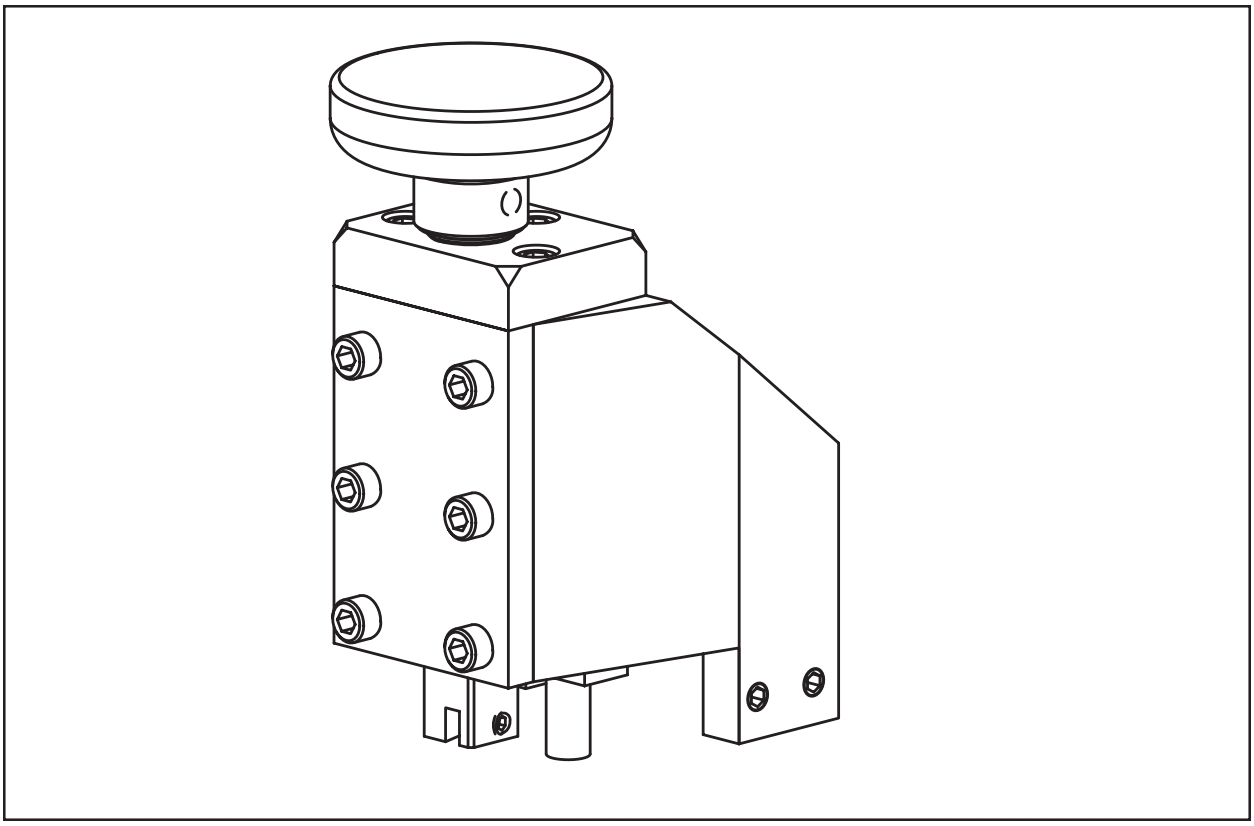

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SAFETY PRECAUTIONS

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 are 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 CBM-1 C'bore Module is a mechanical accessory for the Tri Tool 601SBM, 602.5SBM and 602TSB Clamshells.

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 Tool Block.

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

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

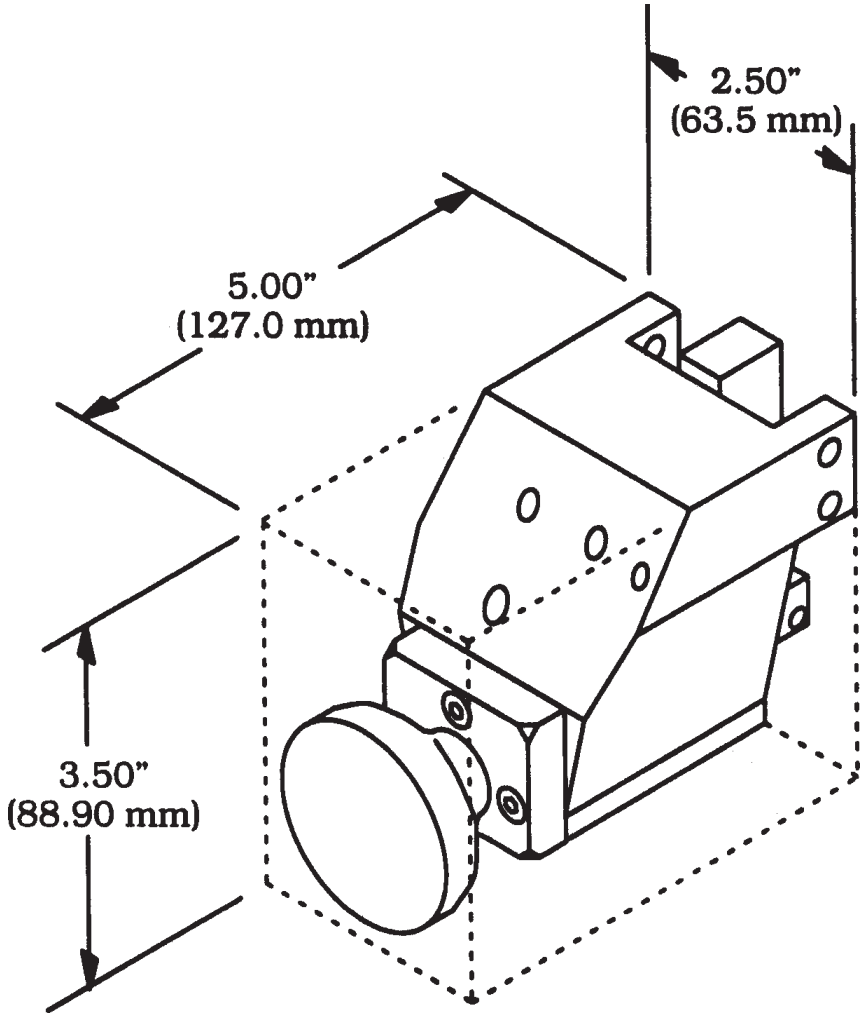
The C'bore Module utilizes Form Tooling Bits which are available in various standard configurations.

SPECIFICATIONS

Counterboring Module

Weight: w/o Tool Block 2.0 lbs. (0.9 kg)

Envelope, Model CBM-1, Counterboring Module



Basic Pipe Sizes: 1” through 2 1/2” pipe all schedules and 3/4” pipe schedules 5S through 40S with the appropriate Clamshell.

Counterbore Depth: Up to 1.13” (28.7 mm) plus lead out.

Clearances

Rotating Parts Diameter: Rotating diameter of clamshell.

Length: 6.60” (167.6 mm) from face of clamshell.

Axial Feed Length: 1.13” (28.7 mm)

Axial Feed Rate: .025” (.64 mm)/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).

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

Daily maintenance

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.

Contact Tri Tool if major repair is required.

Tighten or replace screws or other parts as required.

Monthly Maintenance

Thoroughly clean and lubricate the Feed Screw and the Tool Bit Holder.

Feed the Tool Bit Holder out of the Tool Bracket.

With a clean, dry rag, thoroughly wipe down the Tool Bit Holder and the Feed Screw.

Be sure that all old lubrication, chips, and dirt are completely removed.

Lubricate the Feed Screw and Tool Bit Holder with a light machine oil.

Reassemble the Tool Bit Holder into the Tool Bracket, being sure scribe line on the Tool Bit Holder is facing the Cover Plate.

OPERATION

Read the operating instructions carefully before attempting to operate the CBM-1 C'bore Module.

Use eye protection at all times when operating the Counterbore 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 600 Series Clamshell, which is to be used.

Slide the Mounting Adapter into the Tool Holder.

NOTE:	On Models 601SBM and 602.5SBM the Mounting Adapter is flush with the back of the Tool Block.

NOTE:	On Model 602TSB the scribe line on the Mounting Adapter should be in-line with the back of the Tool Block.

Tighten all Tool Holder Set Screws against the Mounting Adapter.

Mount the C'bore Module on the Mounting Adapter.

Secure the C'bore Module to the Tool Block.

Configure the C'bore Module.

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

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 Tool Bit Holder.

Be sure the cutting edge lies along the radial centerline in the direction of rotation.

Adjust the counterbore diameter.

Radially adjust the C'bore Module 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 C'bore Tool Bit clears the pipe.

Increase the Clamshell RPM to cutting speed. Refer to 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 Tool Block.

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

CUTTING SPEEDS

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

Cutting Speeds (Approx.)

True Diameter	RPM for 200 in/min. (508 cm/min.)	RPM for 250 in/min. (635 cm/min.)	RPM for 300 in/min. (762 cm/min.)
3" (76.2 mm)	21	27	32
2" (50.8 mm)	32	40	48
1" (25.4 mm)	64	80	95

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

Standard Tool Bits

Part No.	Description
99-2710	Tool Bit, C'bore
99-2715	Tool Bit, C'bore Extended, Double Cutting Edge

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 is 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 is 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 is 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

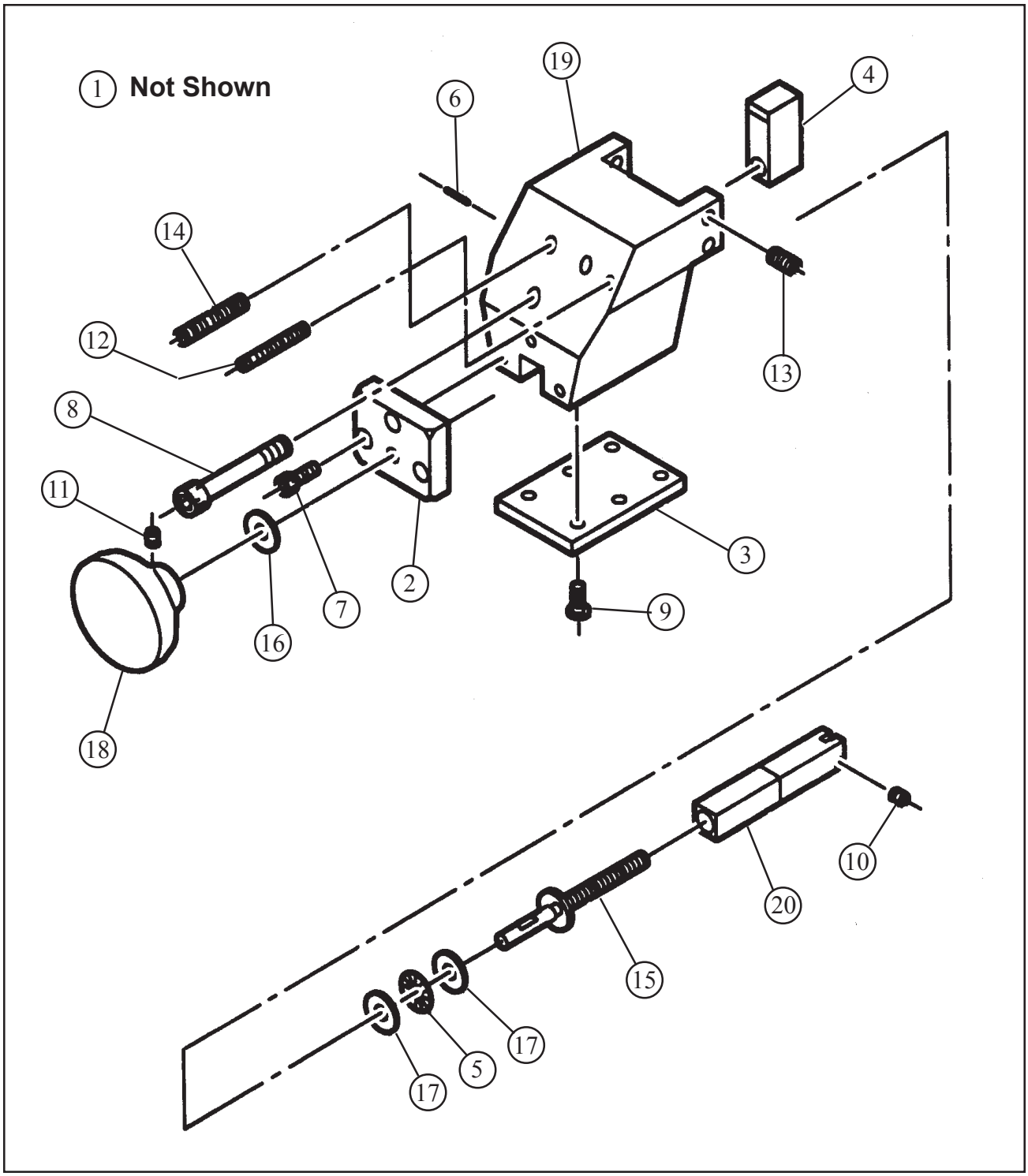
Incorrect tool blocks are installed for the size of the pipe or tube being worked on.
Incorrect tool bit is installed.

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 600CBM-1, COUNTERBORING MODULE (P/N 82-0050)



Parts List, Counterboring Module (P/N 82-0050)

Item No.	Part No.	Description	Qty
1.	08-0036	Tool Block Assy (601/602.5SBM)	ref
	08-0107	Tool Block Assy (602TSB)	ref
2.	24-0705	Plate, Top	1
3.	24-0706	Plate, Cover	1
4.	27-0278	Adapter, Mounting	ref
5.	29-0211	Bearing, Thrust	1
6.	32-0024	Pin Roll	1
7.	33-0028	Screw, Cap, 10-24 x 1/2	3
8.	33-0060	Screw, Cap, 5/16-18 x 2	1
9.	33-0280	Screw, Button, 10-24 x 5/8	6
10.	33-0487	Screw, Set, 10-24 x 3/16, Cup Pt	1
11.	33-0489	Screw, Set, 10-24 x 5/16, Cup Pt	1
12.	33-0497	Screw, Set, 10-24 x 1 1/4, Cup Pt	1
13.	33-0501	Screw, Set, 1/4-20 x 3/8, Cup Pt	4
14.	33-0510	Screw, Set, 1/4-20 x 1 3/4, Cup Pt	2
15.	33-1512	Screw, Feed, 1/4-40	1
16.	34-0218	Washer, Thrust	1
17.	34-0219	Washer, Thrust	2
18.	42-0100	Knob, Mod, Feed	1
19.	47-0420	Bracket, Tool	1
20.	49-0080	Holder Assy, Tool Bit	1

Parts List, C'bore Module Kit (P/N 05-0128)

Item No.	Part No.	Description	Qty
	27-0278	Adapter, Mounting	1
	82-0050	Module Assy, C’bore	1
	99-2710	Tool Bit, C’bore	1
	99-2715	Tool Bit, C’bore, Long	1