SOLUTIONS FOR THE REPAIR RENOVATION AND DECOMMISSIONING OF PIPELINES

Rapid Rotary Cutter - Steel

Operating Instructions

Steve Vick International Ltd

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CONTENTS

1. INTRODUCTION

Since its foundation in 1981, Steve Vick International has been at the leading edge of trenchless techniques for the repair and renovation of underground **gas** distribution pipes.

In the UK, we are a major supplier to the gas distribution networks and many of our techniques have become accepted practice in the industry. We constantly seek to provide our customers with renewal methods which will minimise their costs and maximise their production.

The company has been supplying pipe handler equipment to the **water** utilities and their contractors for over 20 years. More recently we have entered the market with pipe cutting equipment and our sealant technology has been successfully adapted for use in the waste water sector.

In 2014 the company relocated and can be found at:

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2. PRODUCT DESCRIPTION

The Rapid Rotary Cutter (RRC) is designed to make a circumferential cut on cast iron, ductile iron and a separate unit works on steel mains in the common diameters 100mm/4”, 150mm/6”, and 200mm/8” (bespoke cutters are available for different dimensions to special order).

The RRC comprises two aluminium shells with a motor mounted into the top shell. When closed, the cutter sits closely around the circumference of the main. The motor and cutting disc assembly are common to all three pipe dimensions; three different sized frames are fitted to accommodate each pipe diameter.

The motor is air driven and is powered from a typical compressor. The unit comes with a short pneumatic hose and airline lubrication unit which is connected to the hose on the compressor. The lubrication unit maintains the operation of the motor preventing it from freezing, seizing up and prolonging the life of the unit.

The air exhaust hose prevents dust and debris from being blown around the trench and into the face of the operative.

Different cutting discs are attached to the air motor for ductile and steel mains. The motor and cutting disc assembly includes a water fed hose that must be connected to a water bowser when cutting steel otherwise the blade will cause sparking and blunt very quickly.

We strongly recommend using the water line to eliminate sparking and to act as a dust suppressant. At all times the operative must wear approved dust masks. The water line also prolongs the blade life.

The RRC is supplied with depth control discs which allow it to cut inserted mains safely. The motor and cutting disc assembly pivots inside the frame in order to install the frame without fouling the main, this also helps to ensure the right depth of cut is achieved.

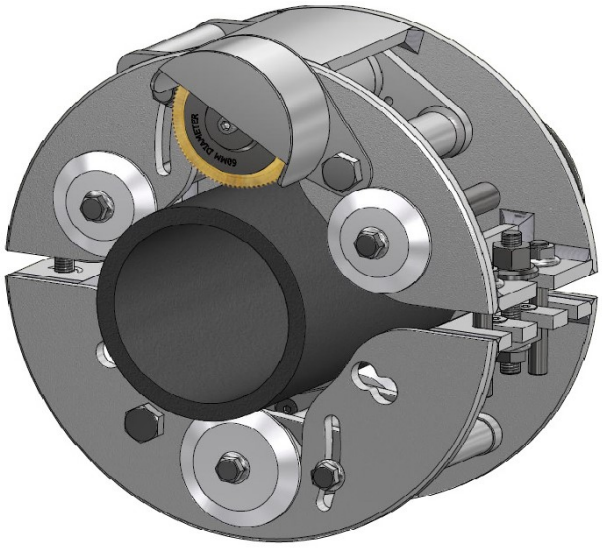


Figure 1 The Rapid Rotary Cutter uses discs to make circumferential cuts on cast iron, ductile iron and a separate unit for steel mains

2.1 ROTARY PIPE CUTTER HIGHLIGHTS

FEATURES

Fast: The Rapid Rotary Cutter is quick to assemble—the two shells are connected over the main in seconds and when assembled the cut is quickly completed.

Configuration: The unit comprises two aluminium shells with a motor mounted into the top shell. When closed it creates a circular frame which sits closely around the circumference of the main.
One motor and cutting disc unit is used for all pipe dimensions in the range; three different sized frames are available to accommodate each pipe diameter.

Air powered: The motor is air driven and is powered from a typical compressor. A stand alone lubrication unit is included to maintain the efficient operation of the motor, preventing it from freezing, seizing up and prolonging the life of the unit.

Exhaust: The air exhaust prevents dust and debris from being blown around the trench and into the face of the operative.

Depth control: The Rapid Rotary Cutter is supplied with depth control discs which allow it to cut inserted mains safely.

Water Line: An integral water line lubricates and cools the steel blade preventing sparking and extending blade life. Also acts as a dust suppressant.

Reduced trench size: The machine is extremely compact and lightweight to handle. It needs less trench space than traditional cutters, requiring less than 10cm clearance around the main.

Quality: the Rapid Rotary Cutter has been quality checked to ISO 9001 standards .

Approved: HSE approved to confirm the vibration and noise levels are well within the safety recommendation.

BENEFITS

Fast: Quick cutting time - approximately 6 minutes to cut a 100mm/4” steel main.

Versatile: Ideal for use in Live Mains Insertion and Dead Insertion projects.

Quick assembly: The two shells are connected over the main in seconds.

Adaptable: One unit for all three sizes using different frames; 75mm/100mm, 150mm and 200mm (3”/4”, 6” and 8”).

Easy to use: Compact, lightweight and simple to use - one man operation.

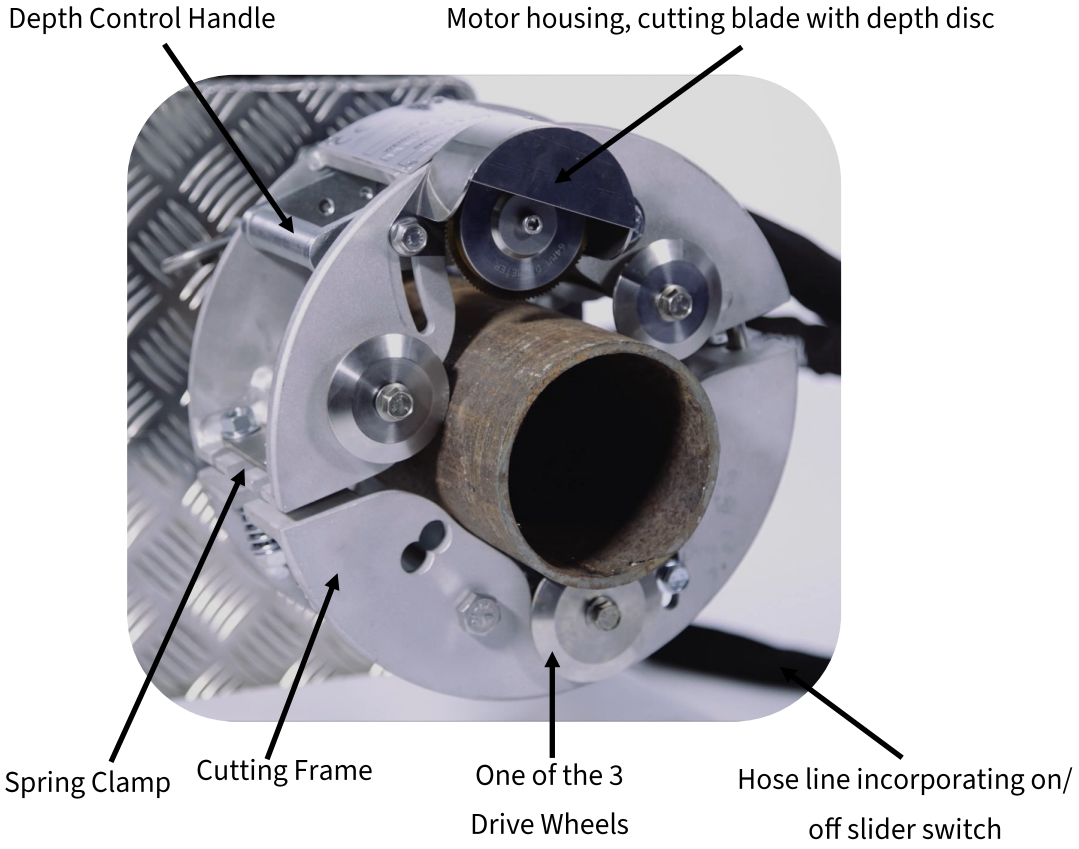
Convenient: Needs smaller trench than traditional cutters - less than 10cm clearance needed around the main.

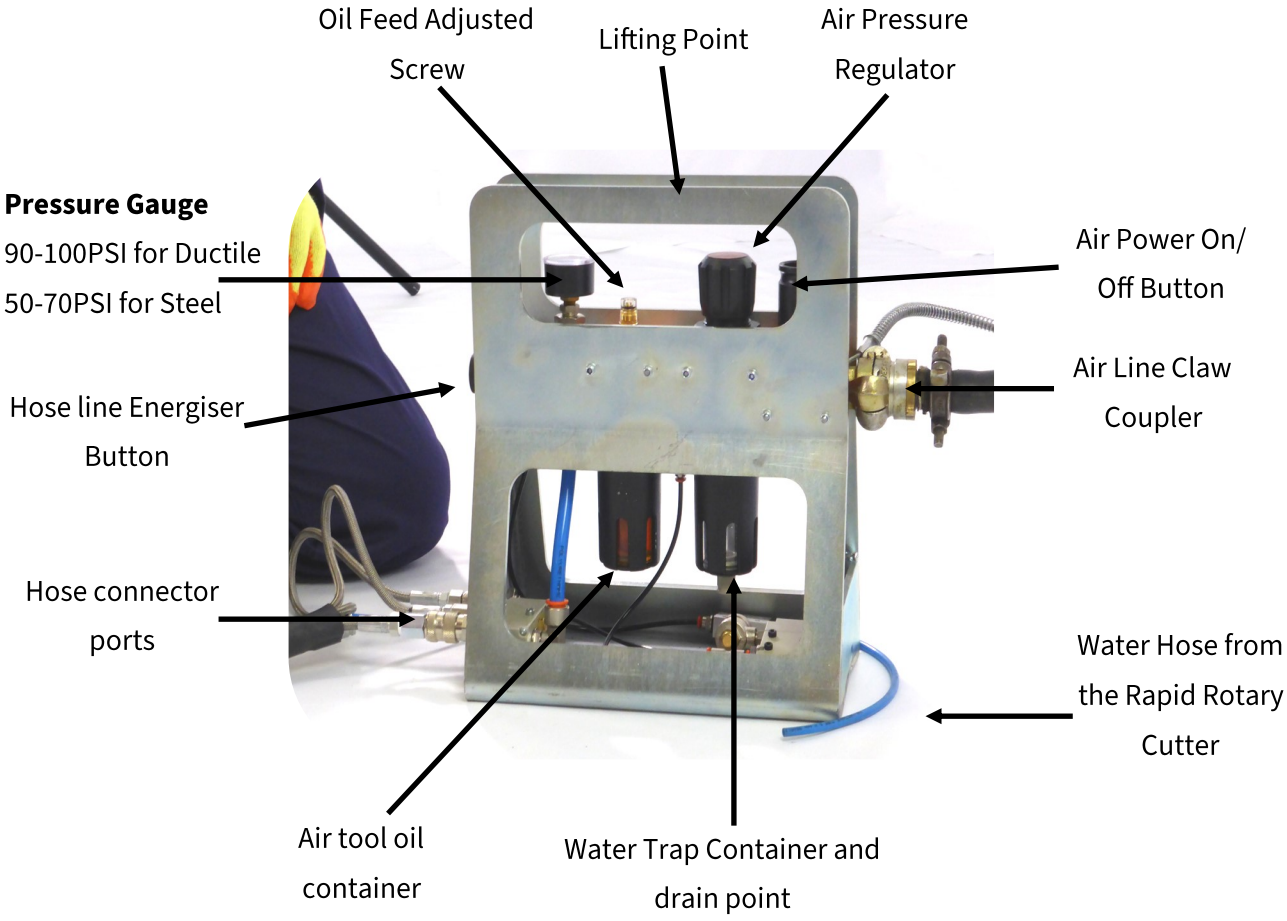
Safe: The cutting blade is mounted away from operator’s hand.

Precise: Depth control discs prevent damage to inserted PE.

2.2 RAPID ROTARY CUTTER OVERVIEW

Figure 2





Figures 2 (top) and 3 above show the key parts of the Cutting Unit (top) and the Lubricator Unit.

3. SPECIFICATION

UNIT	WEIGHT
100mm/4” - without Motor Housing	6.87kg
150mm/6” - without Motor Housing	8.77kg
200mm/8” - without Motor Housing	11.5kg
Motor and Motor Housing (rocker unit)	3kg
Motor only	1kg
Lubricator Unit	8kg

Table 1—Showing key weights

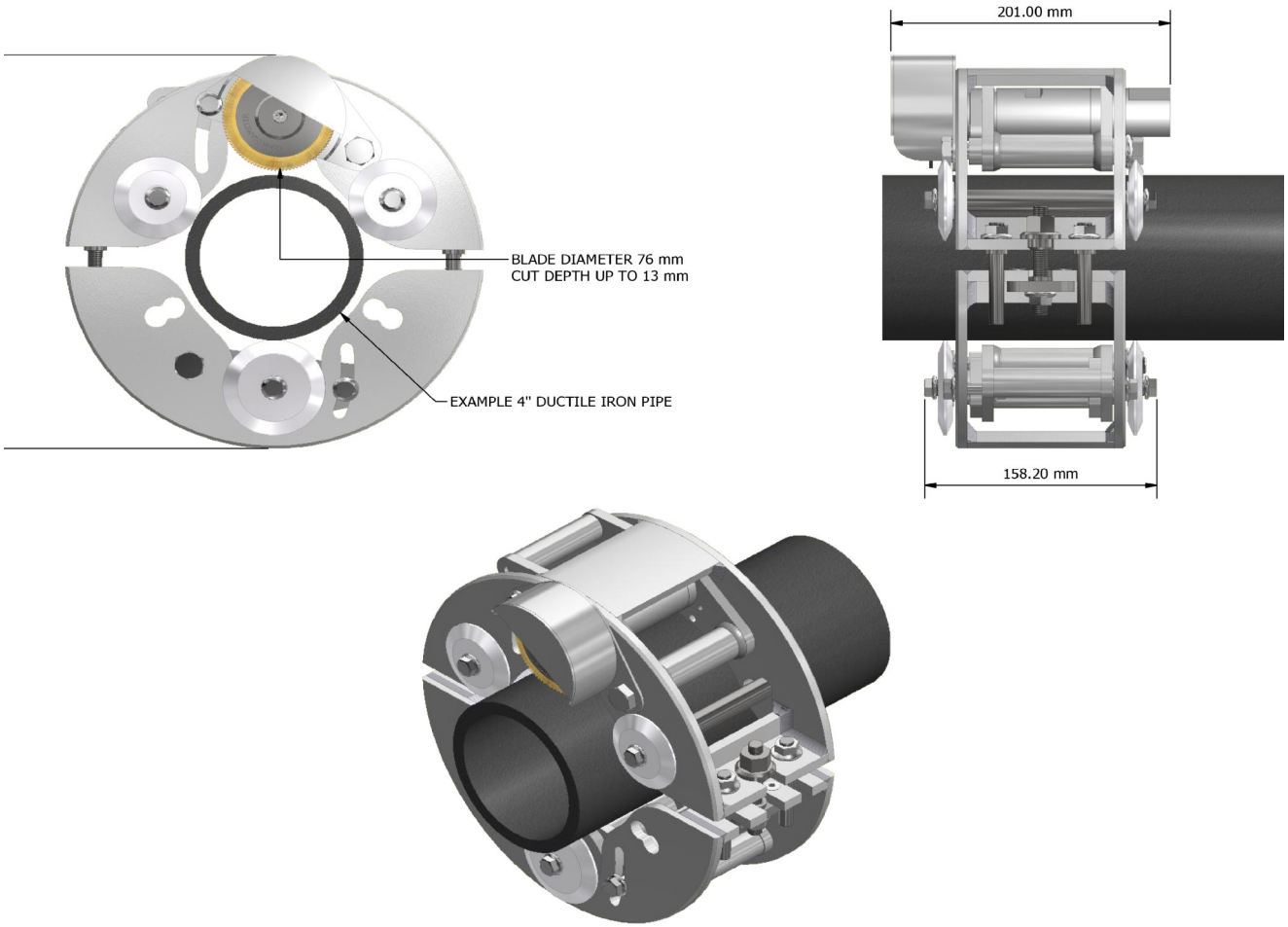


Figure 4 Features of the Rapid Rotary Cutter Steel

4. SAFETY AND PRECAUTIONS

4.1 The following PPE must be worn at all times:

A. Safety goggles
B. Approved Dust Mask
C. The Rapid Window Cutter runs at 85-90db—check local policy if ear defenders are mandatory
D. Hard hat—if applicable
E. High visibility jacket
F. Cut resistant Gloves
G. Steel toe cap footwear
H. Flameproof overalls

4.2 Operatives should avoid placing any limbs inside the unit at any time and always use the outer frame as a hand grip.

4.3 Ensure all operations and equipment, including the compressor and hoses, are situated within an area contained by a barrier.

4.4 Ensure the correct blade is used and in good condition. Any obvious signs of wear or missing teeth the disc must not be used. A disc in unsatisfactory condition will perform badly and create sparks.

4.5 Ensure that the correct depth control disc is used, i.e. corresponding to the pipe wall thickness; as a guide use a coupon drilled from the main.—See 5.6 onwards.

4.6 The section of the steel main being cut should be cleaned of any rust that may inhibit the movement of the Rapid Rotary Cutter.

4.7 If possible move 3rd party plant out of the way (dead PE service tails).

4.8 The cutting blade should not generate any sparks when cutting steel as it is **mandatory** to use the water line. If sparking is experienced firstly check the condition of the blade. If the blade is not the cause of the sparks then the water hose needs checking . Ensure the bowser is full of clean water and constantly pressurised and delivering a sufficient spray. If sparking is still experienced stop the process immediately.

4.9 Ensure the lubricator unit is connected to the hose arrangement and correctly filled with anti-freeze air tool lubricator oil. If necessary adjust the oil drip feed but a full turn clockwise. See oil feed adjuster screw figure 4 page 6.

4.10 The assembly unit is designed so that the filter pot precedes the lubricator pot when attached to the airline hose. If in doubt refer to the direction arrow found on assembly which indicates the flow.

4.11 Oil feed rate is pre-set and should last a typical days cutting.

4.12 Ensure enough clearance to the sides of the main. This is approximately up to 100mm (3 to 4”).

4.13 Only trained / competent operatives must use the equipment.

4.14 Blades can be disposed of in general waste. Waste hydraulic oil to be disposed of as per brand instructions.

5. OPERATING INSTRUCTIONS

5.1 Interchanging the motor and cutting disc assembly: The motor and cutting disc assembly may be removed from one frame to another when working on varying sizes of mains.

The top frame houses the motor and cutting disc assembly and the lower frame has the adjuster wheel to allow for a variance in pipe OD. The motor assembly rocker is broken down as shown in Figure 6 by loosening the three bolts. There are two 13mm nuts and one 19mm nut. Slide out the bolts and remove the assembly from the frame.

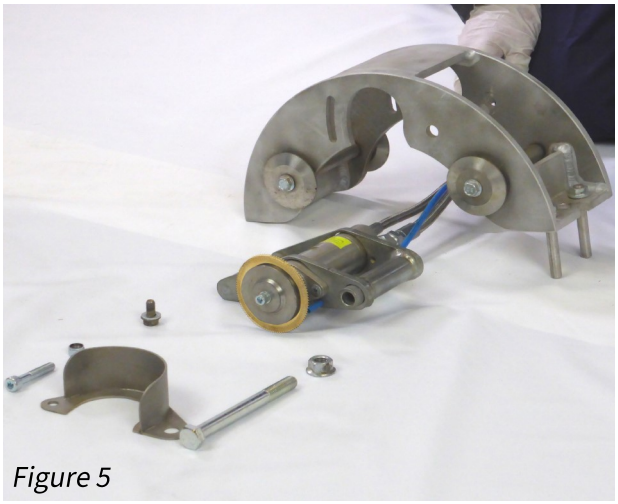


Figure 5

5.2 Slide the motor assembly rocker inside the top frame into the empty opening so that the slot on the assembly is on the same side as the hole in the frame.

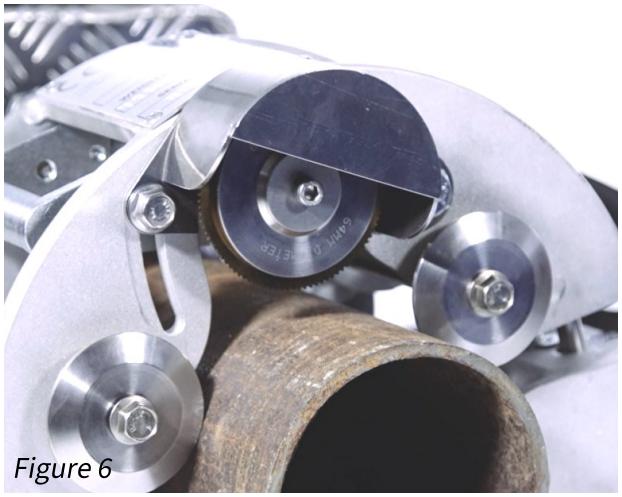


Figure 6

5.3 Drape the disc guard over the cutting disc and slide the long 19mm bolt through both holes and through to the other side and secure with the 19mm locking bolt.

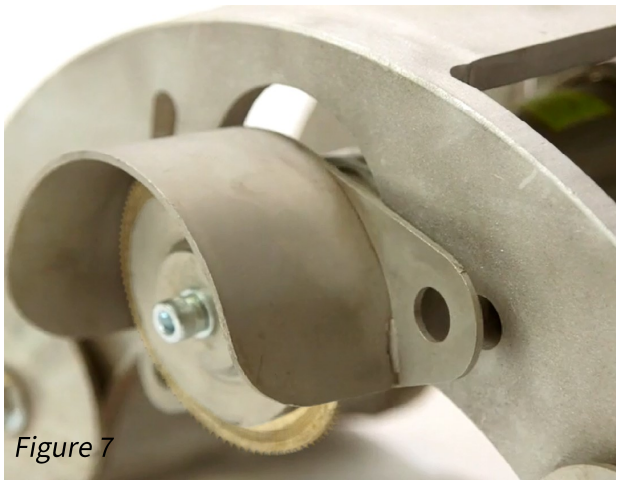


Figure 7

5.4 Slide the longer of the 13mm bolts onto the curved slot on the frame and into the hole on the motor assembly rocker. Tighten with the remaining nut.

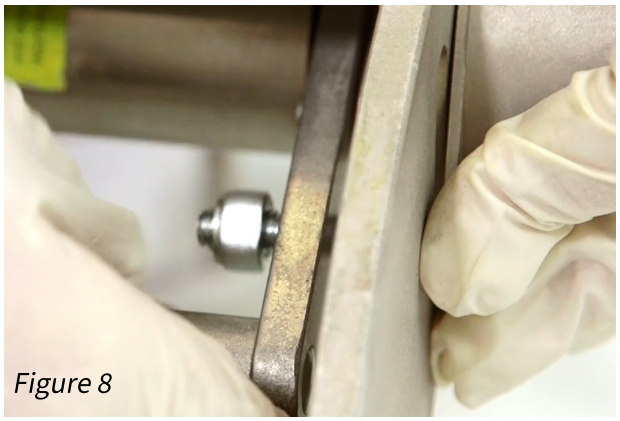


Figure 8

5. OPERATING INSTRUCTIONS (CONTINUED)

5.5 The remaining bolt is screwed into the back end of the frame through the curved slot and into the hole on the motor assembly rocker. This is the security bolt used to set the depth when cutting.

Retract the motor assembly rocker fully up into the top frame and tighten this bolt. It is good practice to keep the motor assembly rocker fully retracted as this keeps the blade away from possible impact damage.

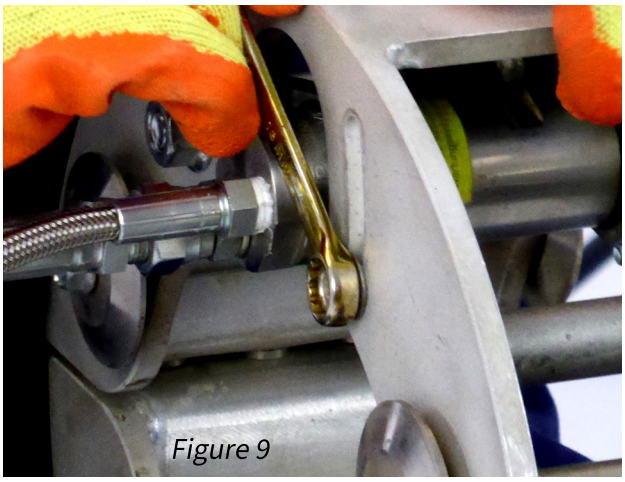


Figure 9

5.6 Select depth control disc using coupon as a guide or a measurement taken from a nearby service hole.

Choose the depth control disc that best matches the measurement taken from a coupon or from an existing tapping. In order to prevent damage to an inserted PE pipe the depth control disc should allow slightly less than the measurement taken.

This is not necessary if the host main has not already been inserted, in this case use a depth disc that allows more travel than the anticipated wall thickness.

Figure 10

5.7 Visually check the cutting blade is fit for purpose and not worn down. Install a new blade if necessary at the same time as the correct depth control disc by sliding both discs over the central spindle on the motor. Cutting blade first followed by the depth control disc.

Also check there is not significant wear on the depth control disc reducing the outer diameter.

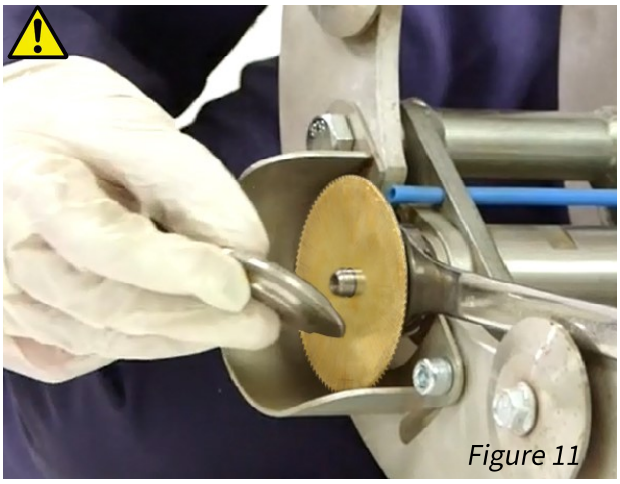


Figure 11

5.8 Fit and tighten the central locking bolt with an allen key and a 19mm spanner. No more than hand tight is necessary.

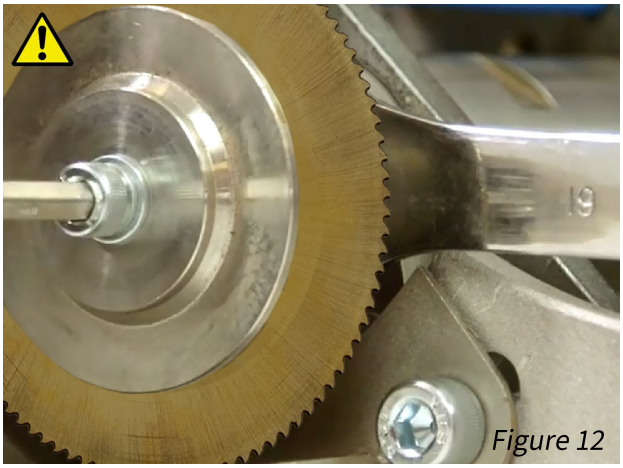


Figure 12

5. OPERATING INSTRUCTIONS (CONTINUED)

5.9 Although the correct depth control disc should be fitted verify this by taking a measurement to the edge of the cutting disc as shown in Figure 14. This measurement should be slightly less than the measurement taken from the host main.

If in any doubt use depth control blade that offers the least travel.

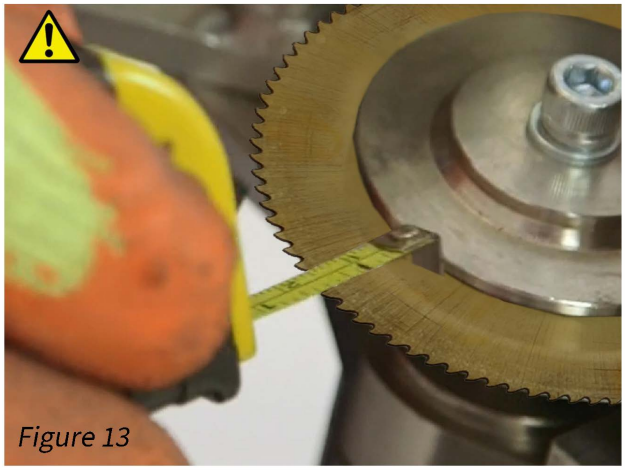


Figure 13

5.10 Locate the lower shell underneath the main roughly at the location of the cut and hook the top shell under the spring loaded plate.

Consider the orientation of the shell so that when the top shell is fitted the hoses do not foul the trench wall or third party plant.

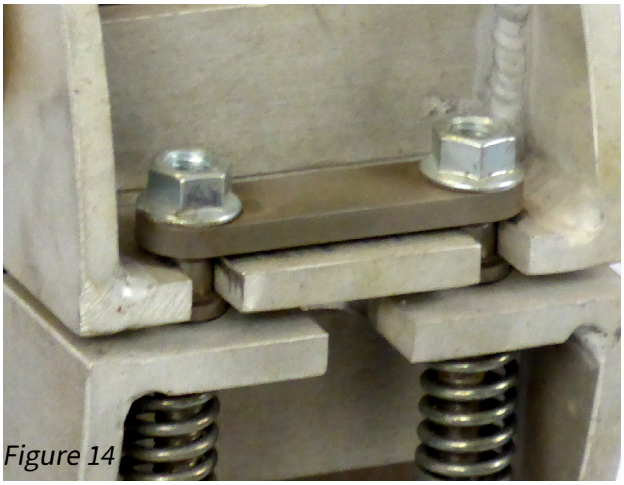


Figure 14

5.11 Secure the other side of the top frame by screwing down the 19mm security nut. If required use a long nosed socket.

The bottom frame has a similar adjustment wheel to that of the motor assembly rocker. The depth of the lower wheel can be altered in the same way to take into account unusual 'out of spec' mains.

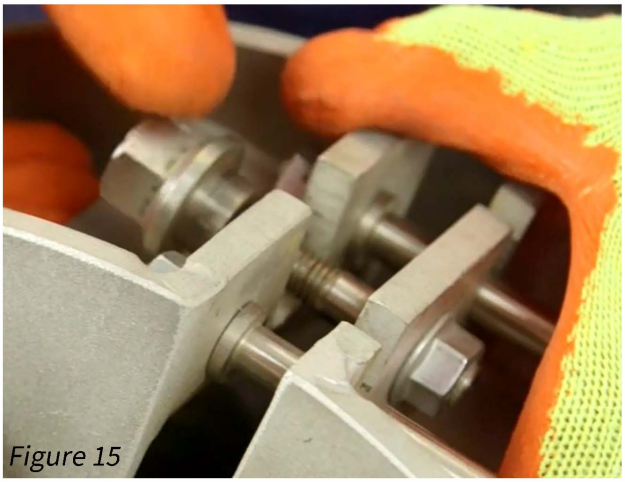


Figure 15

5.12 With both shells assembled check the movement of the Rapid Rotary Cutter by rotating it in the **opposite direction** to that which the cut will be made. This not only confirms the movement is sound but it also feeds the hoses along with it so that during the cutting operation the hoses are being fed back out of the trench. This prevents snagging during the cutting operation.

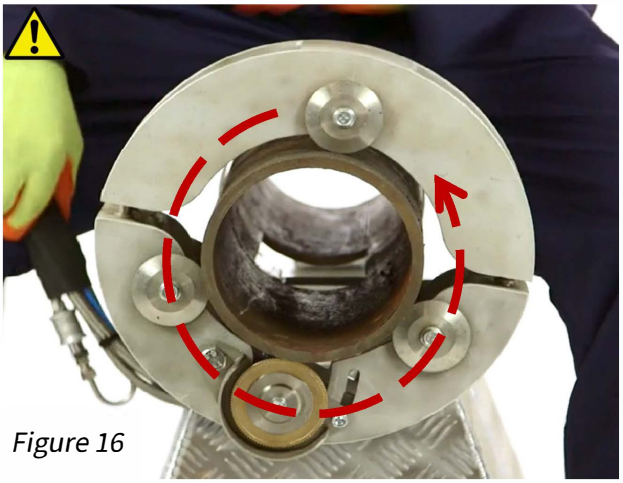


Figure 16

5. OPERATING INSTRUCTIONS (CONTINUED)

5.13 Connect the air line hose from the compressor to the claw coupler fitting on the lubricator unit. Make safe by fitting the whip chain.

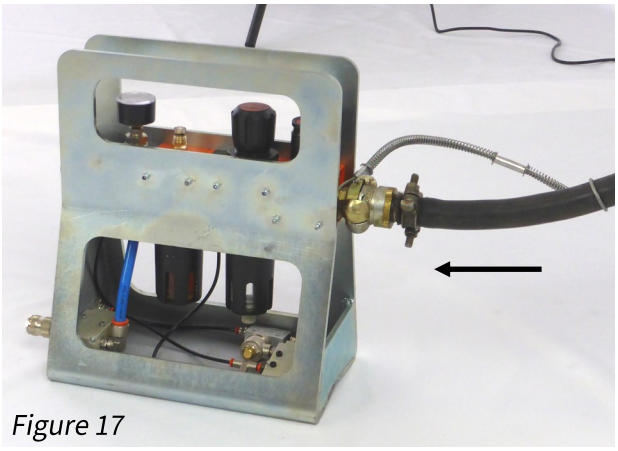


Figure 17

5.14 The group of hoses from the Rapid Rotary Cutter need to be connected into the other side of the lubricator unit. Each hose has specific opposite connector ports on the lubricator unit so that they cannot be connected up incorrectly. The three hoses are:

A. The air inlet
B. The air exhaust
C. The lubricator line

The blue water hose will need to be connected to a water bowser if required.

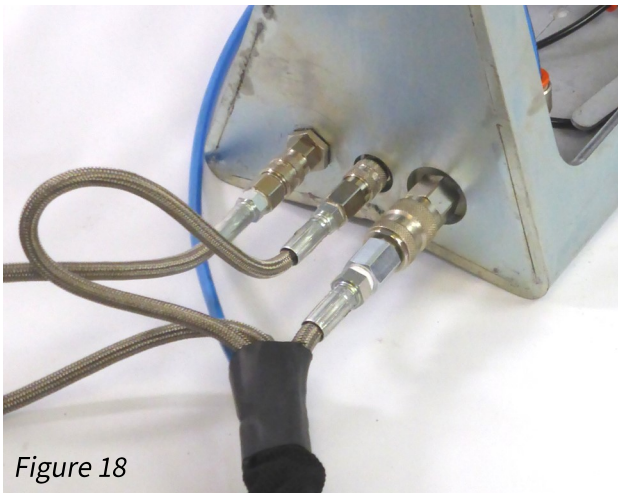


Figure 18

5.15 Check all the functions on the Lubricator Unit as outlined on Page 5 Figure 2:

A. The oil reservoir is filled with standard air tool oil and should be about half full.
B. Whilst operating the Rapid Rotary Cutter ensure there is a sufficient drip rate going to the motor from the oil reservoir. Adjust if necessary.
C. Confirm the water trap container is empty if not there is a drain point underneath the container.

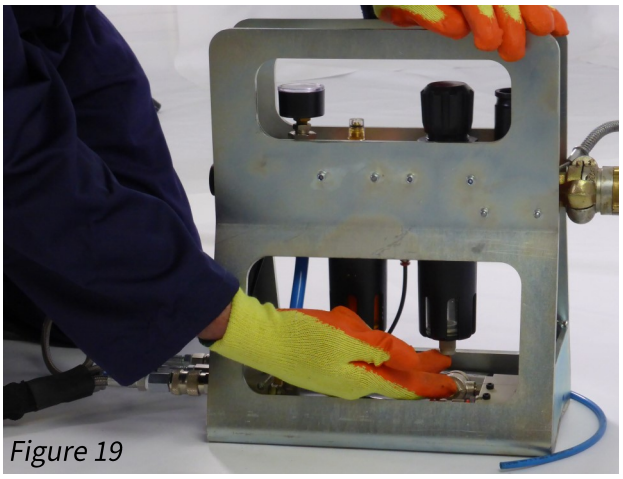


Figure 19

5. OPERATING INSTRUCTIONS (CONTINUED)

5.16 Switch on the air at the compressor. Switch on the air at the Lubricator Unit using the Air Power On/Off button. The orange centre button turns the air on and the black outer rim button switches the air off. Figure 21 shows the Air Power button in the ON position.
If necessary increase pressure by pulling the regulator upwards and turn clockwise. Refer to page 5 for correct pressure gauge reading—lift up regulator and adjust.

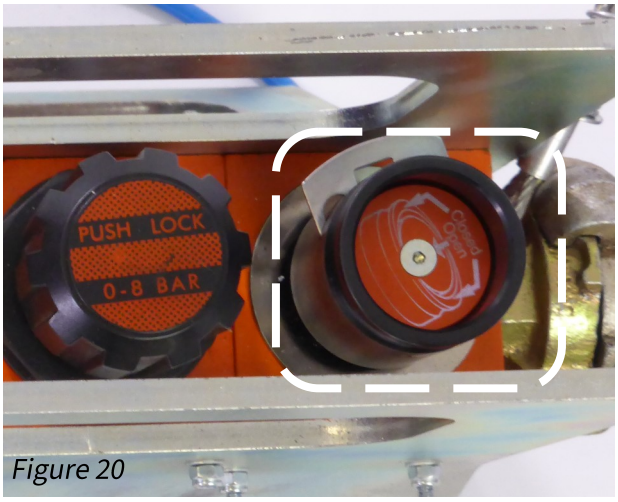


Figure 20

Depress the orange hose line energiser button above the connector ports to allow pressurised air to the motor. *(The hose line energiser button ensures the Rapid Window Cutter cannot accidently start when the compressor is started and the on/off button is on).*

5.17 Cutting the main: Start the motor on the Rapid Rotary Cutter by operating the slide switch on the air line hose to the ON position.

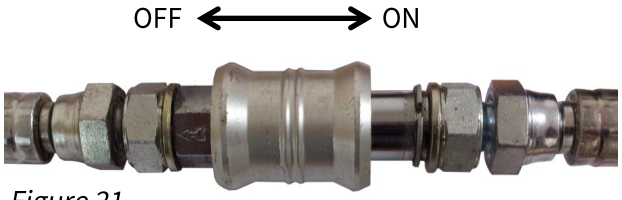


Figure 21

5.18 Activate the water line and ensure water bowser remains full and pressurised throughout the entire cutting operation. When bowser runs out stop the cut, refill and reactivate the water feed.

With the motor in the 12 o'clock position loosen the security bolt freeing the motor assembly rocker (indicated by the red arrow) and allow the cutting disc to contact the wall of the main. See 4.8 page 7 if sparking is experienced at any point of the operation.

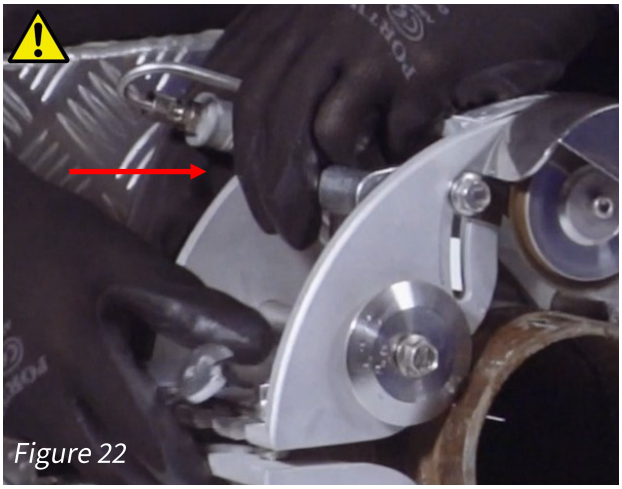


Figure 22

5.19 Carefully press the cutting disc onto the main and slowly cut deeper into the wall of the main.

Make note of the water shown in Figure 13 and ensure the water line is spraying a similar quantity throughout the entire cut.

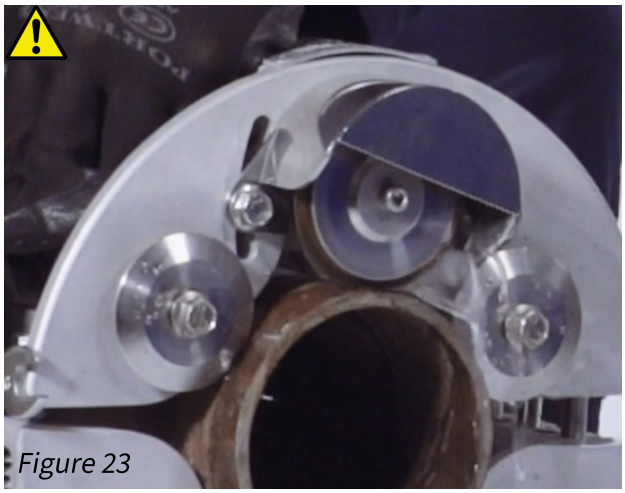


Figure 23

5. OPERATING INSTRUCTIONS (CONTINUED)

5.20 Visually check when the depth control disc touches the main. Best results are obtained by keeping the depth control very slightly clear of the surface, leaving a thin slither of wall material left uncut.

This ensures that no damage is caused to the inserted PE that may be lying tight against the inside wall. (In most cases after two cuts have been made the section can be removed with a heavy blow to the main).

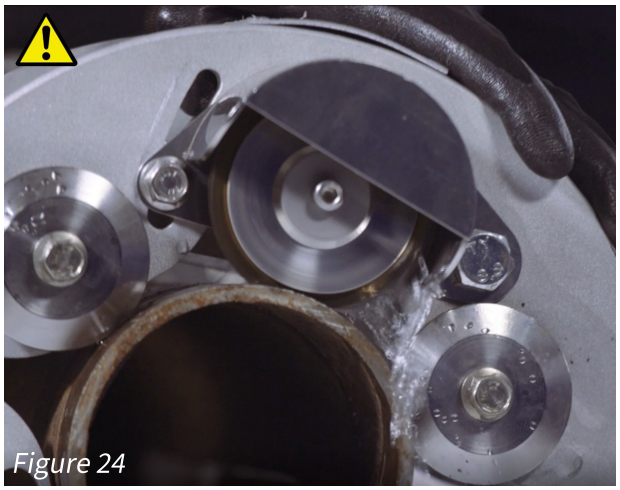


Figure 24

5.21 Begin rotating the Rapid Rotary Cutter by hand in the opposite direction from which it was first installed. This prevents the hoses from tightening around the main.

Make note of the water shown in Figure 15 and ensure the water line is spraying a similar quantity throughout the entire cut.

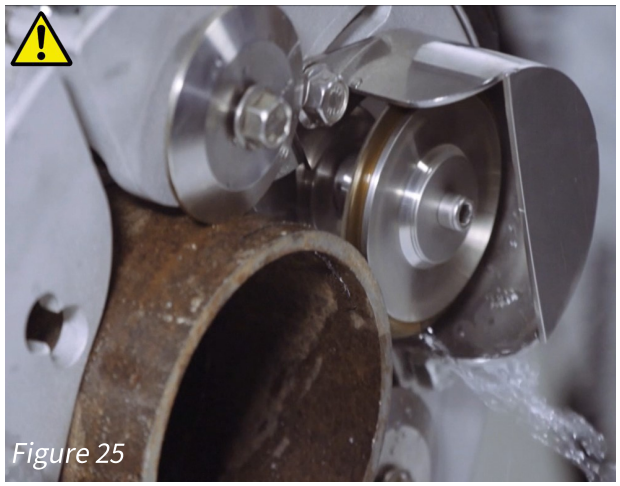


Figure 25

5.22 The speed at which the Rapid Rotary Cutter can be rotated is dictated by the pipe material, wall thickness etc. but should be a controlled manually applied force.

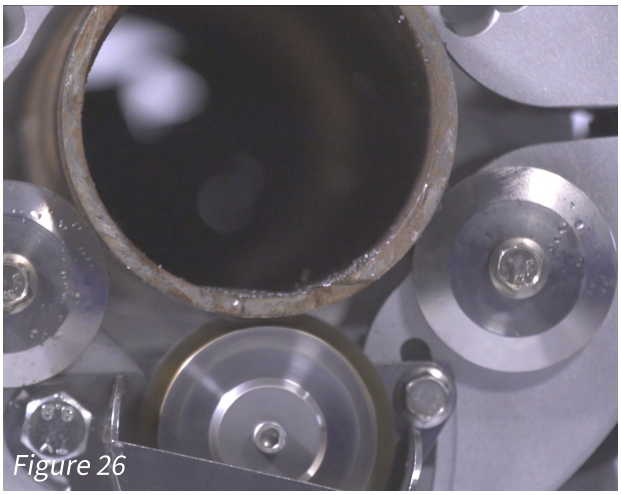


Figure 26

5.23 Continue rotating until the cut is complete. The cutting disc should line up perfectly with the initial cut ensuring a clean full cut out.

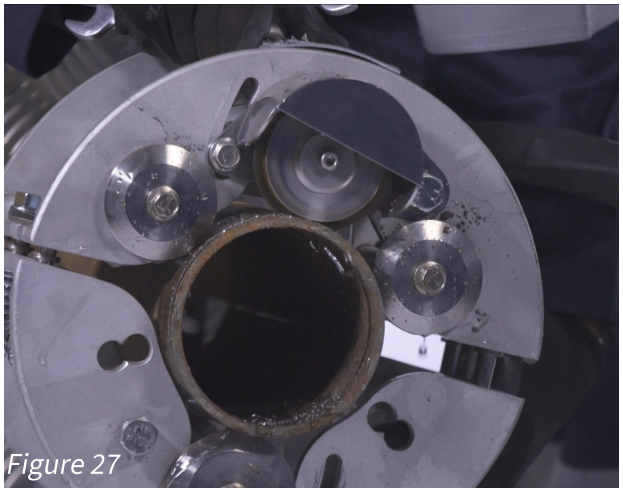


Figure 27

5. OPERATING INSTRUCTIONS (CONTINUED)

5.24 Turn off the Rotary Cutter by operating the slide switch and turn off at the compressor.

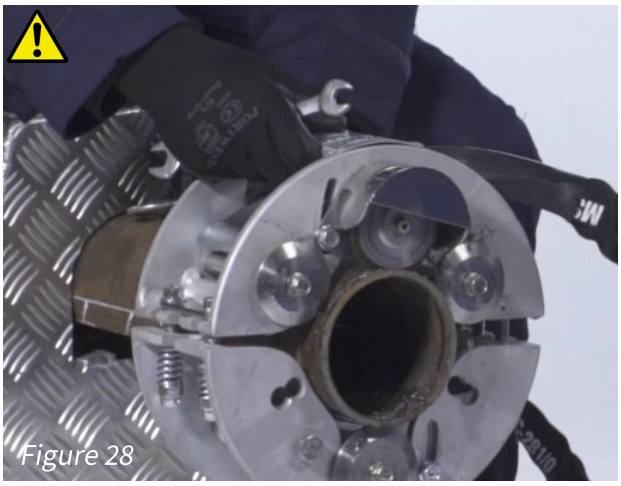


Figure 28

5.25 Retract the motor assembly rocker back into the top frame and secure in place using the security bolt at the rear of the top frame.

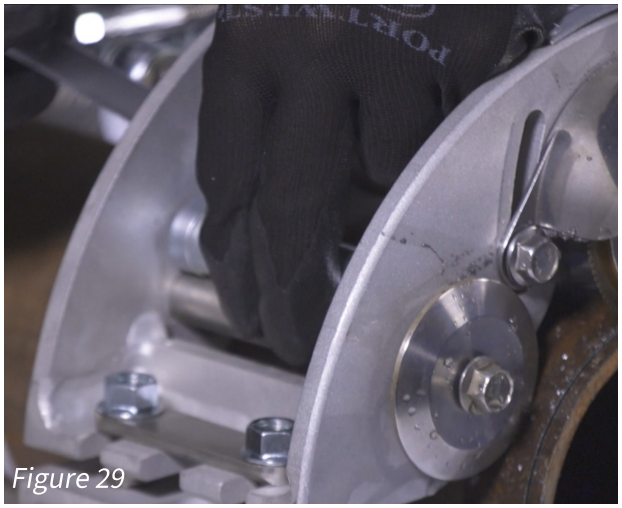


Figure 29

5.26 Loosen the 19mm security nut that holds the two shells together.


Figure 30

5.27 Un hook the top frame from the bottom and lift both shells off the main.


Figure 31

5. OPERATING INSTRUCTIONS (CONTINUED)

5.28 If taking out a section of pipe repeat the operation at the desired location and remove the pipe. It may be necessary to apply several light blows to sever any remaining wall material.

Remove any burrs that may be a hazard.

Figure 32

6. SERVICE GUIDE

It is recommended that the Rapid Rotary Cutter is serviced every 12 months by Steve Vick International. Please contact us for details.

7. ROUTINE MAINTENANCE

The Rapid Rotary Cutter has been designed to be relatively free of maintenance. Simple checks on the tightness of bolts and clips and a visual check for general wear on parts being all that is required in normal day to day operation.

Routine Maintenance	Schedule of Jobs
Clean down the machine and check all moving parts for wear and tear.	Prior to use—Daily
Thoroughly check the cutting blade and replace when worn/teeth missing.	Prior to use—Daily
Check all hoses remain in good condition.	Weekly
Ensure the airline lubricator is operational.	Prior to use—Daily
Retighten all nuts and bolts.	Weekly
Ensure all wheels are present and can rotate.	Prior to use—Daily
Ensure the guard is present.	Prior to use—Daily
Ensure all depth control discs are present.	Prior to use—Daily
Ensure the water bowser is present and operating correctly.	Prior to use—Daily
When mounting the cutting blade and depth control disc, ensure they can attach to the motor assembly securely and are not loose.	Prior to use—Daily
If the motor fails to operate it is recommended that it is taken to a specialist to investigate the problem.	N/A