Cutter
	1	Operating Instructions

Set-up and Operations

Basics

- In order to prevent the high pressure hose from being twisted/turned, and the chain cutter body rotating in pipe, it should only be used with the high pressure swivel joint fitted at the rear of the cutter. Non-hardening blue "Loc-Tite" or other types of thread locker should be applied to the threads of the swivel before installation,
- Before putting the device into operation, as well as after each use, all screws and screw connections must be checked for tightness and possible damage. Loose and/or damaged items must be retightened or replaced,
- It is more efficient if the operator work the tool against the direction of flow in the pipeline, allowing the flow to remove debris as it is cut from the pipe,
- Use of a Chain Cutter in either high water or underwater conditions is discouraged. Either of these conditions will reduce the power and rotational speed of the unit. Pipes in these conditions should be de-watered, plugged, or otherwise have the flow bypassed before operating the cutting unit,
- In order to prevent damage to the unit, the chain cutter should never be pulled out of the working area (pipe/sewer) without water pressure being applied; otherwise dirt could penetrate into the unit, and cause a rotational lockage,
- The units should *NEVER* be allowed remain stationary and laboring upon the debris being removed. A slow back and forth motion is suggested,
- Always have the chain in a balanced condition. Never operate the unit without an equal number of links on each side of the chain retainer. Also, never operate the unit without the chain ends either being "open/open" or "closed/closed". Further details may be found in the chain section of this article,



Figure 3 - Micro Cutter with & without swivel & skid

- Use only the supplied inserts for both the rotational and propulsion nozzle. Use of other inserts or mixing inserts will cause the unit to operate improperly. The calculation of the nozzle sizes should be made according to the performance parameters of the pump (water flow per minute, pressure, diameter and length of hose).

Use of Hand Tools

- Use the appropriate sized tools for all fasteners,
- Fully engage the hex-wrench inside the hex sockets of all socket hex-headed cap screws,
- Do not over tighten fasteners (excessive elongation or "stripping" may occur),
- Use only a "drop" of medium grade "Loc-Tite" on the high pressure swivel,
- Apply a light coat when using anti-seize compounds,

Chain Set-up

- Always have the chain in a balanced condition,
- Never operate the unit without an equal number of links on each side of the chain retainer,
- Never operated the unit without the chain ends either being "open/open" or "closed/closed,
- Check and ensure that the unit's chains do not extended, beyond the unit's centering skid assembly, more than ¾ of a chain link. The type of materials to be removed dictates how to setup the chains.

2" and 3" Pipe Operations

The use of the tool in the 2"or 3" set-up does not require a centering skid. The unit's chains should not be extended beyond the pipe's internal diameter. If the unit is to be passed through a plumber's cleanout or similar access point, it may be necessary to operate the unit without the swivel. Extreme caution should be used in this configuration to make sure the unit remains in motion. Allowing the unit to become stationary in this configuration can result in severe damage to the pipe or conduit.

4" Pipe Operations

The use of the tool in the 4" set-up requires the use of the 4" centering skid. The centering skids must be "locked" to the unit's base, with one of the set screws engaged in the recessed locking slot. Failure to lock the unit into the slot may result in the skid becoming disengaged from the unit while in operation. The unit's chains should not be extended beyond the unit's centering skid assembly more than ¾ of a chain link.



Figure 4 – Micro Chain Cutter & Accessories

Maintenance

General

Any tool that incorporates moving parts must be maintained in some manner. The KEG Chain Cutter family has been designed to require a minimal amount of maintenance. All of the KEG Chain Cutters do not require being "de-watered" with a petroleum or organic based oil. De-watering is completed by holding and/or storing the tool in a vertical position and allowing the water to drain from the tool. At no time should any oil or other oil-based product be used to lubricate the rotating element. *Use of oil will void the tool warranty.* Clean the KEG cutters using soap & water or a Bio-degradable de-greaser.

Prior to Initial Use

Verify all parts and tools are present prior to initial use. If parts or tools are missing inform KEG Technologies for immediate replacement. Check the swivel and ensure that it is smooth and feels free of binding. Insure that no foreign material is present inside the body of the cutter. Check that the internal hose threads of the swivel are free of foreign materials. Check that all inserts are secure in both the body and rotating element.

Set-up

- Ensure that all parts are available for the required pipe diameter set-up prior to assembly,
- *Do not use any non-KEG approved spare parts when assembling the tool,*
- Check the skid assembly for cracks or damage,
- Check and ensure that the skid plates are flat and square,
- Inspect all weld points for cracking or damage prior to use.

Post Use

- Wash the tool with clean water removing dirt, grease and foreign materials on the tool,
- Use of a bio-degradable degreaser may be required to remove grease from the tool. A bio-degradable degreaser may be poured through the tool providing cleaning of the inner sections of the tool,
- Remove the skid assembly and clean between the body and skid assembly,
- Clean and remove any materials in the internal and exterior threads of all fasteners.

Swivel

The swivel is self-sealing and should not require greasing during the life of the tool. *Note: All KEG swivels less than 1" are self-sealing and do not require lubrication, nor or they sold with a grease gun as are the Super Cutter cutters.* If the unit is to used without the swivel, clean and remove the remnants of the Loc-Tite before use and before re-installing the swivel.

Disassembly / Reassembly

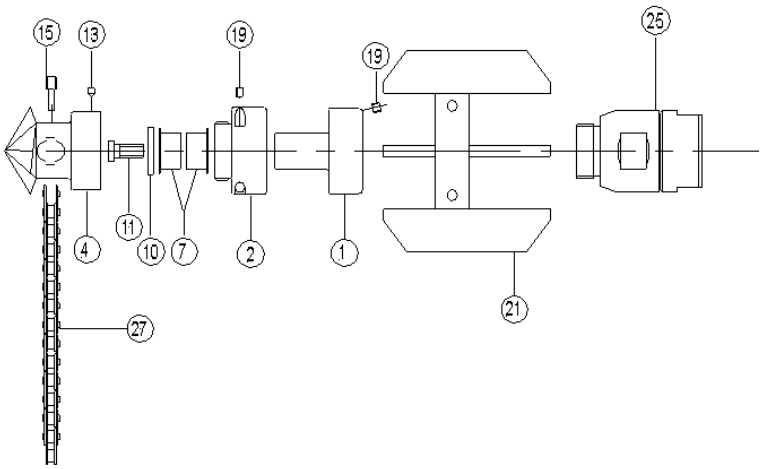
It is not recommended that the tool be dismantled while in the field.

The chain retainer and rotating element may be removed by:

- Removing the locking set screw from the chain retainer,
- Unscrewing the chain retainer from the rotating body, **Note: The chain retainer and rotating body have LEFT handed threads,**
- Remove the spacer disk allowing the rotating element to be removed,
- Clean and inspect all parts. Clean all remnants of Loc-Tite from the internal and external threads,
- During reassembly, use only a drop of Loc-Tite on the screw threads,
- DO NOT use Loc-Tite on the chain retainer threads,
- Apply a thin amount of "silver" anti-seize to the threads of the chain retainer prior to reassembly,
- Secure the locking set screw once the chain retainer is attached to the rotating element.

Schematic and Parts List

Figure 5 – Micro-Cutter (Hummingbird)



Hummingbird Chain Cutter

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Table 3 - Parts List - Micro-Cutter

Ref. Number	DESCRIPTION	Part Number	Quantity
1	Running Axle	00200115	1
2	Rotating Body	00200116	1
4	Chain Retainer	00200117	1
7	Bushing - Collar (1 ea.) - Bearing (1 ea.)	00200059	2
10	Disk - Spacer	00200118	1
11	Cap screw - Socket hex head - for spacer disk	00200061	1
13	Screw - fuse	00200062	1
15	Screw - Chain retention	00200063	1
19	Insert - 6mm - Ceramic - Thrust (3 ea.) and propulsion (3 ea.)	00100175	6
21	Guide Carriage - 4"	00200111	1
25	Swivel - HP - 1/2" NPT	00800010	1
26	Plug - Screw - 1/2" NPT	00800061	1
27	Chain - Replacement - 2 m	00200021	1

Notes:_____