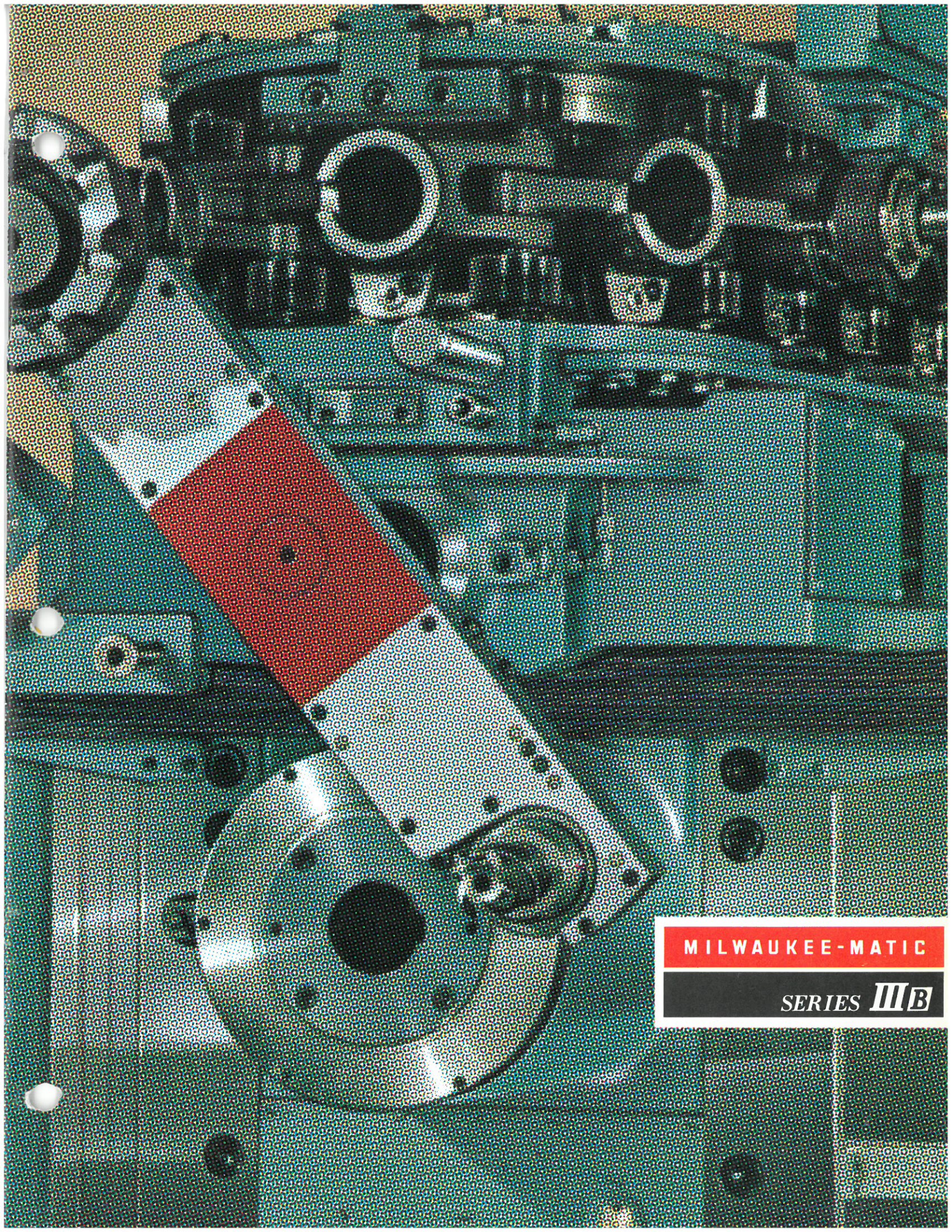

MILWAUKEE-MATIC
SERIES IIB

The MILWAUKEE-MATIC® method of manufacturing

If small-lot production is your problem then you will be extremely interested in Kearney & Trecker's MILWAUKEE-MATIC METHOD OF MANUFACTURING.

It is the "original" numerically controlled multi-operation machining system . . . . so productive and so versatile it introduces a new management strategy to the metal-working industry.

The MILWAUKEE-MATIC MACHINING CENTER concept is designed to produce a continuous stream of finished parts — alike or different — thereby completely upsetting the commonly accepted theory of "economic lot size".

MANAGEMENT STRATEGY

Should management continue to pour their money into present conventional machine tools or should they adopt the MILWAUKEE-MATIC Method of Manufacturing? Covered here are the major economic areas that must be considered to effect a sound decision.

Machine utilization and flexibility — When manufacturing conventionally it is extremely difficult to arrive at a machine loading formula that will result in a high utilization of all machine types and at the same time maintain a balance between the workloads on milling, drilling and boring equipment. Consequently, it's often that some types of machines are idle while other types are overloaded and working on an overtime basis. In addition to the machine problem it is difficult to maintain a balanced work force. This problem can be alleviated with the MILWAUKEE-MATIC Method in which virtually all of the machining operations are accomplished on one machine, and in most instances, in a single setup.

Machine management — With the MILWAUKEE-MATIC Method the machine operator's function is completely changed. He is concerned only with supervision of the machine operation while the machine tool itself is directed from a control tape. Production control is simplified and easily adapted to data processing equipment.

Tooling — Simple holding devices are used to locate workpieces on a MILWAUKEE-MATIC. The absolute repetitive accuracy inherent in the machine establishes the dimensional quality of the parts so that the need for expensive jigs and fixtures are eliminated. The accumulated savings on tooling alone in many cases will pay for the equipment in one to three years.

Lead time — The conventional process of moving parts from one work center to another is time consuming. In most cases the manufacturing lead time is so long that producing to a given inventory level is necessary to provide reasonable delivery dates. When manufacturing with the MILWAUKEE-MATIC Method, it is possible to produce parts as needed. The present policy of manufacturing to an "inventory level" can revert to "manufacturing to order".

Inventory — The basic strategy of the MILWAUKEE-MATIC Method is to produce parts as needed. As a result in-process inventory is practically eliminated — production merely fluctuates to suit demand. Shelf inventory is reduced in proportion to the large reduction in lead time made possible by MILWAUKEE-MATIC. Lower inventory means less taxes, depreciation and carrying costs.

Floor space — Floor space in any plant is expensive. A production expert recently remarked, "Most manufacturing plants are really warehouses, scattered with machine tools". He was pointing out the vast areas of floorspace devoted to storage of work in process, finished parts inventory, tooling, and material handling equipment, in conventional small-lot production. The MILWAUKEE-MATIC Method of making parts eliminates the cause of this wasted space, creating more area for productive purposes. One MILWAUKEE-MATIC can replace four to five conventional machine tools.

Quality — Because of the high precision built into every MILWAUKEE-MATIC and because they are completely automatic (tape-controlled), parts can now be produced with absolute repetitive accuracy, eliminating costly "in-process" inspections. This means that assembly time can be sharply reduced by eliminating the trial and error fitting processes.

Product change — Major product change or new product introduction is inexpensive when manufacturing with MILWAUKEE-MATIC. As a result you may increase your market by introducing innovations more frequently and avoid the staggering expense that accompanies product change when manufacturing conventionally.

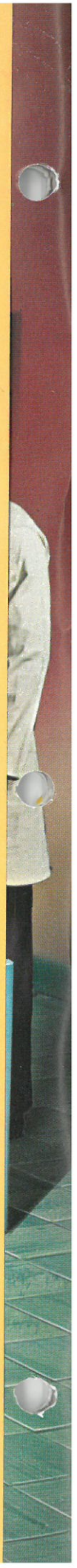
Pricing — When prices are established for a new product that will be manufactured conventionally, the contribution to profit is based on estimated standards. Several lots must be produced before the estimated standard can be reached and, in some instances, are never reached. Consequently, the contribution to profit is reduced. With MILWAUKEE-MATIC, however, standards can be reached after the first part. As a result, prices can be accurately established and the contribution to profit assured.

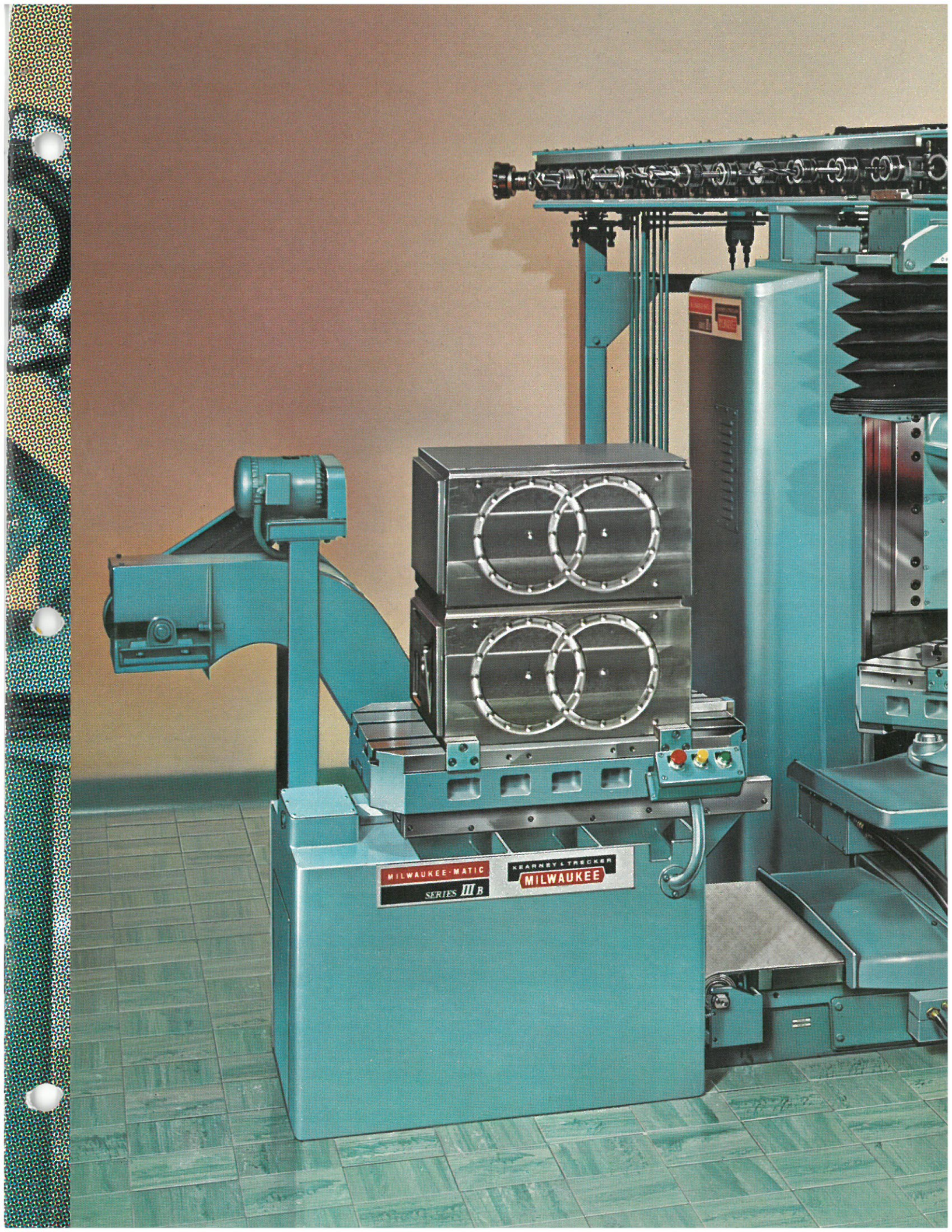
Market increase — When manufacturing with MILWAUKEE-MATIC lower product cost is possible, consequently placing you in a much more favorable competitive position.

Communications — The number of people required, from the design engineer to the final inspector, to produce a finished part by conventional methods create a tremendous problem. Producing with a completely automatic tape-controlled, multi-purpose MILWAUKEE-MATIC, fewer people are on the scene. This means greatly improved communications. It also means that, after a part has been programmed, the communications can virtually be reduced to a roll of tape.

Futurization* — The need to "Futurize" is the greatest challenge facing the world's metalworking industry today. Now, "Futurization" is even more imperative with the development of the versatile MILWAUKEE-MATIC Method of Manufacturing.

***Futurization** is more than mere modernization.




MILWAUKEE-MATIC
SERIES III B
KEARNEY & TRECKER
MILWAUKEE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MILWAUKEE-MATIC
SERIES III B

Automate your small-lot production with the MILWAUKEE-MATIC® SERIES IIIB

In the past, the small-lot manufacturer was faced with tedious, costly manual machining methods or with semi-automatic compromises. This, of course, meant that the real economics of automation evaded most of the world's metalworking plants.

Today, if that economy is evading you, it may be because you haven't taken advantage of the MILWAUKEE-MATIC Method of Manufacturing. MILWAUKEE-MATIC is THE "original" numerically controlled machining center concept (multiple operations in a single setup . . . automatically) which permits the "automation approach" to small-lot manufacturing.

Whether you machine 100 parts, 10, 5 or less, the unit cost remains uniformly low, because the Series IIIB production method provides complete cost control through controlled setup and controlled cycle time, plus absolute repetitive accuracy. As a result, you can now become CONSISTENTLY COMPETITIVE, regardless of the size of your shop or the requirements of your small-lot production.

The working day for a MILWAUKEE-MATIC is a 24-hour day . . . of maximum production . . . of repetitive accuracy . . . of increased profit.

From the first day you put your MILWAUKEE-MATIC in use you'll see your profit increase — RAPIDLY! . . .

. . . and don't settle for anything less!

See the MILWAUKEE-MATIC SAVINGS STORY on Page 13.

31141

This is the bigger "B"

. . . . the MILWAUKEE-MATIC Series IIIB fully automatic Machining Center with random tool selection and changing. It is equipped with the GE Positioning/Contouring* control system which provides "precision" positioning and precision two-dimensional (X and Y plane) contouring. The Series IIIB is capable of handling large workpieces, weighing up to 2½ tons, within a feed range of 38″ longitudinally, 36″ vertically and 24″ in depth. Also illustrated is the factory installed Pallet Shuttle* which automatically transfers a Pallet with completed part off the Index Table and presents another one to the machining station. A Chip Removal system* (extreme left) is also shown.

*optional at extra cost.

Tools changed automatically in only 7 seconds

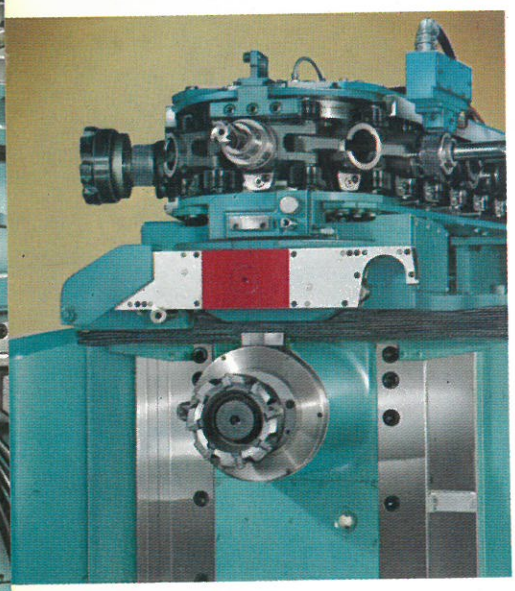
Up to 60 preset tools can be loaded, at random, in the "chain-type" tool storage magazine at any one time, plus one in the spindle. Additional tools, if required, can replace any of the tools in the magazine at any time without interrupting the machining cycle.

The tool magazine rotates automatically and the tool required for a specific operation is selected. At the prescribed programmed instructions the tool changer exchanges the preselected tool with the tool in the spindle. Selection is independent of the location of a tool in the magazine, and is accomplished during machining sequence without the loss of production time.

Maximum tool size for automatic changing is 5¾" in diameter and of any practical length. Tools of a larger diameter may be used with selective loading and programming.

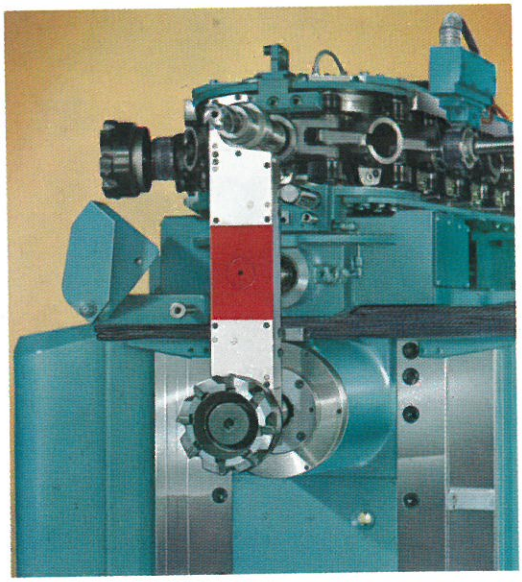
Tools with a usable diameter up to 12", and within weight limit (under 60 pounds) may be used but operator must comply with special clearance diameter at the tool holder side and with the empty tool socket requirement. Larger tools may also be loaded manually.

31134

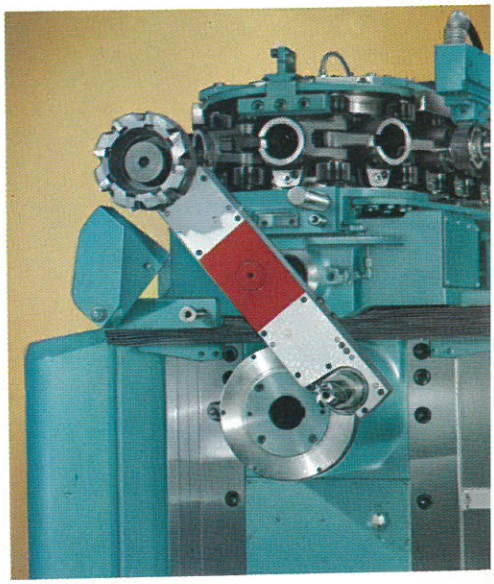


Tool Change Arm is in parked position. Tool in magazine has been preselected and is ready for a change.

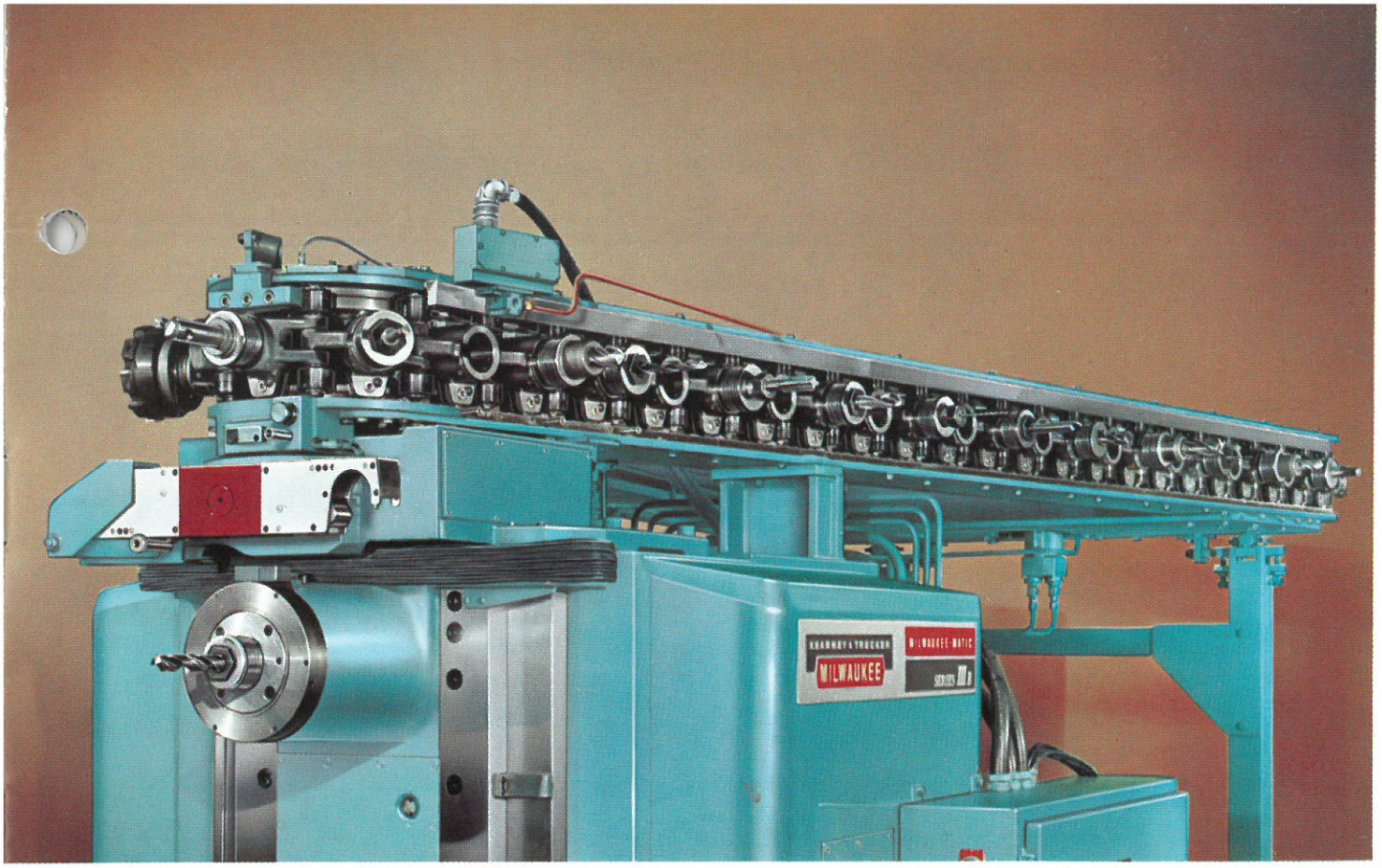
31135



Tool Change Arm simultaneously grips both tools, moves forward removing them from tool magazine and spindle.



With tools removed, the Tool Change Arm rotates 180° clockwise to exchange the position of both tools.



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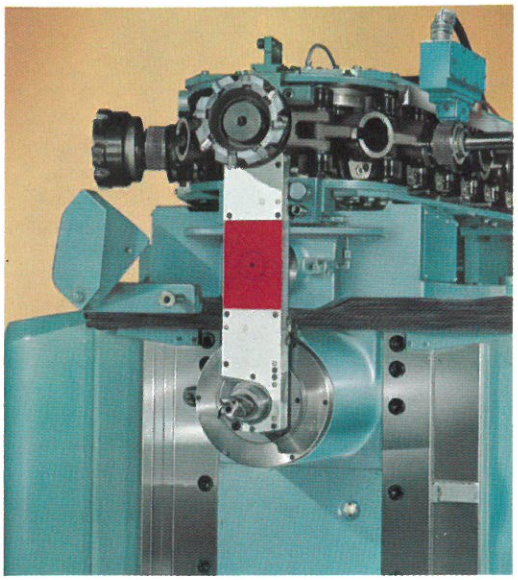


Tool Change Arm moves back, placing pre-selected tool in the spindle and the previously used tool in the magazine.

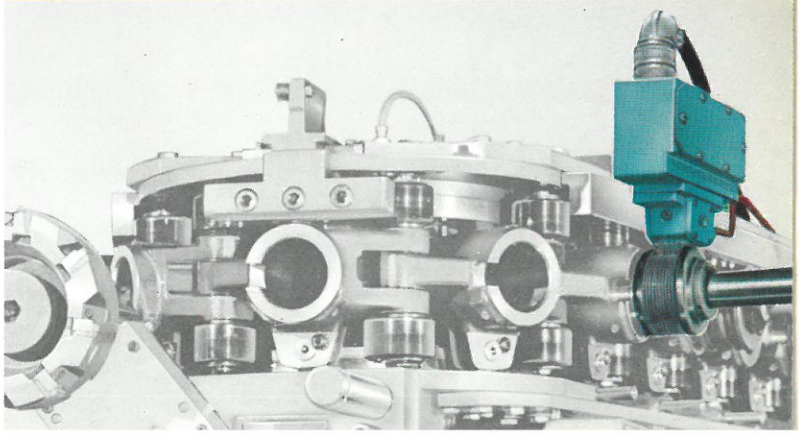
31283

31293

Exclusive tool coding provides random selection

This is the "business-end" of the patented MILWAUKEE-MATIC Tool Selector. It is equipped with 15 sensing fingers that can automatically read 32,767 different tool codes.

Illustrated below the Selector unit is a typical Series IIIB Tool Holder with a preset tool. The code rings and spacers on the upper portion of the Holder identify a specific tool, positively assuring the correct selection by the tool changer.



31136

Jig bore principle applied in mounting spindle head

The high order of "built-in" precision in the Series IIIB starts with the spindle head. Construction is based on the "jig bore principle" of rigidity and accuracy. The head, center mounted between the rugged one-piece column, moves vertically on hardened and ground steel way surfaces. Precise alignment is maintained by adjustable anti-friction recirculating roller bearing cartridges mounted on tapered gibs.

A hydraulic motor provides a constant 10hp to the spindle through hardened and ground gears. The spindle is a taper collet-type, spring clamped and hydraulically unclamped. Spindle travel (Y-axis) is 36″.

The spindle drive is equipped with a unique overload circuit which "adapts" to variations in machining conditions. This circuit automatically reduces the feed rate until the completion of the operation in which the overload condition existed, after which the full programmed feed rate is restored. If extreme overload conditions are encountered, a stall protection features stops all axes movements.

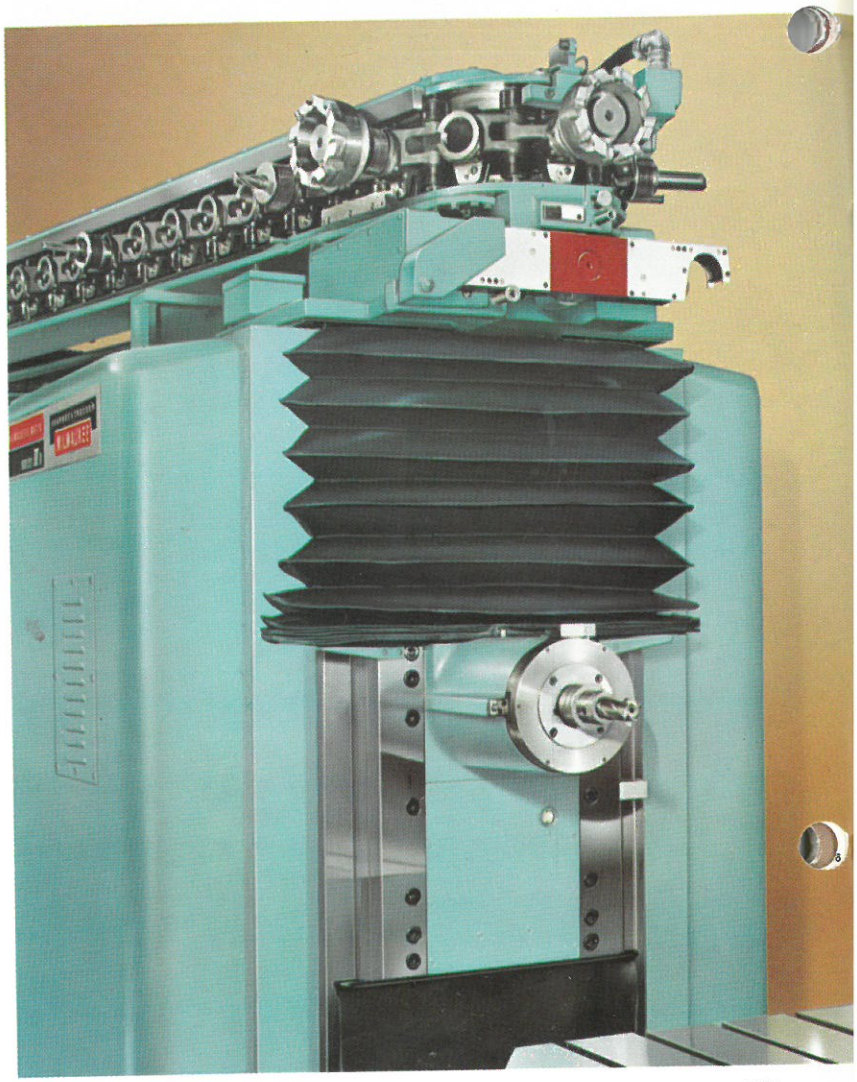
The spindle nose has a tool drive Key-lock which is automatically oriented, before a tool change, providing positive radial location of the tool in the spindle. This feature permits, under tape control, positive orientation of single point tools when required, thus making possible such operations as automatic backboring, and so forth.

The spindle head is temperature compensating to provide automatic monitoring and correction of Depth (Z-axis) positioning errors which could be caused by temperature changes beyond stabilized conditions.

31297

Positive tool retention

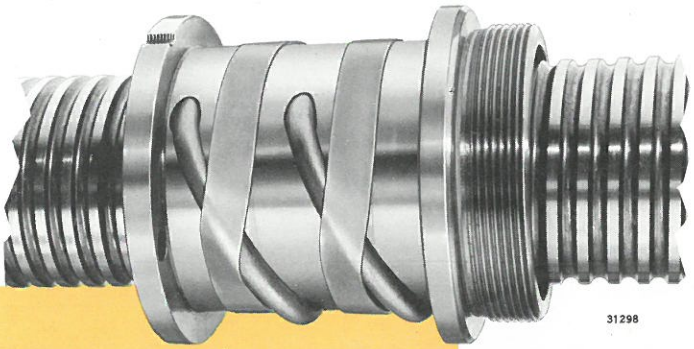
An axial retention device, built into the spindle, eliminates tool pull-out during machining, even with spiral cutters. Spring-loaded, hydraulically released fingers lock into a recess inside the end of the tool shank and apply positive backpressure to hold the tool in place. In addition, the tool holder is accurately located and securely clamped by a spring-loaded collet.



31130

Anti-friction lead screws drive all axes

Smooth, accurate feed movement for all three axes is transmitted through high efficiency, recirculating ball-type lead screws. They are driven by high performance hydraulic servo motors through hardened and ground anti-backlash gears. Both ends of the lead screws are anchored in pre-loaded bearings to provide maximum stiffness for high frequency response. Feeds range from 1 through 98 ipm with rapid positioning at 150 ipm.



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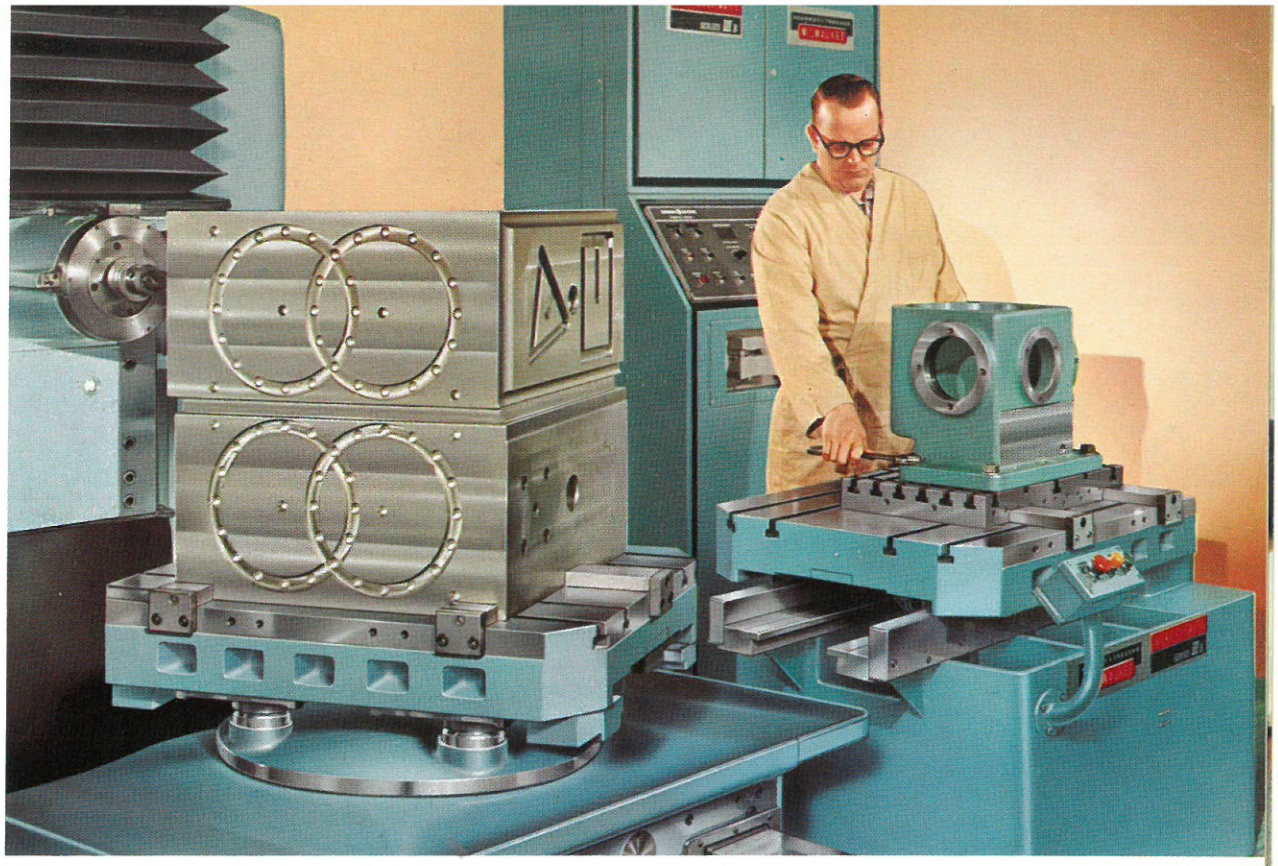


31131

72-position index table and pallet schuttle increases machining ability

The Series IIIB MILWAUKEE-MATIC is equipped with an Index Table which, through the use of a Curvic Coupling, can be automatically indexed to any of 72 positions in 5 degree increments, in either direction. This permits machining many sides of a workpiece in a single setup. Index accuracy is ±10 seconds of arc. Maximum Pallet load is 5,000 pounds.

The Index Table is designed to accept a Pallet with a flat, ground work area of 28″ x 36″. Longitudinal table travel (X-axis) is 38″ and the Depth travel (Z-axis) is 24″.

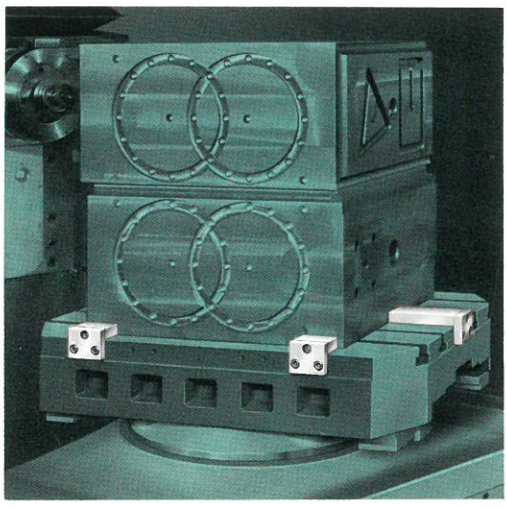
When equipped with the optional, factory installed Pallet Shuttle (right), the Series IIIB is capable of greatly increasing its productivity. It automatically transfers the Pallet with the completed part off the Index Table and presents another part to the machining area.

This exclusive feature also provides for "controlled" off-machine setups permitting the operator to make a complete job change while another part, **alike or different,** is being machined, eliminating idle spindle time.

Pallet edge locators speed setup

Because all operations performed on the MILWAUKEE-MATIC Series IIIB are tape controlled with absolute REPETITIVE ACCURACY, it is possible to use simple devices to locate and hold workpieces instead of preparing expensive, individually designed jigs and fixtures.

To capitalize on this feature and reduce fixture costs and maintenance to an absolute minimum the Pallets for the Series IIIB are equipped with "Edge Locators". This provides rapid, accurate positioning of workpieces and workholding devices when used in conjunction with gage blocks (optional). These gage blocks are ground and lapped to an accuracy of ± 0.0001″ of mean size. They are boxed in sets of one each in sizes from 1″ through 8″.



31122

Tape controls all operations . . . automatically

Standard 1 inch, 8 channel punched tape is the key to the MILWAUKEE-MATIC Series IIIB automatic Machining Center. It provides the memory for the system, never forgetting, never making a mistake, never misinterpreting instructions.

The tape can be prepared entirely on a standard office Flexowriter . . . without (or with) the use of a computer. Programming is simple and can be handled by anyone familiar with machining operations after a brief training period.

The following functions are performed automatically by numerical control:

1. Start and stop machine cycle **2.** Orient spindle to keylock position **3.** Select and change tools **4.** Feed in any axis at programmed feed rate **5.** Shuttle to transfer workpiece pallets **6.** Position any axis at any feed rate—1 thru 98 ipm, or rapid traverse rate—150 ipm **7.** Stop and start the spindle at programmed speed and direction of rotation **8.** Position index table **9.** Two-axis contouring in X and Y plane **10.** Start and stop coolant (flood or mist).

With this system it is possible to perform all operations required to completely finish a part, ready for assembly, and can be repeated over and over, with absolute REPETITIVE ACCURACY.

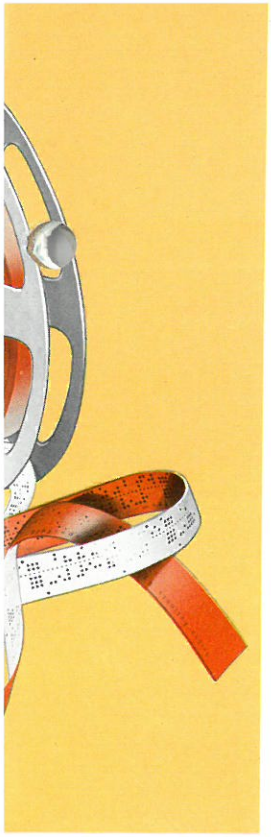
The control system

The MILWAUKEE-MATIC Series IIIB features an especially designed General Electric 100% SOLID STATE numerical control system incorporating standard time-tested modules and fully transistorized circuity. It is the first control system in which both the logic and power sections are 100% SOLID STATE. Conventional power relays have been replaced with Silicon Controlled Rectifiers (SCR).

The control is available in two styles — the basic Positioning system and the optional dual system for precision Positioning and Contouring. The basic Positioning system is suggested where requirements are such that control of positioning to hole centerlines as well as straight-line milling, parallel to a machine axis, is sufficient. The basic system is provided with "commercial" positioning tolerances of ± 0.001". Optional "precision" positioning with tolerances of ± 0.0005" is also available.

The optional dual system for Positioning and Contouring is suggested where requirements include control of precision two-dimensional contouring (X and Y plane), as well as "precision" positioning.

The Series IIIB Operator's Control Console houses the tape readers (one included with basic machine price) and all controls for both automatic (tape control) and manual operation. Under tape mode the operator retains control of: 1. Cycle start and stop 2. Reduction of



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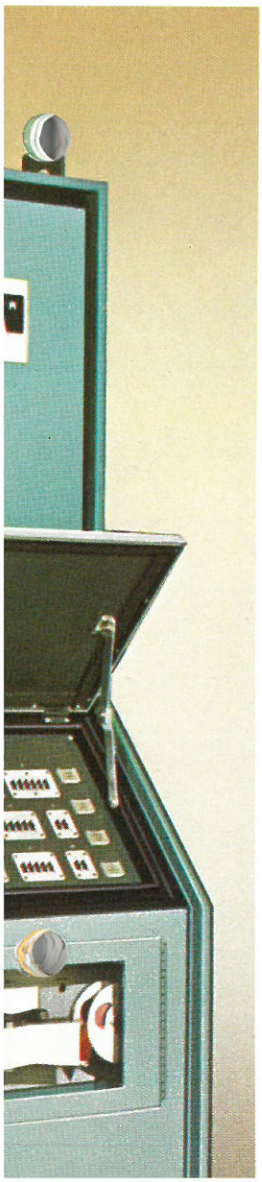


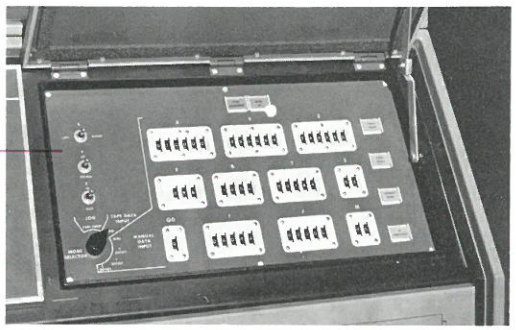
programmed feed rate from 100% to 0% in 10% steps 3. On/off of flood or mist coolant 4. Block by block input data 5. Block sequence number counter 6. Full range zero shift for all 3 axes.

The Console also contains fault condition indicators which enable operator to quickly locate a trouble spot — parity circuit, position and limit overtravel, collet unclamp, and spindle overload.

The Tape Mode panel includes machine function indicators, sequence number display and feed rate override.

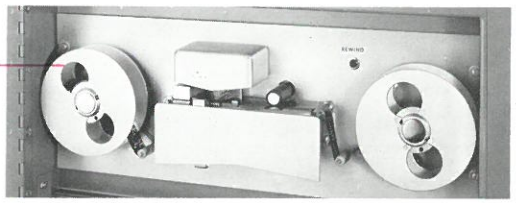
31125

The Manual Mode Panel provides operator with full manual control of all functions with the same accuracy as tape control. All data contained on tape can be duplicated or changed manually, including speeds and feed. Manual jogging, from zero to 60% of programmed feed rate, can be performed. Zero offset is provided for all three axes.



31124

The Tape Reader is a photo-electric (reel-type) compact unit capable of reading 300 characters a second. Two tape readers are provided when the optional Pallet Shuttle system is included.

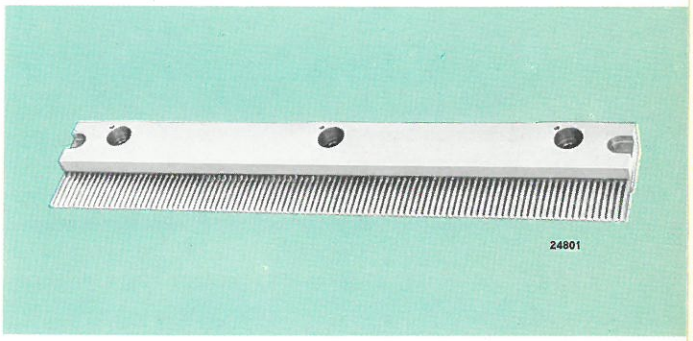


27620

Accupin control measures all axes positions

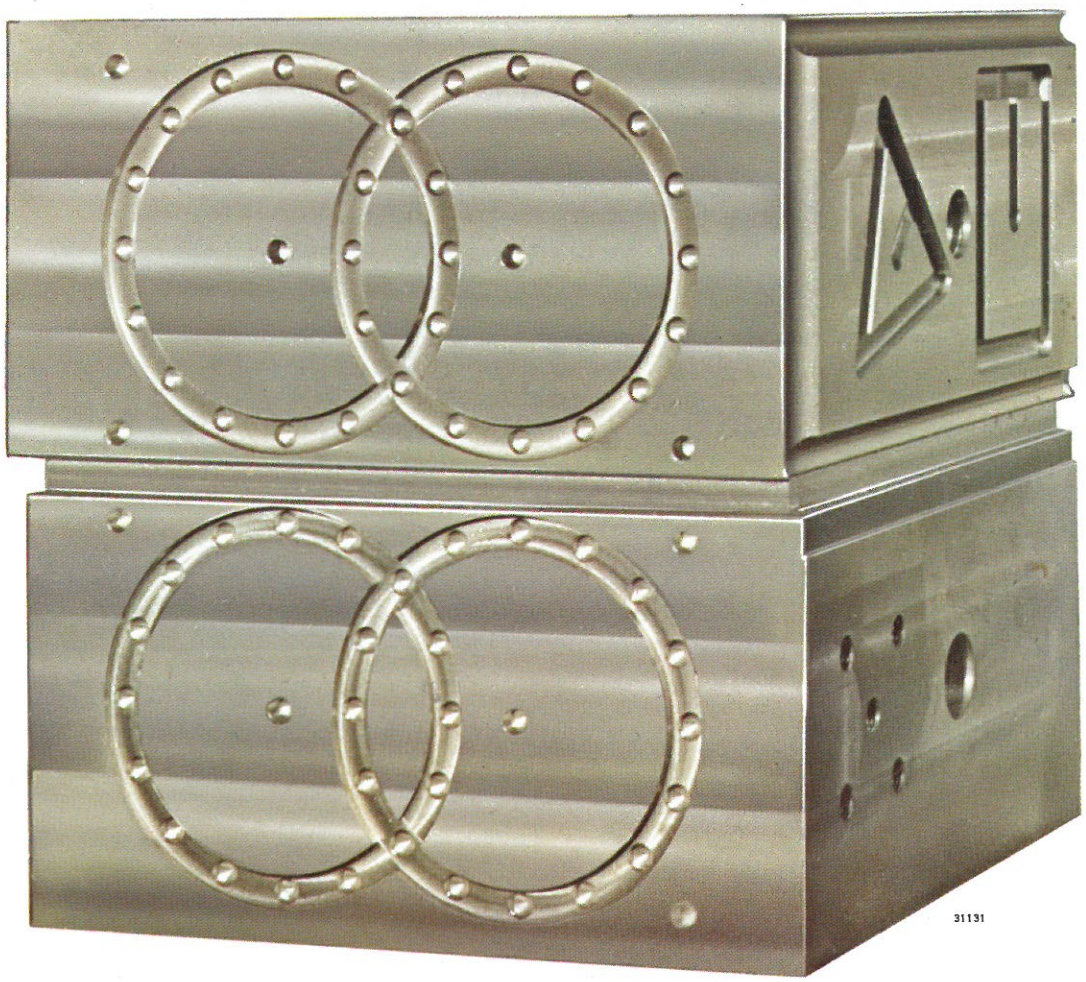
The Series IIIB is equipped with the GE ACCUPIN transducer, (isolated from lead screws) for final positioning of all three axes. It assures linear slide position accuracy to ± 0.0005″*. Because of its unique construction and the absence of moving parts, little or no maintenance is required.

*This is the "Precision" positioning tolerance. A "Commercial" positioning tolerance of ± 0.001″ is available at a slightly reduced cost.



24801

Service backup Kearney & Trecker Corporation is the sole responsible party for the complete MILWAUKEE-MATIC Series IIIB facility, including the numerical control unit. A staff of trained men, located near you, are available for fast service to insure maximum utilization of your Series IIIB.



Two-dimensional precision contouring in X and Y plane without (or with) computer programming plus precision positioning

The optional Positioning/Contouring System is suggested where requirements include control of precision two-dimensional contouring, in X and Y plane, as well as "precision" positioning.

The Positioning/Contouring control uses the same command system as the basic control when functioning in the Positioning mode. When in the Contouring mode it uses incremental position commands and coded feed rate numbers up to 50.0 inches/minute. In this mode the control utilizes linear interpolation to produce slopes and straight cuts and circular interpolation to produce arcs (circular cuts) to a maximum radius of 9.9999 inches.

A computer is not a requirement to produce the machine control tape for the contouring mode. The tape can be easily prepared on an office Flexowriter.

A Post Processor for use with the APT computer programming language and details for its implementation in conjunction with any standard APT system are available.

31294

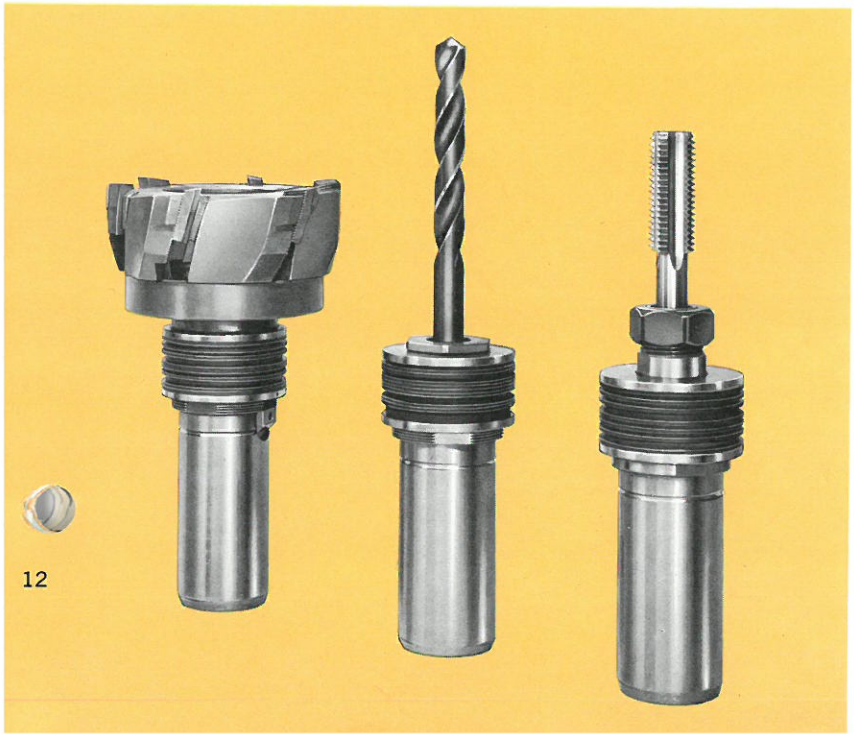
Tool setting simplified

The Precision Optical Tool Setter is a precision measuring instrument designed to provide a quick, accurate method for pre-setting cutting tools for use with every Kearney & Trecker MILWAUKEE-MATIC Machining Center.

It is completely self-contained and will set tools to diameter and length and will verify cutter grinding accuracy.

The Tool Holder is accurately located in a hydraulic chuck which also provides a holding facility for securely locking the collet.

The vertical slide is equipped with a measuring system (Vernac Reader and Scale) for establishing tool length. A rigid bracket, mounted on the vertical slide supports another Vernac Reader and Scale which establishes tool diameter. A 28-power microscope, mounted on the bracket, is used to visually verify cutter grinding accuracy and, simultaneously, verify tool length and diameter.



31293

Tool holders for preset tooling

(EXTRA COST)

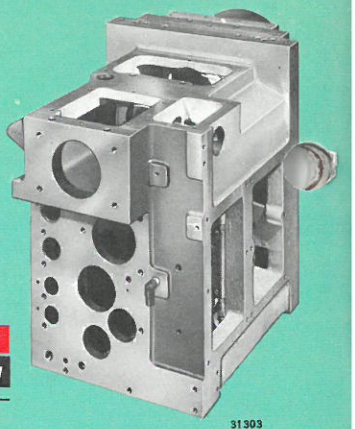
A complete line of standard Tool Holders* and accessories have been developed for the Series III$_B$ MILWAUKEE-MATIC.

Tapping is accomplished automatically **without** the aid of external accessory units. The programmer merely designates the "feed-to-spindle-speed" ratio (determined by lead of thread to be cut) and direction of rotation. The spindle is programmed to reverse rotation and feed when depth is reached.

*Series III$_B$ Tool Holders are interchangeable with Model III MILWAUKEE-MATIC.

The MILWAUKEE-MATIC® savings story

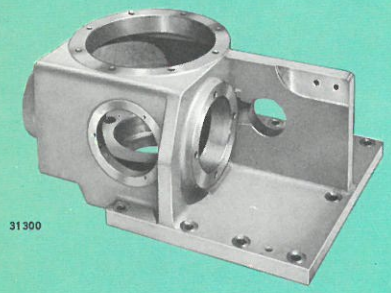
Here is a comparison of the cost of producing several typical parts on the MILWAUKEE-MATIC Series IIIB, and on conventional machine tools. Savings reflect the result from performing multiple operations, automatically, on a single Series IIIB, with automatic tool changing, table indexing, no setup time and inexpensive work-holding devises. Note that setup time has been eliminated in the Series IIIB column. This function is accomplished on the Shuttle permitting almost continuous spindle "up-time".



31303

SPINDLE HEAD
Material — Cast Iron

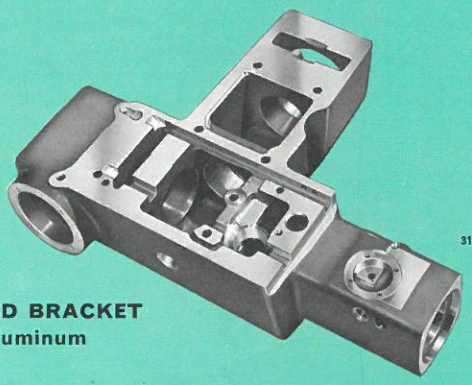
	CONVENTIONAL	MILWAUKEE-MATIC SERIES IIIB
Setup	26.1 hours	None
Cycle	28.3 hours	12.3 hours
Tooling	$15,000	$3,350



31300

GEAR BOX
Material — Cast Iron

	CONVENTIONAL	MILWAUKEE-MATIC SERIES IIIB
Setup	16.9 hours	None
Cycle	7.5 hours	3.2 hours
Tooling	$4,500	$2,000



31299

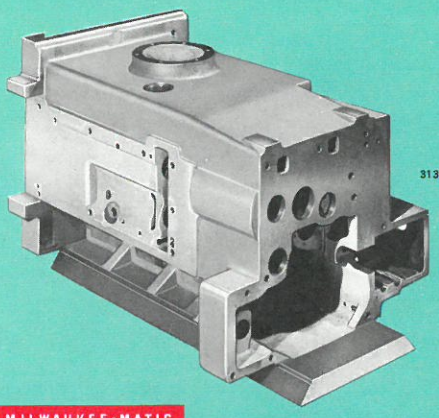
POWER FEED BRACKET
Material — Aluminum

	CONVENTIONAL	MILWAUKEE-MATIC SERIES IIIB
Setup	18.2 hours	None
Cycle	7.6 hours	4.9 hours
Tooling	$7,500	$2,100

31301

TOOL MAGAZINE HOUSING
Material — Aluminum

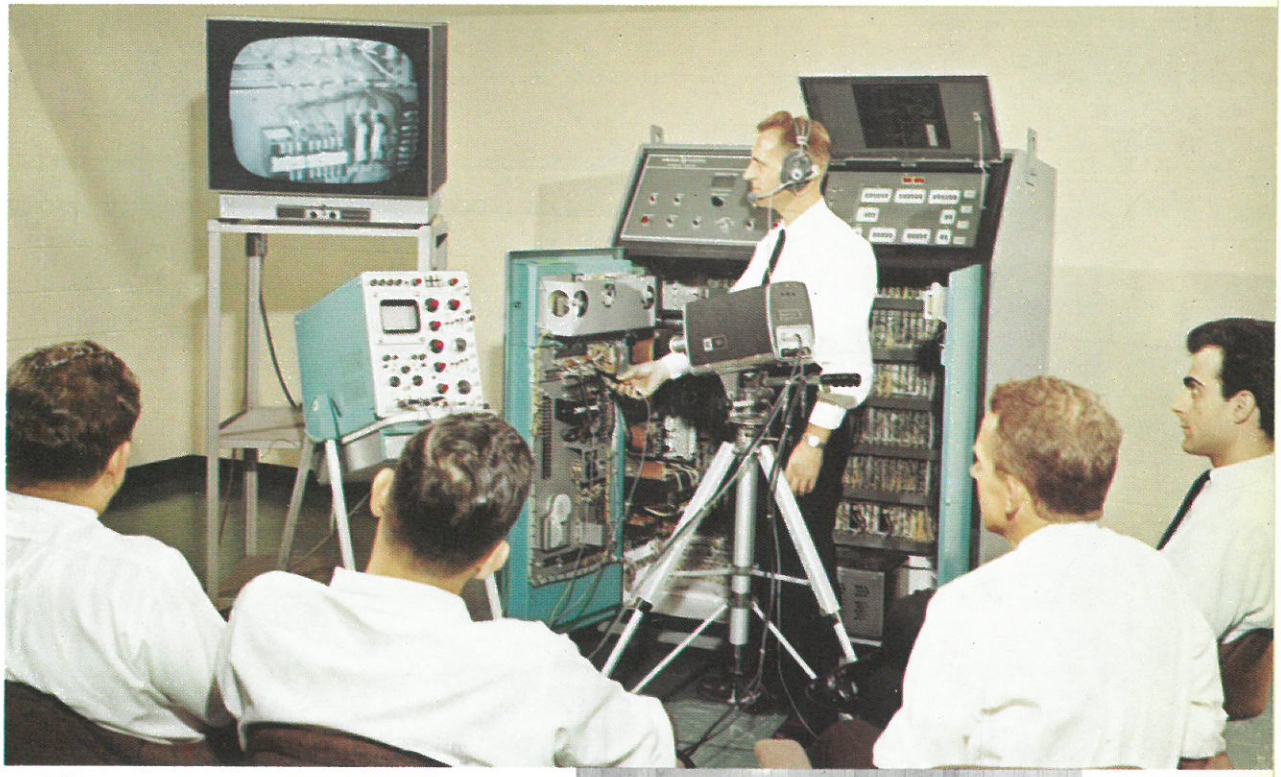
	CONVENTIONAL	MILWAUKEE-MATIC SERIES IIIB
Setup	23.3 hours	None
Cycle	21.6 hours	3.8 hours
Tooling	$5,800	$2,500



31302

MODEL SA KNEE
Material — Cast Iron

	CONVENTIONAL	MILWAUKEE-MATIC SERIES IIIB
Setup	40.2 hours	None
Cycle	19.7 hours	5.7 hours
Tooling	$8,000	$1,140



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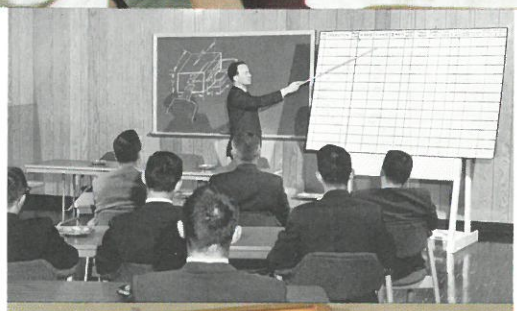
Training courses provided

Kearney & Trecker conducts regularly scheduled courses, in four modern classrooms, covering manual and computer programming, tool setting, machine operation and machine, hydraulic and electronic service and maintenance functions. All instructors have high formal education and extensive trade training.

Classrooms are equipped with machine and electronic simulators and cutaway models of components. Movies, slides, closed circuit TV, and charts compliment the teaching method.

Anyone with a machinist, electronic or equivalent background can become proficient in any phase of the MILWAUKEE-MATIC Method in a few weeks.



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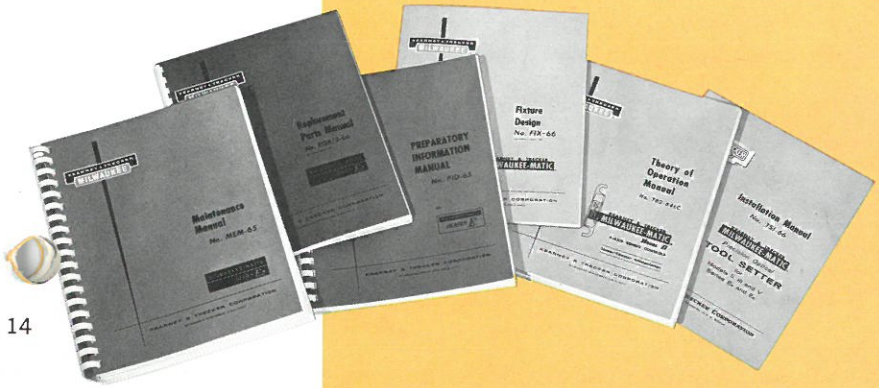

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Instruction manuals

Specially prepared training text books on manual and computer programming, tool setting, machine operation, and machine, hydraulic and electronic service and maintenance functions of the MILWAUKEE-MATIC Series III$_B$ are provided, without charge, to owners. All books are comprehensive, clearly written and generously illustrated.

It's easy to own the MILWAUKEE-MATIC® SERIES IIIB

For many companies, one of the major deterrents to more active purchasing of modern machine tools is the availability of money for capital investment. For this reason, Kearney & Trecker has developed the following attractive finance plans:

MILWAUKEE Cash-Flo Machine Tool Purchase Plan

The "Cash-Flo" Plan is based on the ability of a new Kearney & Trecker MILWAUKEE-MATIC Series IIIB Machining Center to pay its own way in terms of increased production as compared to conventional machine tools. This plan is the first of its kind to incorporate all of the recently effected tax benefits and depreciation schedules into a single capital equipment buying plan.

Under the Kearney & Trecker "Cash-Flo" Plan, your down payment on the Series IIIB is only 7% . . . equivalent to the amount of your Investment Tax Credit. Or, if you wish, trade in an old Kearney & Trecker milling machine worth the 7% or more . . . it will be accepted as your down payment at its full trade value. The plan also permits payments to be made on a quarterly basis over an 8 year period. You retain a healthy cash balance each year . . . in addition to which you acquire full ownership of the machine . . . all out of INCREASED EARNINGS.

Kearney & Trecker TOOL-LEASE PROGRAM

In 1954, Kearney & Trecker pioneered in the field of machine tool financing by introducing the industry's first practical Tool-Lease Plan. Regardless of the size of your company you may discover many real advantages in leasing your new MILWAUKEE-MATIC Series IIIB.

This plan assures you the future service of a Series IIIB for as long as required without committing you for its total life.

Tool Leasing releases working capital so necessary for other company purposes.

The flexibility provided by Tool Leasing allows a manufacturer to maintain exceptionally high standards of efficiency and capacity without incurring prohibitive capital investment cost.

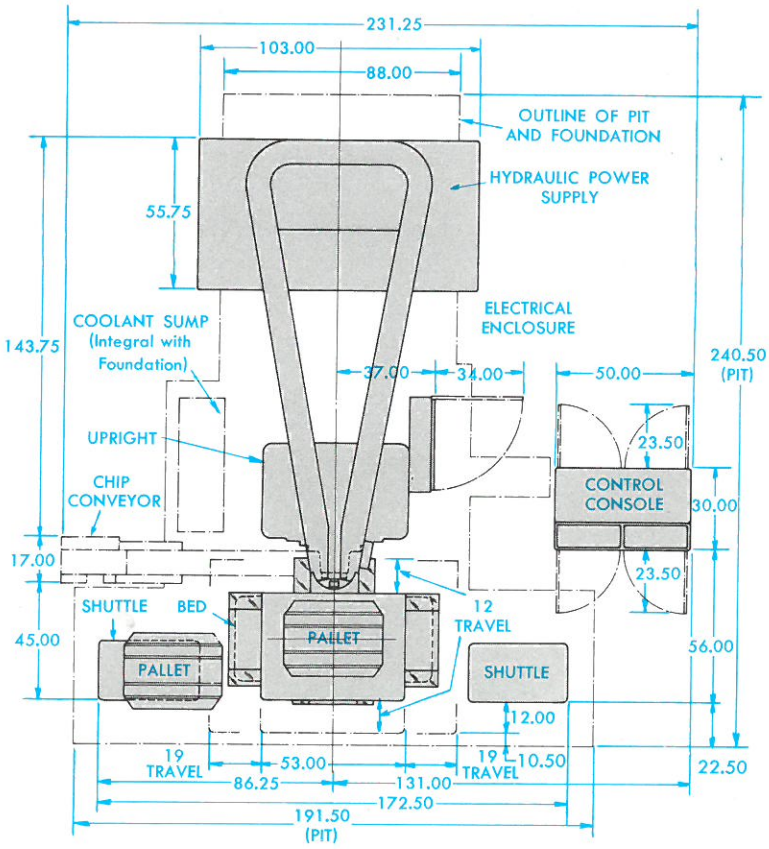
KTIC KEARNEY & TRECKER INSTALLMENT CONTRACT

In the past, industry practice has usually been to offer the customer an installment contract on a negotiated basis. The customer wanted the lowest down payment, the longest length of time and the lowest interest charge possible.

We think we have solved this problem and are offering an extremely liberal plan: As low as 10% down payment — customer's choice. Up to 6 years to pay — customer's choice. 4.5% add-on rate of interest per annum.

This plan presents an attractive "do-it-yourself" approach. You can pick your own down-payment (minimum of 10%) and select the length of your contract — subject only to the interest charge of $4.50 per $100 per year.

Your Kearney & Trecker representative will be pleased to explain details of these plans to you, and to help tailor a finance program exactly suited to your needs. Ask for our Bulletin PL-66.



MAX. HEIGHT (FROM FLOOR) = 98.00

Plan dimensions and specifications

Axis Movements — Positioning Accuracy — "Commercial" — ±0.001″
— Positioning Accuracy — "Precision" — ±0.0005″

Saddle — Longitudinal (X) axis ..... 38″
Spindle Head — Vertical (Y) axis ..... 36″
Table — Depth (Z) axis ..... 24″

Pallet Work Surface ..... 28″ x 36″

Pallet Load — Maximum ..... 5,000 lbs.

Feed Rates — (all linear axes) ..... 0.1 thru 98 ipm
Contouring in X and Y plane (optional) ..... max. 50 ipm
Rapid Traverse ..... 150 ipm

Spindle Speeds ..... 60 to 2400 rpm in 32 steps

Spindle Drive Motor — (hydraulic) ..... constant 10hp

Control System ..... GE 100% Solid State

Control System Resolution —
(GE Accupin feed back for final positioning) ..... 0.0001″

Tape Readers — (Photo/Electric) ..... 300 characters/second

Tape Format —
Binary coded decimal — letter address — 1″ wide, 8-channel

OPTIONS — Control System — Metric Input

See the MILWAUKEE-MATIC Series IIIB in action

A 16mm sound motion picture in color, "The Winning Hand", shows you in just 15 minutes how simply and quickly you can perform complete machining operations with the MILWAUKEE-MATIC Series IIIB. To learn more about how this unique Automatic Machining Center can increase your profit on small-lot work, contact your local K & T representative, or write Advertising Department, Kearney & Trecker Corporation, Milwaukee, Wisconsin 53214.

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Southfield, Mich. 48075

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11000 Theodore Trecker Way

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PHILADELPHIA, PENNA.
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Suburban Square Bldg.
Ardmore, Penna. 19003

PITTSBURGH, PENNA. 15238
Kearney & Trecker Corp.
1120 Freeport Road

Sales representatives
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ATLANTA, GA. 30308
Scott Machine Tool Co.
411 Williams St., N.W.

BATON ROUGE, LA. 70815
Oliver H. VanHorn Co., Inc.
6301 Choctaw Street

BIRMINGHAM, ALA. 35209
Modern Machinery Associates
1824 29th Ave., South

BOSTON, MASS. 02215
Stedfast & Roulston, Inc.
11 Deerfield St.

BUFFALO, N. Y. 14223
Syracuse Supply Company
1965 Sheridan Drive

CHARLOTTE, N. C. 28203
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1529 South Tryon

CHATTANOOGA, TENN. 37411
Scott Machine Tool Co.
116 Dauphin Way

CHICAGO, ILL. 60656
Jackson-Fotsch Co.
7350 West Lawrence Ave.

CINCINNATI, O. 45202
The E. A. Kinsey Co.
327-335 W. Fourth St.

COLUMBUS, O. 43212
The E. A. Kinsey Co.
1020 W. Fifth St.

DALLAS, TEX. 75235
Greene Machinery Co.
Frito-Lay Tower, Suite 839

DAYTON, O. 45409
The E. A. Kinsey Co.
1580 W. Dorothy Lane

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F. J. Leonard Co.
No. 10 Garden Center
Broomfield, Colorado 80020

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814-820 Winston St.

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751 Fifth Street, S.W.

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Steel & Machine Tool Sales
4747 Gulf Freeway

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C & F Machinery Corporation
P. O. Box 238
Ewa Beach, Hawaii 96706

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451 N. Gallatin Street

JACKSONVILLE, FLORIDA 32205
Scott Machine Tool Co.
1111 Legay Avenue

KANSAS CITY, MO. 64133
Nuetzel Machinery Co.
9140 E. 50 Highway

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Germain-Moore Machinery Company
3200 South Garfield Avenue

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1742 St. Charles Ave.

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Fuchs Mach. & Supply Co.
2401 N. Eleventh St.

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15 North 40th Place

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Smith-Courtney Co.
Seventh & Bainbridge Streets

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Jackson-Fotsch Co.
22 Watch Hill Road

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Syracuse Supply Company
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2363 University Ave.

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165 So. Fourth West Street

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Moore Machinery Company
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Emeryville, Calif. 94608

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5931 Fourth Ave., S.

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228 Spring Street

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Syracuse Supply Company
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Kansas-Oklahoma Machine Tools, Inc.
3216 E. 21 Street

WICHITA, KAN. 67211
Kansas-Oklahoma Machine Tools, Inc.
2234 South Mead

Sales representatives
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KEARNEY & TRECKER
MILWAUKEE®

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