TM 9-3417-210-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL

MILLING MACHINE, RAM TYPE, SWIVEL HEAD PLAIN TABLE, POWER FEED, 1 1/2 HORSEPOWER 110-VOLT, 60-CYCLE, SINGLE-PHASE

(VAN NORMAN MACHINE COMPANY MODELS IR-3-22 AND IRQ-3-22) (3417-624-4254)

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY
MARCH 1967

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TM 9-3417-210-10
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CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 May 1973

Operator's Manual

MILLING MACHINE, RAM TYPE, SWIVEL HEAD PLAIN TABLE, POWER FEED, 1 ½ HORSEPOWER 110-VOLT, 60-CYCLE, SINGLE-PHASE (VAN NORMAN MACHINE COMPANY MODELS IR-3-22 AND IRQ-3-22) (3417-624-454)

TM 9-3417-210-10, 17 March 1967 is changed as flows:

Page 10. After the wiring diagram, add the following paragraphs:

Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to: Commander, US Army Weapons Command, ATTN: AMSWE-MAS-SP, Rock Island IL 61201.

Components of the End Item

Parts included with the end item and considered as components of the end item configuration are listed in the following table:

Table 1. Components of the End Item

ARBOR, MILLING CUTTER:
6-156C (79141)
- NUT, MILLING CUTTING ARBOR: J-269D (79141).
- SPACER, MILLING ARBOR: J-303D (79141).
- SPACER, MILLING ARBOR: J-304D (79141).
- SPACER, MILLING ARBOR: J-266D (79141).
- SPACER, MILLING ARBOR: J268D (79141).
- SPACER, MILLING CUTTING ARBOR: J564D (79141).

ARBOR, MILLING CUTTER:
12-771C (79141).
- NUT, MILLING ARBOR: 111-364D (79141).
- SPACER, MILLING ARBOR: 111-409 (79141).
- SPACER, MILLING ARBOR: 111-412D (79141).
- SPACER, MILLING ARBOR: 111-367D (79141).
- SPACER, MILLING ARBOR: 111-819D (79141).

ARBOR, MILLING CUTTER:
12-774 (79141).
- NUT, MILLING ARBOR: 111-364D (79141).

Table 1. Components of the End Item - Continued

- SPACER, MILLING ARBOR: 111-409D (79141).
- SPACER, MILLING ARBOR: 111-412D (79141).
- SPACER, MILLING ARBOR: 111-367D (79141).
- SPACER, MILLING ARBOR: 111-369D (79141).
- SPACER, MILLING ARBOR: 111-420D (79141).
- SPACER, MILLING ARBOR: 111-819D (79141).
- SPACER, SLEEVE: 111-629D (79141).

BRACE, OUTER:
No part No.

COLLET, SOLID, TAPER HOLE:
C-361 (79141).

COLLET, SOLID, TAPER HOLE:
12-757 (79141).

COLLET., SOLID, TAPER HOLE:
C-413 (79141).

COLLET, SOLID, TAPER HOLE:
12-779 (79141).

CRANK. RAM:
16-396 (79141).

FIXTURE, INDEXING:
6-7200 (79141).

VISE, MACHINE TABLE:
12-71175 (79141).

WRENCH, LEVER PIN TYPE:
111-206 (79141).

Page A-1, A-2, and A-3. Appendix is superseded as follows:

APPENDIX
BASIC ISSUE ITEMS LIST
AND
ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items and items troop installed or authorized required by the crew operator for operation of the milling machine.

2. General

This basic issue items list and items troop installed or authorized list is divided into the following sections:

a . Basic Issue Items List-Section II. A list, in alphabetical sequence, of items which are furnished with, and must be turned in with, the end item.

b. ltems Troop Installed or Authorized List-Section III. Not applicable.

3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Federal Stock Number This column indicates the Federal stock number assigned to the item which will be used for requisitioning purposes.

b. Description. This column indicates the Federal item name and a minimum description required to identify the item.

c. *Unit of Measure (U/M).* This column indicates the standard or basic quantity by which the listed item is used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, e.g., ea, in., pr; etc., and is the basis used to indicate quantities. When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will he requisitioned.

d. Quantity Furnished with Equipment. This column indicates the quantity of the item furnished with the equipment.

f. Illustration. This column is divided as follows:

(1) Figure number. This column indicates the figure number of the illustration in which the item is shown.

(2) *Item number. This* column indicates the item number used to identify each item called out in the illustration.

Section II. BASIC ISSUE ITEMS

(1) Federal stock number	(2) Description	(3) Unit of meas	(4) Qty furn with equip	(5) Illustration (a) Figure No.	(5) Illustration (b) Item NO.
5120-184-8558	WRENCH, OPEN END FIXED: Dble hd type, 15 deg angle of hd, 11/16 and 25/32 opngs, 11/32 hd thk, 7 lg.	ea	1		
5120-277-2691	WRENCH, OPEN END FIXED: Sgle hd type, 15 deg angle of hd, 3/4 opng, 7/16 hd thk, 7-1/8 lg.	ea	1		
5120-277-1253	WRENCH, OPEN END FIXED: Sgle hd type, 15 deg angle of hd, 7/8 opng, 1/2 hd thk, 8 lg.	ea	1		
5120-277-1250	WRENCH, OPEN END FIXED Sgle hd type, 15 deg angle of hd, 1-1/4 opng, 3/4 hd thk, 11-718 lg.	ea	1		

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Ft Monmouth (5)
AVSCOM (2)
USACDCEC (10)
Army Depots (3)
Arsenals (2)
USASA (1)
USATC, Ft Eustis (3)
USACMLES (3)
USAOC&S (3)
Engr FLDMS (2)
QM FLDMS (2)
Ft Knox FLDMS (1O)
Units org under fol TOE
(1 copy each unit):
9-12;
9-57.

NC: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

Installation, Operation and Maintenance

Instructions for

Nos. 1R-3,1RQ-3

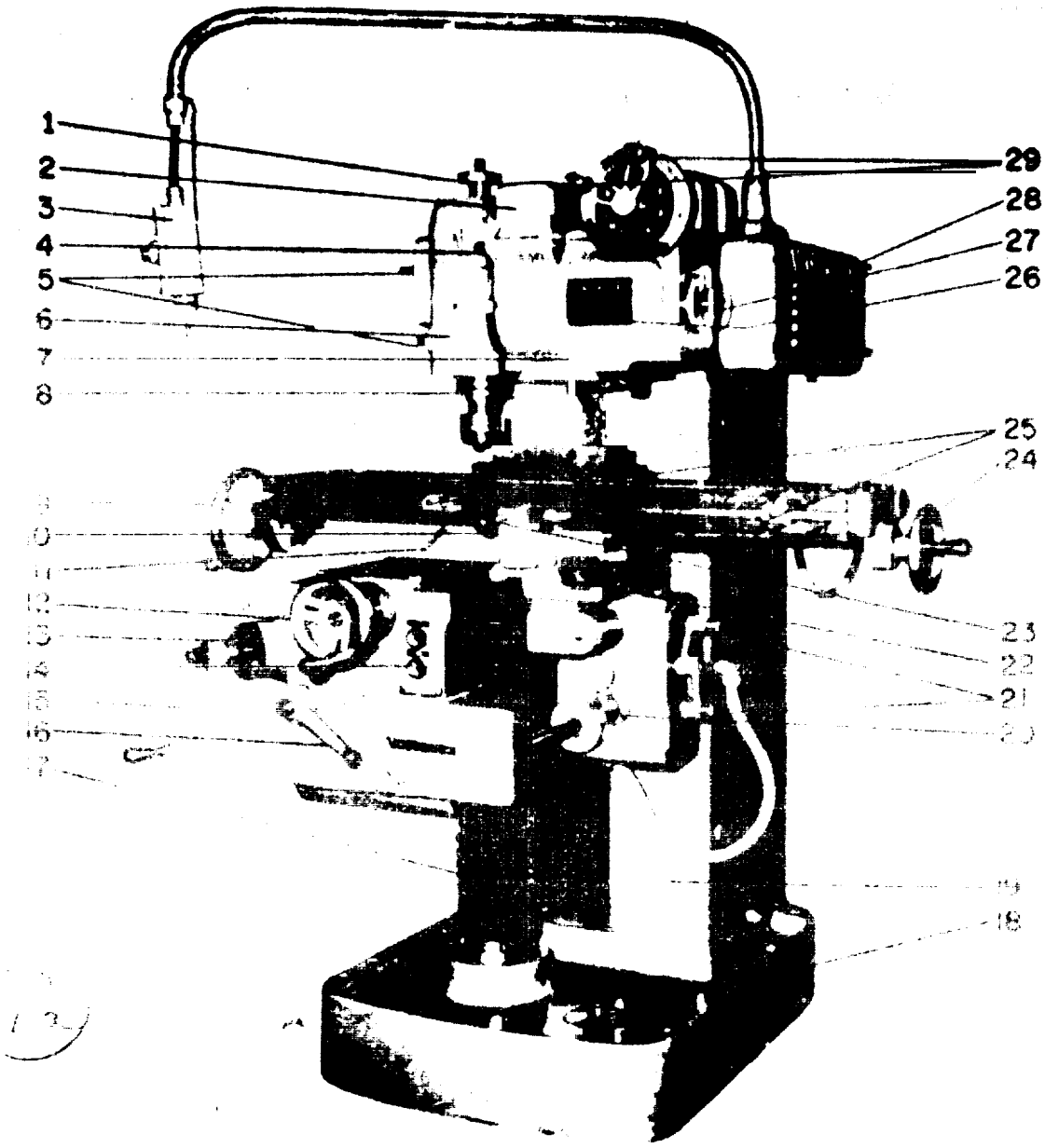
Nos. 1R-3,1RQ-3

The Nos. 1R-3 and 1RQ-3 Van Norman Ram Type Milling Machines are precision tools, built of the best material obtainable and to the highest degree of accuracy. Each machine and its parts are checked many times during construction for both quality and accuracy. With ordinary care and observance of the suggestions in this booklet your Model 1R Van Norman Ram Type Milling Machine will give you many years of satisfactory service.

In the general operation of these models it is important to note that the machine can be used for an exceptionally wide range of milling operations with the minimum of effort on the part of the operator.

In milling operations involved on most jobs where one or a few pieces are required, much time can be saved and the highest degree of accuracy will be assured, by keeping in mind at all times that your machine has as an important part of its design, a spindle which can be instantaneously adjusted to any angle between horizontal and vertical. Also, the spindle cutterhead is adjustable in or out with respect to the column by means of the ram on which it is mounted; thereby providing added range and adaptability to a wide range of milling operations with the minimum of changes in setups.

Before setting up the piece to be milled it is suggested that the operator carefully analyze the operations to be done in order to position the piece for most advantageous use of the horizontal, vertical and angular adjustments of the cutterhead as well as adjustability of the ram unit.

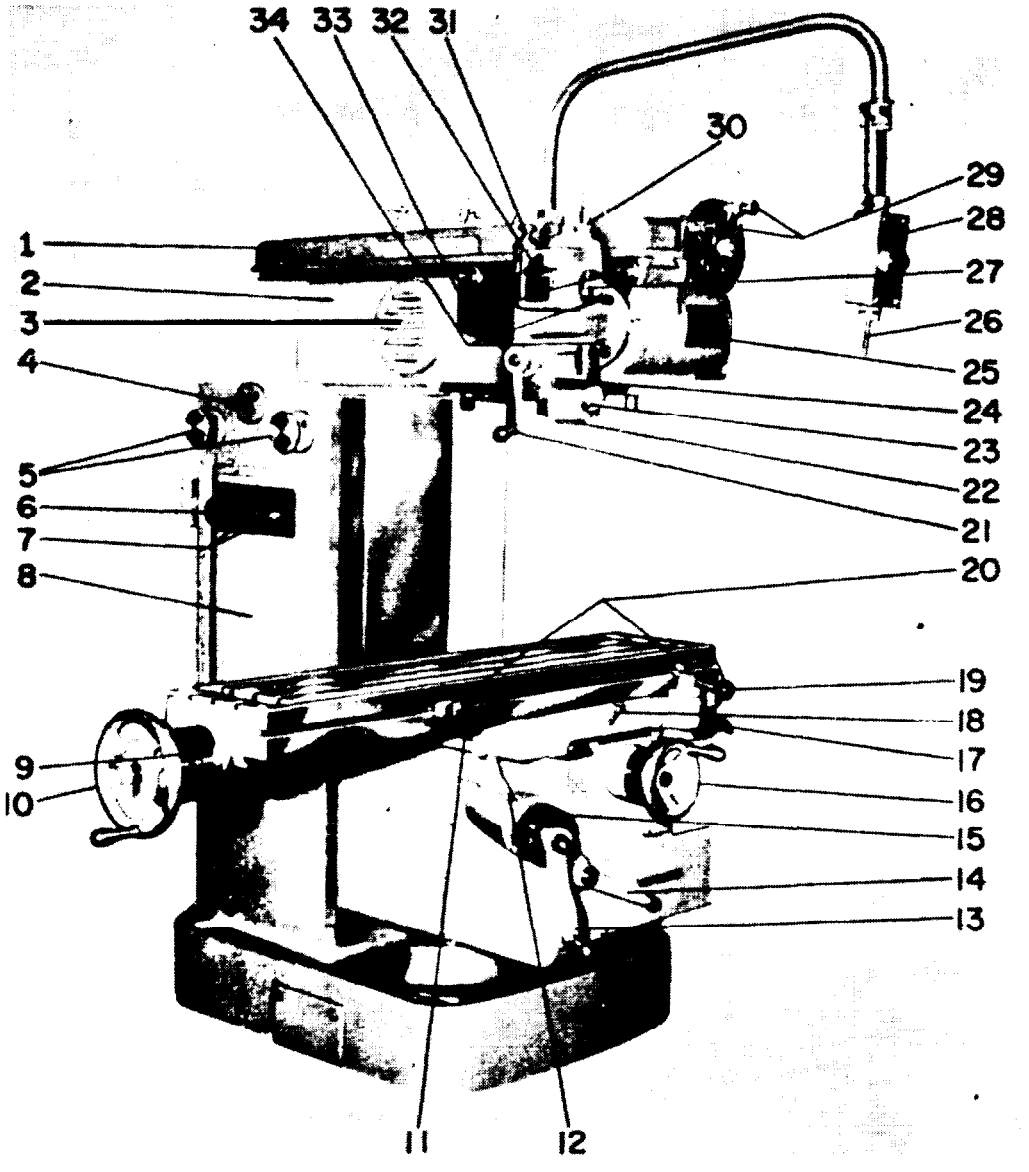


1R-3-22

1. Spindle Draw Bar
2. Overarm
3. Pendant Control
4. Overarm Binder Bolt
5. Cutterhead Clamping Bolts
6. 90 ° Swivel Cutterhead
7. Adjustable Ram
8. #40 N.M.T.B.A. Taper Spindle
9. Table Hand Feed Wheel
10. Directional Table Control
11. Table Binder
12. Crossfeed Handwheel
13. Graduated Dial Vertical
14. Power Positioning Control
15. Knee Elevating Crank
16. Knee Binder
17. Knee Elevating Screw Boot
18. Coolant Tank Cover
19. Heavily Ribbed Cast Column
20. Gear-Mesh Handwheel
21. Feed Selector Knobs
22. One-Shot Lubricator
23. Adjustable Table Traverse Stop
24. Table Hand Wheel
25. Positive Table Stops
26. Spindle Speed Plate
27. Spindle Hand Wheel
28. 3 H.P. Spindle Motor
29. Spindle Speed Selector Knobs

FIGURE 1

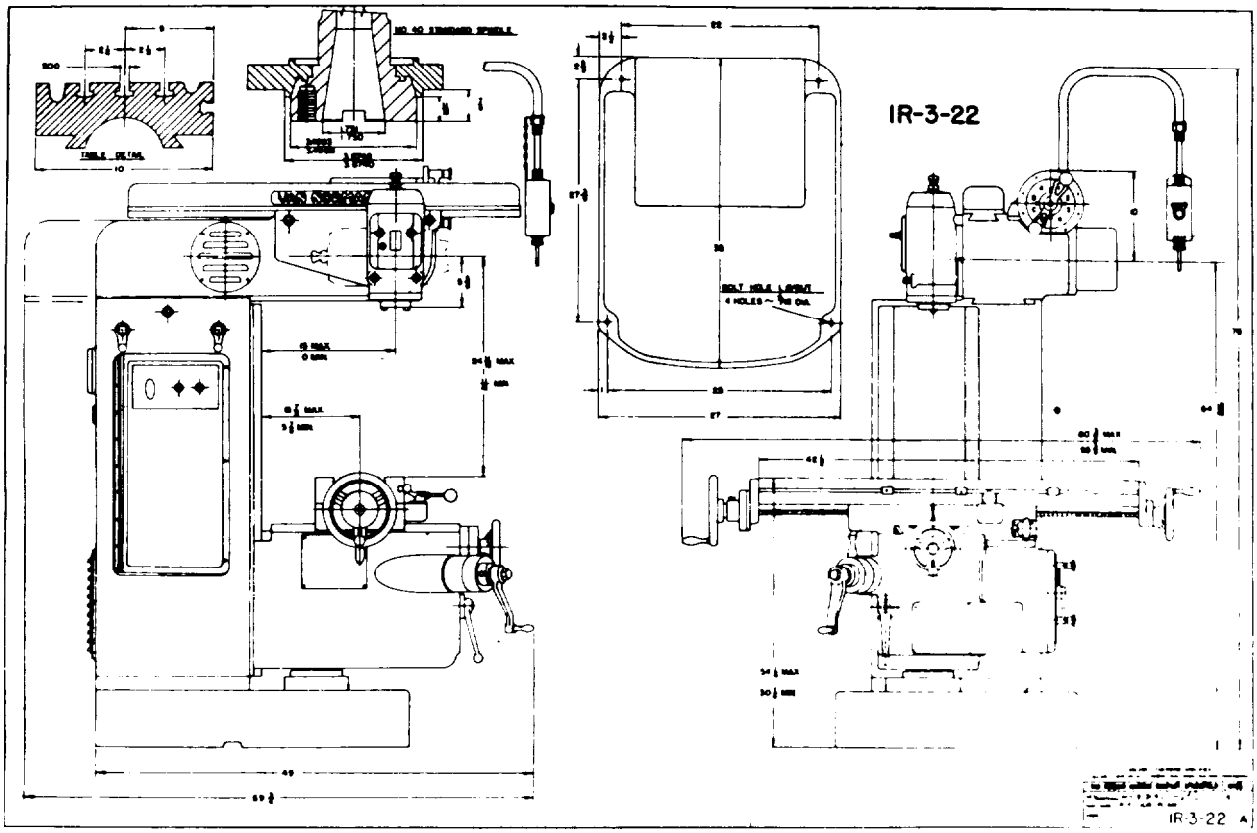
GPO 816—255

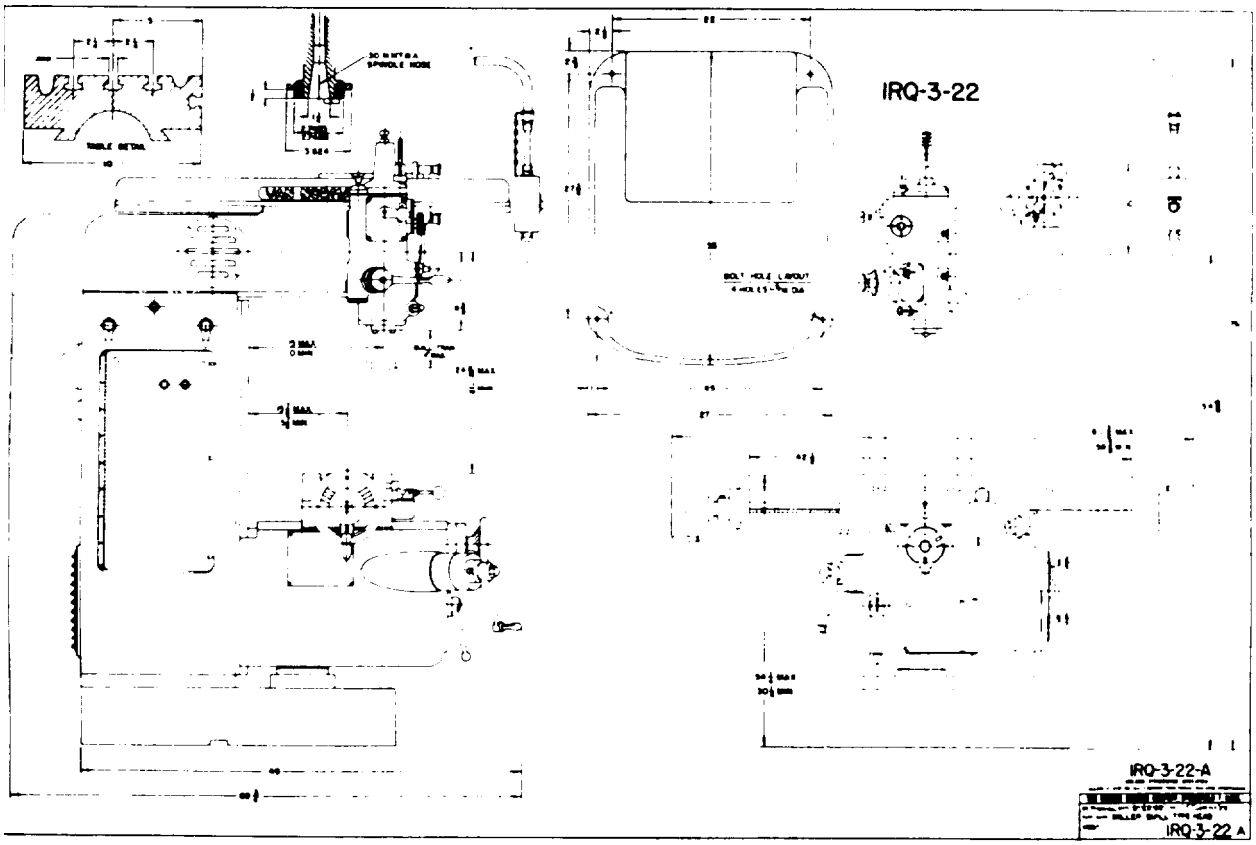


1RQ-3-22

1. Overarm
2. Adjustable Ram
3. 3 H.P. Motor
4. Ram Rack Pinion
5. Ram Binders
6. Selector Switch Control Lever
7. Start-Stop Push Buttons
8. Electrical Panel
9. Traverse Dial
10. Table Handwheel
11. Adjustable Table Stop
12. Saddle Binder
13. Knee Elevating Handwheel
14. Knee Binder
15. Knee Elevating Handwheel Dial
16. Crossfeed Handwheel
17. One-Shot Lubrication
18. Table Binder
19. Directional Table Control
20. Positive Table Stops
21. Quill Travel Hand Crank
22. Van Norman "C" Style or #30 N.M.T.B.A. Taper Spindle
23. Quill Binder
24. 90° Swivelling Cutterhead
25. Spindle Speed Plate
26. Pendant Toggle Stop
27. Quill Power Feed Mesh Control
28. Pendant Control
29. Spindle Speed Selector Knobs
30. Micrometer Quill Travel Depth Control
31. Quill Feed Directional Control Knob
32. Quill Power Feed Shift Lever
33. Overarm Binder Bolts
34. Cutterhead Binder Bolts

FIGURE 2





INSTALLATION PLAN

INSTALLATION

HANDLING

Serious damage can result from improperly lifting and moving a milling machine. Where possible, it is the best procedure to "skid" the machine to its location, and ease it into place with jacks. If cranes are used, it is most important that the sling be properly applied to prevent permanent misalignment in the machine. A sling of 1" diameter rope sufficiently large in circumference should be placed under the front part of the knee, crossed over approximately two feet above the machine and then placed under the rear of the ram with the ram centered on the column. The hook should be located at the exact rope cross-over point. Test the lift for balance before lifting to any height.

CAUTION: *Be sure the ram birders are tightened. It is also recommended that padding be used under the rope to prevent marring the finish of the machine Avoid other methods of slinging, as they may either spring the machine, or upset it as it is lifted*

LEVELING

It is essential to the accuracy of the milling machine that it be properly leveled. This should be done by the use of a long spirit level mounted on the table, both longitudinally and transversely. If leveling blocks are used, these should be placed at the four corners of the base, as well as on each side midway between the rear and front edges. If leveling blocks are not used, the concrete floor should be as smooth as possible, and tapered wedges or shingles, should be inserted in any openings so that the base received as much foundation as possible. Lag screws must be used for securing the machine to the floor after leveling.

INITIAL CLEANING AND PREPARATION FOR OPERATION

The machine is shipped with slushing oil on all ways and machined surfaces to prevent rust during shipment. This slushing oil should be washed off with kerosene or other dissolving agent to make sure that all surfaces are free from residue or dust which might have accumulated. Then all slide ways and flat surfaces should be carefully covered with lubricating oil, after which it is advisable to move the table, saddle and knee by hand so that this oil will thoroughly work onto the surfaces. Before operating the machine, check all oil levels, and oil and grease in accordance with instructions under "Lubrication."

WIRING AND ELECTRICAL *CONTROLS*

Two features of your Van Norman Miller are the enclosed electrical controls and the pendant control. A single selector switch (Fig. 3) controls the starting and stopping of all motors as well as the reversing of the spindle motor.

The #1R Series Millers have two motors, a built-in reversing motor which drives the cutterhead spindle and a feed drive motor which is mounted on the underside of the knee. If the machine is obtained with a coolant system, the pump with a third motor is

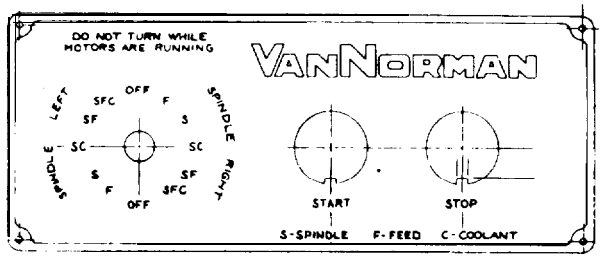


FIGURE 3

mounted in the base. If machine is also equipped with Vertical Power Positioning the motor is located in the lower left front of the knee.

The selector switch which controls the combination of motors has ten operating positions and two off positions. In the middle position everything is off. In each of the five positions to the right, the spindle is rotating forward, or clockwise when viewed from the rear of the machine. In the position marked "F" the feed motor alone is in operation. In the next position marked "S" the spindle motor alone is in operation. The next position marked "SF" operates the spindle and power feed. In the next position marked "SC", the spindle motor and coolant are in operation. The last position marked "SFC" operates all three motors, namely spindle, feed and coolant.

In each of the positions to the left of the "OFF" position the spindle motor is reversed for left hand spindle rotation. These positions control the operation of the coolant and feed motors the same as explained above. (See Fig. 3.)

Turn the lever, right or left, to position the selector switch at the desired setting. To start the machine in operation once the selector switch is correctly positioned, simply push the black start button. Once the selector switch has open correctly positioned, the machine may also be started or stopped by means of the pendant control which may be swung to the most convenient position.

OPERATION

OPERATION

The machine is now ready for operation so it would be well for the operator to become familiar with the movements and controls, both manual and power operated. As mentioned previously, the machine is operated by two motors, one operating the cutter exclusively, and the other the table feed. Each motor has its attendant gearbox for obtaining various speeds. Vertical adjustment of the knee and cross adjustment of the saddle are entirely manual except when a machine is equipped with Vertical Power Positioning in which case vertical adjustment may be either power or manual. Table feed may be either power operated or hand operated.

CAUTION: STOP MOTORS BEFORE SHIFTING GEARS Do not clash moving gears when changing speeds or feeds.

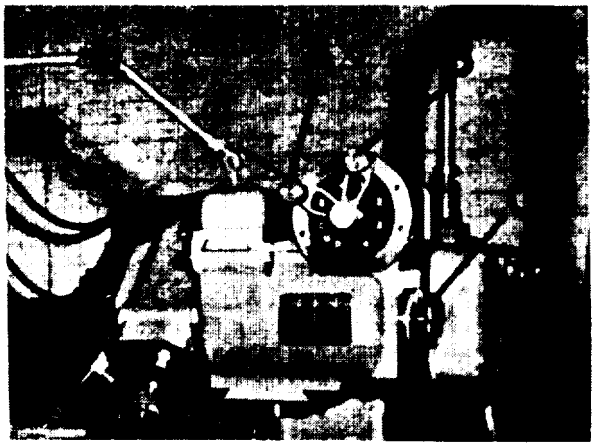


FIGURE 4

SPINDLE SPEED CHANGES

Ranging from 55-2000 RPM on the #1R and 100-3600 RPM on the #1RQ, 14 cutter spindle speeds are obtained by positioning the 2 speed change levers ("A" and "B" Fig. 4), located on the top right face of the ram. There are 4 positions for each Iever. In addition, the left lever has a fifth position for neutral. When in this position, the spindle may he freely rotated by the hand wheel located on the right side of the ram ("C" Fig. 4), without turning the other shafts.

Each of the levers has a pull-out knob, and to secure the desired speed it is only necessary to position them as indicated on the speed plate. All sliding gears have been chamfered so that the teeth will slide between each other as desired. Occasionally, however, these teeth may line up in such a way that their edges come on "dead center", in which case it would be necessary to rotate the hand wheel "C" Fig. 4 slightly so that the proper meshing of the gears can be obtained. After the proper speed selection has been obtained from these levers, the motor is again started. In event that the spindle is to rotate in the opposite direction, this is accomplished electrically by the selector switch as explained in the section entitled Wiring and Electrical Controls.

POWER FEED - TABLE

To obtain the table power feed, first be sure the feed motor is in operation then engage the power feed lever (Item 10. Fig. 1) on front of the saddle. The feed lever is directional, that is, the table will travel in the direction that the lever is positioned.

The power feed may be automatically disengaged as desired by positioning the adjustable table stop, (Item 23, Fig. 1). This will assure the table stopping at a given position repeatedly.

POWER SAFETY STOPS

Table travel limit stops (Item 25, Fig. 1) are fixed in position at the factory at each end of. the travel run. These stops are provided to prevent the feed screw running to the end of the thread and damaging the feed mechanism. Under no conditions should these stops ever be moved.

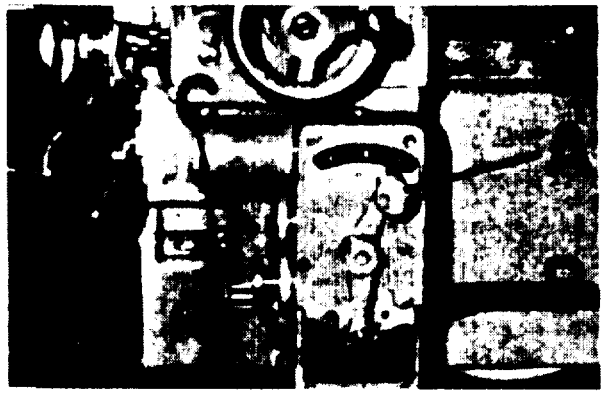


FIGURE 5

POWER FEED CHANGES

The No. 1R Series Van Norman Ram Type Milling Machines have nine feed rates from ¾" per minute to 17" per minute. The feed changes are made by the two feed change levers A and B (Fig. 5) located on the right side of the knee. They operate very similar to the speed change levers in that the top lever "A" is positioned below the station with the desired feed rate and the lower lever "B" is positioned above the station with the same feed rate, *i.e.* if the desired feed rate is 4 inches per minute place the top lever in the middle position below the "B" station and place the lower lever in the middle position or "2" station.

The handwheel "C" Fig. 5 on the left side of the knee may be turned if necessary to mesh the gears.

HAND FEEDS

The table can be moved longitudinally by hand by either the hand wheel (item 9. Fig. 1) at the left end of the table or the hand wheel (Item 24, Fig. 1) at the right hand end of the table.

The cross feed adjustment is by means of the cross feed hand wheel in front of the machine. (Item 12, Fig. 1).

The vertical adjustment is by means of the vertical feed hand crank (Item 15. Fig. 1) also conveniently located at the front of the machine

Large diameter dials graduated in thousandths are provided for all hand movement adjustments. These dials can be set by thumb screws provided on each dial.

Binders are also provided for each of the three movements. The table binder (Item 18, Fig. 2) is located in front of the saddle. The cross feed or saddle binder (Item 12, Fig. 2) is located on the left side and operates by tightening the saddle gib. The vertical feed or knee binder (Item 14, Fig. 2) is located in the front of the knee and operates by tightening the knee gib against the angle on the face of the column.

Whenever a member is to be moved, either by hand or power feed, the appropriate binder must be loosened. At all other times the binders should be tight. This is important as they help to provide rigidity to the machine.

RAM

The ram is solidly locked to the column by means of two binders (Item 5, Fig. 2). To move the ram in or out on the column, it is very essential to loosen these binders. The ram movement is made by rotation of the ram adjustment (Item 4, Fig. 2) which turns a pinion which in turn engages a rack on the bottom of the ram. A hand crank is furnished with the machine which fits the ram adjustment

IMPORTANT: *After making the necessary ram adjustment the binders must be tightened before any milling is done on the machine*

OVERARM

When heavy horizontal milling is to be done, it is desirable to stead the arbor with the overarm and arbor support. The overarm is locked in position by the binders (Items 33, Fig. 2).

IR

HEAD SPINDLE SPEED			
SETTING	SPEED	SETTING	SPEED
B-1	55	B-3	400
A-1	85	A-3	575
B-2	120	D-2	635
A-2	180	C-4	750
B-4	250	C-3	1150
D-1	310	D-4	1325
C-2	360	D-3	2000

DO NOT SHIFT WHEN GEARS ARE IN MOTION

IRQ

HEAD SPINDLE SPEED			
SETTING	SPEED	SETTING	SPEED
B-1	100	B-3	665
A-1	155	A-3	1000
B-2	205	D-2	1100
A-2	315	C-4	1300
B-4	435	C-3	2000
D-1	540	D-4	2300
C-2	625	D-3	3600

DO NOT SHIFT WHEN GEARS ARE IN MOTION

FIGURE 6

CUTTERHEAD - IR-3

The cutterhead is adjustable to any angle between horizontal and vertical, the desired angle being indicated by the graduations on the flange. To move the head, loosen the four binders (Items 5, Fig. 1). Slowly swing the head to the desired angle, and tighten the four binders. Two stops on the ram have been factory set to accurately determine the horizontal and vertical positions. When moving the head, do not bang it against these stops as misalignment might result from the stresses incurred

CUTTERHEAD - 1RQ-3

The 1RQ quill travel cutterhead is adjustable to any Position between a horizontal and a verticalplane, the desired angle being indicated by graduations on the flange of the head. To move the head loosen four binder bolts located around flange of head as shown in Item 34, Figure 2. Swing the head slowly to the desired position and lock all four binder bolts. To operate the machine using the quill feed, loosen quill binder, Item 23, Figure 2. Select feed desired by moving quill power feed shift lever, Item 32, Figure 2 to proper location. There are three feeds - .0015 " .003" and .006". There is also a neutral position. See plate mounted on quillhead as illustrated here in Figure 7. Knob 31, Figure 2, controls in and out direction of the quill. Power feed can be engaged or disengaged by pushing lever as indicated under Fig. 7. Quill can be fed a maximum of 4". At the top of the cutterhead, when in a vertical plane, is a micrometer adjustment which can be set for any length of quill travel desired within the range of traverse. Turn the knurled dial to desired stroke. A recessed rod scaled in inches operates in conjunction with the knurled knob for the desired stroke. Dial is graduated in tens of thousandths. One complete revolution equals .125". This knurled knob when set for desired stroke also determines limit of automatic power feed and at the point where the power kick-out takes effect. TO operate the machine for normal milling operations, retract the quill travel up into the head and lock quill binder, Item 23, Figure 2. Remove quill hand traverse handle, Item 21, Figure 2, as this hand lever is not needed on this type of operation. Place quill power feed shift lever, Item 32, Figure 2, in neutral position, select speeds and feeds desired and proceed as in conventional milling as otherwise described in this booklet. There is a safety clutch in the cutterhead to control any possible overload.

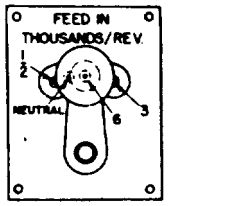


FIGURE 7

UNIVERSAL SADDLE

To adjust the table on models equipped with universal saddle to desired angular position, loosen hex head bolts on underside of lower saddle unit, one at left front, one at right rear, until they drop entirely clear of the upper swivel unit. Then loosen the three swivel saddle binders, one on front face, one on left side, and other on rear face of lower saddle unit. The table then can be revolved to the desired angular position and the table locked by means of the swivel binders.

When the table is used in normal operating position (0 degree angularity) the table should be revolved to the normal position after which the hex head locking bolts on underside of saddle are engaged in the threads of the upper saddle unit and securely fastened. It is also advisable to secure the swivel saddle binders. For extreme accuracy in setting the table to "0" position, use an indicator.

PERIODIC MACHINE ADJUSTMENTS

SPINDLE BEARINGS

CAUTION: Do not attempt to take up spindle bearings without a thorough knowledge of bearing adjustments and operating conditions

The spindle bearings used in the head are the taper roller type and have been properly adjusted for average conditions before leaving the factory, so should not require readjustment before use.

If desired, the end play in the spindle bearings may be checked after a few months of operation in the following manner: Using a lead or composition hammer, gently tap the face of the spindle until all play is taken up towards the rear of the machine. Place an indicator against the face, and then tap the spindle shaft forward from the rear. If the play exceeds .001", adjustment may be made as follows: .

ADJUSTMENT - 1R-3

1. Remove the rear cap from the cutterhead.
2. Loosen set screw in bearing nut.
3. Loosen or tighten the nut as necessary to secure the desired adjustment.
4. Tighten set screw and reassemble the rear cap on the cutterhead.

ADJUSTMENT - 1RQ-3

1. Remove the 1/2" pipe plug which is located in front of the circular scale on the cutterhead.
2. Move quill until the rear most plug in the quill is accessible - remove plug.
3. Revolve the spindle so that a wrench can be inserted in the set screw in the bearing adjusting nut.
4. Loosen set screw and loosen or tighten the nut till the desired bearing adjustment is achieved.
5. Tighten set screw, replace plug in quill and pipe plug in cutterhead.

GIBS

CHECKING GIB ADJUSTMENTS: Gib adjustments should only be made by those who are acquainted with the operation. In general, all gibs should be tight enough to eliminate all play, but not so tight that there will be a heavy drag on the working parts. Gibs that are too loose will result in inaccurate work. Gibs that are too tight will cause severe wear and strain on the operating mechanisms.

The gibs are properly adjusted at the factory and when readjustment becomes necessary. proceed as follows: The table gib is adjusted by means of two shouldered screws located on each end of the saddle. By first loosening one and then tightening the other. the taper gib may be adjusted as needed. The saddle and knee gibs are adjusted in a like manner.

RAM GIB

The ram gib is adjusted by two adjusting screws. The front screw and the end screw are the adjusting screws. To adjust the gib the ram stops must be removed. The stops are located on the bottom of the ram.

Loosen the set screws which are located on the front and back end of the column. Turn both screws on the gib a like amount. Retighten the set screws in the column to hold the adjustment. Replace ram stops.

TABLE FEED SCREW

The backlash in the table feed screw is adjusted by an adjustable bronze feed screw nut located at the Ieft hand end of the saddle. This nut is located in the saddle mechanism just above the saddle binder. To make any desired adjustment loosen the check nut and insert a pin in any of the many holes around the flange of the nut and turn it in either direction until the backlash is from .002" to .005". After completing the adjustment tighten the check nut.

SADDLE FEED SCREW

The saddle feed screw is adjusted by means of a bronze adjusting nut in the rear end of the bracket carrying the screw under the saddle. To adjust, remove plate from left side of knee, loosen the two Allen screws holding the bronze nut, insert a pin in one of the holes in the circumference *of* the nut and turn it until the backlash is from .002" to .005'. After making the adjustment, tighten the two Allen screws and replace cover plate.

LUBRICATION

Lubrication of this machine has been very thoroughly developed so that a minimum of attention is required. However, it is absolutely essential that inspection be made at necessary intervals.

In all units where oil is specified unless otherwise indicated, we recommend a good grade oil with a viscosity of approximately 300 S.U.V. (Seybolt Universal Viscosity) at 100° Fahrenheit.

It is recommended that the oil be drained from the ram, feed box and cutterhead every four months. The reservoir should then be cleaned with a light flushing oil. The machine may be run up to five minutes with this flushing oil, after which it should be drained and the reservoir refilled to the proper level with the recommended lubricant.

RAM — 1R3 AND 1RQ-3

An oil sight glass is provided near the front on the right side of the ram for inspection of the oil level. When the ram gears are stationary, the oil level should be at the center of the sight glass. When necessary, the oil may be replenished by removing the small cover in the top of the ram immediately behind the speed change levers. Oil can be drained by removing plug located on the underside of ram near front. The capacity of the ram is 6 quarts.

CUTTERHEAD — 1R-3

An oil sight glass is provided on the side of the cutterhead for inspection of the oil level. The oil level should be at the center of the glass when the head is in the horizontal position and the spindle is stationary. This reservoir lubricates the spiral bevel gear. When necessary the oil may be replenished by removing the oil plug on the top. A drain plug is located on the underside of the cutterhead. The capacity is 1 pint.

Spindle bearings should be lubricated every six months with anti-friction bearing grease, supplied by Van Norman in one pound cans under Part No. 19249.

CUTTERHEAD — 1RQ-3

The spiral bevel gears are lubricated by oil from the ram.

The Cutterhead bearings should be lubricated once a year, through a Zerk fitting.

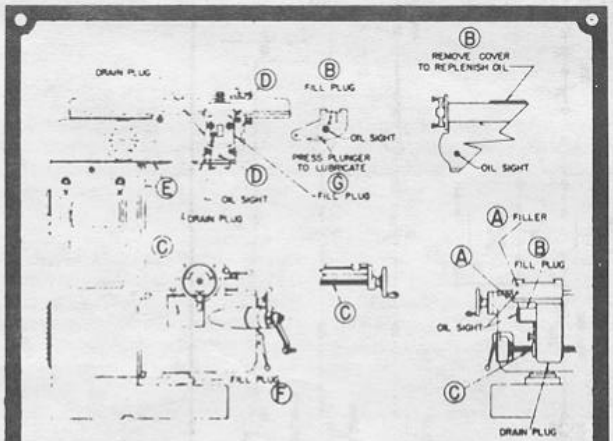
To lubricate: (1) Remove ½" pipe plug located in front of circular scale on the cutterhead. (2) Move quill until "the first plug" nearest the front of quill is accessible, (the second plug is for bearing adjustment described on previous page). (3) Remove plug, and screw in Zerk fitting — apply grease, approximately four to six shots. Both front and rear bearings are lubricated simultaneously in this operation (4) Remove Zerk fitting, and replace plugs.

Grease quill feed worm through grease fitting located on side of cutterhead — apply one shot of a stringy-fibrous grease every four weeks.

Feed gears should be repacked once a year with a stringy-fibrous grease. To accomplish this repacking, remove top and round side covers, indicated as "G" on IRQ-3 lubrication chart.

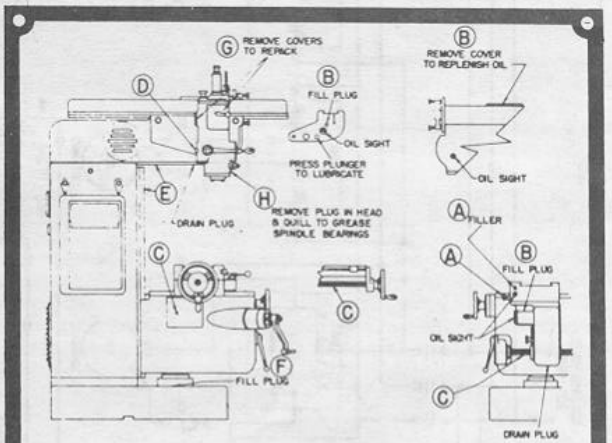
TABLE AND SADDLE

The table and saddle mechanism, as well as saddle and table ways, are lubricated by means of a single shot oiling device located at the front of the saddle. By pulling and releasing the plunger the necessary oil is distributed to these surfaces. This plunger should be operated every hour or two depending upon the use of the machine. The oil reservoir holds sufficient oil for several weeks' operation. An oil sight located in the side of the reservoir indicates the oil level and oil should be added as required.



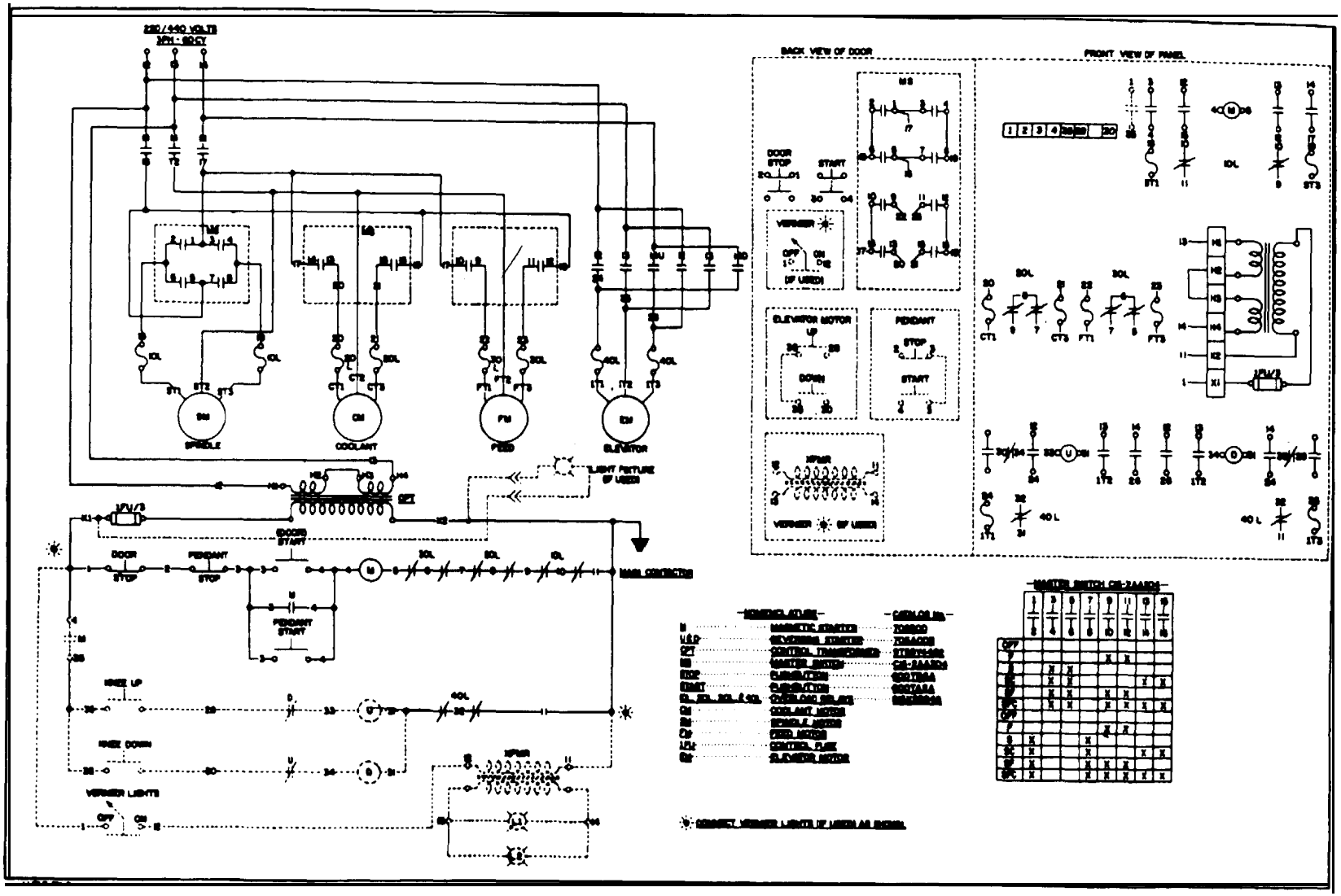
LUBRICATION POINTS	FREQUENCY	TYPE OF LUBRICANT
A	PULL PLUNGER EVERY 2 HRS	SUNOCO WAY OIL NO. 80
B	KEEP OIL LEVEL-CHANGE EVERY 6 MOS	150 SUV AT 100° F. OIL
C	EVERY WEEK WITH SQUIRT CAN	150 SUV AT 100° F. OIL
D	TWICE A YEAR	BEARING GREASE (VN PT NO. 19249)
E	DAILY WITH SQUIRT CAN	SUNOCO WAY OIL NO. 80
F	FILL RESERVOIR EVERY 2 WEEKS	PEN-O-LED EP I
G	KEEP OIL LEVEL-CHANGE EVERY 4 MOS	150 SUV AT 100° F. OIL

Lubrication Chart 1R-3



LUBRICATION POINTS	FREQUENCY	TYPE OF LUBRICANT
A	PULL PLUNGER EVERY 2 HRS	SUNOCO WAY OIL NO. 80
B	KEEP OIL LEVEL-CHANGE EVERY 6 MOS	150 SUV AT 100° F. OIL
C	EVERY WEEK WITH SQUIRT CAN	150 SUV AT 100° F. OIL
D	EVERY 4 WEEKS	STRINGY-FIBROUS GREASE
E	DAILY WITH SQUIRT CAN	SUNOCO WAY OIL NO. 80
F	FILL RESERVOIR EVERY 2 WEEK	PEN-O-LED EP NO.1
G	ONCE A YEAR	STRINGY-FIBROUS GREASE
H	ONCE A YEAR	BEARING GREASE (VN PT NO. 19249)

Lubrication Chart 1RQ-3



Wiring Diagram — 1R3, 1RQ-3

APPENDIX

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists items which accompany the Ram Type Milling Machine or are required for installation, operation, or operator's machine.

2. Requisitioning a part to which FSN has not been assigned.

When requisitioning a C source (local procurement) item identified only by a manufacturer's part number, it is mandatory that the following information be furnished the supply officer:

a. Manufacturer's code number (5 digit number preceding the colon in the descriptive column .

b. Manufacturer's part number (the number, and sometimes letters, following the colon, (a above). Dashes, commas, or other marks must be included exactly as listed.

c. Nomenclature exactly as listed herein, including dimensions if necessary.

d. Name of manufacturer of end item (from cover of TM or manufacturer's name plate).

e. Federal stock number of end item (from TM).

f. Manufacturer's model number (from TM or name/data plate, preferably name/data plate

g. Manufacturer's serial number (from name/data plate).

h. Any other information such as tape, frame number, and electrical characteristics, if applicable.

i. If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field, in accordance with AR 725-50. Complete form as follows:

(1) In blocks 4, 5, and 6, list manufacturer's code and manufacturer's part number (as listed in description column).

(2) In Remarks field, list noun name (repair part), end item application (FSN of end item), manufacturer, model number (end item), serial number (end item), and any other pertinent information such as frame number, type, etc.

3. Explanation of Column.

a. Source, Maintenance, and Recoverability Codes, column la, are as follows:

(1) Source Code column la, indicates the selection status and source for the listed Item. Source codes are:

Code	Explanation
C	Obtain through local procurement. If not obtainable from local procurement, requisition through normal supply channels with a supporting statement of non-availability from local procurement. Applied to repair parts which are stocked in or supplied from GSA/DSA, or Army supply system, and are authorized for we at indicated maintenance categories.

(2) Maintenance Code, column lb, indicates the lowest category of maintenance authorized to install the listed Item. The maintenance level is:

Code	Explanation
C	Operator *or crew* maintenance

(3) Recoverability Code, column lc, indicates whether unserviceable items should be returned for recoverability or salvage. Items not coded are expendable. Recovery code is:

Code	Explanation
R	Items which are economically repairable at direct and general support maintenance activities and are normally furnished by supply on an exchange basis.

b. Federal Stock number, column 2, indicates the Federal stock number for the Item.

c. Description, column 3, indicates the Federal item name and any additional description required. A five digit manufacturer's code and part number is included in parentheses for reference.

d. Unit of Issue, column 4, indicates the unit used as a basis for issue, e.g., ea, pr, ft, etc.

e. Quantity Incorporated in Unit Pack, column 5, indicates the actual quantity contained in the unit pack.

f. Quantity Incorporated in Unit, column 6, Indicates the total quantity of the item used on the equipment.

g. Quantity Authorized, co1umn 7, indicated the total quantity of an item to be on hand and necessary for operation and maintenance of the equipment. Items to be requisitioned as required are indicated by an asterisk.

h. Illustration, column 8, is divided as follows:

(1) Figure Number, column 8a, indicates the figure number of the illustration in which "the item is shown.

(2) Item Number, column 8b, indicates the callout number used to reference the item in the illustration.

4. Abbreviations.

Abbreviations	Explanation
brg -	bearings (s)
B&S -	-Brown&Sharpe
c/o -	consist of
deg -	degree(s)
hd -	head
1h -	left hand
max-	maximum
NS -	American National Special Thread
o/a -	overall
spdl -	spindle
w -	width
w/ -	with
w/o -	without

5. **Federal Supply Code.**

Federal Supply Code	Manufacturer
39899	Metallising Company of America

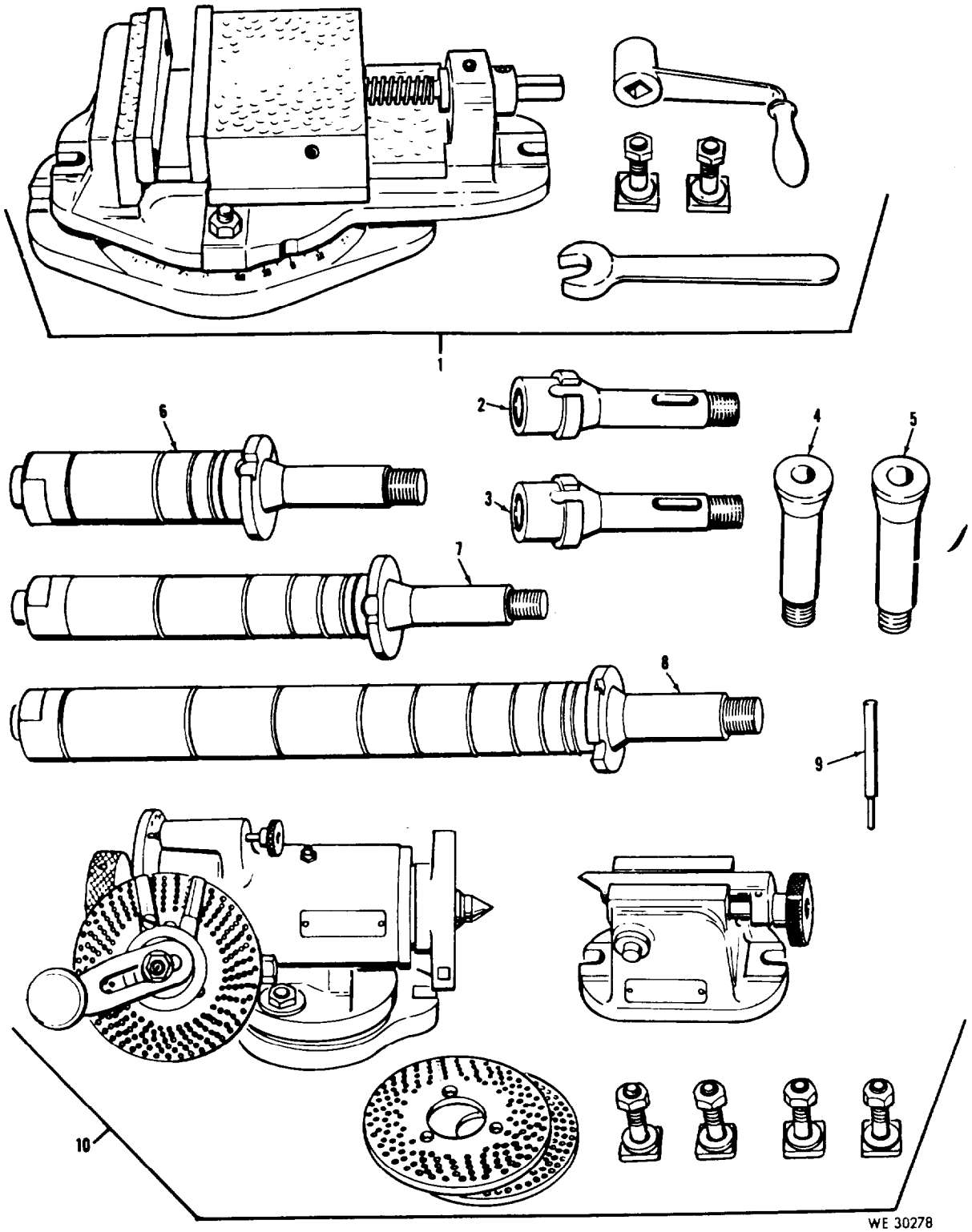
6, Errors, Comments, and/or Suggestions.

Reports **of** errors, comments, and/or suggestions are encouraged. They should be submitted on DA Form 2028 and forwarded direct to: Commanding General, Headquarters, U. S. Army Weapons Command, ATTN: **AMSWE-SMM-P,** Rock Island Arsenal, Rock Island, Illinois, 61201.

(1) SOURCE, MAINT. AND RECOV. CODE (a)	(b)	(c)	(2) FEDERAL STOCK NO.	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY. INC. IN UNIT PACK	(6) QTY. INC. IN UNIT	(7) QTY. REQUIRED	(8) ILLUSTRATION (a) FIG. NO.	(b) ITEM NO.
				TOOLS AND EQUIPMENT FOR MILLING MACHINE, FAN TYPE (79141:IR-3-22 & IRQ-3-22)						
PC	R		34660-356-8874	ARBOR, MILLING CUTTER: tong and, 7/8 arbor dia, 6-1/2 arbor lg, c/o pilot, w/clamp nut and spacers w/o brg sleeves (79141-6-158c) c/o:	EA	1	1	1	A-1	7
PC	--		5310-357-2200	NUT, MILLING CUTTER ARBOR: 7/8-12NS-3 1h thd (79141:J-2690)	EA	1	1	1	--	--
CC	--		---	SPACER, MILLING ARBOR: cutting, 7/8 id, 1/4 thk (79141:J-303D).	EA	1	1	1	--	--
CC	--		---	SPACER, MILLING ARBOR: cutting, 7/8 id, 1/2 thk (79141:J-304D).	EA	1	1	1	--	--
CC	-		---	SPACER, MILLING ARBOR: cutting, 7/8 id, 3/4 thk (79l41:J-266D).	EA	1	1	1	--	--
CC	-		---	SPACER, MILLING ARBOR: cutting, 7/8 id, 1 thk (79141:J-268D).	EA	1	1	1	--	--
PC	--		3460-338-6724	SRACER, MILLING CUTTING ARBOR: 7/8 id, 2 thk (79141:J-564D).	EA	1	2	2	--	--
PC	R		3460-356-8873	ARBOR, MILLING CUTTER: thd hole end, 1-10NS 1h, 1 arbor dia, 3-1/2 arbor lg, v/o pilot, v/clamp nut and spacers, w/o brg sleeves (79141:12-771C) o/o	EA	1	1	1	A-1	6
PC	--		5310-357-2201	NUT, MILLING ARBOR: 1-10NS-3 1h thd (79141:111-364D).	EA	1	1	1	--	--
PC	--		3460-357-3986	SPACER, MILLING ARBOR: cutting, 1 id, 1/4 thk (79141:111-409D).	EA	1	1	1	--	--
PC	--		3460-357-3987	SPACER, MILLING ARBOR: cutting 1 id, 1/2 thk (79141:111-409D)	EA	1	1	1	--	--
PC	--		3460-357-3988	SPACER, MILLING ARBOR: cutting, 1 id, 3/4 thk (79141:111-367D)	EA	1	1	1	--	--
PC	--		3460-357-3991	SPACER, MILLING ARBOR: cutting, 1 id, 2 thk (79141:111-819D)	EA	1	1	1	--	--
PC	R		3460-356-8875	ARBOR, MILLING CUTTER: thd hole end, 1-10NS 1h, 1 arbor dia, 12 arbor lg, w/o pilot, w/clamp nut and spacer, v/o brg sleeves (91141:12-774) c/o:	EA	1	1	1	A-1	8
PC	--		5310-357-2201	NUT, MILLING ARBOR: 1-10NS-3 1h, thd (79141:111-364D).	EA	1	1	1	--	--
PC	--		3460-357-3986	SPACER, MILLING ARBOR: cutting, 1 id, 1/4 thk (79141:111-409D).	EA	1	1	1	--	
PC	--		3460-357-3987	SPACER, MILLING ARBOR: cutting, 1 id, 1/2 thk (79141:111-4120D).	EA	1	1	1	--	--
PC	--		3460-357-3988	SPACER, MILLING ARBOR: cutting, 1 id, 3/4 thk (79141:111-367D).	EA	1	1	1	--	--
CC	--		---	SPACER, MILLING ARBOR: cutting, 1 id, 1 thk (79141:111-369D).	EA	1	1	1		
CC	--		---	SPACER, MILLING ARBOR: cutting, 1 id, 1-1/4 thk (79141:111-420D)	EA	1	2	2	--	

(1) SOURCE, MAINT AND RECOV CODE (a) SOURCE	(b) MAINT	(c) RECOV	(2) FEDERAL STOCK NO.	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT PACK	(6) QTY INC IN UNIT	(7) QTY AUTH.	(8) ILLUSTRATION (a) FIG NO	(b) ITEM NO
				TOOLS AND EQUIPMENT FOR MILLING MACHINE, RAM TYPE (79141:IR-3-22 & IRQ-3-22) - Continued						
P	C	--	3460-357-3991	SPACER, MILLING ARBOR: cutting, 1 id, 2 thk (79141:111-819D).		1	2	2	--	--
P	C	--	3417-357-3992	SPACER, SLEEVE: S, 1.003 max id, 1.605 max od, 3.005 max o/a lg, v/keyway (79141:111-820D).		1	1 *	1	--	--
CC		R	---	BRACE, OUTER: spdl, ram clamp-on type, w/removable center.		1	1	1	--	--
P	C	--	3460-357-0043	COLLET, SOLID, TAPER HOLE: "C" style, No. 5 B&S taper (79141:C-361).		1	1	1	A-1	2
P	C	--	3460-357-0044	COLLET, SOLID, TAPER HOLE: "C" style, No. 7 B&S taper (79141:12-757).		1	1	1	A-1	3
C	C	--	---	COLLET, SOLID, TAPER HOLE: "0" style, No. 1 Morse taper (79141:C-413).		1	1	1	A-1	4
CC		--	---	COLLET, SOLID, TAPER HOLE: "C" style, No. 2 Morse taper (79141:12-779).		1	1	1	A-1	5
CC		--		CRANK, RAM: w/8 sq opng for ram and overarm binder (79141:16-396).		1	1	1	--	--
PC		R	3417-357-0594	FIXTURE, INDEXIG: 7-1/2 swing, complete w/base, tailstock, and 4 tee bolts v/ants and washers (794141:6-7200).		1	1	1	A-1	10
PC		R	3460-975-1740	VISE, MACHINE TABLE: swivel base, tee slot, 5 jaw w, 2-1/2 jaw opng, complete w/crank handle, tee bolt wrench, and 2 tee bolts w/nuts and washers (79141:12-71175).		1	1	1	A-1	1
PC		--	5120-357-8673	WRENCH, LEVER PIN TYPE: 1/4 dia, 4-1/4 lg (79141:lll-200).		1	1	1	A-1	9
PC		--	5120-184-8558	WRENCH, OPEN END FIXED: dble hd type, 15 deg angle of hd, 11/16 and 25/32 opngs, 11/32 hd thk, 7 lg.		1	1	*	--	--
PC		--	5120-277-2691	WRENCH, OPEN END FIXED: sgle hd type, 15 deg angle of hd, 3/4 opng, 7/16 hd thk, 7-1/8 lg.		1	1	*	--	--
PC		--	5120-277-1253	WRENCH, OPEN END FIXED: sgle hd type, 15 deg angle of hd, 7/8 opng, 1/2 hd thk, 8 lg.		1	1	*	--	--
PC		--	5120-277-1250	WRENCH, OPEN END FIXED: sgle hd type, 15 deg sngle of hd, 1-1/4 opng, 3/4 hd thk, 11-7/8 lg.		1	1	*	--	--

TOOLS AND EQUIPMENT



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