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## SAFETY PRECAUTIONS

### IN GENERAL

When using rotating head cutting equipment, basic safety precautions should always be followed to reduce the risk of personal injury.

Operate this tool only in accordance with specific operating instructions.

#### **WARNING:**

Do not override the deadman switch on the power unit. Locking down, obstructing, or in any way defeating the deadman switch on the power drive unit may result in serious injury.

### DRESS CONSIDERATIONS

Use standard safety equipment. Hard hats, safety shoes, safety harnesses, protective clothes, and other safety devices should always be used when appropriate.

Use safety glasses. Do not operate cutting tools without eye protection.

Dress properly. Do not wear loose clothing or jewelry. They can be caught in rotating and moving parts. Avoid slippery floors or wear nonskid footwear. If you have long hair, wear protective hair covering to contain it.

### WORK AREA

Keep the work area clean. Cluttered work areas and benches invite injuries.

Consider the work area environment. Keep the area well lit. Keep electrical cords, cables, rags, rigging straps, and etc. clear of rotating equipment. Do not use power-cutting tools in the presence of flammable liquids and gasses.

Keep visitors away. Do not let visitors or untrained personnel at or near operating tools. Enforce eye protection requirements for all observers.

Do not over reach. Keep proper footing at all times.

Stay alert. Watch what you are doing. Use common sense. Do not operate tools when you are tired.

### **TOOL CARE**

Maintain tools with care. Keep tools in good operating condition. Sharp tool bits perform better and safer than dull tool bits. Well maintained tools function properly when needed.

Check for damaged parts. If a tool has malfunctioned, been dropped or hit, it must be checked for damage. Run no-load tests and feed function checks. Do a complete visual inspection.

Electric motors. Use only with proper AC voltage power sources and observe all normal electric shock hazard procedures.

Do not abuse power and control cords. Pulling or running over cords and cables can result in electrical shock hazards and malfunctions. Keep control and power cords out of all cutting fluids and water.

Hydraulic drives. Observe proper procedures for electrically driven power sources. Avoid damage to hydraulic lines. Keep quick-disconnects clean. Grit contamination causes malfunctions.

Air tools. Check the exhaust muffler. Broken or damaged mufflers can restrict air flow or cause excessive noise. Use air motors only with a filtered, lubricated and regulated air supply. Dirty air, low-pressure air or over pressure air will cause malfunctions, including delayed starting.

### **AREA EQUIPMENT**

Secure work. Whenever possible use clamps, vises, chains and straps to secure pipe.

Make sure the tool is secured; it is safer to have both hands free to operate the tool.

### **TOOL USE**

Use the right tool and tool bit for the job. Do not use a tool, which is incorrect for the job you are doing.

Keep the tool bits fully engaged in the tool bit holders. Loose bits are a safety hazard.

Disconnect power supply during setup and maintenance. Use all 'Stop' or 'Shut off' features available when changing or adjusting tool bits, maintaining the tool, or when the tool is not in use.

Remove adjusting keys and wrenches before applying power to the equipment. Develop a habit of checking the tool before turning it on to make sure that all keys and wrenches have been removed.

Do not force tools. Tools and tool bits function better and safer when used at the feed and speed rate for which they were designed.

Do not reach into rotating equipment. Do not reach into the rotating head stock to clear chips, to make adjustments, or to check surface finish. A machine designed to cut steel will not stop for a hand or an arm.

Handle chips with care. Chips have very sharp edges and are hot. Do not try to pull chips apart with your hands; they are very tough.

Avoid unintentional starts. Do not carry or handle tools with your hand on the operating switches or levers. Do not lay the tool down in a manner that will start the drive. Do not allow the tool to flip around or move when adjusting or changing tool bits.

Store idle tools properly. Disconnect tools from the power source and store in a safe place. Remove tool bits for safe handling of the tool.

## **GENERAL DESCRIPTION**

The C'bore Module Kit is a mechanical accessory for the Model 604SB through 612SB Clamshell.

The C'bore Module provides the capability to counterbore pipe after an in-line spool, valve or fitting has been removed.

The C'bore Module is mounted directly to the Clamshell.

No repositioning or modification of the Clamshell is necessary after the in-line spool has been removed.

The C'bore Module features a manual "easy grip" axial feed and infinitely adjustable radial positioning.

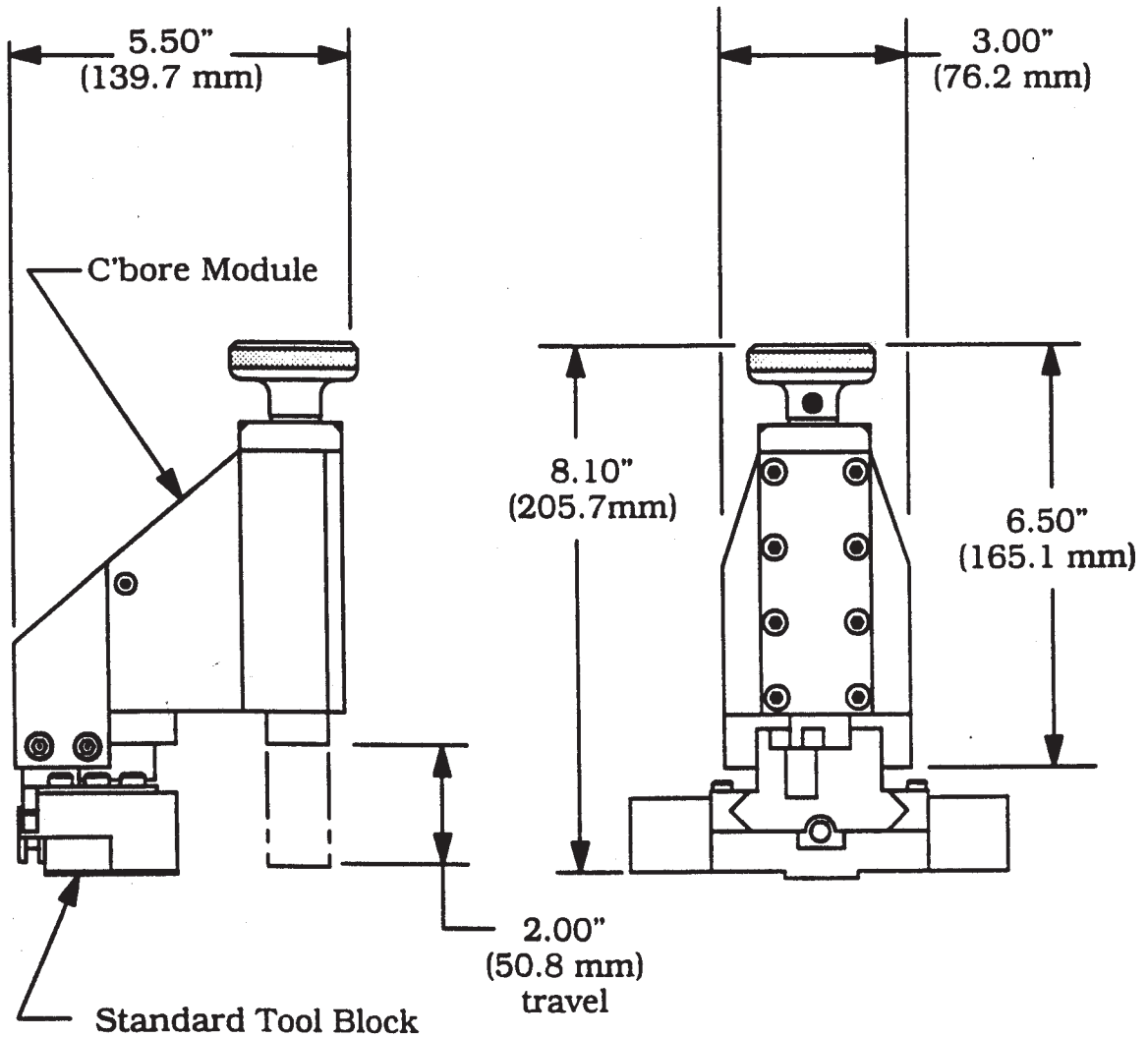
The C'bore Module utilizes Form Tooling Tool Bits that are available in various standard configurations.

## SPECIFICATIONS

Weight

5.6 lbs. (2.6 Kg)

### Envelope, Model CBM-2, Counterbore Module



**BASIC PIPE SIZES**

Equal to the full range of the Clamshell to which the C'bore Module has been mounted.

Approximately 3" pipe through 12" pipe, all schedules.

**C'BORE DEPTH**

Up to 2.00" (50.8 mm) plus lead-out.

**CLEARANCES**

Rotating Parts DIA

Rotating DIA of the Clamshell

Length

8.10" (205.7 mm) from the face of the Clamshell.

Axial Feed Length

2.00" (50.8 mm)

Axial Feed Rate

.031" (.78 mm) per revolution.



## MAINTENANCE

All components should be cleaned and coated with a light film of oil prior to storage.

Use a clean, non-detergent oil, preferable SAE 10 (90 SSU or lighter) or oil which is specified for the air motor.

If the C'bore Module is operated in such a way that the Module collects chips or debris near the tool holder, the C'bore Module should be cleaned after each cutting operation.

### DAILY

Wipe the unit down and spray with rust preventative under severe humidity conditions.

Visually inspect for loose screws, missing bolts, or damage due to impact.

Tighten or replace screws or other parts as required.

Contact Tri Tool Inc. if a major repair is required.

### MONTHLY

Thoroughly clean and lubricate the Feed Screw and the Boring Bar.

Feed the Boring Bar out of the Tool Bracket.

With a clean, dry rag, thoroughly wipe down the Boring Bar and the Feed Screw. Be sure that all old lubrication, chips, and dirt are completely removed.

Lubricate the Feed Screw and Boring Bar with a light machine oil.

Reassemble the Boring Bar into the Tool Bracket.

## **OPERATION**

Read the operating instructions carefully before attempting to operate the C'bore Module.

Use eye protection at all times when operating the C'bore Module.

Install the Clamshell on the pipe and remove the in-line spool, fitting etc. as described in the appropriate Clamshell operating instructions.

Refer to the Operator's Manual for operation of the 600SB Series Clamshell, which is to be used.

Slide the Mounting Adapter into the Tool Holder. Tighten all mounting screws.

## **CONFIGURING THE COUNTERBORE MODULE**

Select the appropriate Tool Bit. Refer to the 'Tool Bits' section.

### **WARNING:**

Use of dull or improperly designed Tool Bits or Tool Bits not manufactured by Tri Tool Inc. may result in poor performance and may constitute abuse of this machine and therefore voids the Tri Tool Inc. factory warranty.

Install the Tool Bit in the Boring Bar. Be sure the cutting edge lies along the radial centerline in the direction of rotation.

Adjust the counterbore diameter.

Radially adjust the Feed Tube using the Feed Sprocket.

## **MACHINING SEQUENCE**

Check to insure that the Tool Bits are clear of the pipe and that the Clamshell Feed Pin is retracted.

Slowly rotate the clamshell to insure that the Form Tooling Bit clears the pipe.

Increase the Clamshell RPM to cutting speed. Refer to the section on 'Cutting Speeds'.

To feed the Tool Bit in, hold the Feed Knob.

**WARNING:** Do not use a wrench or lever to obtain extra holding strength.

**WARNING:** Do not force the feed.

If the feed pressure builds up too high, release the knob for 2 or 3 revolutions before continuing.

When the counterbore is finished, release the Feed Knob and allow the Clamshell to rotate 2 or 3 times to release the chip.

Retract the Tool Bit.

Remove the C'bore Module from the Clamshell.

Remove the Clamshell from the pipe as described in the appropriate Clamshell instruction manual.

## CUTTING SPEEDS AND FEEDS

The chart shows RPM to obtain specified Tool Bit surface cutting speed on the surface of the pipe.

DIA		RPM for 200 in/min (508 cm/min)	RPM for 250 in/min (635 cm/min)	RPM for 300 in/min (762 cm/min)
12.00"	304.8 mm	5	7	8
10.00"	254.0 mm	6	8	10
8.00"	203.2 mm	8	10	12
6.00"	152.4 mm	11	13	16
4.00"	101.3 mm	16	20	24
Cutting Speeds (approximate)				

Use 200 surface inches per minute (508 surface centimeters per minute) for:

Stainless steels in general when no coolant is allowed, all heavy-wall tube and some of the chrome/molybdenum steels.

Use 250 surface inches per minute (635 surface centimeters per minute) for:

Mild steels and some thin wall stainless steels when coolants are permitted and applied.

Use 300 surface inches per minute (762 surface centimeters per minute) for:

Aluminum and thin-wall mild steel and tube with coolants.

**TOOL BITS**

C'bore Angle	Pipe or Tube Mat'l	Tool Bit Length	Double End	Radius	C'bore Tool Bit P/N
14.5°	CS, SS	1.38" (35.1 mm)	NO	.070" (1.8 mm)	99-2669
		2.25" (57.2 mm)	YES		99-2670

## TROUBLE SHOOTING

### **Problem: The Tool Bit Chatters**

- The tool bit is loose or overextended.
- The tool bit is damaged.
- The tool holder is too loose in the slides.
- The cutting speed is too fast.
- The clamping pads are loose on the pipe or tube.
- Cutting fluid is required.
- The main bearing pre-load is loose.

### **Problem: There's Excessive Tool Bit Wear**

- The pipe or tube material is too hard or abrasive.
- The cutting speed is too fast.
- Cutting fluid is required.
- A dull Tool Bit is causing surface hardening conditions (Stainless pipe or tubing).
- There is scale or other foreign matter on the pipe or tube, which is dulling the tool bit at the start of the cut.
- The tool bit is incorrect for the material being cut.

### **Problem: The Surface Finish is Rough**

- The tool bit is dull, chipped, etc.
- Metal build-up on the cutting edge of the tool bit is creating a false cutting edge.
- Cutting fluid is required.

### **Problem: The Tool Holder is Not Feeding**

- The feed pin is broken or out of position.
- The feed sprocket shear pin is broken.
- The feed screw is stripped.
- The feed nut is stripped.
- The slide rails are too tight.

**Problem: There's a Loss of Air Power**

The air supply pressure is too low.  
The air filter is plugged.  
The air line size is insufficient.  
The air line is too long.

**Problem: There's a Loss of Hydraulic Power**

The hydraulic supply pressure is too low.  
The hydraulic filter is plugged.  
The hydraulic line size is insufficient.  
The hydraulic line is too long.

**Problem: The Tool Bit Will Not Reach the Work**

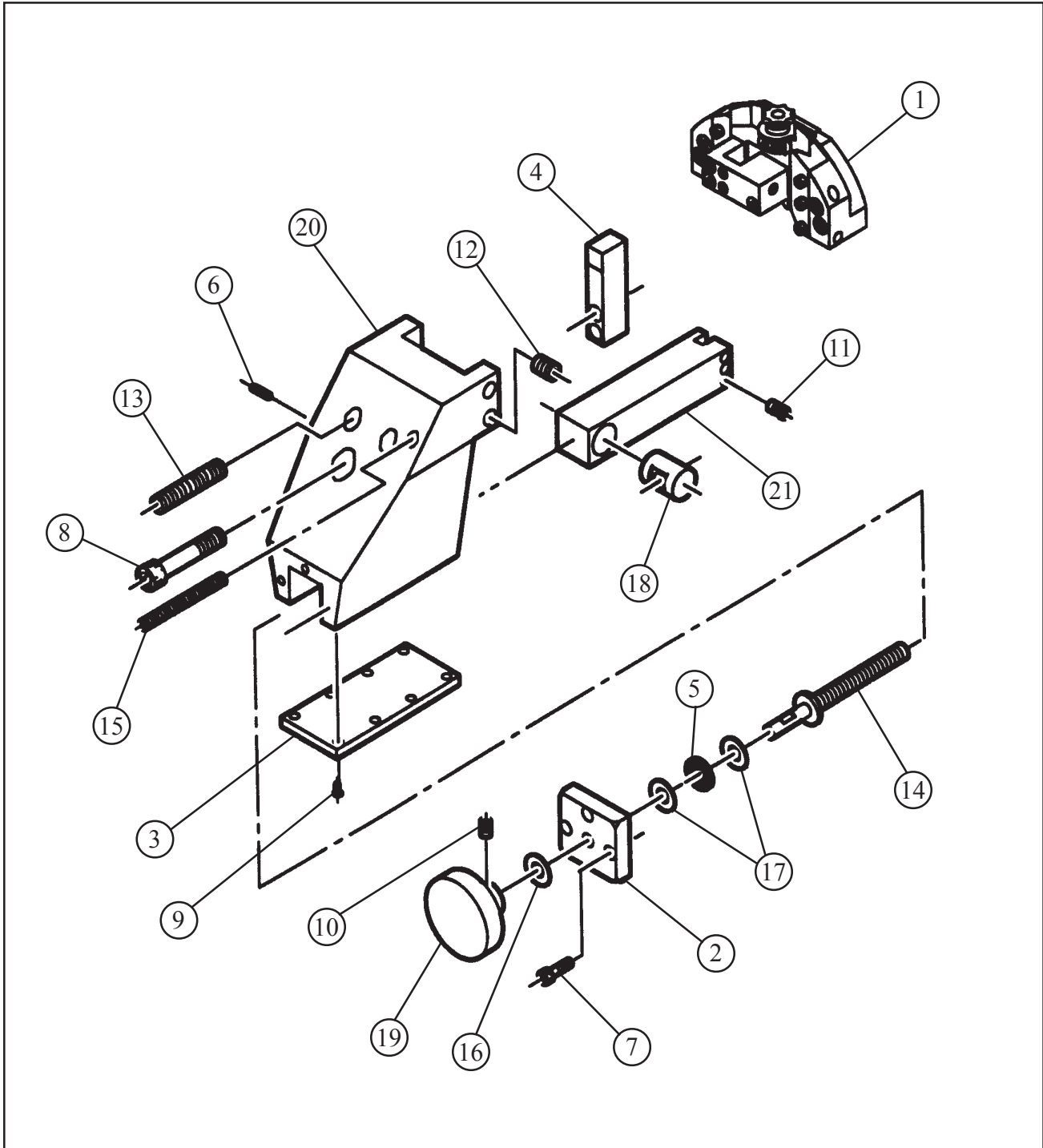
Incorrect tool blocks are installed for the size of the pipe or tube being worked on.  
Incorrect tool bit is installed.

**Problem: The Hydraulic Motor Will Not Start**

The hydraulic power supply is shut off.  
The hydraulic motor is damaged and will not run free.

# ILLUSTRATED PARTS BREAKDOWN

## MODEL CBM-2, COUNTERBORE MODULE (P/N 82-0047)





## Model CBM-2, Counterbore Module

### Parts List, Model CBM-2, Counterbore Module (P/N 82-0047)

Item No.	Part No.	Description	Qty
1.	08-0037	BLOCK ASSEMBLY, TOOL	REF
	08-0040	BLOCK ASSEMBLY, TOOL, EXTENDED	REF
2.	24-0693	PLATE, TOP	1
3.	24-0694	PLATE, COVER	1
4.	27-0275	ADAPTER, MOUNTING	REF
5.	29-0190	BEARING, THRUST	1
6.	32-0024	PIN, ROLL, 1/8" DIA X 1/2"	1
7.	33-0029	SCREW, CAP, #10-24 X 5/8"	3
8.	33-0075	SCREW, CAP, 3/8-16 X 2"	1
9.	33-0280	SCREW, BUTTON, #10-24 X 5/8"	8
10.	33-0500	SCREW, SET, 1/4-20 X 5/16", CUP PT	1
11.	33-0503	SCREW, SET, 1/4-20 X 1/2", CUP PT	3
12.	33-0529	SCREW, SET, 3/8-16 X 1/2", CUP PT	4
13.	33-0537	SCREW, SET, 3/8-16 X 2", CUP PT	2
14.	33-1507	SCREW, FEED	1
15.	33-1508	SCREW, SET, 1/4-20 X 2 1/2", CUP PT	1
16.	34-0108	WASHER, THRUST, 5/16" x 3/4" x 1/16"	1
17.	34-0202	WASHER, THRUST, 5/16" x 3/4"	2
18.	35-0261	NUT, FEED	1
19.	42-0099	KNOB, FEED	1
20.	47-0414	BRACKET, TOOL	1
21.	49-0075	HOLDER, TOOL	1

**TRI TOOL INC.**

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Parts List, NOT SHOWN - Counterbore Module Kit (P/N 05-0116)

<b>Item No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Qty</b>
1.	27-0275	ADAPTER, MOUNTING	1
2.	82-0047	C'BORE MODULE ASSEMBLY	1
3.	99-2669	TOOL BIT, C'BORE	1
4.	99-2670	TOOL BIT, C'BORE, LARGE	1