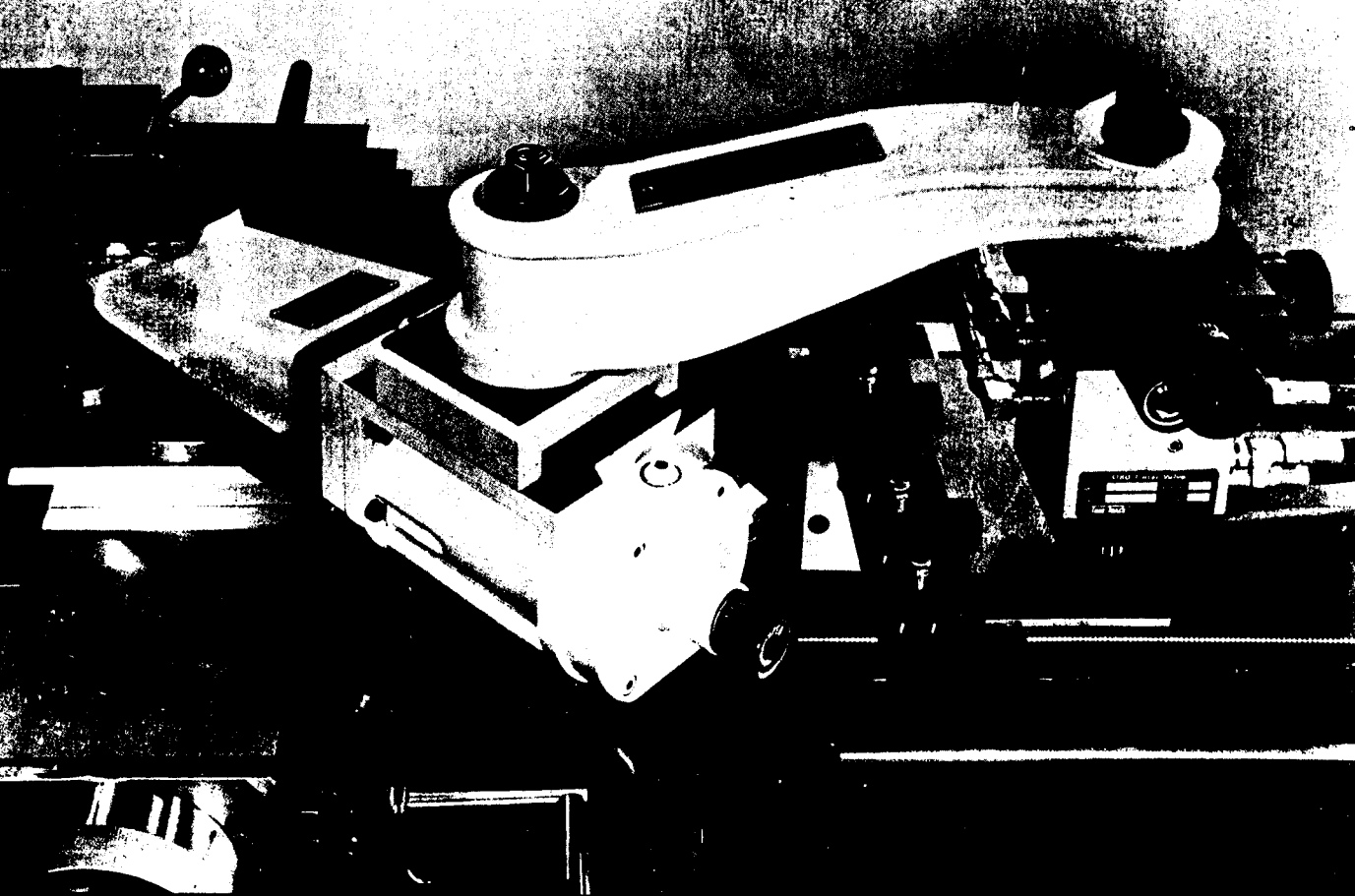


TRUE-TRACE

PIVOT TYPE

LATHE TRACER ATTACHMENTS

Description, Operation
and Service



TRUE-TRACE
CORPORATION



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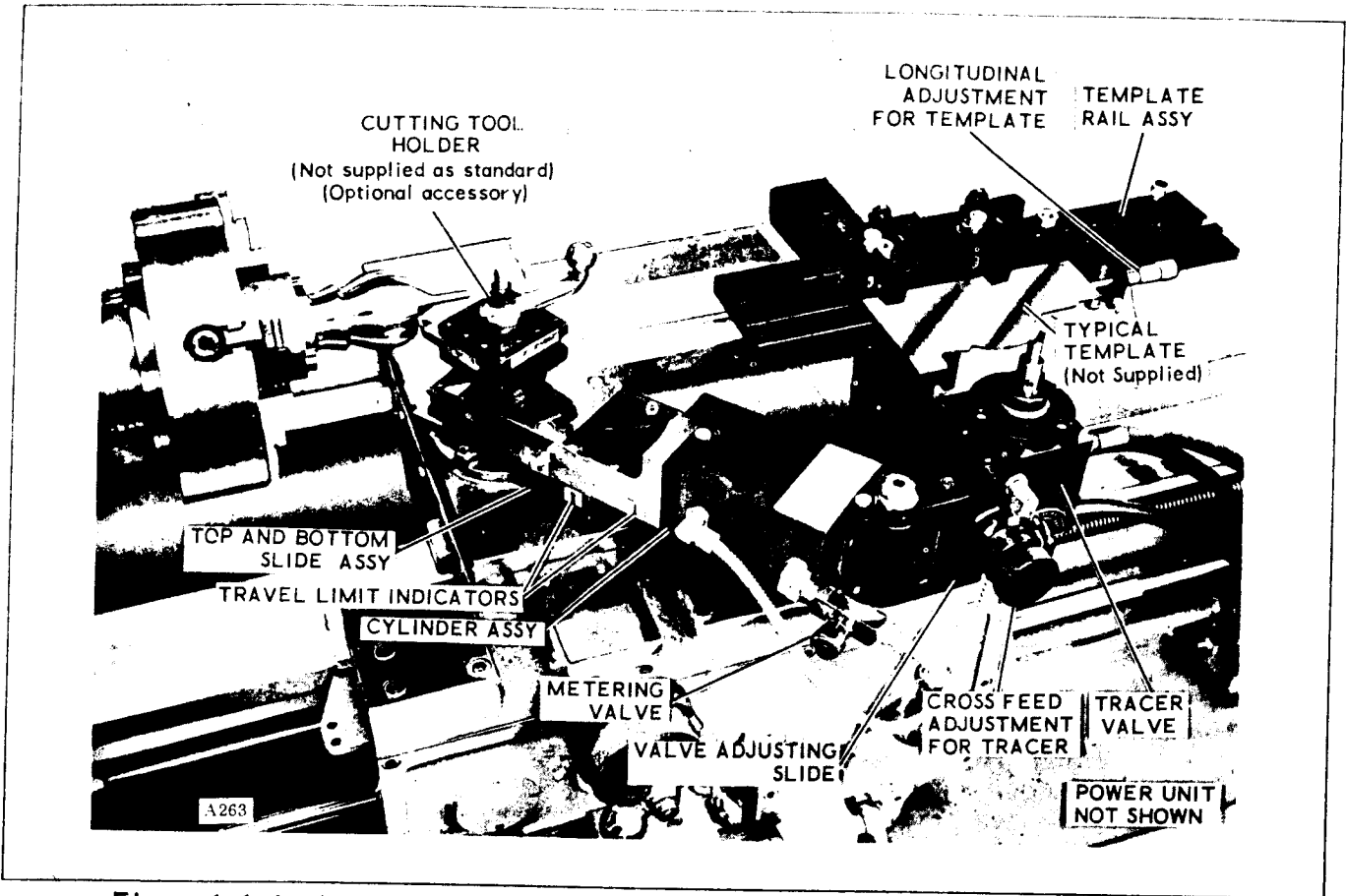


Figure 1-1. Lathe Tracer Attachment Mark "O-A" Series, Typical Installation

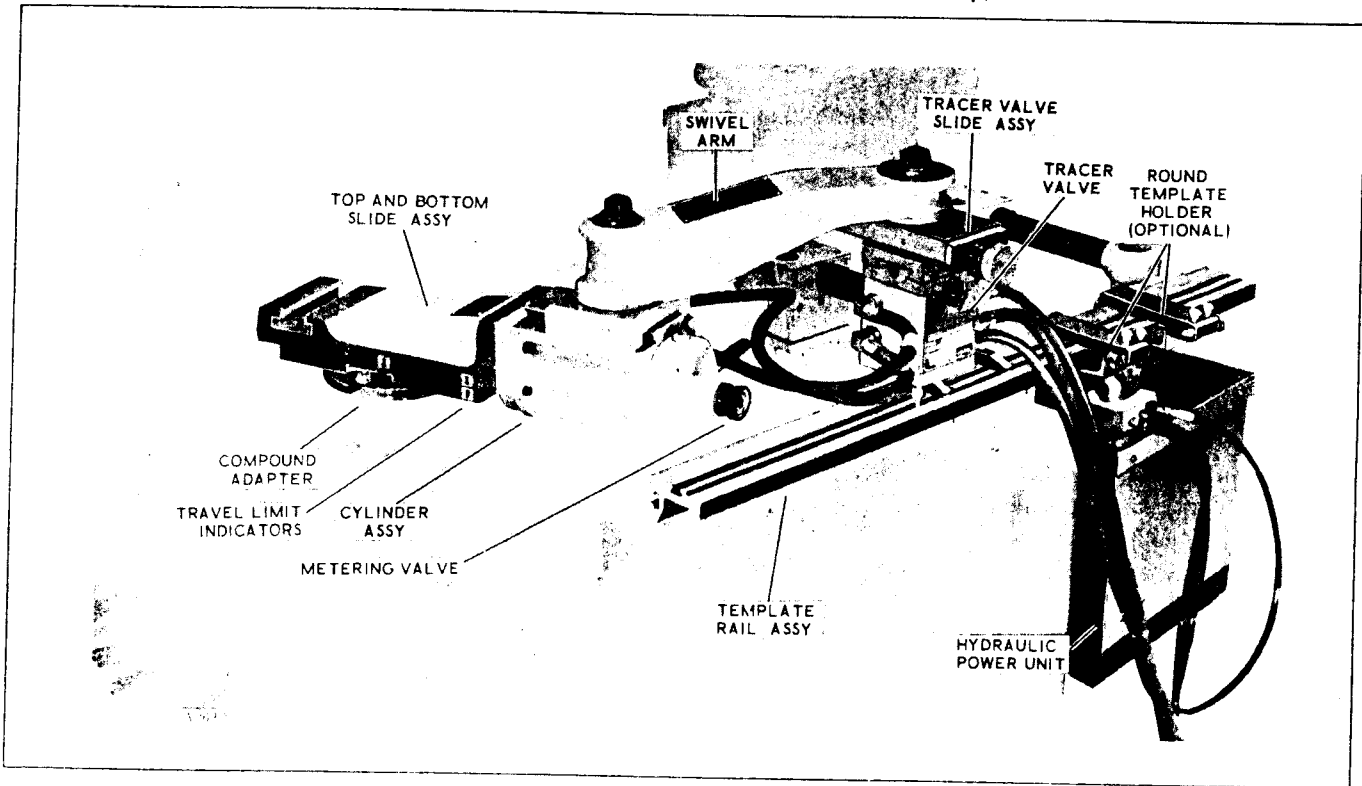


Figure 1-2. Lathe Tracer Attachment Mark IIA Series, Typical Installation



section I description

1-1. INTRODUCTION

1-2. Mark Series Lathe Tracer Attachments are hydraulic tracing systems designed for installation on conventional turning lathes. The attachments are designed for rapid and accurate duplication of machined parts in all shapes and contours using a profile template or master part. Each Lathe Tracer Attachment is supplied in kit form. The standard basic kit is designed for installation on most lathes with only simple alterations. When ordered for a specific lathe, the kit is pre-machined at the factory and is shipped ready for installation without further machining or fitting. When desired, the kit may also be installed by True-Trace factory engineers.

1-3. MARK "O" AND "O-A" SERIES

1-4. The Mark "O" and "O-A" Series Lathe Tracer Attachments are designed for use on tool room lathes of 9 to 13 inch capacity. They may be adapted to larger lathes where light contouring operations are required. The Mark "O" Series consists of the equipment listed in table 1-1. The Mark "O-A" Series consists of the equipment listed in table 1-2.

NOTE: The Mark "O" Series Lathe Tracer Attachments were manufactured to serial No. 50 only. This series is no longer in production.

a. The cylinder and slide assembly consists of a top slide, bottom slide, hydraulic cylinder, and a valve adjusting slide. The bottom slide is dovetailed into the top slide and is attached to the piston rod in the hydraulic cylinder. The hydraulic cylinder housing is attached to the top slide at one end and hinge connected to the valve adjusting slide on the opposite end. In operation, the top slide and cylinder housing are moved by hydraulic action and the bottom slide and piston rod remain fixed. Hydraulic pressure is regulated at the output of the hydraulic power unit. On the mark "O-A" Series, a metering valve is provided for the cylinder and is used to slowly "meter-in" to the work or to lock the cylinder in any desired position. (The metering valve may be used to lock the cylinder when the lathe is being

used in a conventional manner to eliminate the need for removing the tracer attachment from the lathe. The cylinder is never locked when making a cut during a tracing operation.)

b. A compound adapter is cast as an integral part of the bottom slide. A compound pivot stud is attached to the bottom slide by a socket head screw. Two slots for securing the bottom slide to the lathe carriage cross slide are provided on each side of the bottom slide compound adapter. Travel limit indicators are provided on the top and bottom slides.

c. The tracer valve (fig. 1-3) dovetails onto the valve adjusting slide and is secured to the slide by a valve adjusting screw. The valve adjusting screw is manually controlled by a knob which is graduated in thousandths of an inch. The tracer valve is operated with the stylus pointing up. The tracer valve is a precision hydraulic valve carefully flow balanced to control the tracing operation. In operation, the tracer valve is guided by a contour template or

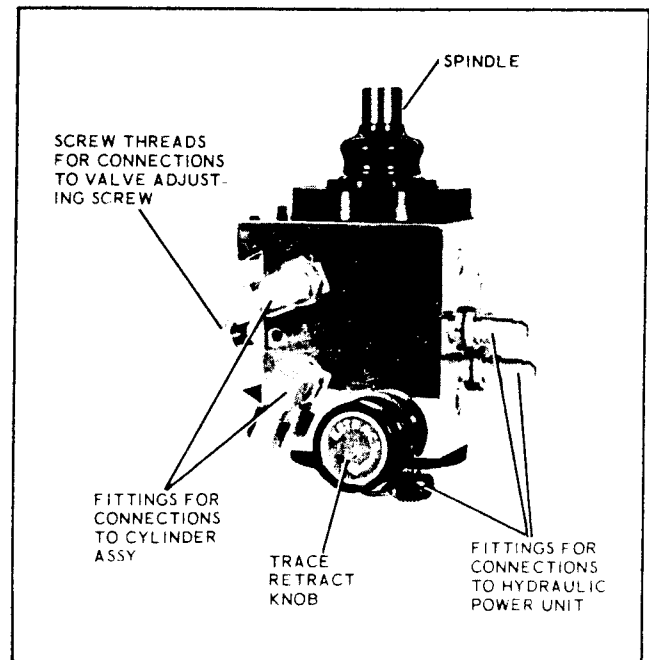


Figure 1-3. Tracer Valve, Model Group 1068.
(Used with Mark "O" and "O-A")

master part and provides for the "in" and "out" motion of the slide in turning operations, or for the "left" and "right" motion when performing facing operations.

d. The hydraulic power unit (fig. 1-4) is a single pressure self-contained unit including an electric motor and hydraulic pump. The electric motor is a totally enclosed type. The hydraulic pump is a Tuthill gear type. The hydraulic reservoir has a 15 gallon capacity. The interior and exterior surfaces of the reservoir are coated with hard-baked enamel for durability and ease of cleaning. The output pressure is adjusted at the factory for 160 psi. The unit should seldom be adjusted higher than 160 psi for operation of the Mark "O" and "O-A" Series Lathe Tracer Attachments. The pump capacity is 1.5 gallons per minute.

NOTE: Early models of the hydraulic power unit had a 10 gallon capacity.

e. The template rail assembly provided as standard equipment with the Mark "O" Series is shown in figure 1-5. The template rail assembly provided as standard equipment with the Mark "O-A" Series is shown in figure 1-6. Each template rail assembly

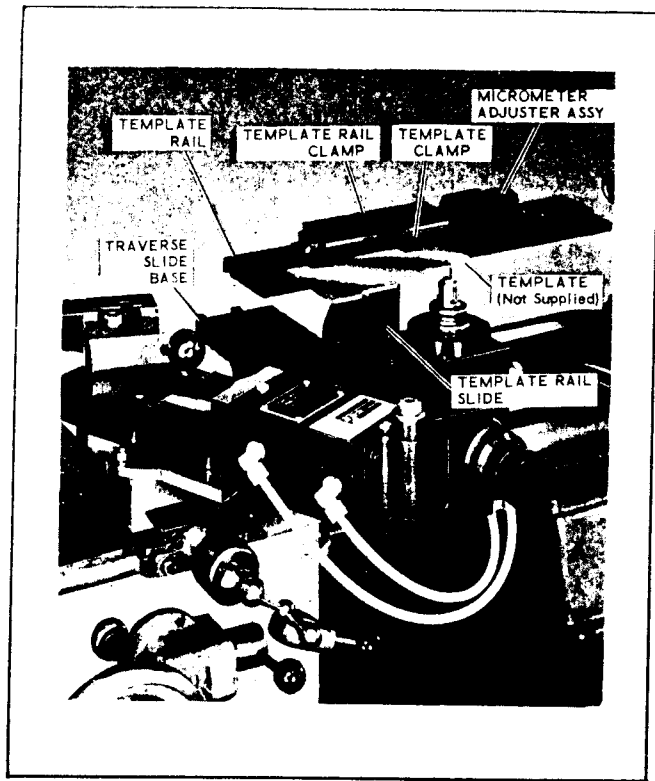


Figure 1-5. #40640 Template Rail Assembly.
(Used with Mark "O" Series)
(Mark "O" Series manufactured to serial No. 50 only.)

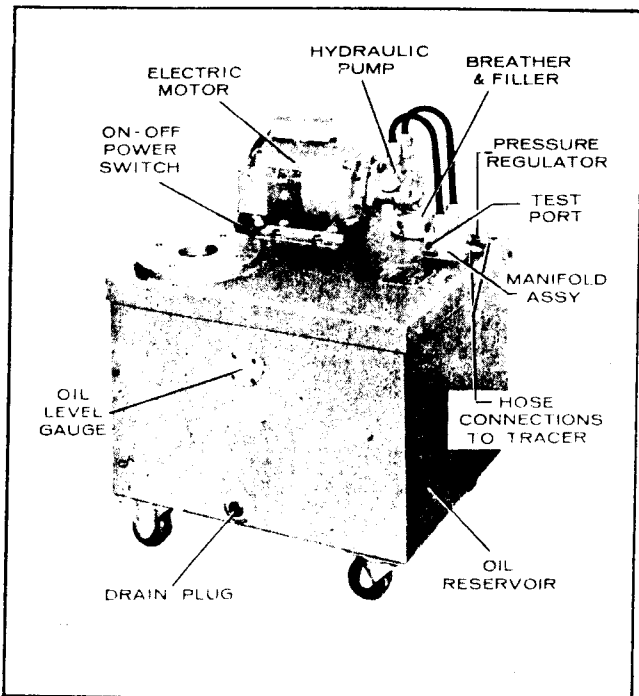


Figure 1-4. Typical Hydraulic Power Unit
Used With Mark Series Lathe Tracer
Attachments

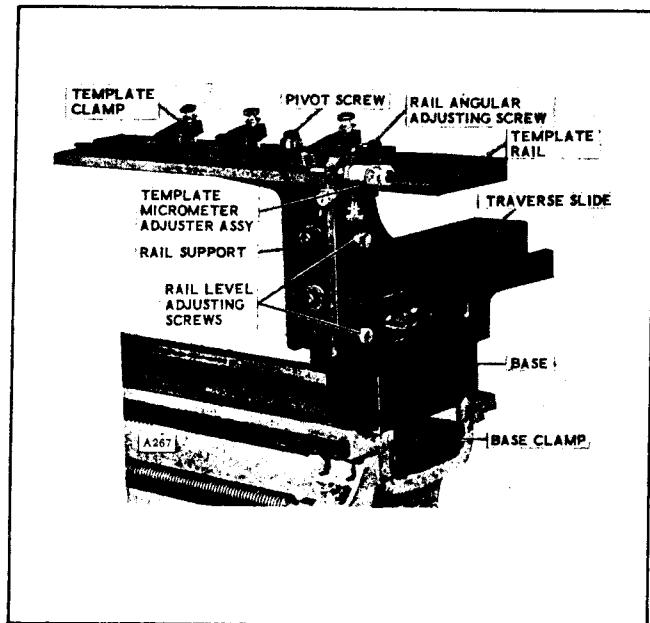


Figure 1-6. #40685 Template Rail Assembly.
(Used with Mark "O-A" Series)

includes all necessary clamps and brackets for adapting the template rail assembly to the lathe. Both template rail assemblies are adjustable in horizontal and vertical axis and include a micrometer adjuster assembly for making fine horizontal template adjustments. The template rail assemblies are similar in construction, except that the template rail assembly provided with the Mark "O-A" Series has additional adjustment features.

f. A Round Template Holder (fig. 1-7) is available as OPTIONAL equipment for use with the Mark "O-A" Template Rail Assembly. The holder consists of two clamp assemblies as shown in figure 1-7. Each clamp assembly consists of a front clamp and a rear clamp. The front clamp fits over the front of the template rail and is locked in position by a thumbscrew in the bottom of the clamp. The rear clamp slides into the T-slot of the template rail and is attached to the front clamp by two socket head screws.

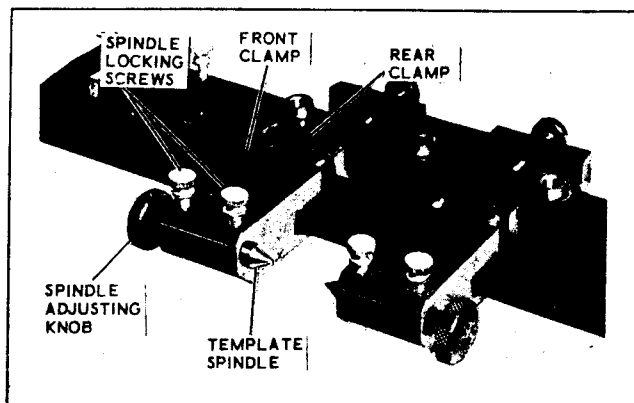


Figure 1-7. Round Template Holder, Model 3057-02. (Used with Mark "O-A" Series)

Table 1-1. Equipment Supplied With the Early Mark "O" Series Lathe Tracer Attachment (manufactured to Serial No. 50 only)

Qty	Description	Model Part No.
1	Cylinder and Slide Assy	N D
1	Tracer Valve	106S-05
1	Template Rail Assy	40640
1	Hydraulic Power Unit	5013-07
2	Tracer Hyd. Hose Assys	20377
3	Hyd. Pressure, Drain & Exhaust Hose Assy	55126

Table 1-2. Equipment Supplied With a Standard Mark "O-A" Series (Model 2055-01) Lathe Tracer Attachment

Qty	Description	Model Part No.
1	Cylinder and Slide Assy	40600
1	Tracer Valve	106S-05
1	Template Rail Assy	40685
1	Hydraulic Power Unit	5013-07
1	Tracer Hyd. Hose Assy	20377
1	Tracer Hyd. Hose Assy	20378
3	Hyd. Pressure, Drain & Exhaust Hose Assy	55126

1-5. MARK IIA SERIES

1-6. The Mark IIA Series Lathe Tracer Attachment is designed for use on a standard lathe of 13 to 20 inch capacity. It may also be adapted to smaller or larger lathes as required. The Mark IIA Series consists of the equipment listed in table 1-3.

a. The bottom slide dovetails into the top slide and is attached to the piston rod in the cylinder assembly. A removable compound adapter plate is attached to the bottom slide. Slots for securing the bottom slide to the lathe cross slide are provided in the compound adapter plate. Travel limit indicators are provided on the top and bottom slides.

b. In operation, the top slide and cylinder housing are moved by hydraulic action and the bottom slide and piston rod remain fixed. The cylinder assembly includes a metering valve which may be used to slowly "meter-in" to the work or to lock the cylinder and slide in any desired position. A safety by-pass valve in the cylinder assembly prevents damage to the equipment in the event the equipment is improperly operated when the cylinder is locked.

c. The swivel arm assembly dovetails onto the cylinder assembly at one end and is attached to the valve slide assembly (fig. 1-8) on the opposite end. The valve slide assembly is a precision two-way micrometer adjustable slideway. The tracer valve dovetails into the lower slide of the valve slide

assembly. The micrometer adjustments allow the tracer valve to be positioned independently of the tool slide angle. The slides are set at 90 degrees to each other and are fitted with gibs to insure proper adjustment. The micrometer dials are graduated in increments of 0.001 inch. The tracer valve is a precision hydraulic valve carefully flow balanced to control the tracing operation. In operation, the tracer valve is guided by a contour template or master part and provides for the "in" and "out" motion of the cross slide in turning operations, or for the "left" and "right" motion when performing facing operations. The tracer valve is operated with the stylus pointing down.

d. The hydraulic power unit (fig. 1-4) is a self-contained unit similar to the unit described in paragraph 1-4d.

e. The template rail assembly provided as standard equipment with the Mark IIA is the Universal Template Rail Assembly described in paragraph 1-15. Early model Mark IIA and III Series Lathe Tracer Attachments were supplied with the 40754 Template Rail Assembly. (This template rail is shown in figures 2-11 and 2-12.)

f. A Round Template Holder (fig. 1-9) is available as OPTIONAL equipment for use with the 43570 and 43585 Template Rail Assemblies. The holder consists of two clamp assemblies as shown in figure 1-9. Each clamp assembly is secured to the bottom of the template rail by a bottom clamp and thumb-screw, and to the rear of the template rail by two top clamp locking screws.

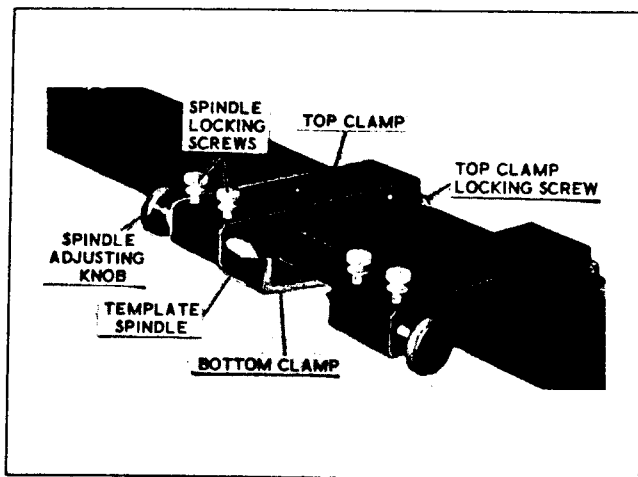


Figure 1-9. Round Template Holder, Model 3057-03. (Used with Mark IIA thru VI Series)

Table 1-3. Equipment Supplied With a Standard IIA Series (Model 2056-01) Lathe Tracer Attachment

Qty	Description	Model/Part No.
1	Top and Bottom Slide	40734
1	Cylinder Assy	40729
1	Swivel Arm Assy	40731
1	Valve Slide Assy	4049-02
1	Tracer Valve	1066-05
1	Hydraulic Power Unit	5013-07
1	Hyd. Pressure Hose Assy	55127
2	Drain & Exhaust Hose Assys	55128
1	Tracer Valve & Cylinder Hose Assy	55129
1	Tracer Valve & Cylinder Hose Assy	55130
1	Template Rail Assy (Universal)	43570

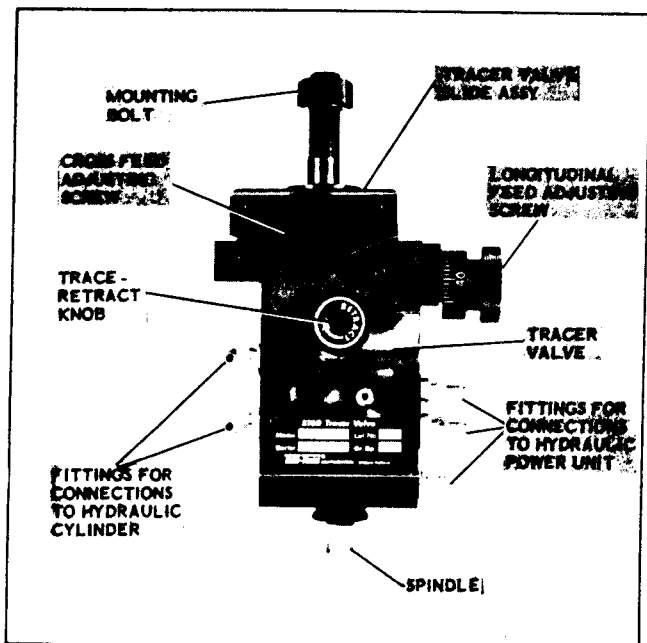
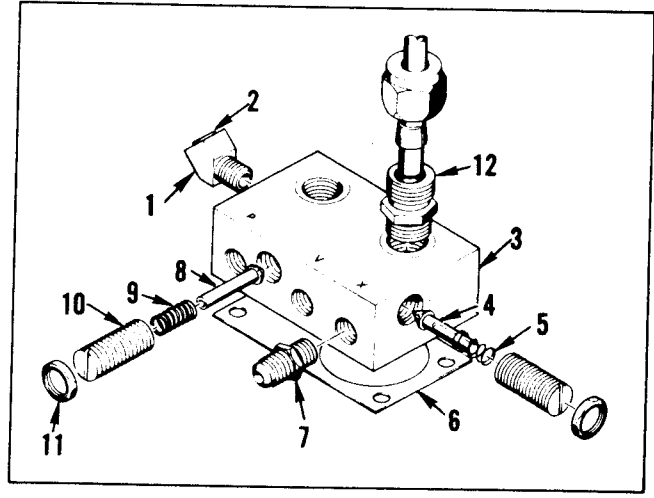
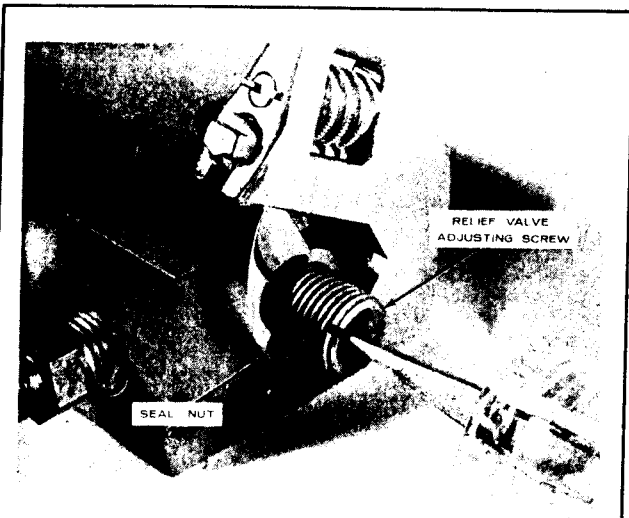


Figure 1-8. Typical 1066 Tracer Valve with 4049 Valve Slide Assembly. (Used with Mark IIA thru VI Series)

PARTS LISTS AND ADJUSTMENTS FOR MODEL SERIES 5013
HYDRAULIC POWER SUPPLY CONTAINING A VACUUM UNIT.

THIS SHEET TO BE INSERTED INTO THE M-306B MANUAL (1/15/68)



VACUUM MANIFOLD ASSEMBLY

Pressure Relief Valve for the Adjustment of Vacuum, is adjusted in the same manner as the main pressure relief valve shown in Sec. IV, Page 4-2.

The vacuum line should pull approximately 5 inches of mercury for the average installation of a Mark Series attachment.

To increase vacuum, turn the *Valve Adjusting Screw* clockwise. To decrease vacuum, turn valve adjusting screw counterclockwise and lock the seal nut, which also serves as a lock nut.

CAUTION: In making this adjustment, do not have too much vacuum because this will aerate the oil and cause the cylinder to be spongy and trace an irregular pattern. Better to have not enough vacuum than too much. "Ref. D-310 for Bleeding of Cylinders."

ADJUSTMENT OF VACUUM

12	192-07	Connector, (1/2 Tube to 3/4 In Str Thrd)	Lz	2
11	199-55	Nut, Fro-Seal (9/16-18)	Fr	2
10	50198	Screw, Adjusting Relief Valve	Tru	2
9	58000	Spring, Relief Valve	Tru	1
8	50200	Plunger	Tru	1
7	103-040 (3/8 1/4)	Connector (1/4 Male Pipe to 1/4 Tube)	Wh	3
	110-040 (1/2 1/4)	Connector (1/4 Male Pipe to 1/4 Tube)	Wh	3
	110-07	Connector (1/4 Male Pipe to 1/4 Tube)	Wh	1
	110-07	Connector (1/4 Male Pipe to 3/8 Tube)	Wh	2
6	50176	Gasket, Manifold		
5	58412	Spring, Relief Valve	Tru	1
4	50197	Plunger	Tru	1
3	50185	Manifold	Tru	1
2	103-035	Plug, Pipe (1/4 N.P., L.)	Con	1
1	127-02	Elbow 45° Street (1/4 N.P., L.)	Wh	1
Index	Part No.	Description	Mtr.	Qty.

1-7. MARK III SERIES

1-8. The Mark III Series Lathe Tracer Attachment is similar in construction to the Mark IIA Series (par. 1-5). It is designed for use on a standard lathe of 19 to 24 inch capacity. It may also be adapted to smaller or larger lathes as required. The Mark III Series consists of the equipment listed in table 1-4.

Table 1-4. Equipment Supplied With a Standard Mark III Series (Model 2057-01) Lathe Tracer Attachment

Qty	Description	Model Part No.
1	Top and Bottom Slide	40800
1	Cylinder Assy	40820
1	Swivel Arm Assy	40731
1	Valve Slide Assy	4049-02
1	Tracer Valve	1066-05
1	Hydraulic Power Unit	5013-19
1	Hyd. Pressure Hose Assy	55127
2	Drain & Exhaust Hose Assy	55128
1	Tracer Valve & Cylinder Hose Assy	55129
1	Tracer Valve & Cylinder Hose Assy	55130
1	Template Rail Assy	43570

NOTE: Mark IIA and III Series were formerly provided with the 40754 Template Rail Assembly. They are currently provided with the 43570 Universal Template Rail Assembly (par. 1-15).

1-9. MARK IV SERIES

1-10. The Mark IV Series Lathe Tracer Attachment is similar in construction to the Mark IIA Series (par. 1-5). It is designed for use on a standard lathe of 20 to 28 inch capacity. It may also be adapted to smaller or larger lathes as required. The Mark IV Series consists of the equipment listed in table 1-5.

Table 1-5. Equipment Supplied With a Standard Mark IV Series (Model 2055-01) Lathe Tracer Attachment

Qty	Description	Model Part No.
1	Top and Bottom Slide	40900
1	Cylinder Assy	40910
1	Swivel Arm Assy	40917
1	Valve Slide Assy	4049-03
1	Tracer Valve	1066-07
1	Hydraulic Power Unit	5013-22
2	Hyd. Pressure & Exhaust Hose Assy	55197
1	Drain Hose Assy	55198
1	Tracer Valve & Cylinder Hose Assy	55199
1	Tracer Valve & Cylinder Hose Assy	55200
1	Template Rail Assy	43585

1-11. MARK V SERIES

1-12. The Mark V Series Lathe Tracer Attachment is similar in construction to the Mark IIA Series (par. 1-5). It is designed for use on a standard lathe of 25 to 32 inch capacity. It may also be adapted to smaller or larger lathes if required. The Mark V consists of the equipment listed in table 1-6.

NOTE: Mark IV, V and VI Series were formerly provided with the 43554 Template Rail Assembly. They are currently provided with the 43585 Universal Template Rail Assembly (par. 1-15).

1-13. MARK VI SERIES

1-14. The Mark VI Series Lathe Tracer Attachment is similar in construction to the Mark IIA Series (par. 1-5). It is designed for use on a standard lathe of 25 to 32 inch capacity. It may also be adapted to smaller or larger lathes as required. The Mark VI Series consists of the equipment listed in table 1-7.

Table 1-6. Equipment Supplied With a Standard Mark V Series (Model 2059-01) Lathe Tracer Attachment

Qty	Description	Model/Part No.
1	Top and Bottom Slide	43000
1	Cylinder Assy	43010
1	Swivel Arm Assy	43013
1	Valve Slide Assy	4049-03
1	Tracer Valve	1066-07
1	Hydraulic Power Unit	5013-22
2	Hyd. Pressure & Exhaust Hose Assys	55197
1	Drain Hose Assy	55198
1	Tracer Valve & Cylinder Hose Assy	55199
1	Tracer Valve & Cylinder Hose Assy	55200
1	Template Rail Assy	43585

Table 1-7. Equipment Supplied With a Standard Mark VI Series (Model 2060-01) Lathe Tracer Attachment

Qty	Description	Model/Part No.
1	Top and Bottom Slide	43500
1	Cylinder Assy	43510
1	Swivel Arm Assy	43013
1	Valve Slide Assy	4049-03
1	Tracer Valve	1066-07
1	Hydraulic Power Unit	5013-22
2	Hyd. Pressure & Exhaust Hose Assys	55197
1	Drain Hose Assy	55198
1	Tracer Valve & Cylinder Hose Assy	55199
1	Tracer Valve & Cylinder Hose Assy	55200
1	Template Rail Assy	43585

1-15. UNIVERSAL TEMPLATE RAIL ASSEMBLY

1-16. The "Universal" Type Template Rail Assembly (fig. 1-10) is currently supplied as standard equipment with the Mark IIA, III, IV, V, and VI Series Lathe Tracer Attachments. The template rail assembly is attached to the bed of the lathe by two rugged base assemblies. Each base assembly is secured by a wedge clamp at the rear and a flat clamp at the front. An elbow type extension assembly slides into each base and provides in-and-out adjustment of the template rail. The extension assemblies may be installed pointing up or down depending upon overall height requirements. A template rail mount is installed on each extension assembly. Up and down adjustment of the template rail is provided by sliding the mounts up or down on the extension assemblies. The template rail is attached to the face of each mount with two socket head screws and square nuts. The square nuts slide in a T-slot in the rear of the template rail. Each mount has two sets of mounting holes so that the template rail may be mounted along the lower portion of the mounts (as shown in detail A, fig. 1-10), or along the upper portion of the mounts (as shown in detail B, fig. 1-10). The template rail may be secured in any position along the length of the rail. Four template clamps are provided in a T-slot on the top of the template rail. The 4-foot rail is standard for the Mark IIA and III Series, and a 6-foot rail is standard for the Mark IV, V and VI Series. Longer template rails are available upon special order.

1-17. FACING TEMPLATE RAIL. Facing Template Rail, Model Group 3058, (fig. 1-11) is available as OPTIONAL equipment for use with the Universal Template Rail Assembly. The facing template rail consists of a template rail mount and a 12-inch long template rail. The template rail is attached to the mount by four screws. Additional mounting holes are provided in the template rail for changing the position of the template rail with respect to the mount. The template rail mount may be installed in a mounting hole provided in the top of either of the Universal Template Rail Assembly base assemblies as shown in figure 2-23. The template rail mount is secured by a socket head setscrew in the side of the base assembly. A T-slot in the top of the facing template rail will accommodate the template clamps provided with the Universal Template Rail Assembly.

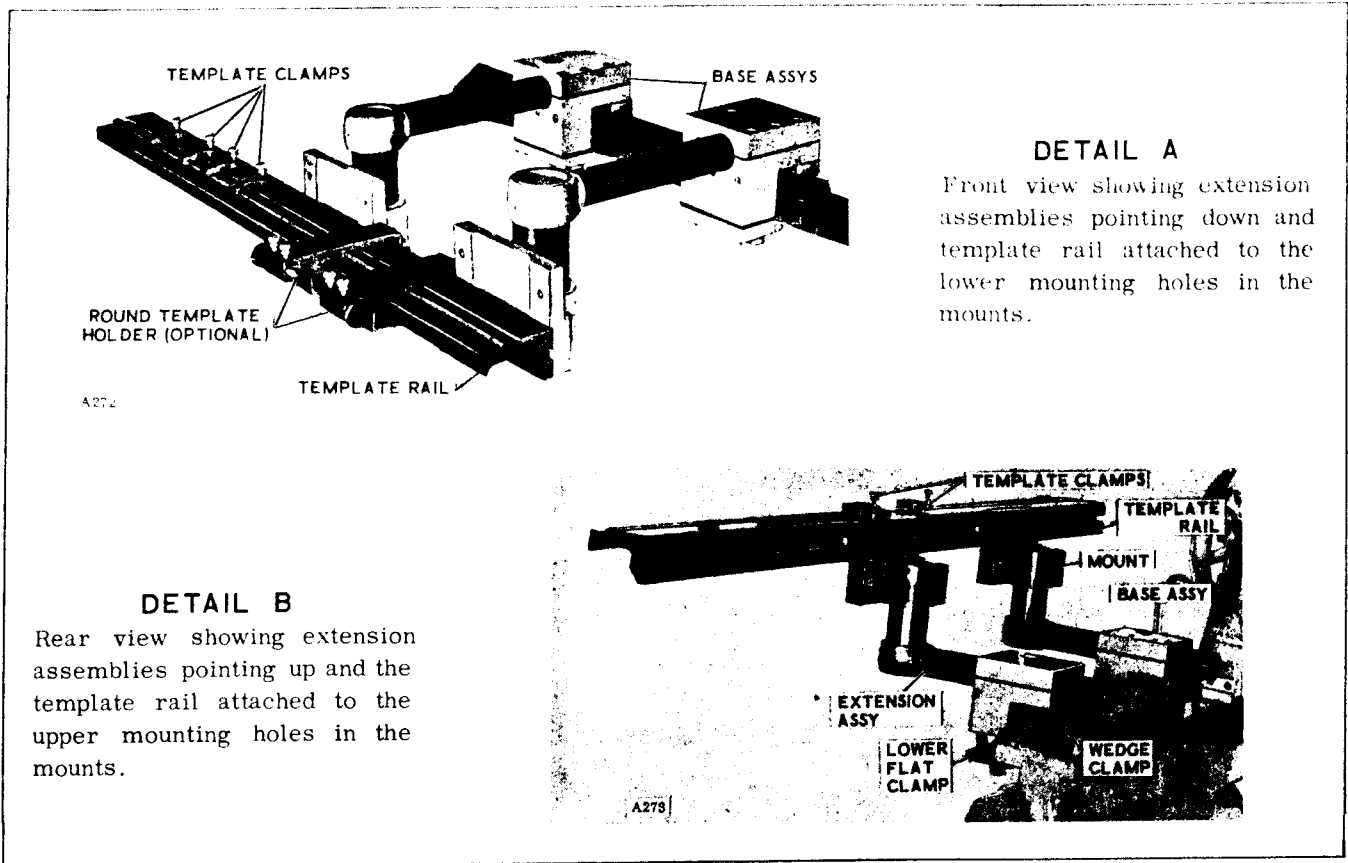


Figure 1-10. Typical Universal Template Rail Assembly. Used with Mark IIA thru VI Series)

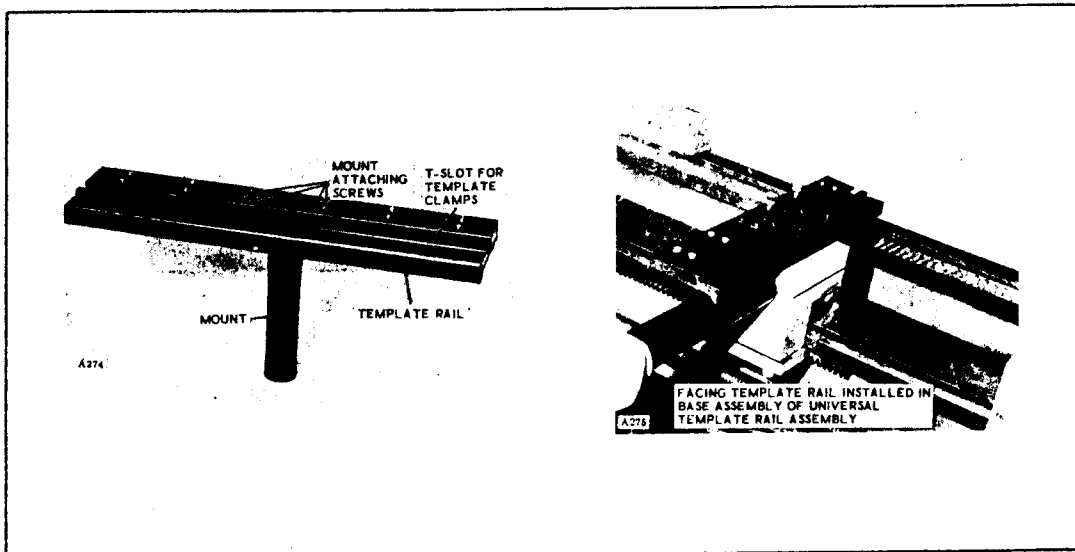


Figure 1-11. Facing Template Rail Assembly Model Group 3058.