

MODEL 10RH RAM TURRET

DUPLEX MILLING MACHINE

MODEL 10R
RAM TURRET
VERTICAL
MILLING MACHINE



Axelson

Manufacturing Company

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MODEL 10RH RAM TURRET DUPLEX MILLING MACHINE AND MODEL 10R RAM TURRET VERTICAL MILLING MACHINE

take advantages of carbide cutter tools. Power feed to the vertical spindle and table are available if desired. The machine provides 22" under the vertical cutter and $19\frac{1}{2}$ " under horizontal spindle to the table and the combined table and turret slide provides 38" travel. With the optional table this travel is extended to 44", permitting the handling of large work pieces.

MODEL 10R RAM TURRET VERTICAL MILLING MACHINE

The Model 10R Ram Vertical Milling Machine is identical to this machine with the exception of the horizontal spindle. Extra attachments and equipment are available for handling a wide range of work economically.

MAIN CASTINGS

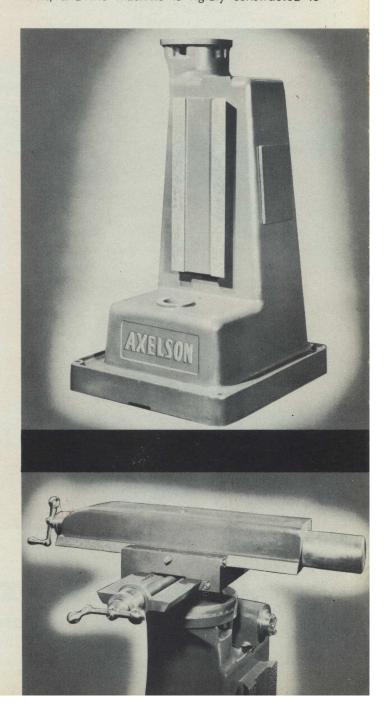
All castings are made in Axelson's own foundry which also casts the famous Axelson Lathe beds and parts. They are made from "Axloy" Axelson #35 CNM semi-steel formulation containing chrome, nickel and molybdenum. This formulation is designed for high strength, rigidity and great resistance to wear. It has a modulus of elasticity of approximately twenty million as compared with eight million for regular cast iron. In addition, the heavy box type structure of the main column and base is ribbed on the inside to provide the strength and rigidity required for heavy accurate work.

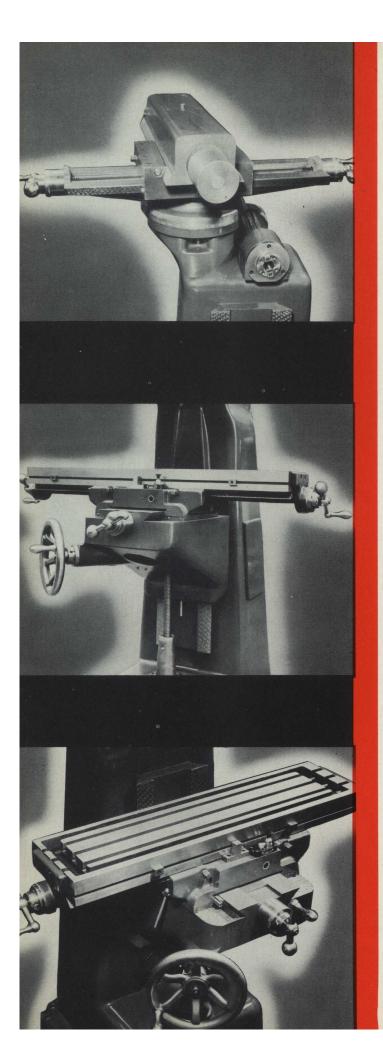
HEAVY DUTY RAM

The heavy duty ram is mounted on a heavy dovetail way slide. It is cast from Axloy and is of extremely heavy construction to give the rigidity and strength required for heavy duty milling. In and out adjustment of the ram is by means of a ball crank operating a precision screw. A large dial graduated in thousandths of an inch assists the operator in making precision settings or feeding to desired dimensions. One end of the ram supports the vertical spindle and the other end holds the arbor support which may be positioned to suit the work at hand. The ram has an in and out travel of 18" and combined ram and cross feed travel is 26"

The Axelson Model 10RH Ram Turret Duplex Milling Machine is a medium weight milling machine that offers large machine capacity. It is moderately priced for a tool that possesses the high precision and stability required to handle a large variety of milling, boring, drilling, and grinding operations. It is particularly suited to tool rooms, pattern shops, and machine shops of all types.

The outstanding advantages of the Model 10RH are reflected in its extra capacity, increased horse-power, with wide range of spindle speeds required to handle a great variety of work. Heads may be powered with 1 or 1½ H.P. motors which supply 6, 8, 12, or 16 spindle speeds, depending upon the motor speed and back gearing equipment selected. Vertical spindle speeds may range from 50 to 6400 RPM and horizontal spindle speeds from 55 to 3600 RPM, and the machine is rigidly constructed to





TURRET SLIDE

The turret slide supports the ram turret on dovetail ways and provides a longitudinal travel of 16" for the ram. This travel combined with the standard table travel is 38" and may be increased to 44" with the optional table. Heavy milling cuts can be taken over the entire length of the slide travel and provide large machine capacity at moderate machine cost. Feeding of the slide is by ball cranks operating a feed screw at either end of the turret slide. Large dials graduated in thousandths of an inch are located at each end of the slide to facilitate machining operations.

SADDLE - KNEE

The saddle and knee is of extra heavy construction to give the extra strength required to absorb the stresses of heavy milling cuts. The knee slides on a 12" wide dovetail way cast integral with the column and provides a 14" long bearing support. The knee bearing has an overall width of 14" with 4" wide ways on each side of the dove tail. Positive lever locking rigidly clamps the saddle and knee at any desired position for the work at hand. Vertical adjustment of the knee is by a large diameter hand wheel operating a vertical screw through a set of bevel gears. A large dial graduated in thousandths of an inch assists the operator in making accurate settings quickly.

TABLE

The table is cast from Axloy for extra strength and to provide a durable working surface with long wearing qualities. The standard table has a 9" x 36" working surface and top and sides are precision ground. The table has three T-slots and a well around the edge for collecting coolant. One end of the table is tapped for coolant removal. Optional tables are available which provide 9" x 42" working surface. Table feeding is through a precision screw operated by a ball crank at the left end of the table provided with large dials graduated to read in thousandths of an inch.

"ALL-ANGLE" MILLING HEAD

The type 30 precision all-angle milling head is of quill type construction and is ideally suited for milling, drilling, boring, reaming, and grinding operations. It is powered by $\frac{3}{4}$, 1, or $1\frac{1}{2}$ H.P. motors and supplies 6, 8, 12, or 16 spindle speeds. Feeding is by handwheel, hand lever, or power feed.

The all-angle head may be rotated 360° around the overarm. The 1½V machine has a built-in crank operated worm wheel angle adjuster which saves valuable minutes in making desired settings. If desired, a positive draw taper pin may be installed for quickly and accurately locating the head on vertical center. Large graduated dials assist the operator in making fast, accurate angle settings for any desired angle of operation. This saves valuable time, and work moves faster because it is faster to change the machine than to reset the work.

SPECIAL HAND WHEEL ANGLE ADJUSTER

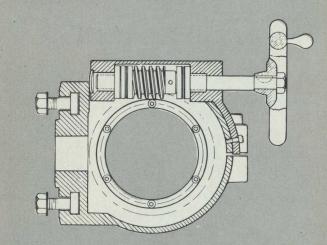
A special hand wheel angle adjuster that operates through a worm and worm wheel may be provided as an extra to assist the operator in swivelling the head to any desired angle after loosening the bolts that lock the head rigidly in place. A large graduated dial is provided for making the desired angle settings. This adapter is particularly suited to such work as dies, jigs and fixtures that require a wide variety of machining operations and many different angle settings on a single piece of work. It saves time because it is faster to reset the head than to change the work set-up and eliminates the expense of angle cutters in manufacturing operations.

SPINDLE SPEEDS AND MOTORS

Axelson type 30 milling attachments may be supplied with either 6 or 12 spindle speeds or with patented back gear feature to supply 8 or 16 spindle speeds. The extra speeds provide the necessary power on the low speed ranges for heavy milling with large cutters. This is accomplished through back gears which give a 3 to 1 reduction through a set of planetary gears located in the V-belt sheeve.

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	H.P.	Motor Speed		No. Speeds	s Spindle Speeds — RPM		
	3/4, 1	1200	No	6	300, 530, 865, 1625, 2400, 4250		
	3/4, 1	1200	Yes	8	100, 180, 300, 530, 865, 1625,2400, 4250		
	3/4, 1, 1	11/2 1800	No	6	450, 800, 1300, 2240, 3600, 6400		
١	3/4, 1, 1	11/2 1800	Yes	8	150, 250, 450, 800, 1300, 2240, 3600, 6400		
	Two Speed Motors						
	1	1200/600	No	12	300, 532, 866, 1625, 2400, 4250 150, 265, 432, 812, 1200, 2125		
	1	1200/600	Yes		100, 175, 300, 532, 866, 1625, 2400, 4250 50, 87, 150, 265, 433, 812, 1200, 2125		
	11/2	1800/900	No	12	450, 800, 1300, 2240, 3600, 6400 225, 400, 650, 1120, 1800, 3200		
	11/2	1800/900	Yes		150, 250, 450, 800, 1300, 2240, 3600, 6400 75, 125, 225, 400, 650, 1120, 1800, 3200		





The spindle speeds available are dependent upon the motor selected, as shown in the table, and all speeds are reversible. Speed changing is a manual operation performed by loosening the motor mounting screws and moving the motor toward the spindle pulley which permits shifting the belts to any desired pulley step.

MOTORS AND CONTROLS

Motors can be supplied for 220/440 volt, 3 phase, 50 or 60 cycle; or 115/230 volt, 1 phase, 60 cycle current with manual forward, stop, and reverse switch installed on the motor. If desired, J.I.C., magnetic and other switches are available upon request. The entire motor bracket rotates 360° about the attachment and may be set at any desired position. This has a particular advantage of moving the motor bracket to avoid any interference with some projection of the work being machined.

PLANETARY BACK GEAR

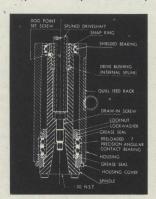
Planetary back gears are available in both the vertical spindle and the horizontal spindle pulleys to provide an additional two or four speeds, depending upon motor selected, in the lower speed range for heavy duty milling with large cutters. The planetary gives a 3 to 1 reduction and may be engaged or disengaged by a knurled pull pin. The planetary on the horizontal spindle is of the same design as in the vertical spindle except that it is larger and heavier of necessity.

THE QUILL AND SPINDLE

The precision ground quill is made of heat treated mechanical tubing, accurately machined, honed and draw lapped with housing. The quill has a $3\frac{1}{2}$ " long travel and is provided with a rack for feeding. A quill lock that is positive in action permits the operator to accurately locate the cutter at any desired height. The quill weight is adjustably compensated for sensitivity.

The precision hardened vertical spindle is made from chrome moly steel, accurately ground and fitted in the spindle quill. The spindle is mounted on preloaded #7 precision angular contact bearings that eliminates looseness in the bearing in a radial or axial direction while the other end of the spindle is carried on a single row double shielded ball bearing taking the radial load only. The spindle has a No. 30 National Standard Taper with positive key

drive. Cutters and tools are interchangeable with the horizontal spindle. Cutter and arbors do not stick in the spindle and it is not necessary to drive them out by pounding when changing tools. As a result, the original precision of the bearings is preserved over a long period of time.

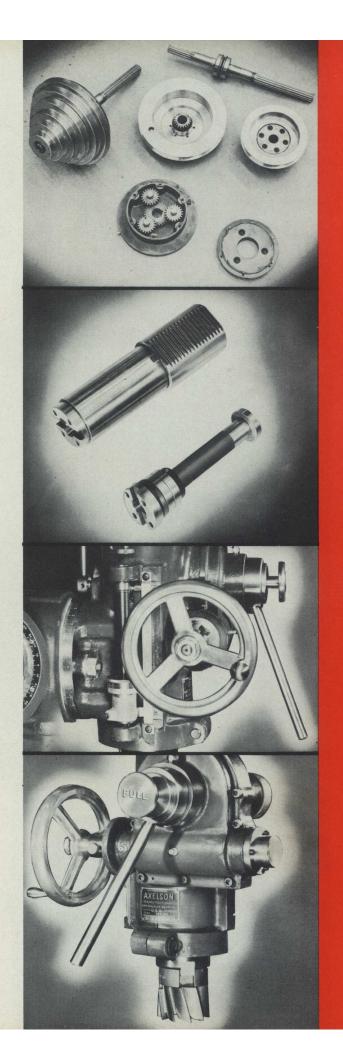


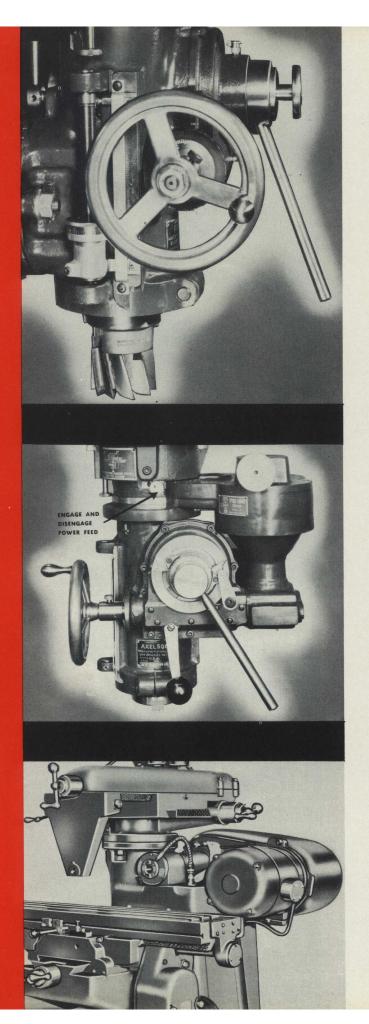
VERTICAL SPINDLE FEEDING

Both hand wheel and hand lever feed to the quill is supplied on the No. 30 milling head as standard equipment.

Hand wheel feed operates through a 34 to 1 ratio worm and worm gear and provides fine feeding and sufficient power for heavy drilling, boring, or milling operations. A large adjustable dial on the handwheel graduated in thousandths of an inch, assists the operator in feeding to desired depths or in making accurate cutter settings.

Hand lever feed for sensitive feeding is through a rack and pinion and is engaged by a pull-pin at the hub of the hand lever. Pulling out engages a positive jaw clutch for hand lever feeding and pushing in disengages the clutch and engages the hand wheel feed.





MICROMETER QUILL STOP

A built-in adjustable micrometer quill stop is provided to assist the operator in making accurate settings of feeding to accurate depths. The stop consists of a micrometer screw, knurled stop nut with pointer, and a $5\frac{1}{2}$ " scale mounted on the head. The stop nut is graduated to read in thousandths and is provided with a positive clamping screw that locks the stop nut rigidly in place. The stop has a working range of $3\frac{1}{2}$ "

POWER FEED TO QUILL

Power feed to the quill, available as an extra, is supplied through a positive gear attachment. It provides a powerful steady rate of feed to the quill for milling, drilling, and boring operations. Three feeds of .0015", .003", and .006" per revolution of the spindle may be quickly selected by turning the knurled knob located on the power feed gear box. When not desired, the power feed can be disconnected by turning the small knurled knob on the head which avoids excessive use of the gears when not needed. Control of feeding is through a lever mounted at the side of the housing. A forward position feeds the spindle down and a backward position of the lever feeds the spindle up. Two trip dogs are provided for power feeding — one is a permanent cut out and acts to protect the spindle and gearing at the end of the spindle travel. The other is adjustable and may be set for disengaging the feed at any desired point.

HORIZONTAL SPINDLE

The precision hardened horizontal spindle is made from chrome moly steel, accurately ground and fitted in the spindle housing. The spindle is mounted on preloaded #5 precision angular contact bearings that eliminates looseness in the bearing in a radial or axial direction while the other end of the spindle is carried on a single row double shielded ball bearing taking the radial load only. The spindle has a No. 30 National Standard Taper with positive key drive. Cutters and tools are interchangeable with the vertical spindle. Cutter and arbors do not stick in the spindle and it is not necessary to drive them out by pounding when changing tools. As a result, the original precision of the bearings is preserved over a long period of time.

HORIZONTAL SPINDLE DRIVE

The horizontal spindle has its own independent motor drive. The controls are mounted on the motor itself convenient to the operator. Spindle drive is through V-belts and speed changing is a simple, fast operation. The motor is 1 H.P. and may be either single speed or double speed to provide spindle speeds as shown in the table.

H.P.	Motor Speed		Back Gear	Number Speeds	Spindle Speeds—RPM
1	1200	RPM	Yes	8	110, 255, 280, 640, 980, 1470, 2250, 3600
1	600/1200	RPM	Yes	16	55, 110, 128, 255, 140, 280, 320, 640, 490, 980, 735, 1125, 1470, 1800, 2250, 3600

Motors can be supplied for 220/440 volt, 3 phase, 50 or 60 cycle; or 115/230 volt, 1 phase, 60 cycle current with manual forward, top, reverse switch installed on the motor. If desired, J.I.C., magnetic and other switches are available upon request.

HORIZONTAL SPINDLE AND PLANETARY BACK GEAR

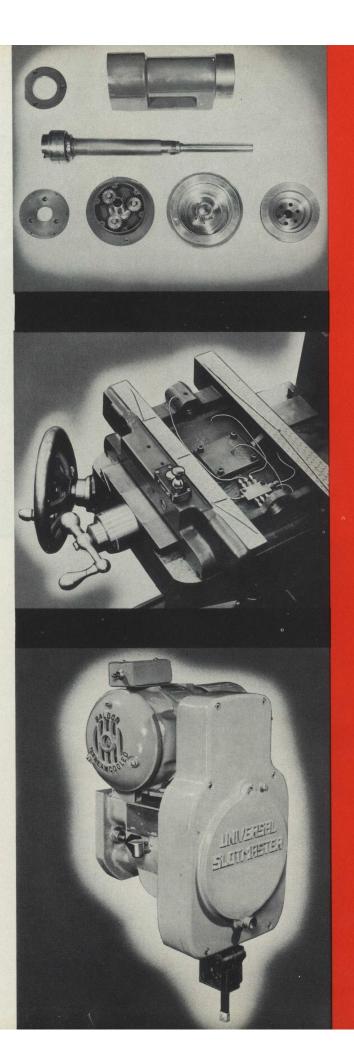
A planetary back gear arrangement located in the horizontal spindle pulley provides an additional two or four speeds depending upon the type motor selected. The additional speeds are in the low range to provide the extra power required for heavy duty milling with large cutters. The planetary back gear supplied as standard equipment on the horizontal spindle gives a 3 to 1 reduction and is of similar design but heavier construction than the back gear used with vertical spindle. The back gear is engaged or disengaged by a knurled pull pin. Single speed 1200 RPM motors provide 8 spindle speeds from 110 to 3600 RPM, while two-speed 600/1200 RPM motors provide 16 spindle speed changes from 55 to 3600 RPM.

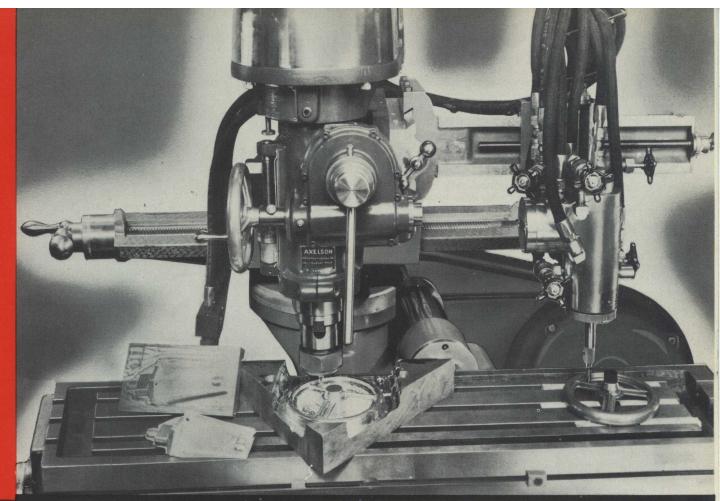
LUBRICATION

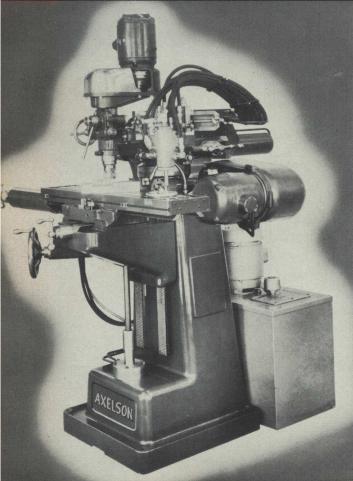
A one-shot lubrication system is built into the saddle to provide fast, simple lubrication to the table ways, knee' ways, and feed screw nut. Eight points are lubricated with metered amounts of oil at one press of the button to insure long accurate service. A built-in sight oil gauge tells the operator at a glance the quantity of oil in the reservoir. Other points of the machine requiring less frequent attention are lubricated through Zerk oil fittings.

UNIVERSAL VERTICAL SHAPER

The Universal Vertical Shaper is available for performing such operations as cutting keyways, templates, splines, internal gears and for slotting out precision blanking dies and molds, or wherever sharp corners and special shapes are machined. The shaper attaches on the ram slide in the same manner as the Axelson all-angle milling head and can be positioned at any angle desired. The table motions of the milling machine provide the means for positioning the work for shaping operations. The stroke of the shaper is easily adjustable for O" to 4" and speeds range from 50 to 250 strokes per minute. The tool holder is of the clapper box type and provides clearance on the return stroke. It is made of tool steel, hardened and ground, and can be turned in any desired position about the vertical axis. The Universal Shaper is approximately 18" long, 8" wide and 12" deep, and is a complete selfcontained unit.

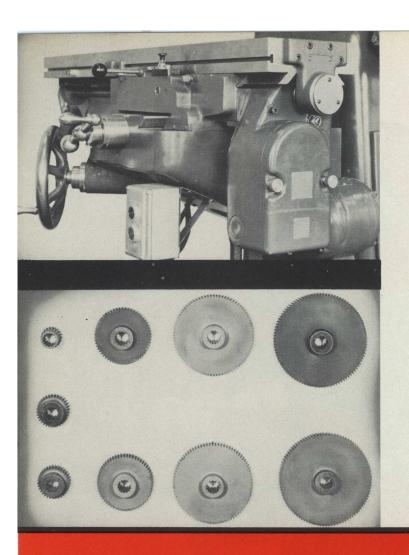






HYDRAULIC DUPLICATOR ATTACHMENT

A hydraulic duplicator attachment may be supplied for making duplicate molds, dies, or for contour milling to templates. The duplicator sensing tracer head controls the movement of the table, knee, and ram slide. In operation, the operator moves the stylus over the master which in turn causes the cutter to move in like manner. Less than six ounces of pressure is all that is required to move the stylus finger. Oil pressure is supplied by a self-contained unit resting on the floor at the rear of the machine. If not desired, the sensing head may be quickly removed, restoring the machine to its standard manual operation. Tracing units may include 1, 2 or 3 slide control units.



POWER TABLE FEED

Motorized power table feed is available as an extra to provide powerful steady longitudinal table feed. This attachment is powered by a ½ H.P. motor and drive is through a series of pick-off gears that permit changing the rate of speed to provide a range of ½" to 13" per minute. Control for power feeding is by a lever at the front of the machine that controls the direction of feed as well as disengaging feed. Adjustable stop dogs may be set at any desired points over the full working range of the table to provide automatic feed trip. The table power feed unit is equipped with a slip clutch as a safety measure in case the table is fed past the table stop. The addition of power table feed reduces the overall table travel by 3".

Change gears are stored in a convenient dust free compartment provided in the main housing.

ADDITIONAL GEARS

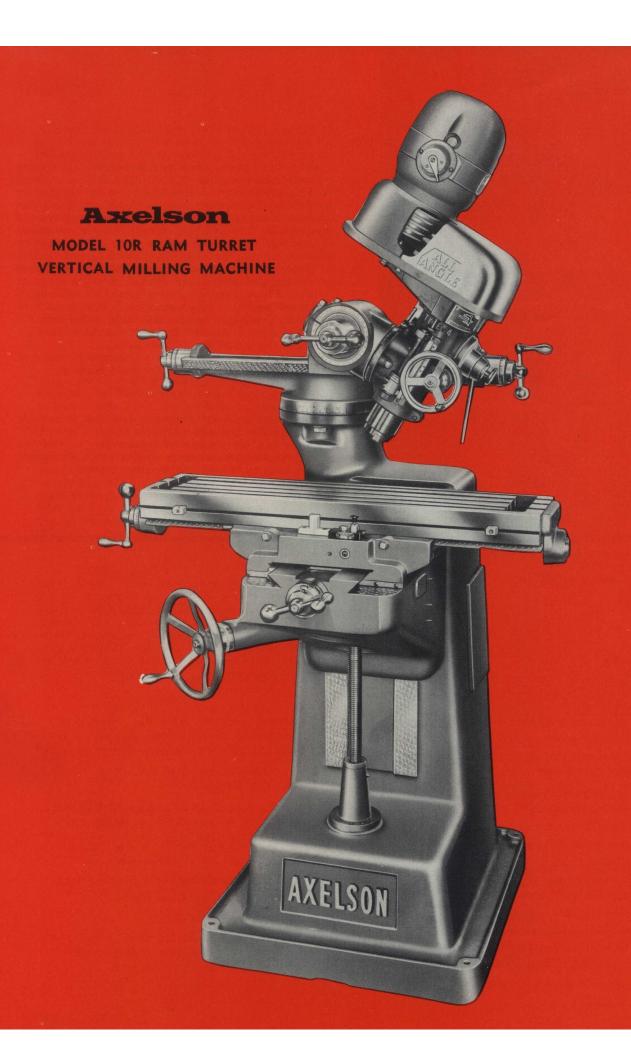
Additional pick-off gears are available to provide for 81 table feed changes. This range is from .525" to 13.125" per minute and gears may be selected to give any desired feeds in this range. Gears are cut from alloy steel and are heat treated.

ADDITIONAL EQUIPMENT

Additional equipment, adapters, and tooling are available at extra cost, as follows:

- 1. #189 Collet Chuck and Wrenches
- 2. #180 Collet 1/8" to 3/4"
- 3. #409 Collet Chuck and Wrenches
- 4. #400 Collets 1/8" to 1"
- 5. Drill Chuck 0" to 17/32"
- 6. Drill Chuck Adapter
- 7. Axelson Offset Boring Head, Std. 3"
- 8. Boring Head Adapter
- 9. Shell Mill Arbor 1/2", 3/4", 1"
- 10. Adapter, Drawbar style, No. 30 NST to: No. 2 MT, No. 3 MT, No. 7 B. & S
- 11. Coolant System with Motor
- 12. Special Hand Wheel Angle Adjuster
- 13. Power Table Feed—with adjustable automatic trips—Feeds of ½" to 13" per minute

- 14. Additional pick-off gears for Power Feed Attachment (Specify feeds desired 81 feeds avaliable, two feeds per set of gears.)
- 15. Shaper Attachment, Self Contained, Motor Driven, 4" stroke
- 16. Power Feed to Quill—Provides Three Feeds .0015", .003", and .006" per revolution
- 17. Dividing Head-11" Plain
- 18. Dividing Head——11" Universal
- 19. 6" Chuck, 3 Jaw Universal for Dividing Heads
- 20. Swivel Base Vises, 41/2" or 61/2"
- 21. Rotary Tables, 9" and 12"
- 22. Precision Locating Attachment, includes a Micrometer dial indicator reading to .0001", installed on table and cross slide



HEAVY DUTY RAM

The heavy duty ram is mounted on a heavy dovetail way slide. It is cast from Axloy and is of extremely heavy construction to give the rigidity and strength required for heavy duty milling. In and out feeding or adjustment of the ram turret is by means of a ball crank located at the front of the machine which operates a precision screw. A large dial graduated in thousandths of an inch assists the operator in making precision settings or feeding to desired dimensions. The ram has an in and out travel of 18" and combined ram and cross feed travel of 26" to handle large work pieces.

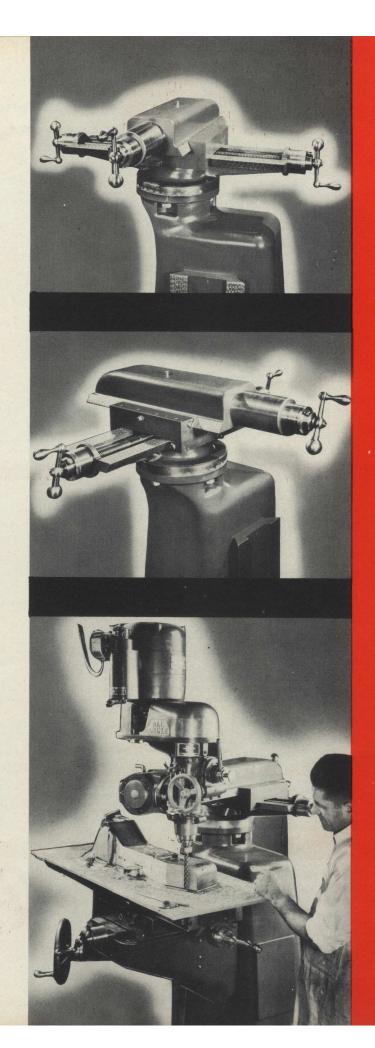
TURRET SLIDE

The turret slide supports the ram turret on dovetail ways and provides a longitudinal travel of 16" for the ram. This travel combined with the standard table travel is 38" and may be increased to 44" with the optional table. Heavy milling cuts can be taken over the entire length of the slide travel and provide large machine capacity at moderate machine cost. Feeding of the slide is by ball cranks operating a feed screw at either end of the turret slide. Large dials graduated in thousandths of an inch are located at each end of the slide to facilitate machining operations.

The entire turret slide may be set at any angle to the table on the main column which permits angular milling operations without resetting the work. The turret slide mounting is graduated to assist the operator in making the desired angular settings. In addition, the head may be set at any angle which permits the machine to take compound angular cuts such as dovetails at an angle with the main body of a part, or by feeding the ram, angular cuts across the table may be made. This unique feature is invaluable on dies, patterns, and metal molds.

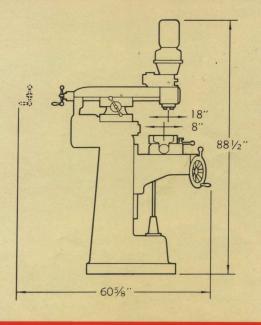
MACHINING METAL PATTERNS

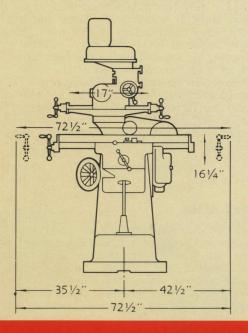
The versatility and extra capacity of the Model 10R Ram Turret Vertical Milling Machine is clearly illustrated in making metal patterns. This aluminum pattern is 42" long by 16" wide and includes a great variety of milling, boring, and drilling operations, many of which can be made from a single setting of the work. For instance, the 19° 55' angle being milled is made quickly by setting the turret slide to that angle. The required draft of 1° on the sides is made by long helical cutters by setting the "Allangle" head at that angle. This eliminates special angle cutters and saves time. Patterns can be cleaned up faster than by hand methods and are much more accurate. Over-all tolerances on this pattern are .030" but others are held to .005" and boring operations are held to .001".



SPECIFICATIONS

Axelson Model 10 RH Ram Turret Duplex Milling Machine and Axelson Model 10 R Ram Turret Vertical Milling Machine.





	10RH	10R
Capacity		
Longitudinal Table Travel	22"	22"
With Optional Table	28"	28"
Cross	8"	8"
Vertical	16"	16"
	22"	22"
Spindle Nose to Top of Table.		
Horizontal Spindle to Table	191/2"	
Ram Travel—in and out	18"	18"
Combined Ram and Cross	25"	26"
Feed Travel	26"	26"
Turret Slide—Travel	16"	16"
Combined Table and Turret Slide	38"	38"
With Optional Table	44"	44"
Table—Working Surface	9" x 36"	9" x 36"
With Optional Table	9" × 42"	9" x 42"
Number of T-Slots	Three	Three
	9/16" x 21/8"	9/16" x 21/8"
Cutter Capacity—Shell End Mill	4" dia.	4" dia.
Collet Capacity	1/8" to 1" dia.	1/8" to 1" dia.
Drilling Capacity using Std.		
Drill Chuck	17/32" dia.	17/32" dia.
Spindle Nose Vertical	No. 30 NST	No. 30 NST
Spindle Nose Horizontal	No. 30 NST	Duelanded #7
Vertical Spindle Bearings	Preloaded #7 Precision	Preloaded #7 Precision
Harizontal Spindle Pearings	Preloaded #5	Precision
Horizontal Spindle Bearings	Precision #5	
Ouill Travel	31/2"	31/2"
Vertical Spindle Speeds—	- /2	- //2
6 Speeds	450-6400 RPM	450-6400 RPM

	10RH	10R				
With Optional Back Gear— 8 Speeds	150-6400 RPM	150-6400 RPM				
16 Speeds—1200/600	50-4250 RPM 75-6400 RPM	50-4250 RPM 75-6400 RPM				
with 1200 RPM Motor With Back Gear and 2 Speed Motor	110-3600					
16—1200/600 RPM Motor Motor Drive—Vertical Spindle Horizontal Spindle	55-3600 1 or 1½ H.P. 1 H.P.	1 or 1½ H.P.				
Power Spindle Feed (Extra	.0015", .003" and .006" per Rev.	.0015", .003" and .006" per Rev.				
Power Table Feed (extra)	As Specified 1/2" to 13" per min.	As Specified 1/2" to 13" per min.				
Feed Dials	3" dia. calibrated to .001"	3" dia. calibrated to .001"				
Lubrication Bijur one shot system table, ways, knee ways and lead						
Vertical Motor Support—and belt housing swivels 360° around spindle permitting spindle to be used at any angle without interference.						
Floor Space	high 2800 lbs.	6'1" x 4'9" x 7'3" high 2200 lbs.				
Approximate shipping wt	2900 lbs.	2300 lbs.				

STANDARD EQUIPMENT

Model 10RH — One shot oiling system for sliding surfaces of knee, table, and saddle; table top and sides precision ground; table tapped for coolant system; table stop dogs; ram slide gibbed; precision lead screw in ram slide; ball crank and feed dial on ram slide; lever operated clamps on table, saddle, and knee; precision lead screws for table, saddle, knee, and turret slide; back gear on horizontal spindle; instruction manual and parts catalog; necessary wrenches.

Model 10R — One shot oiling system for sliding surfaces of knee, table, and saddle; table top and sides precision ground; table tapped for coolant system; table stop dogs; ram slide gibbed; precision lead screw in ram slide; ball crank and feed dial on ram slide; lever operated clamps on table, saddle, and knee; precision lead screws for table, saddle, knee, and turret slide; instruction manual and parts catalog; necessary wrenches.



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