

MACHINE TOOL TOPICS

VOL. 1, No. 1 • JANUARY 1970

A NEWSLETTER FOR THE MACHINE TOOL INDUSTRY

TO OUR FRIENDS IN THE MACHINE TOOL INDUSTRY

This is the first issue of Machine Tool Topics which we hope you will find interesting and informative. Our aim in publishing this newsletter is to provide a means of communicating information on new products, systems, and concepts of significance to the industry. If we're on target this should be another input to help you stay abreast of industry trends, changing market needs, and give you some ideas on ways these can be met.

We will mail subsequent issues on an occasional basis as important and new information becomes available. We welcome any comments or suggestions you may have on this initial issue.

D. R. Hall, Manager, East Central Region
Industrial Sales Division, Cleveland, Ohio



OHIO
MICH
KY
INDIANA
W. VA.

PLANT EXEC. PERSONNEL
IN MACHINE TOOL INDUSTRY
LARGE USERS OF MACHINE TOOLS &
O.C.M.

* * *

OUTSTANDING SERVICES SUPPORT MARK CENTURY NUMERICAL CONTROL

General Electric now offers a wide-range of support services to Mark Century Numerical Control users. More than 90 cities have NC support services, more than 1,000 customer graduates from maintenance school yearly, 200 Numerical Control-trained service engineers worldwide, and 15 countries with time-sharing service for part programming. And there are others too. Like: postprocessors for all major computer programs, an automatic check tape with each control, local spare parts stocking, and liberal warranties.

All these GE services make your NC investment worth a lot more. Day-to-day and year-to-year they add convenience, save time, and reduce operating and investment expense.

With GE Mark Century NC you are way ahead in product quality and performance, too. That's why 164 builders choose GE. And 164 is just about every NC machine builder in the world.

So specify GE Mark Century NC with your next NC machine for satisfaction today and a real long-term payoff on your investment.

* * *

FOR THE MACHINE TOOL INDUSTRY: A NEW MINI PROCESS COMPUTER

A new mini process computer designated the GE-PAC* 30 is now being marketed by the GE Process Computer Department. This flexible, read-only-memory based computer, selling in the \$10,000 range, is well-suited for a wide variety of automation applications in the machine tool industry. Some specific applications include: instrument control, process control, subsystem controlling, loading terminal automation, production testing of components, and direct computer control of N/C machine tools.

Customer demand for a GE product in the burgeoning mini process computer market prompted the introduction of the GE-PAC 30 computer series. The GE-PAC 30 thus joins GE's larger line of process computers, including the front-running and versatile GE-PAC 4020 for a complete product offering and new flexibility in process control. The read-only-memory feature makes the GE-PAC 30 one of the most flexible machines of its size on the market today.

In addition to faster computing speed, read-only-memory also makes possible more efficient and responsive control. Special-purpose instructions can be built right into the hardware.

Other features of the GE-PAC include dual in-line integrated circuits; functional, plug-in modular design, easy programming - 16-32 bit instructions, direct addressing to 64K bytes.

*Registered trademark of GE Company.

* * *

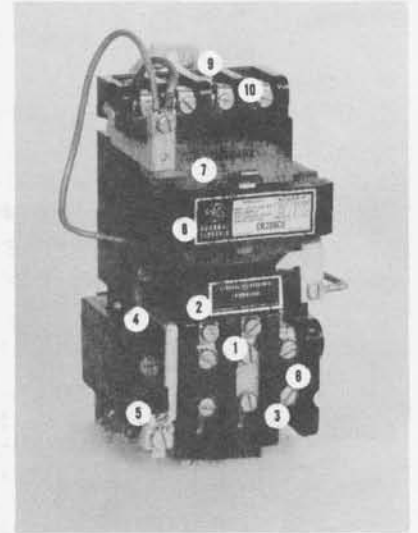
POLYDYNE DRIVES REDESIGNED TO USE NEW TRI-CLAD 700 MOTORS

The Gear Motor Business Section of GE's General Purpose Motor Department has announced the availability of Polydyne Drives with Tri-Clad 700 motors. This offering provides a modern mechanical way to obtain adjustable speed from AC power at low cost, in the range of ¼-to 50-horsepower. It has been specially designed for uses where you need or want: most efficient process speed, low maintenance, machine versatility, stepless adjustment of output speed, adaptability of machine speed to operator ability, and rigid control of product quality. Note new literature listings for available bulletin.

200 LINE STARTER MODIFIED FOR MACHINE TOOL MARKETS

The 200 Line--General Electric's "second generation" of magnetic starters--combines the time-proven dependability of the 100 Line with the most recent developments in control technology. To fulfill the unique needs of the Machine Tool Industry, special forms of the 200 Line with auxiliary terminals and an accessory surge suppressor (Item 1 & 2) have been made available. Other new features are:

- 1) Accessible Auxiliary Terminals, specifically for Machine Tool applications, permit control of more than one motor with a single starter.
- 2) The new Surge Suppressor, easily installed, contains an RC circuit which absorbs energy surges that appear on the line.
- 3) New Block Overload Relay gives you greater application flexibility with either standard two-leg or optional three-leg motor protection.
- 4) The New Overload Relay also features an exclusive manual contact operation check--to let you know for sure that contacts have not welded due to short circuits in the control wiring.
- 5) New Single Reset Arm resets all three legs, simplifies panel construction and layout.
- 6) Unique Dual-Bimetal Relay "anticipates" rate of temperature rise in motor windings, reduces "trip" time in dangerous locked rotor positions giving you greater motor protection than ever before.
- 7) Completely Encapsulated Coil is impervious to moisture, dirt and oil; resists mechanical damage and high humidity failure.
- 8) General Electric's field-proven magnet design is now specially treated to resist rust. Magnet faces are protected during idle periods, ready to operate when needed.
- 9) Contactor and Overload Relay mount vertically on an integral baseplate to make a strong, rigid unit.
- 10) Straight Through Power Wiring with General Electric's 100-Line has been refined in the 200-Line. Line terminals on top, load terminals on the bottom eliminate unnecessary bending and looping of wires around starter. This saves time and money "on-the-job".



In addition, the renewal parts of the 100-Line are completely interchangeable with the new 200 Line. These features indicate many of the sound reasons why the 200 Line is today's best answer to the increasing demands of the Machine Tool Industry.

* * *

AC MOTOR CONTROL FOR MACHINE TOOL APPLICATIONS

Solid state adjustable frequency control of a-c motors, both induction and synchronous, is now practical for a wide-range of machine tool and other industrial applications, even down in the fractional horsepower range. General Electric's ST-100 adjustable frequency line offers not only the obvious advantages of a-c motors but also some unique functional benefits for both individual drive uses and drive systems.

The basic ST-100 control provides long term drift accuracy of 3%, speed regulation dependent on motor characteristics, time acceleration and deceleration, regeneration capability of limited amount on a momentary basis and for braking to a stop, a current trip circuit and undervoltage protection.

The basic control can be made to provide higher levels of accuracy by locking the inverter frequency to an external adjustable frequency oscillator (0.1% accuracy) or to an external crystal controlled oscillator through a pulse rate multiplier to provide an adjustable frequency range (0.01% accuracy).

Any number of basic controls can be integrated into digitally locked systems having features such as:

1. Linear acceleration and deceleration of the system as a whole.
2. Provision for adjusting the speed ratios between sections by digital means and for holding these ratios exactly at any point in the drive operating range and while accelerating or decelerating between operating points. Speed ratios are held exactly at their set values; for example, while the system is accelerated from a "thread" speed to a "running" speed.
3. Speed ratios settable in increments of 0.01% or smaller.
4. Speeds or speed ratios manually adjustable by thumbwheels or adjustable by information from punched cards, paper tape, or from a digital computer.
5. Analog or digital tachometer following.
6. Digital speed readout.
7. Fast in-train stopping.

MACHINE TOOL COMPANY REDUCES PROGRAMMING TIME THROUGH TIME-SHARING

Since 1924, the Moore Special Tool Company of Bridgeport, Conn., has maintained its reputation as manufacturer of some of the most accurate machine tools in the world. On this outstanding record the firm has built a world-wide business. Its products include universal measuring machines, jig borers, jig grinders, a rotary table for accurate positioning operations, a precision index for inspecting mechanical and optical rotary tables, a pantograph wheel dresser, a small-angle divider, a die flipper, precision index centers, as well as a full line of machine-tool accessories.

ACCURACY NEEDS TO GROW

According to Richard C. Ferguson, Manager of Numerical Control at Moore, the need for accuracy becomes more and more important in the machine tool business each year. In addition, he said, parts get more complex. That is why his firm subscribed recently to the GE computer Time-Sharing Service. He said that it increases the accuracy of operations and reduces time and expense needed to produce vital machine parts. The GE computer system also proved vital to the performance of many other shop operations such as exceedingly accurate measuring operations.

Ferguson said that the firm formerly had no computer equipment, nor did it use service bureaus for its production calculations. Instead it used desk calculators to work out its problems manually.

The need for a versatile and flexible computer service is pointed up by the great amount of geometry involved in designing, manufacturing, testing and measuring in the machine tool field. For example, Ferguson explained, the Moore firm recently had to make a template with a 200-inch radius in order to produce a gage with a 20-inch radius. This was to be produced by the point-to-point method, rather than by contouring, which is a more costly method.

TWENTY TIMES FASTER

Using the computer time-sharing service, Ferguson said, "We were able to compute 600 points on the point-to-point system and to mill the template in two hours. The same process would have taken 40 man-hours using manual methods."

Recently the Moore staff was able to complete a grinding machine job to an accuracy of .0002 of an inch in eight hours. "It would have taken at least 25 hours to grind this piece, if we had controlled it manually rather than with the computer tape," Ferguson said.

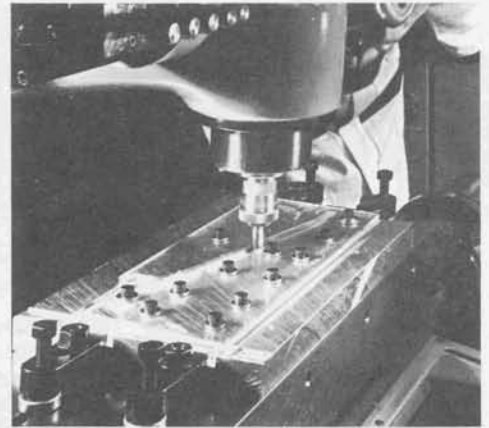
In the company's Tool Division, the computer system allows personnel to quote shorter engineering time on jobs, thus "making them more competitive," Ferguson said. He explained that quotes can be made lower because of the ease with which the computer system works out complicated and repetitive calculations.

In the Jig Borer Division, he said, a recent job required only eight minutes per slot using the computer system for point-to-point machining, as contrasted with an hour per slot to do the job manually. Ferguson explained that the Moore firm can use less costly point-to-point machining methods with more accuracy than the more expensive contouring procedure which is done on a larger and more complicated machine.

EXTREME ACCURACY REQUIRED

The time-sharing service has proved invaluable in making the myriad geometry calculations involved in complicated measuring jobs on the Moore Universal Measuring Machine, where accuracy of .000035 of an inch is attained.

"By manual means, these measurements represent a long and arduous task," said Ferguson. "However, with the aid of the computer service, we are able to complete such jobs in a fraction of the manual time." Time sharing at Moore is done principally by programs already in the GE file. However, the Moore company is going ahead with its own programs to meet its own particular needs.



A 200-inch radius template is shown here on a Moore Jig Borer controlled by a GE Mark Century numerical control system. The N/C system in turn is controlled by a tape produced by the GE computer Time-Sharing Service.

* * *

NOW YOU CAN
GET NC
MACHINE TOOLS
FROM 164
BUILDERS...

... and save on all by specifying GE Mark Century Numerical Control

With GE Mark Century NC you get the widest choice of machines ... and the many benefits of being able to standardize on one basic control design. Save on operator and maintenance training, cut troubleshooting time to a minimum, stock much fewer spare parts, and make your programming job easier.

With GE Mark Century NC you are way ahead in product quality and performance too. That's why 164 builders choose GE. And 164 is just about every NC machine builder in the world.

READING MATTER To order reprints or brochures listed here, contact: F. S. Starlin
General Electric Company
1000 Lakeside Avenue
Cleveland, Ohio 44114

— Two magazine article reprints of interest to the Machine Tool Industry: "What to Look for in Your Next NC System" - reprinted from May 1969 METALWORKING (request NEC-1054), "A Postprocessor Personified" — reprinted from June 1969 AMERICAN MACHINIST (request NEC-1055).

— New brochure on Mark Century 7500 Series Numerical Control outlines in easily readable form the many outstanding features and advantages of these controls. (GEA-8749)

— Two brochures highlighting Mark Century Numerical Control applications: the Moore numerically controlled Continuous Path Jig Grinder, and the Moore Model No. 3 Precision Jig Borer. (Request GEA-8701 and GEA-8702 respectively.)

— General Electric's Process Computer Department, Phoenix, Arizona, has available a new bulletin, GEA-8870, on its OMNIBUS family of related software packages for both foreground and background processing.

Individual bulletins covering the following foreground programs are also available:

— GE-DDC direct digital control - performs basic function of loop control and provides flexibility necessary to build multi-level, feed-forward, feedback control schemes. (GET-3558)

— BICEPS supervisory control - establishes setpoints for DDC loops or for analog controllers. (GET-3559)

— OPO optimization - determines optimum operating conditions for a plant to produce maximum dollar profit. (GET-3560)

Background processing with FREETIME IV permits developing the plant model, or compiling and testing special programs while continuing to control the process. (Bulletin GET-3561)

— New GE-PAC 30 Process Computer, a flexible mini computer to solve your control problems. (Bulletin GEA-8838)

— New Form G Motor Catalog now available. This 8-page publication from GE describes the full line of commonly used 1/20 through 5-horsepower Form G definite and general purpose motors. (Request GEC-5000)

— Another new 8-page brochure from GE's General Purpose Motor Department describes the expanded line of 5-1/2 inch diameter Form G motors used extensively in the Machine Tool Industry. (Request GEA-8113)

— GE's Gear Motor Business Section recently announced a new line of "C" face reducers which find application in the Machine Tool Industry for deburring machines and chip conveyors. (Request GEA-8682)

— Also from the Gear Motor Business Section of GE's General Purpose Motor Department is a new publication describing the availability of Polydyne drives with Tri-Clad 700 motors. These are used on such machines as punch presses, multiple stage hobbers, and precision boring machines. (Request GEA-6806A)

— Three new publications announced by GE's Specialty Transformer Department of interest to the Machine Tool Industry are: "Control Transformers for Applications in Machine Tools and Panelboards" -- GEA-7307A, "GE's AC Line Voltage Stabilizers for Electronic and Electrical Equipment" -- GEA-7376A, and "GE Amplistat Magnetic Amplifiers and Reactors" -- GEA-6930B. Copies of each are available on request.

* * *

INFORMATION PLEASE For additional information on articles in Machine Tool Topics; to order brochures or magazine article reprints listed under "Reading Matter"; or for any information on General Electric Products and Services, contact:

F. S. Starlin
General Electric Company
1000 Lakeside Avenue
Cleveland, Ohio 44114

GENERAL  ELECTRIC