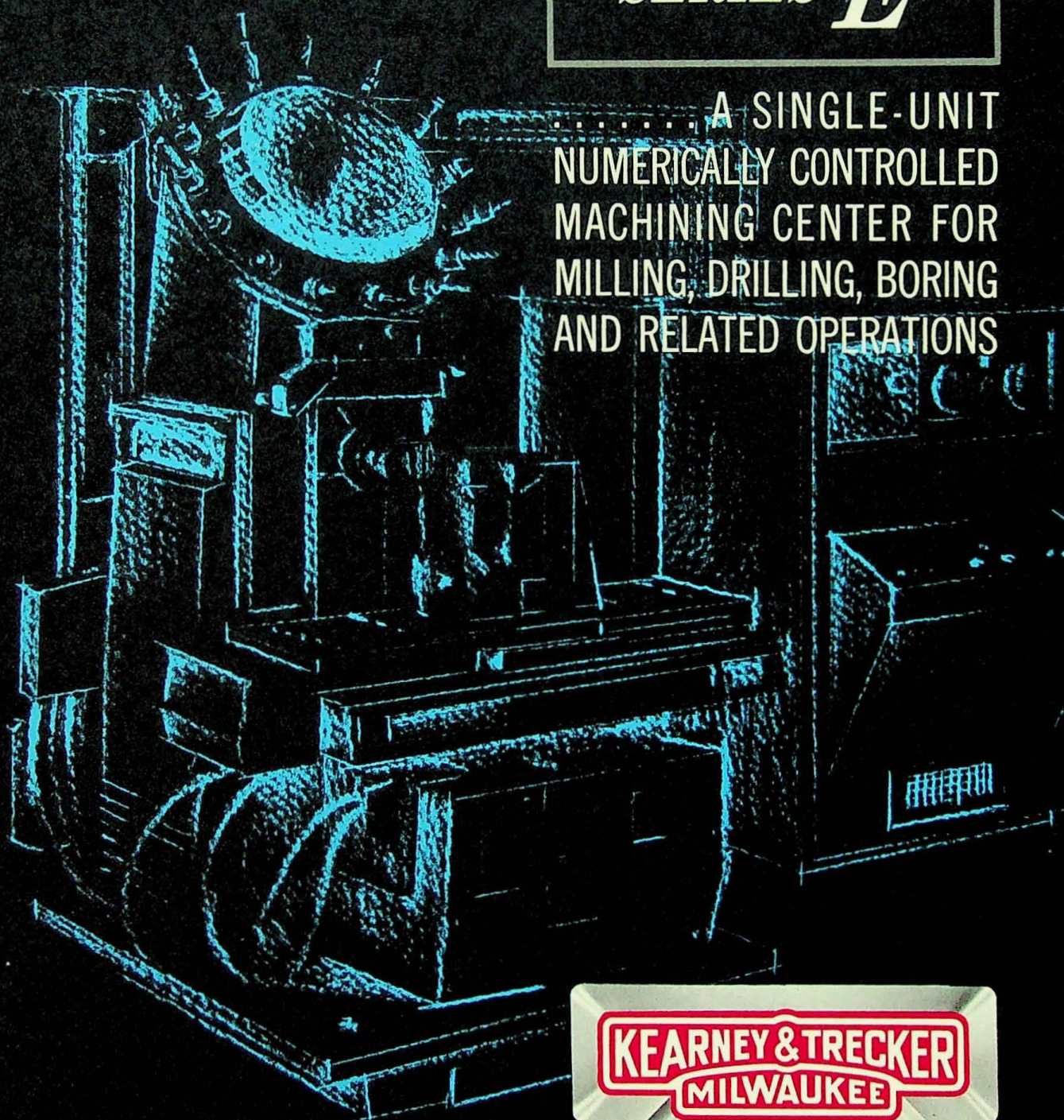
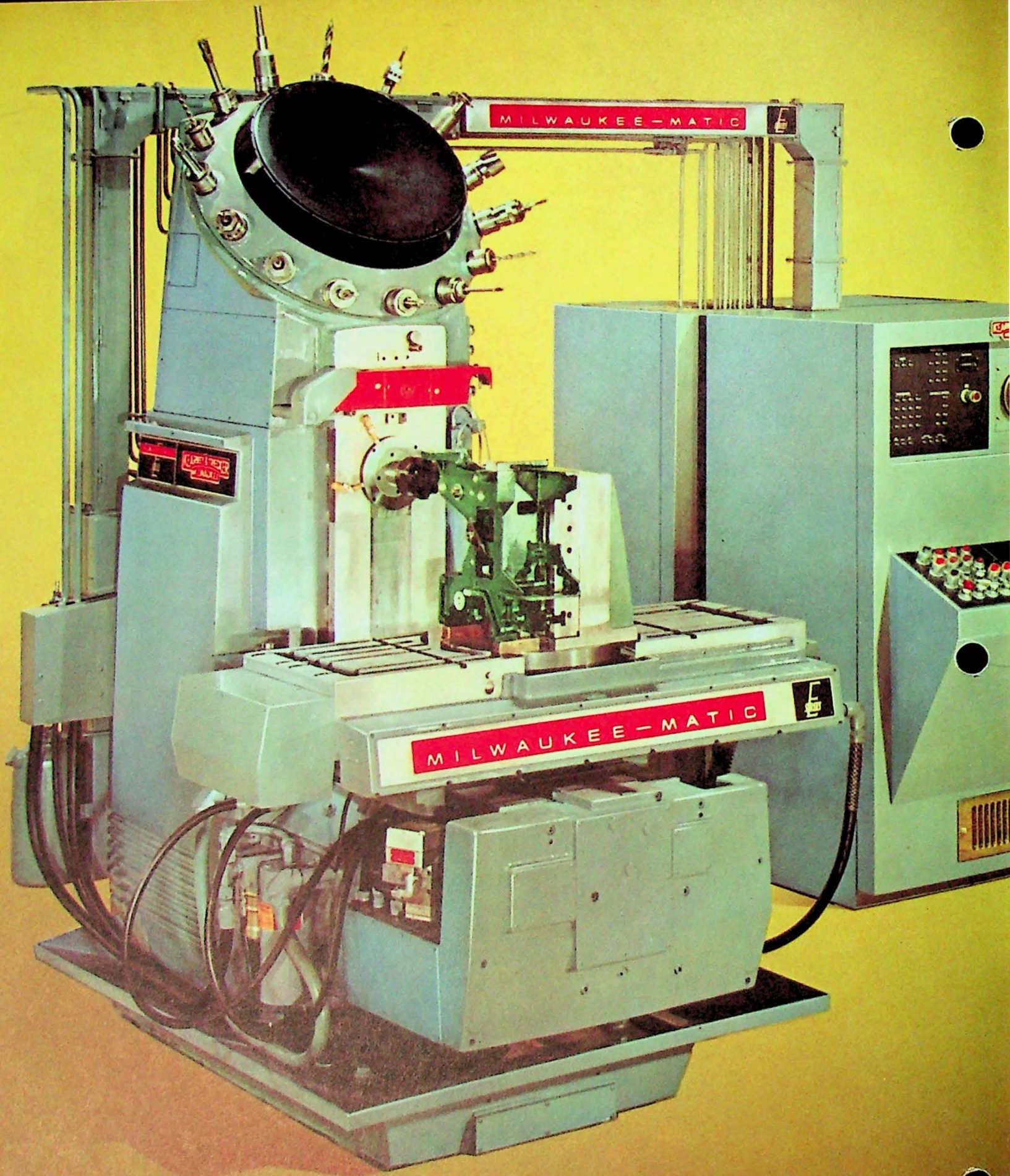
the all new

MILWAUKEE-MATIC®
SERIES E

A SINGLE-UNIT NUMERICALLY CONTROLLED MACHINING CENTER FOR MILLING, DRILLING, BORING AND RELATED OPERATIONS



KEARNEY & TRECKER
MILWAUKEE
®



"THE MACHINE THAT LEAVES THE PAST BEHIND AND PUTS THE FUTURE IN YOUR SHOP TODAY"

AUTOMATE YOUR SMALL LOT PRODUCTION
with the economical MILWAUKEE-MATIC

SERIES E

This New Machining Center gives you complete control over costs

The MILWAUKEE-MATIC *Series E* is specifically designed and engineered to bring the many profitable advantages of numerically controlled machining to shops which previously were hesitant about investing in an automatic machining center.

By performing milling, drilling, reaming, tapping and boring operations in a single setup, the *Series E* permits the "production approach" on short-run jobs. Whether you machine 100 parts, 10, 5 or less, the unit cost remains uniformly low, because the MILWAUKEE-MATIC production method provides cost control through controlled setup and controlled cycle time, plus absolute repetitive accuracy.

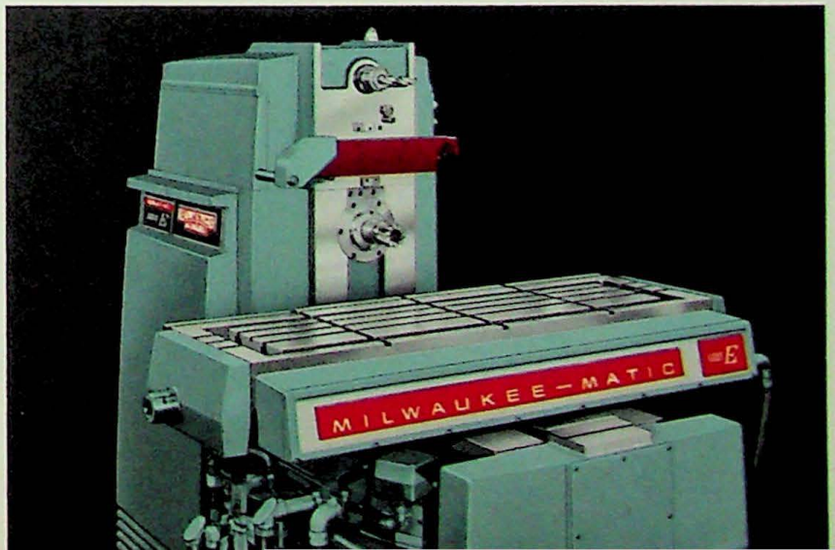
To this can be added the inherent advantages of high utilization and flexibility, lower fixture costs, elimination of expensive in-process inventory, simplified programming and set-up, and reduction of lead-time.

The *Series E* MILWAUKEE-MATIC permits economies previously considered almost impossible. As a result, you can now be *consistently competitive*, regardless of the size of your shop or the number of small lots you may be required to manufacture. The *Series E* is truly the most versatile, most competent machining method available to industry today.

BASIC MACHINE OPTIONS

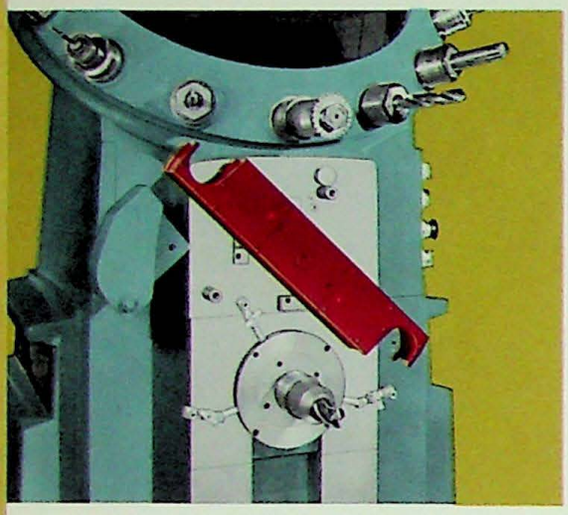
The standard MILWAUKEE-MATIC *Series E* is pictured at the left. It is also available as shown in small photo below, with tool changer and a one-tool manually loaded ready position, instead of the tool storage magazine. Both models can be equipped with a plain table or with the 4-position index table described on page 4.

27301



ONLY 5 SECONDS TOOL-TO-TOOL with this new

27201

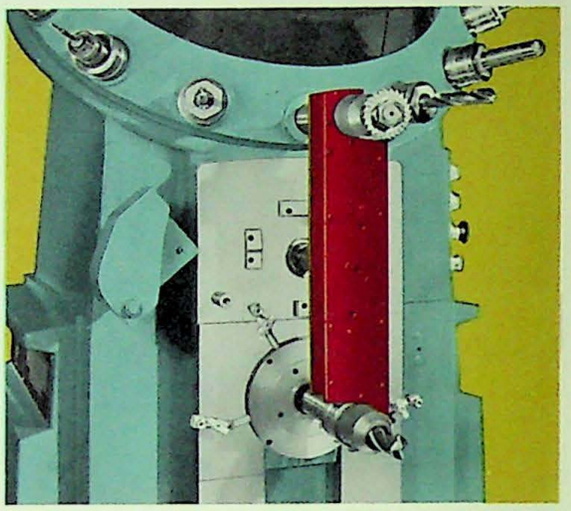


1 Changer arm rotates clockwise to engage tools in spindle and magazine simultaneously . . .

To assure maximum production time, the standard MILWAUKEE-MATIC *Series E* is equipped with a high-speed tool changer. Complete cycle takes only 5 seconds.

Up to 15 pre-set tools can be loaded, in sequence, in the magazine at any one time. At the start of each machining operation the magazine is automatically indexed to the first tool position. Thereafter, taped commands rotate the magazine to the next tool during other machine functions. Maximum tool size for automatic changing is 4″ in diameter and 7½″ in length. Larger tools may be used with selective programming or through manual loading. Drills and boring bars, to 10″ long, can be handled automatically.

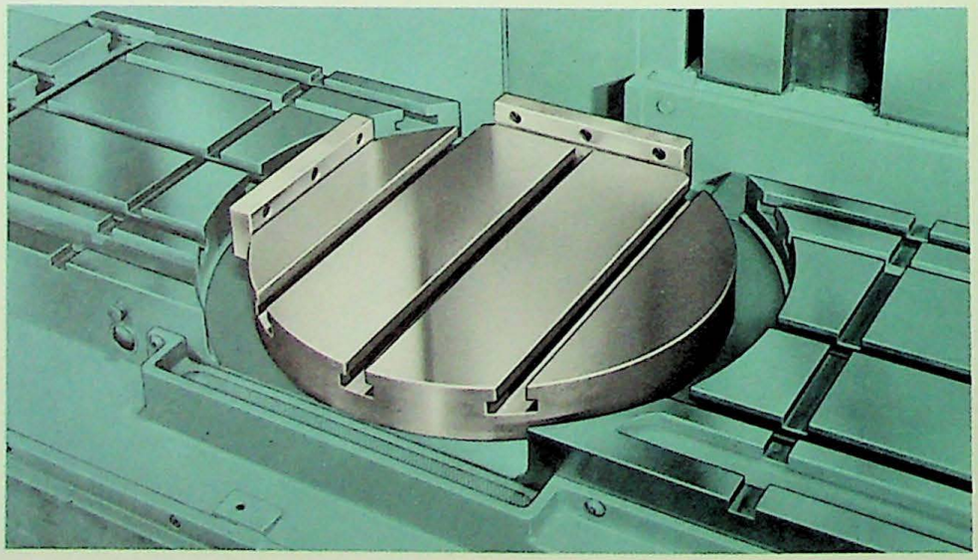
27202



2 Grips tools mechanically, then moves forward to remove tools from socket and spindle

FOUR POSITION INDEX TABLE SPEEDS, SIMPLIFIES SETUP

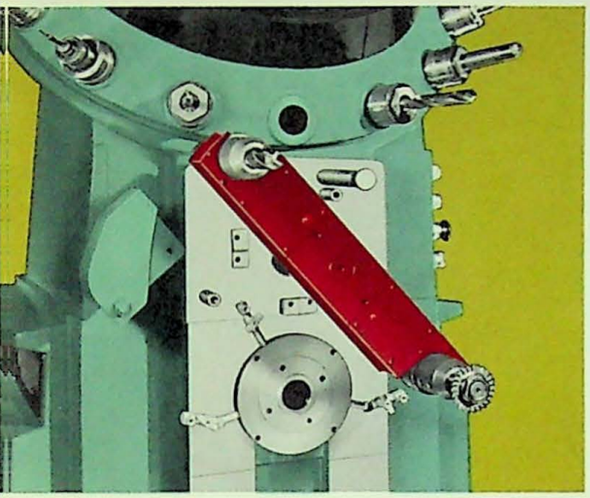
The Standard MILWAUKEE-MATIC *Series E* is equipped with a four-position, 16″ diameter table which can be automatically indexed to four 90° positions in a counter-clockwise direction. This permits machining four sides of the average workpiece in a single setup. The index table is equipped with two Edge Locators, set at 90°, for positioning and securing fixtures. This provides for "controlled" off-machine setups. The two locators are at 7″ from center of table and are held to within 0.0005 TIR (Total Indicator Reading) with respect to the center of rotation.



27187

Automatic Tool Changer

27203



3 Tool changer arm continues clockwise rotation to exchange position of tools

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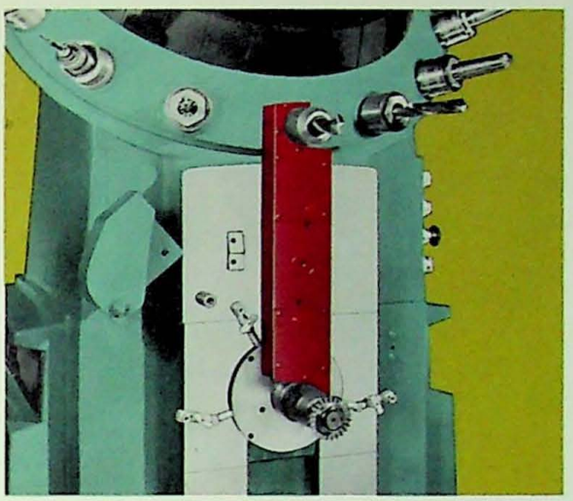
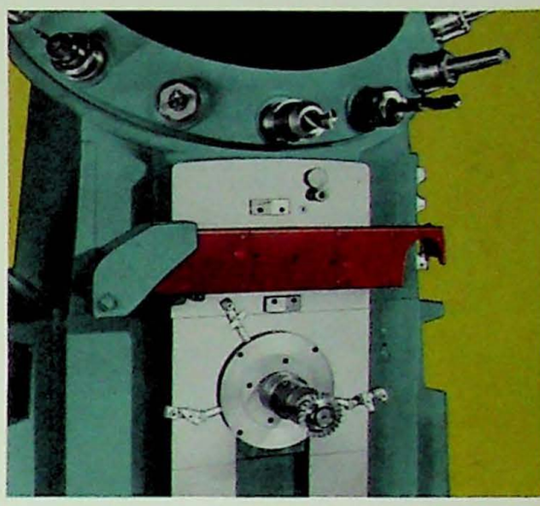


4 Places next selected tool in spindle and previously used tool in magazine

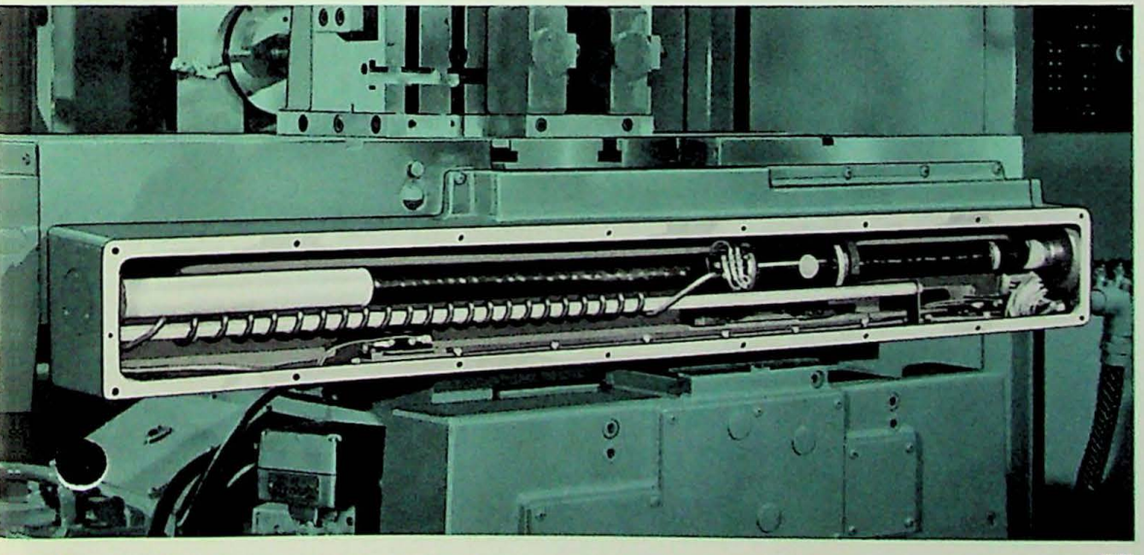
27205



5 . . . and changer arm returns to park position while machine automatically resumes operation

POSITIVE TOOL RETENTION

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



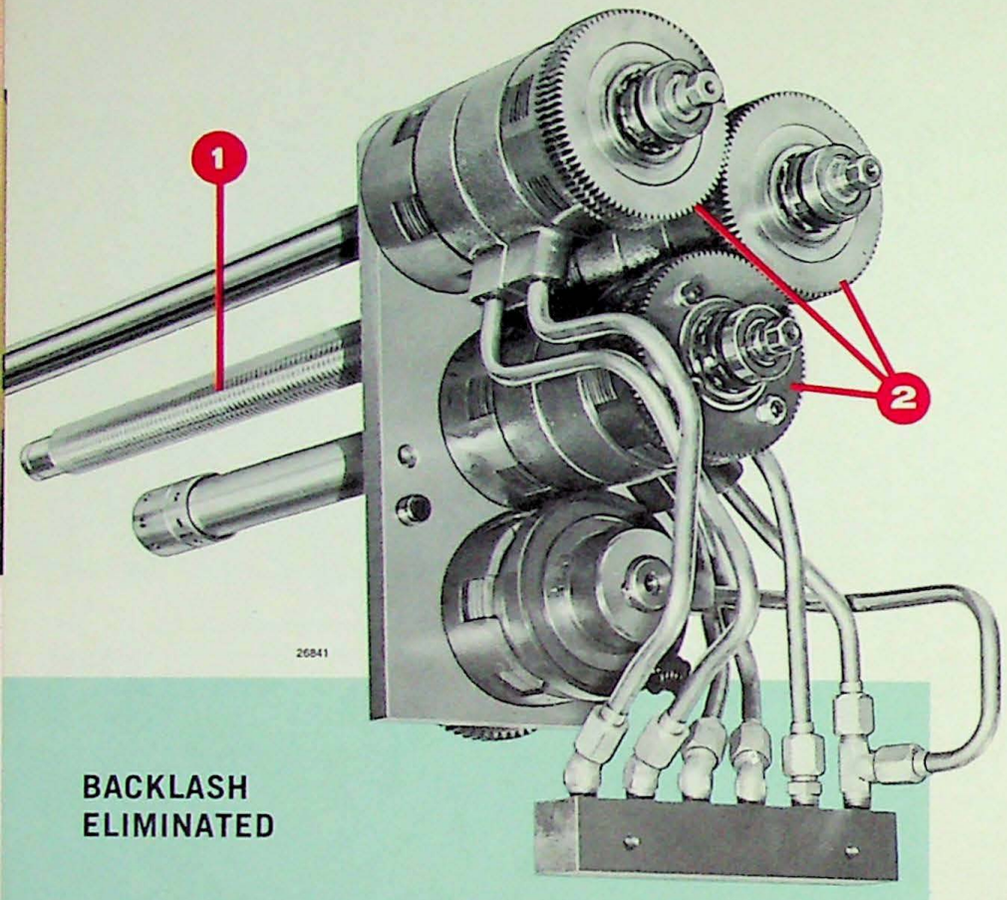
27197

TRANSDUCER GUARANTEES POSITIVE LINEAR ACCURACY

Point to point positioning and straight line milling accuracy is assured on all three axes of the *Series E* by Linear Transducers, each of which operates electronically and is not dependent upon mechanical feedback. Positioning speed is 200 inches per minute. This Transducer is exceptionally dependable and has no brushes, contacts or other moving parts subject to wear or misalignment. Because of its simple construction and rugged industrial packaging, little or no maintenance is required.

MILWAUKEE-MATIC SERIES E

is Quality-Built . . . easy to service



26841

The *Series E* is designed to require only a minimum of servicing. When needed, however, maintenance is simplified by unit construction throughout. This permits fast, easy removal of complete assemblies without tearing down the entire machine. For example, the feed assembly for all three axes can be taken out as a single unit, as pictured at left.

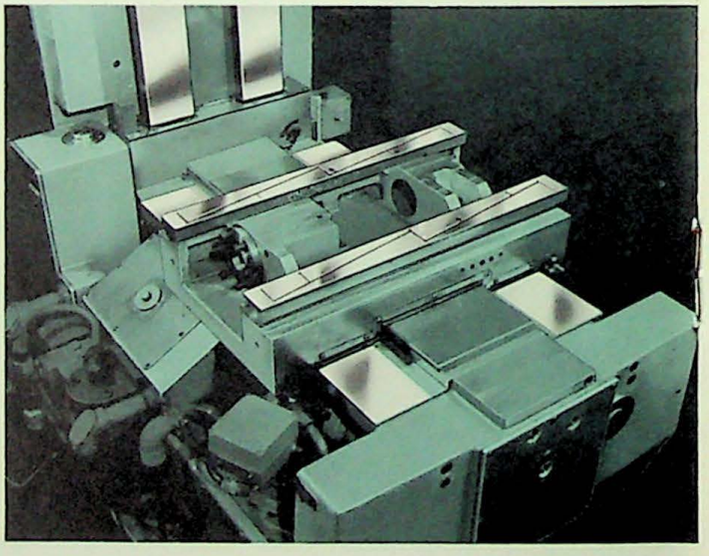
The vertical axis is counter-balanced with positive hydraulic pressure to assure smooth, accurate cutting movements and rapid positioning at 200 inches per minute.

The *Series E* spindle is powered by a 5 hp squirrel cage motor and insures constant output for all cutting speeds from 100 to 3,000 rpm.

BACKLASH ELIMINATED

1. Recirculating ball-type lead screw.
2. Pre-loaded, adjustable anti-backlash gearing for all three axes.

27121



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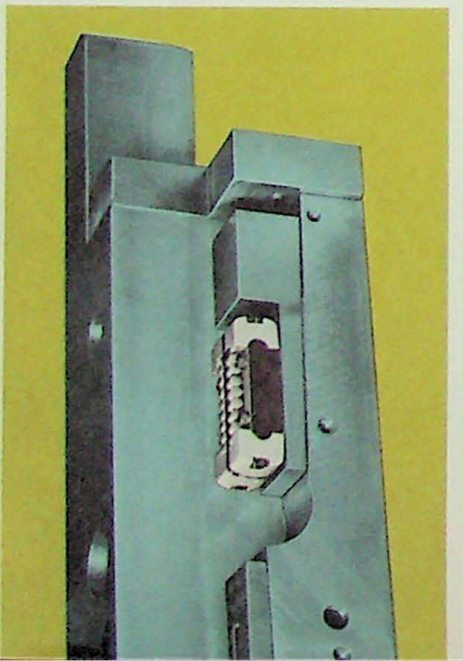
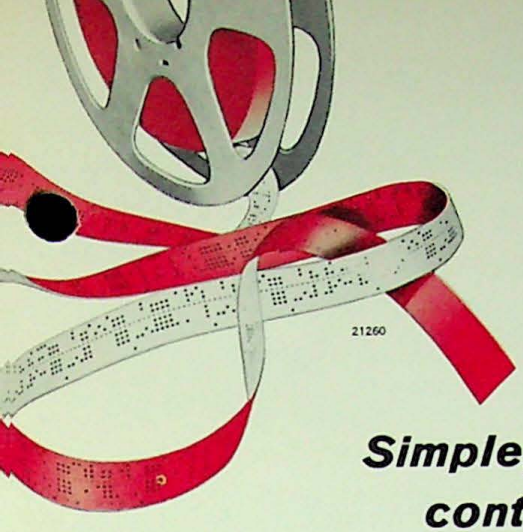


ANTI-FRICTION WAY BEARINGS

Recirculating roller bearings, shown left, reduce friction in movement of the vertical axis and provide for rapid positioning with complete accuracy. These rollers, together with tapered gibs, also provide vertical axis alignment.

HARDENED AND GROUND WAYS FOR ACCURACY AND LONG LIFE

The MILWAUKEE-MATIC *Series E* is equipped with hardened and ground steel ways on all three axes to reduce friction, minimize wear and provide greater stability and accuracy.



Simple, trouble-free tape controls all operations

This 1 inch, 8 channel punched tape is the key to the MILWAUKEE-MATIC *Series E* automatic manufacturing method. It provides the memory for the system, never forgetting, never making a mistake, never misinterpreting instructions.

The tape is read at 55 characters per second by a motorized mechanical tape reader which transmits the taped commands to a static solid state logic control.

The *Series E* control tape is prepared entirely on a standard office Flexowriter . . . no computer required. Programming is simple and can be handled by anyone familiar with machining operations after a brief training period. The machine operator is concerned only with supervision of the machine, while the machine itself is directed by taped instructions.

The following functions are all performed by numerical control:

1. *Feed in any axis at the programmed feed rate*
2. *Position any axis at any feed rate or rapid traverse rate — 200 IPM*
3. *Stop or start the spindle at programmed speed and direction of rotation*
4. *Position index table*
5. *Sequence and changing of tools*
6. *Start and stop coolant (flood or mist)*
7. *Start and stop machine*

With this system it is possible to perform all operations required to completely finish a part, ready for assembly, in greatly reduced time over conventional methods. These operations can be repeated over and over, with repetitive accuracy.

The *Series E* reduces lead-time from days or weeks to hours, by eliminating the need for planning, scheduling, routing and handling each part between four, five or more machine tools ordinarily required to perform all the machining operations that can be done on one *Series E*.

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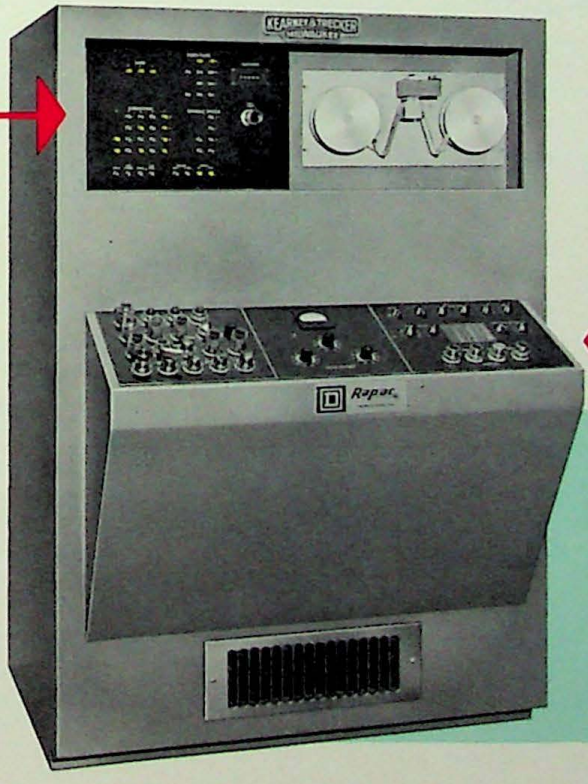


DATA READOUT LIGHTS are provided, for a quick check of information being read by tape.

MANUAL SELECTOR provides operator with full manual control of the *Series E*, with the same accuracy as tape control. All signals contained on tape can be duplicated or changed with the manual controls, including speeds and feeds. Zero offset of ±.050 max. is provided for all three axes. Both features are standard equipment on the *Series E*.

SOLID STATE LOGIC CONTROL SYSTEM

The MILWAUKEE-MATIC *Series E* numerical control system employs standard logic elements, time tested in industrial use for many years. Easily interchanged static logic components, with built-in spares, are encapsulated, making them resistant to mechanical and thermal shocks, and protected against contamination from dirt and atmospheric conditions.

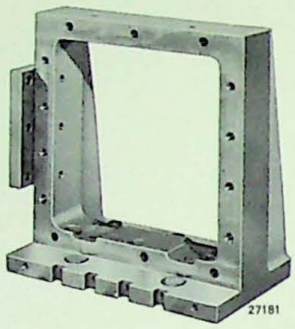
UNIVERSAL VISE JAW SET

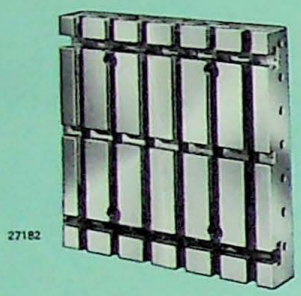
SERIES E UNIVERSAL TOOLING KITS FOR INCREASED PROFITS

(extra cost)

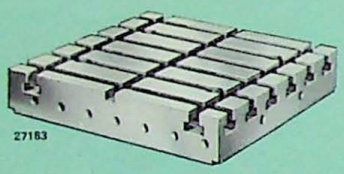
UNIVERSAL FRAME-TYPE BASIC FIXTURE

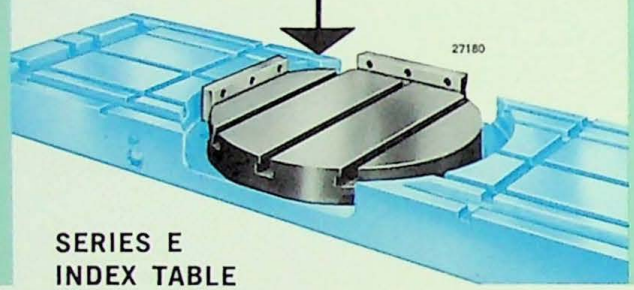
Face Plate and Chuck Plate can be mounted on Frame Fixture for vertical use, or directly on Indexing Table for horizontal holding.



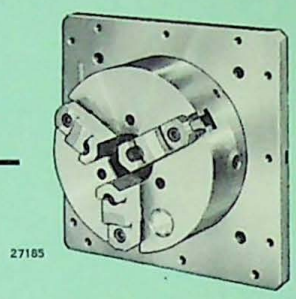


UNIVERSAL SLOTTED FACE PLATE

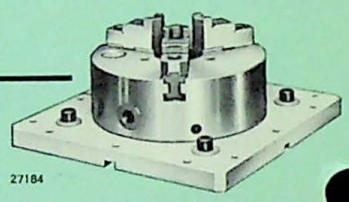




SERIES E INDEX TABLE



UNIVERSAL CHUCK PLATE



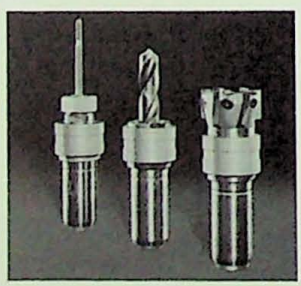
Because all operations performed on the MILWAUKEE-MATIC *Series E* are tape controlled, with a high degree of repetitive accuracy, it is possible to use simple devices to hold and locate workpieces, instead of expensive, individually-designed jigs and fixtures.

To capitalize on this feature and reduce fixture costs and fixture maintenance to an absolute minimum, particularly on short-run lots, the *Series E* Universal Fixture Kit, pictured here, is offered as an accessory. Typical savings it affords are illustrated by a survey of the first 65 typical parts: 63 were able to utilize the Fixture Kit, bringing the average cost to less than $50 per fixture. In many cases, the saving on tooling alone will pay for the equipment in a few years.

ECONUMERIC PRECISION TOOL SETTER

(extra cost)

The Econumeric Precision Tool Setter provides a quick, accurate method for pre-setting tools.



STANDARD TOOL HOLDERS FOR PRESET TOOLING

(extra cost)

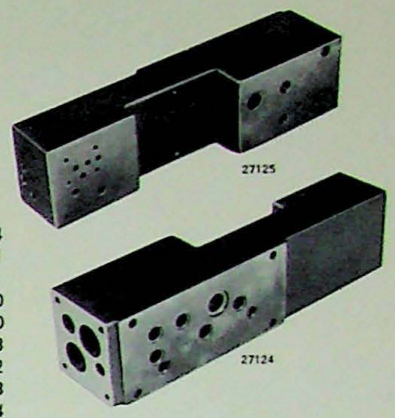
A complete line of standard tool holders and accessories has been developed for the MILWAUKEE-MATIC *Series E*. Tapping is accomplished without the aid of external accessory units. The programmer merely designates the "feed-to-spindle-speed" ratio (determined by lead of thread to be cut) and direction of rotation. The spindle is programmed to reverse its rotation and feed when depth is reached.

Note: Most MILWAUKEE-MATIC Model II tool holders can be easily adapted for use with the *Series E*.

THE MILWAUKEE-MATIC® SERIES E SAVINGS STORY

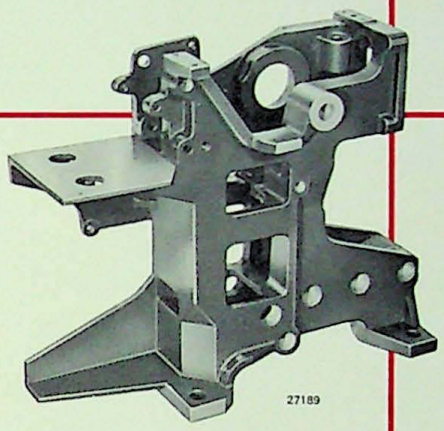
From the day you put your MILWAUKEE-MATIC *Series E* in use, you'll see your profit increase — RAPIDLY! You'll find that, for the first time, you'll really be CONSISTENTLY COMPETITIVE on small lot production . . . because the *Series E* provides for full flexibility and full utilization.

Here is a comparison of the cost of producing several typical parts on the MILWAUKEE-MATIC *Series E*, and on conventional machines. Savings shown result from performing multiple operations on a single machine, with automatic tool changing, table indexing, more economical fixturing and minimum set-up time.



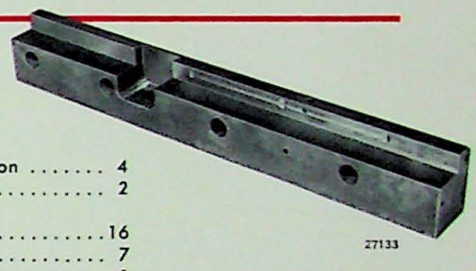
Number of sides worked on 4
Number of setups 1
Number of operations:
drill 40
tap 20
bore 3
counter bore 12
ream 3
mill 4
Material — cast iron Lot size — 10

	Conventional	SERIES E
SETUP	5.3 hrs.	0.3 hrs.
CYCLE	2.7 hrs.	1.2 hrs.
TOOLING	$1,000.00	$325.00



Number of sides worked on.. 6
Number of setups 3
Number of operations:
mill 19
drill 21
ream 6
tap 6
bore 4
counter bore 2
spot face 3
Material — aluminum Lot size — 40

	Conventional	SERIES E
SETUP	19.5 hrs.	0.5 hrs.
CYCLE	12.5 hrs.	1.75 hrs.
TOOLING	$7,300.00	$1,600.00



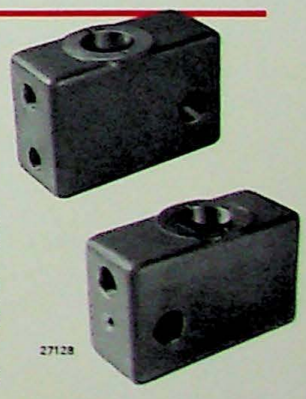
Number of sides worked on 4
Number of setups 2
Number of operations:
drill 16
tap 7
bore 1
counter bore 5
ream 1
mill 10
Material — cast iron Lot size — 20

	Conventional	SERIES E
SETUP	7.1 hrs.	0.5 hrs.
CYCLE	1.5 hrs.	0.8 hrs.
TOOLING	$775.00	$175.00

Number of sides worked on..... 6
Number of setups 2
Number of operations:
drill 29
tap 12
bore 3
counter bore 13
trepan 2
mill 3
Material — cast iron Lot size — 5

	Conventional	SERIES E
SETUP	4.8 hrs.	0.5 hrs.
CYCLE	2.1 hrs.	0.9 hrs.
TOOLING	$850.00	None*

*Universal tooling used

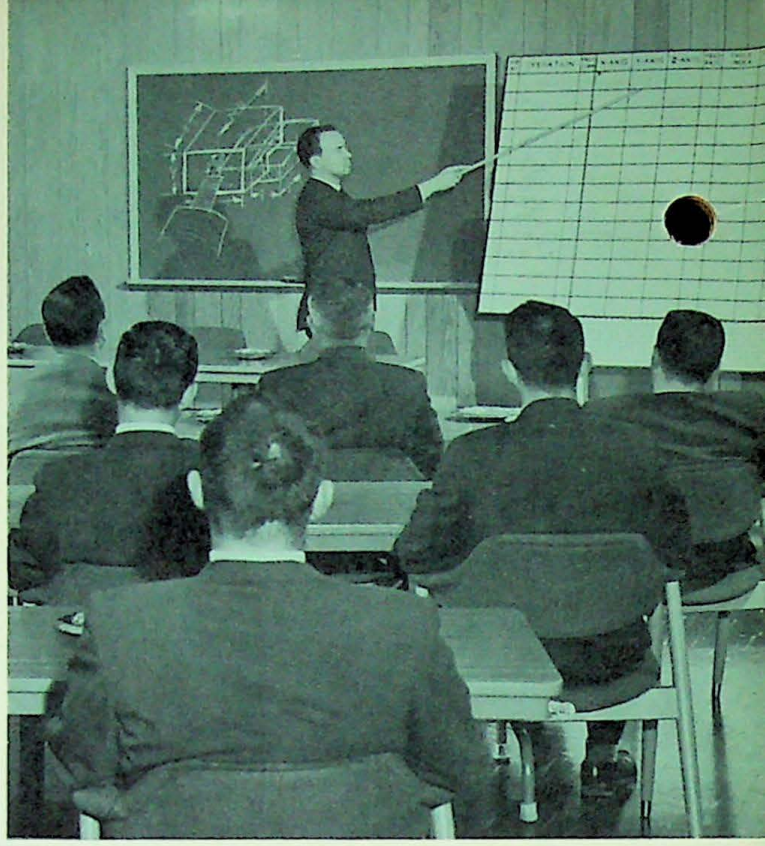


Number of sides worked on 4
Number of setups 2
Number of operations:
drill 12
tap 6
bore 3
mill 1
Material — aluminum Lot size — 75

	Conventional	SERIES E
SETUP	1.8 hrs.	0.4 hrs.
CYCLE	.9 hrs.	.3 hrs.
TOOLING	$500.00	None*

*Universal tooling used

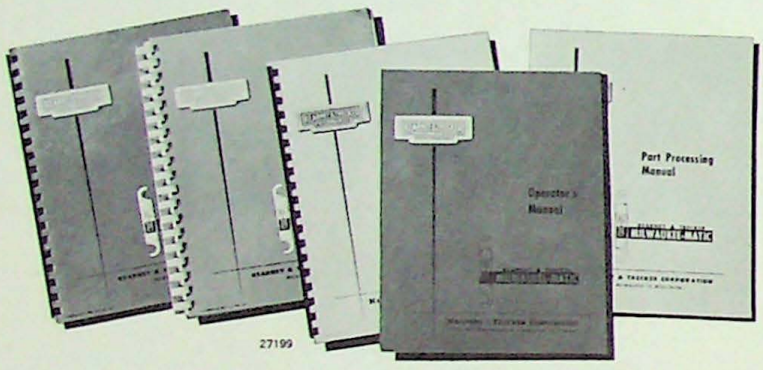
KEARNEY & TRECKER
NUMERICAL CONTROL SERVICES



26134

TRAINING

Anyone with a machinist or equivalent background can become proficient in *Series E* operation in a week or two. Kearney & Trecker conducts training schools covering programming, tool setting, machine operation and maintenance with the single aim of assuring you that your MILWAUKEE-MATIC *Series E* will return the full profit of which it is capable.



27199

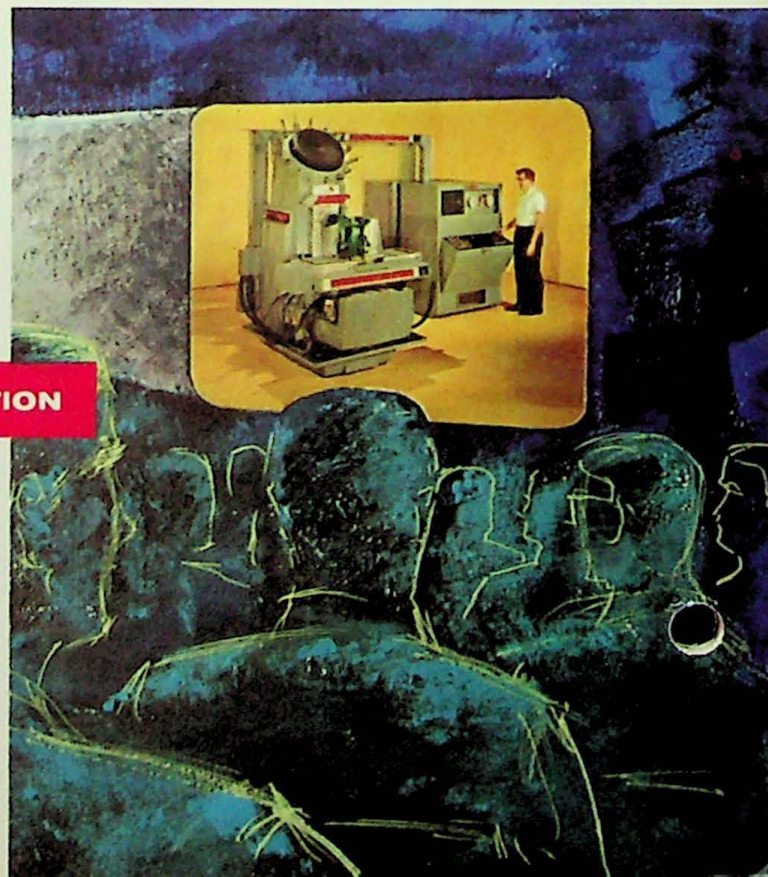
INSTRUCTION MANUALS

Instruction manuals on programming, tool setting, operation and maintenance of the MILWAUKEE-MATIC *Series E* are provided without charge to owners. Manuals are comprehensive, clearly written and well illustrated.

SERVICE BACKUP

Kearney & Trecker is the sole responsible party for the complete MILWAUKEE-MATIC *Series E* 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 E*.



SEE THE MILWAUKEE-MATIC *SERIES E* IN ACTION

A full color, sound motion picture, "Producing for Profit", shows you in just 15 minutes how simply and quickly you can perform complete machining operations with the MILWAUKEE-MATIC *Series E*. To learn more about how this new, economical machining center can double your profit on small lot work, contact your local K & T representative, or write Department E, Kearney & Trecker Corp., Milwaukee, Wisconsin 53214.

MILWAUKEE-MATIC®
SERIES E

27192

IT'S EASY TO OWN THE MILWAUKEE-MATIC SERIES E

Cash-Flo Machine Tool Purchase Plan

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:

The "Cash-Flo" Plan is based on the ability of a new Kearney & Trecker MILWAUKEE-MATIC *Series E* 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 E* is only 7% . . . equivalent to the amount of your 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'll find many real advantages in leasing your new MILWAUKEE-MATIC *Series E*.

This plan assures you the future service of a *Series E* 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.

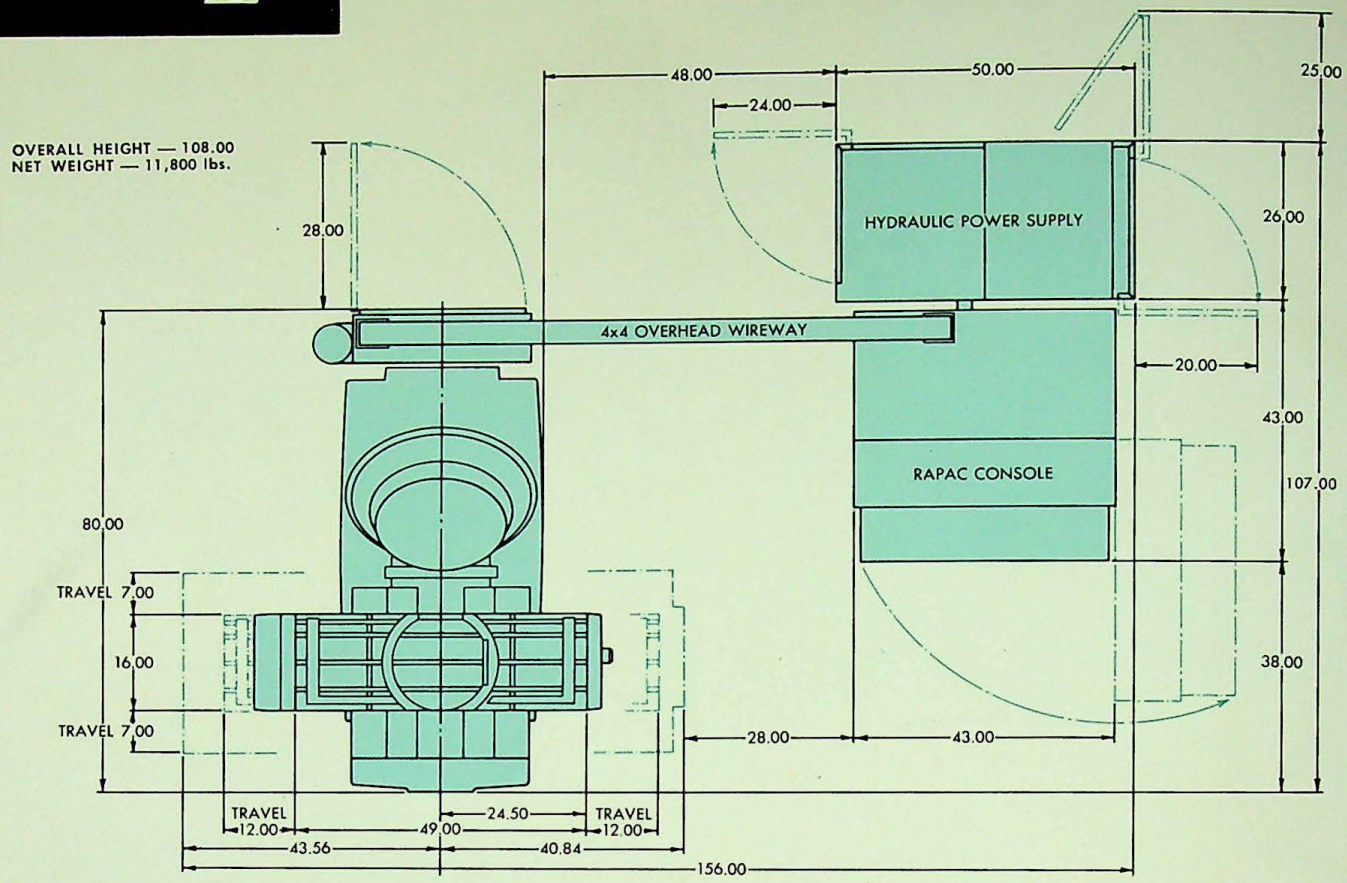
Remember — more than 80% of the work produced today is in the area of small-lot jobs. Be prepared to cash in on it!

Your Kearney & Trecker representative will be happy to explain details of these plans to you, and to help tailor a finance program exactly suited to your needs.

MILWAUKEE-MATIC®

SERIES E

PLAN DIMENSIONS AND SPECIFICATIONS



Slide Movements —	
Longitudinal (X) axis	24"
Vertical (Y) axis (with 4 position Index Table)	14"
(with Plain Table)	16"
Cross (Z) axis	14"
Work Surface (4-position Index Table)	dia. 16"
(Plain Table)	16" x 49"
Feed — all axes	1 to 70 IPM
Rapid Traverse	200 IPM
Programmed feed rate may be reduced by 50% in infinite steps.	
Spindle Speeds	100 to 3000 RPM in 32 steps
Spindle Drive Motor	Constant 5 hp
Control System — (Static Logic)	Square D RAPAC
Control System Resolution	.001"
Mechanical Tape Reader — Speed	55 Characters/second
Tape Format — 1" wide, 8 channel — Binary coded decimal-tab sequential punched tape	

K & T LEADERSHIP

Since 1946, Kearney & Trecker has exhaustively researched the development of automatic machine tools controlled by previously programmed data.

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