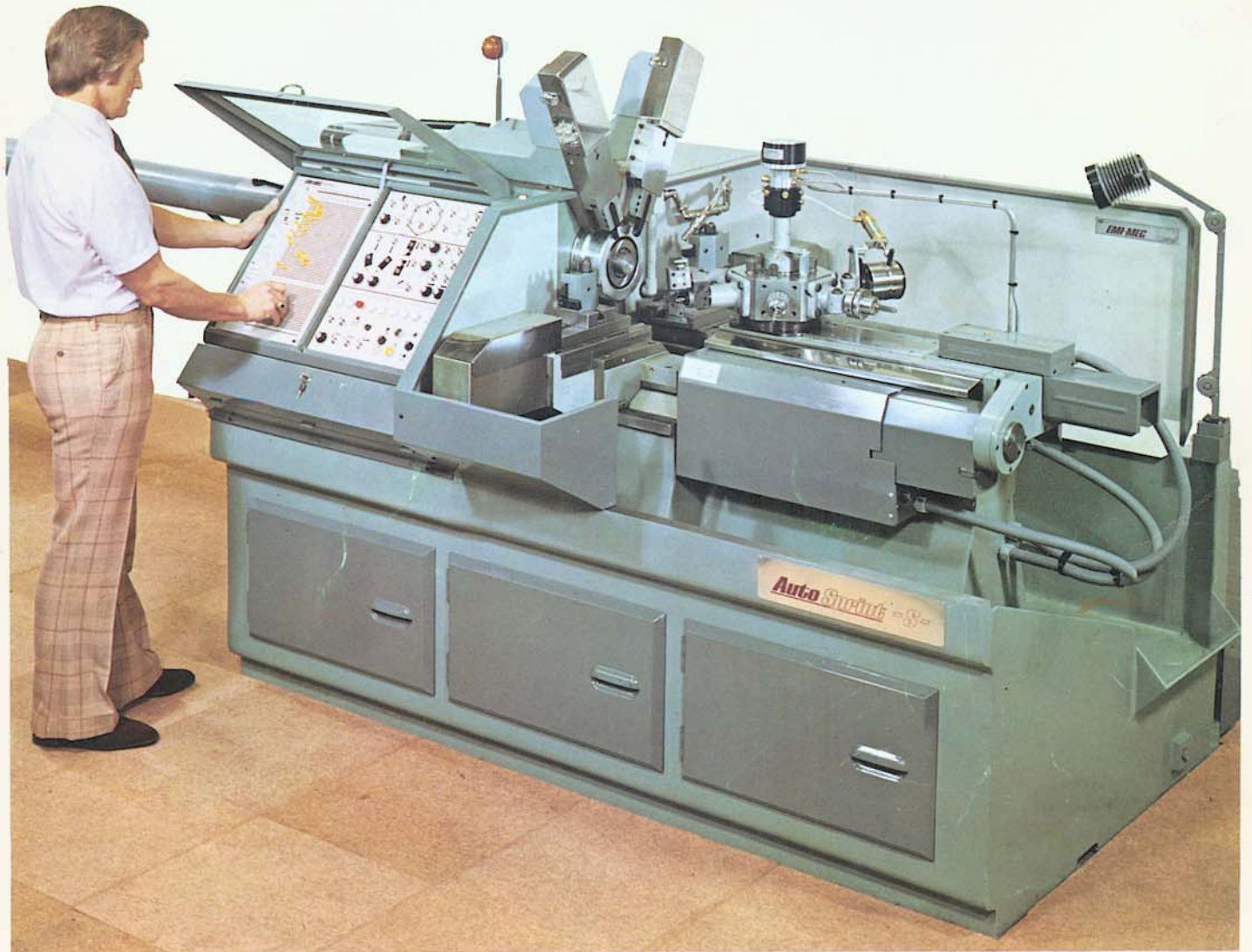


# EMI-MEC *Auto Sprint - S -*

Design Council  
Award 1977

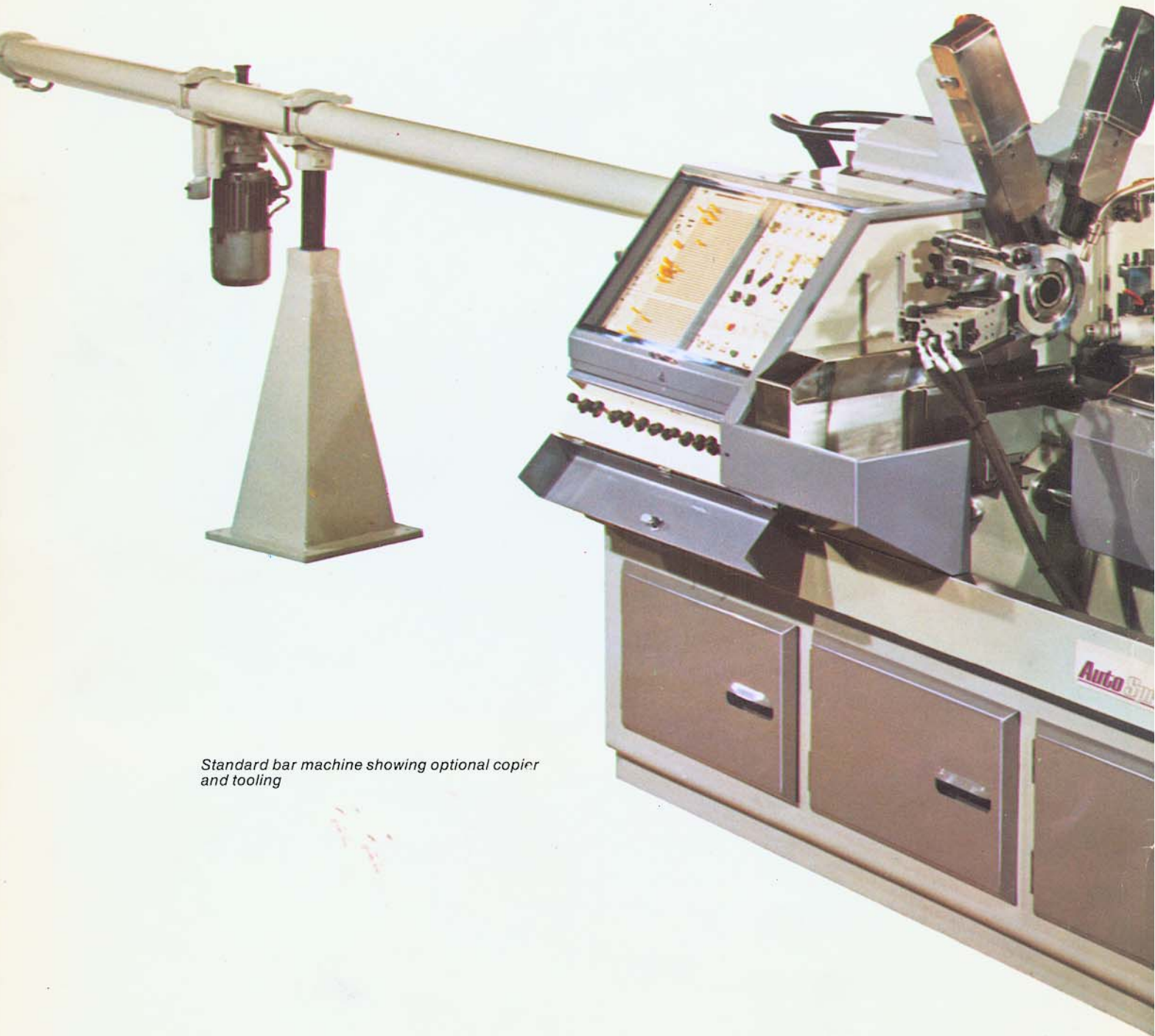


50mm





# Features and facilities never before offered in a single spindle P.S.C. auto lathe



*Standard bar machine showing optional copier  
and tooling*



The Auto Sprint 'S' automatic programme sequence controlled (P.S.C.) turret lathe is an entirely new, purpose-built machine designed for high speed, accurate and cost effective automatic production.

The Auto Sprint 'S' is the result of a three year development programme. With over 10,500 machines and systems in service throughout the world EMI-MEC has been ideally placed to study the demands and needs of turned parts manufacturers.

The Auto Sprint 'S' is a 'facilities' machine providing many possibilities for producing the same component and is designed to meet the large demand for simple-to-operate, automatic machines that do not require extensive operator re-training, elaborate re-tooling, cam designing or tape production and rectification.

The versatile plugboard controls are quick and simple to operate and provide production flexibility and reduced down-time between jobs – essentials for modern, economic engineering.

#### STANDARD FEATURES

- 30 speeds
- Independent cross slides with cut-away bed for swarf clearance
- Double rail traversable front slide
- Twin 65° overhead recess/part off slides
- Auto retract facility on all slides
- Electronic 'check' sensors for fast approach
- Self compensating collect mechanism
- Auto selecting turret – up to 6 stations in one pass
- Adjustable hydraulic feed rates for each turret station
- Two Turret back feeds
- Turret air and coolant distributor
- Turret slide interlock – turret will not proceed until correct turret face is selected
- Air economy system gives maximum thrust to slides with minimum air consumption
- Silenced and filtered air system
- Cross slide and turret inching
- Graduated quick-setting check trips
- Electric auto bar feed
- Chuck/collet switching circuit
- Plug in printed circuit boards for separate major functions
- Coolant pump and splash guards
- Programmed coolant
- Diode pin tester
- Single pin control of "feed bar to stop" sequence
- Thermistor protection of main motor
- Electro/mechanical spindle brake
- End of bar light
- Pre-set parts counter
- Low voltage work light

#### OPTIONAL EXTRAS

- 2- or 3-jaw pneumatic chucking
- Multi-pass turning
- Hydraulic copying

#### TRANSMISSION

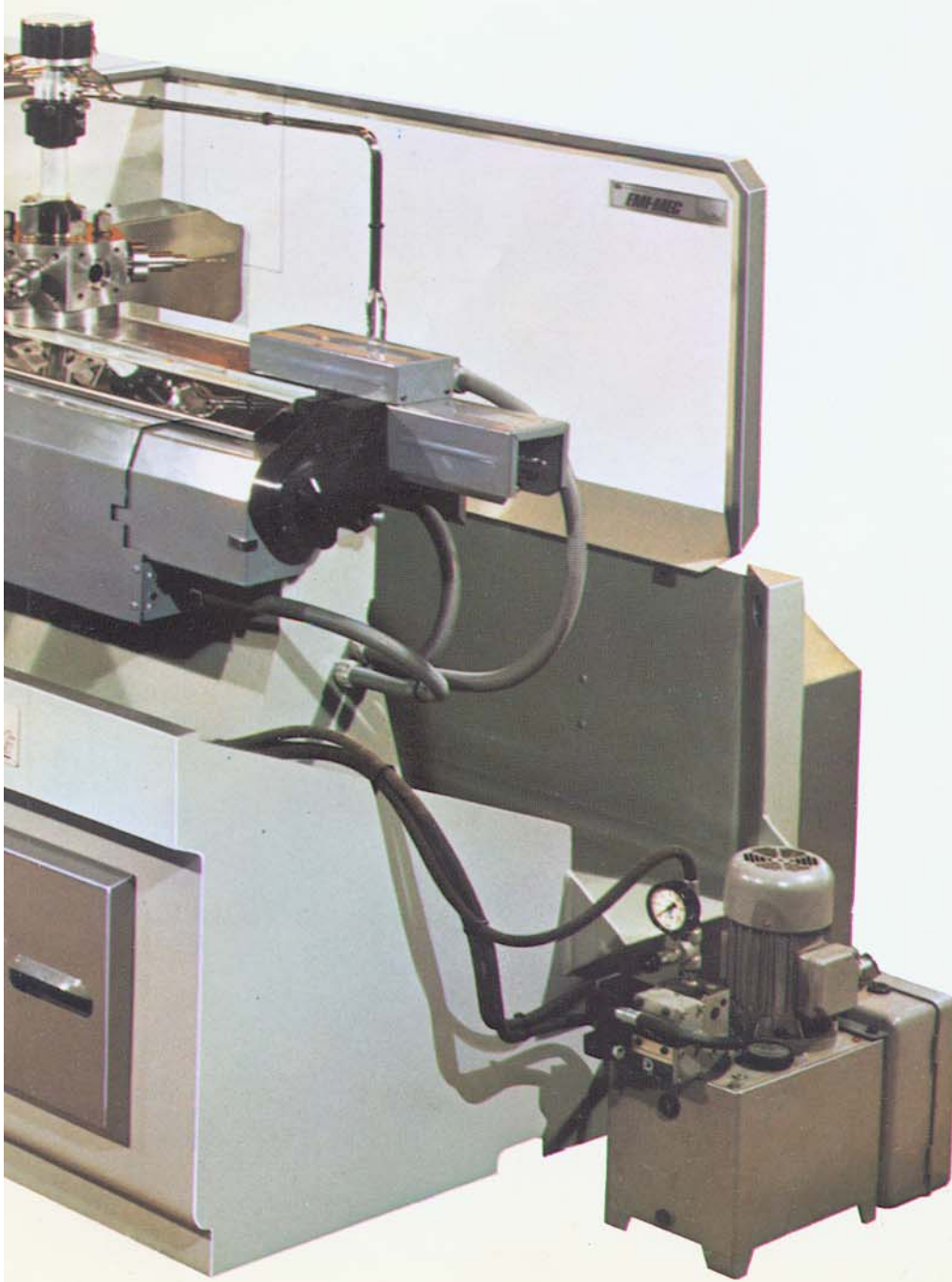
The power drive to the spindle is transmitted from the three-speed 7½ h.p. motor via a constant mesh oil-immersed two ratio gear box through five vee belts. Thirty spindle speeds are available in five ranges of six speeds. Any chosen range can be programmed in an automatic cycle, the remaining four ranges are attained by the changing of easily accessible pick-off gears. The selection of spindle speeds from 1 to 6 automatically engages the correct combination of clutch and motor speed. The spindle is mounted in pre-loaded double angular contact bearings at the front and is supported by a large single roller bearing at the rear. Spindle speeds range from 50-2560 rpm.

#### ALL SLIDES INDEPENDENT – LONGITUDINAL TRAVERSING FRONT SLIDE AND TWIN OVERHEAD SLIDES

Real versatility is built into the Autosprint 'S' with split cross slides and dual 65° overhead slides, all capable of independent operation. The cross slides are of massive construction and are designed for heavy work. The front cross slide, mounted on a double rail for maximum rigidity, traverses longitudinally enabling, for example, long diameters to be turned behind a shoulder without using form tools.

With the optional multi-pass printed circuit board, the front slide is able to take progressive cuts from right to left until the material is reduced to the correct diameter. In this way a fully automatic "centre lathe" type operation using normal turning tools is possible, making the machine ideal for very short runs and the six inches of longitudinal traverse also enables an optional copy turning unit to be fitted.

Twin overhead slides provide for part-off, recessing and chamfering and have longitudinal adjustment of up to 100 mm (4"). These are essential, greatly helping to minimise the need for complicated tooling and further reducing the machine set up time.





**ELECTRONIC CHECK SENSORS**

In place of waterproof switches, which experience has shown to be susceptible to troubles, all the rapid check settings on the machine are activated by electronic sensors which have no contact between the moving dolly and the 'switch'. This also enables the settings to be made manually by novel sliding rack trips obviating the use of keys or spanners, further reducing machine set-up time.

**SELF COMPENSATING COLLET**

This unique feature of the Auto Sprint 'S' allows for variation in bar size of up to 0.75mm (0.030 in.) once the collet has been primarily adjusted. Significant operating economy is provided by eliminating the need for frequent collet adjustment and the setter is able to operate with much wider tolerances in bar size. This original design, uses a series of banked springs operating through mechanical advantages and controlled by static hydraulics giving a theoretical thrust of 10,000 lb. (4536 Kgs) to a multibore collet.

**AUTO-SELECTING TURRET**

Any one of the six stations of the turret can be directly selected in any sequence without indexing the turret sequentially to the required position. This auto-selecting capability, which allows substantial time saving and great flexibility in tool setting, is a considerable advance over conventional skip indexing, and is of particular benefit when copying. In addition, the auto-selecting turret enables movement of the turret to be interlocked with the turret station selector so that the turret will not proceed until the correct station has been located. Each turret station has its own feed control needle valve which is automatically selected. The usual EMI-MEC features such as woodpecker feed are also included.

**AIR ECONOMY SYSTEM**

The slides for this 50mm machine require high pressures, particularly since the complications of a mechanical drive to the turret have been abandoned. Operation with air pressures alone would require very large power units and very great air consumption. To overcome this problem EMI-MEC has designed a unique new system to give high economy of air and still maintain the necessary high thrust to the slides. This is achieved by advancing the slide to its rapid check position with a smaller air cylinder at which point the pneumatic/hydraulic intensifier takes over and supplies a high pressure for the working stroke. This unique design avoids the necessity for the sophisticated circuitry which would otherwise be required in hydraulic machines. Typical air consumption for a theoretical programme using all slides on an average workpiece would be 5 1/2 cu. ft. (0.150m<sup>3</sup>) per minute giving a theoretical thrust of 1700 lb. (7.70 Kgs.) for the cross slides and 2,830 lb. (1,300 Kgs.) for the turret.

**AUTOMATIC BAR FEED**

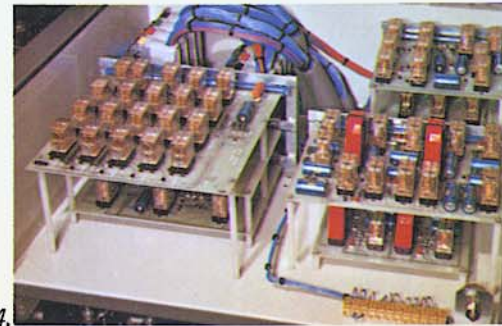
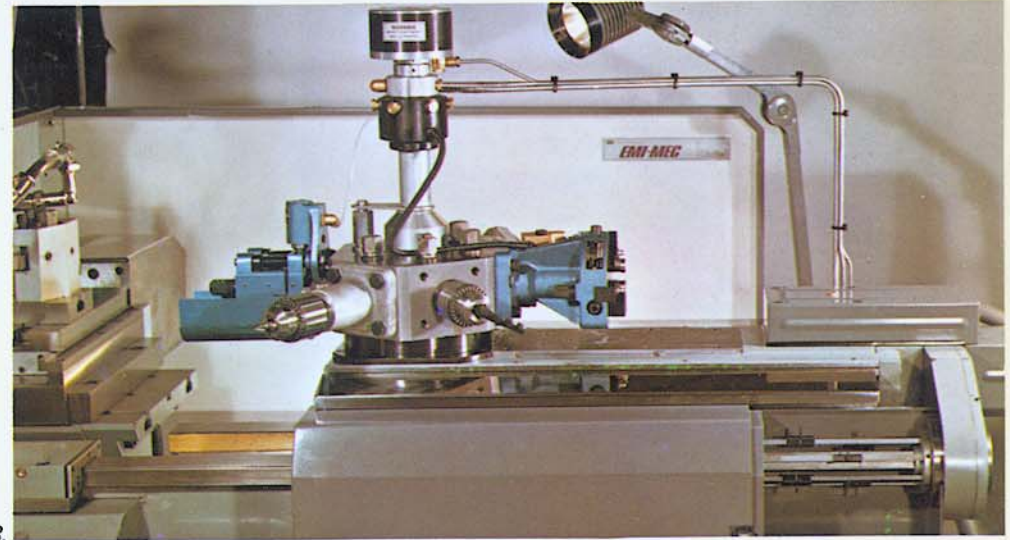
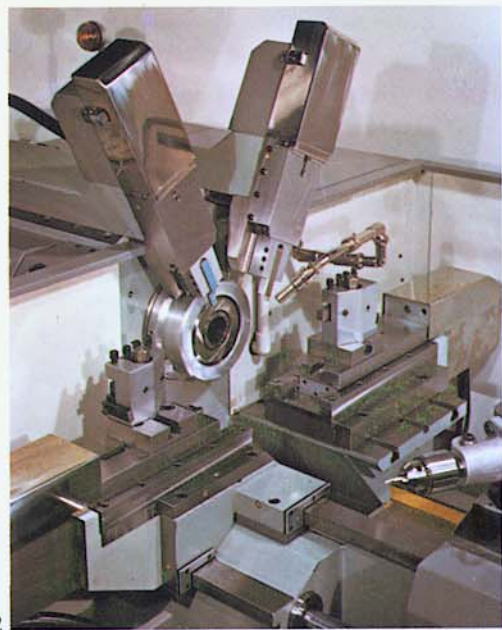
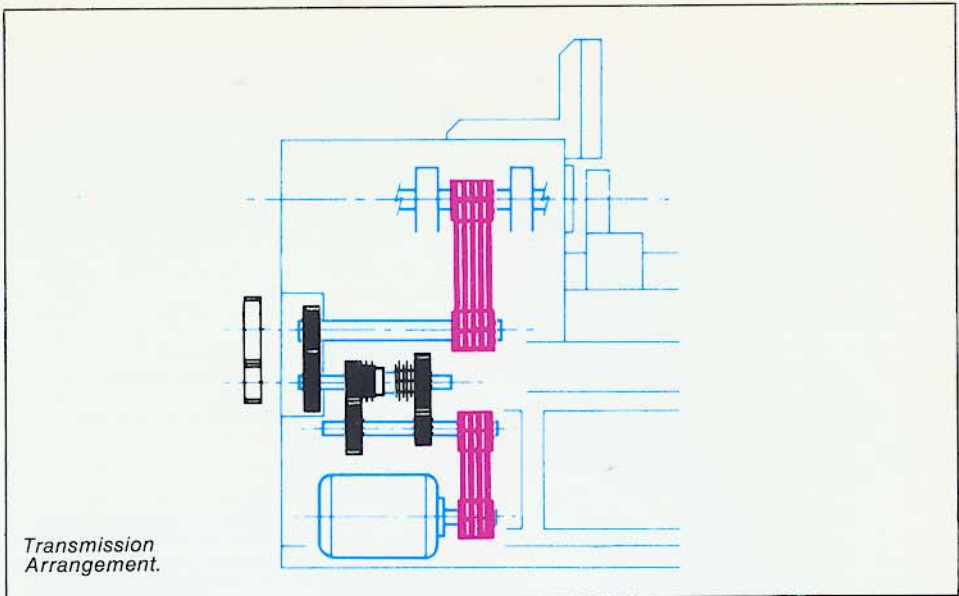
The bar feed to the machine is electrically driven forward and in reverse through a slipping clutch. An end of bar switch stops the machine at the end of the automatic cycle and operates a pedestal mounted amber flashing light.

**NOISE AND ENVIRONMENTAL CONTROL**

The air system incorporates a number of silencers and filters which drastically reduce the noise level normally associated with such machines and prevents oil mist venting to the atmosphere. The bar feed tube is also silenced.

**RAPID SPINDLE BRAKING**

A feature of the Auto Sprint 'S' is the electrical and mechanical braking arrangement which provides very rapid stopping of the spindle from even the highest speed - invaluable for hand loading chuck work. The dual circuit brake can be programmed to remain engaged for operations such as cross hole drilling.



1. Self compensating collet  
 2. All Slides Independent - Longitudinal Traversing Front Slide and Twin Overhead Slides  
 3. Auto-selecting turret  
 4. Modular electronics for easy servicing



# EMI-MEC programme control for rapid set-up

## PLUGBOARD

Because of the number of machines already in existence and the very real problem of re-training operators, this machine retains the standard EMI-MEC plugboard control system but allows for the latest improved programming technique to be used. The diode pin plugboard through which the manual set-up is converted to a sequential programme allows an amazing versatility of automatic operation. On switching to the automatic cycle the first complete left hand vertical line of sockets (column 1 of the plugboard) is simultaneously energised. By the insertion of a diode pin in the required socket, the selected function will take place. By placing several diode pins in different motion sockets, but in the same column, many functions can take place simultaneously, such as the cross slides vertical slides and turret operating together.

At the end of each main function or slide travel, the operation of a limit switch will energise column two. As column 2 is energised a supply from this column automatically cancels the previous column. The novel system allows continuous, un-interrupted overlapping of various slide and other functions while the

programme is stepping from one column to the next. In this way, power is transferred to the next column and further slide movements and other functions, depending on the programme, will take place. Not only does this allow for greater flexibility – such as changing the turret feed while cutting – but it overcomes the problem sometimes associated with the “step-over” on plugboard machines. Certain logic functions such as ‘feed bar to stop’ are built into the programme and are selected by the use of a single diode pin. Plugboard indicator lights show the live column and enable the programme sequence to be followed while special auto retract switches allow multi-slide operations to be performed with the minimum of programming.

## CONTROL PANEL

The simple layout of the modular control panel enables setters to understand the various functions with the minimum of instruction. All switches fall readily to hand and during the initial setting up of any component, feed and speed adjustments can be made quickly and easily. The conveniently grouped slides and

turret needle valve controls are mounted on the panel together with the ‘dial in’ dwell timers, which, with the auto retract switches, allow a fast final setting of sizes during initial set up without subsequent adjustment. With the aid of facilities for turret and cross slide inching, the setting of the machine can be accomplished quickly and easily.

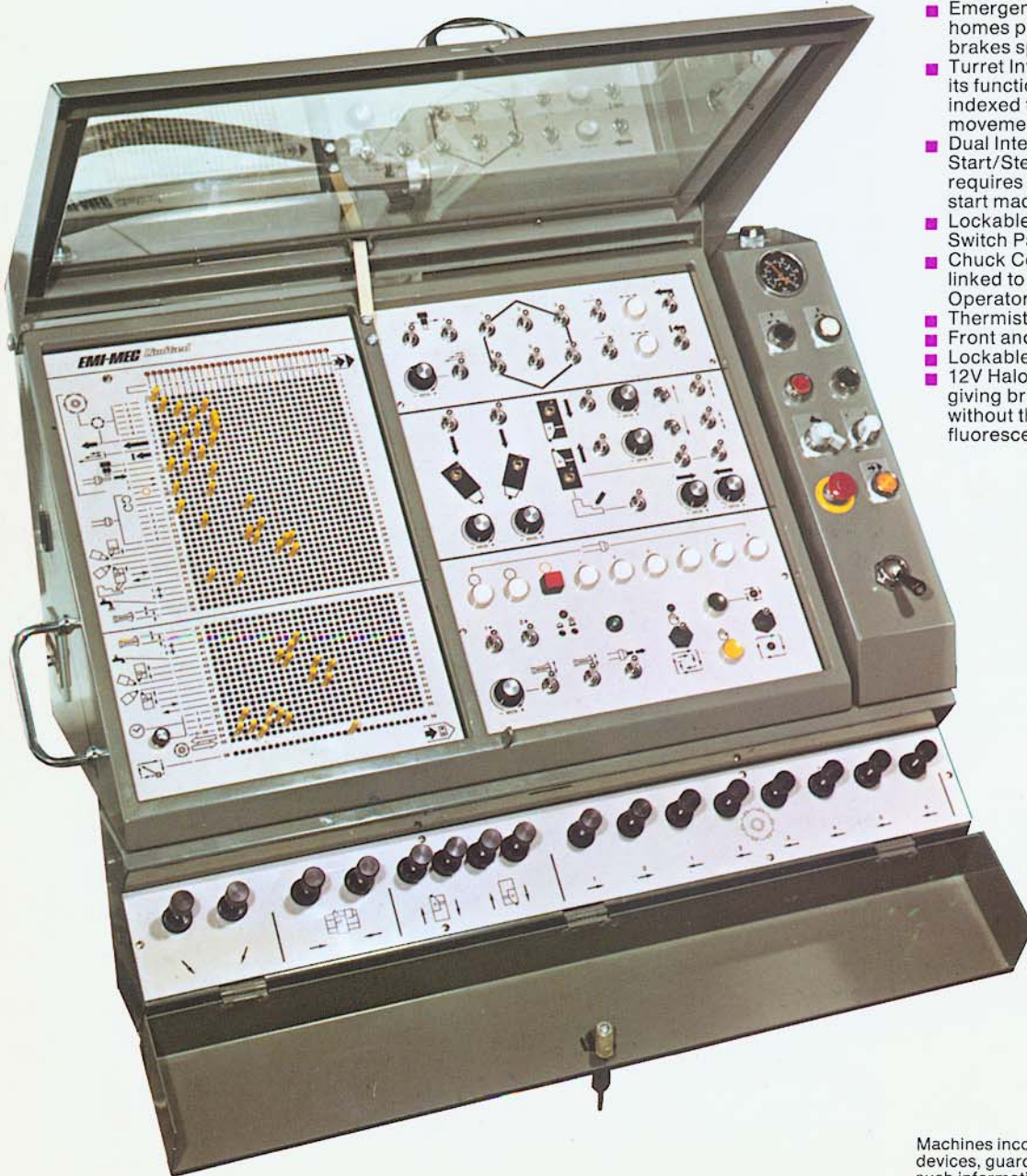
The plugboard and switch panels have graphic symbols for universal identification and are fitted with lockable covers for protection.

A further feature is the hand step push buttons which, when programmed, enables the operator to manually step from one column to the next on the plugboard. With the correct programme sequence, the hand step control enables the automatic cycle to be interrupted under the operator's control. This is particularly useful for ‘on machine’ inspection of components and the hand loading of parts to the collet or chuck as in second operation work. For hand loading work, to start the automatic cycle after loading, two buttons must be depressed simultaneously – one with each hand – thus ensuring that both the operator's hands are free from the machining area.

## INDUSTRIAL SAFETY

The Series “S” Machine incorporates a range of safeguards as follows:-

- Emergency Stop Button  
homes programme, retracts slides and brakes spindle.
- Turret Interlock  
its function is to ensure turret is always indexed to correct position before forward movement.
- Dual Interconnected Start/Step Buttons  
requires hand to be free from work area to start machine on second operation work.
- Lockable Plugboard and Switch Panel Cover
- Chuck Control Buttons  
linked to dual brake circuit for maximum Operator protection.
- Thermister protection of Main Motor.
- Front and Back Guarding
- Lockable Mains Isolator
- 12V Halogen Light  
giving brilliant illumination of working area without the dangerous stroboscopic effect of fluorescent lights.



Machines incorporate safety design features, safety devices, guarding arrangements and are supplied with such information as to their safe operation and use, that we believe, so far as it is reasonably practicable, they are safe and in compliance with the legal requirements of the Health and Safety at Work etc. Act 1974.



# Specification

## HEADSTOCK

Bar capacity	2 in.	50.8mm
Diameter of hole through spindle	2 $\frac{1}{32}$ in.	51.6mm
Swing over cross slide	6 $\frac{1}{2}$ in.	165mm
Swing under support bar	9 in.	228mm
A6A Spindle Nose: Fitted with Multibore Sleeve and Nosecap to accept Multibore Collets V-120 Series		

## TURRET

Number of Faces	6—Auto Selecting	
Diameter of tool holes	1 in.	25.4mm
Maximum working stroke	7 in. High Power Stroke	177.8mm
	7 $\frac{7}{8}$ in. Max. Movement	200mm
Centre of tool holes to top of slide	2 $\frac{3}{4}$ in.	69mm
Number of steplessly variable feeds	6 forward	6 forward
	2 back	2 back

## CROSS SLIDES

Type: High Thrust Independent		
Front: 2 Axis Traversing Type		
Programmable to accept optional copying unit		
Slide stroke up to centre line	4 $\frac{1}{2}$ in.	114mm
Longitudinal Travel	6 in.	152mm
Tool size	$\frac{3}{4}$ in. x 1 in.	19mm x 25.4mm
Maximum distance between tool posts	17 in.	432mm
Rear: Maximum distance between tool posts	17 in.	432mm
Slide stroke up to centre line	4 $\frac{1}{2}$ in.	114mm
Tool size	$\frac{3}{4}$ in. x 1 in.	19mm x 25.4mm

## TWIN OVERHEAD SLIDES

Type: Twin 65° recess/part off units		
Stroke	3 $\frac{1}{2}$ in.	89mm
Maximum distance from tool post to centre line	4 $\frac{1}{2}$ in.	114mm
Longitudinal Adjustment	4 in.	101mm

## MAIN DRIVE MOTOR

Power Rating	7 $\frac{1}{2}$ /7 $\frac{1}{2}$ /5 H.P. 5.5/5.5/3.75 kw
Type	3 Speed Reversible – T.E.F.C.
Electrical Rating	400/440 Volts, 3 Phase, 50 Cycles (other Ratings available to suit local supply)

## SPINDLE SPEEDS – Forward and Reverse (Ranges selected by pick off gears)

Range 1	50	65	100	310	415	620 R.P.M.
Range 2	65	90	135	415	555	830 R.P.M.
Range 3	100	135	200	630	840	1260 R.P.M.
Range 4	150	200	300	950	1275	1900 R.P.M.
Range 5	205	275	410	1280	1700	2560 R.P.M.

## WEIGHTS

Lathe 2675 Kgs nett 3107 Kgs gross.  
Bar feed 142 Kgs. nett 190 Kgs. gross.

## DIMENSIONS (boxed)

Lathe 269 x 165 x 191 cms.  
Bar feed 437 x 30 x 41 cms.

## INDUSTRIAL NOISE CONTROL

This machine is fitted with a silenced and filtered pneumatic system

## PATENTS

This machine is the subject of patents and patent applications

## EMI-MEC SERVICES

Supporting their range of machines, EMI-MEC Ltd., offer a most comprehensive back up service for customers and distributors.

### Tooling:

The EMI-MEC tooling department offers a highly successful range of tooling items ideal for use with EMI-MEC Autos. Customers purchasing EMI-MEC tooling can be confident that it will be suitable for their particular EMI-MEC machine.

### Training:

A variety of training courses are held at the factory for our customers. These include programming, setting, preventive maintenance and faultfinding. By special arrangement, courses can be tailored to the individual requirements of the customer.

### Spares:

An efficient U.K. and export spares department (connected by Telex to overseas distributors) ensures the best possible service.

### Service:

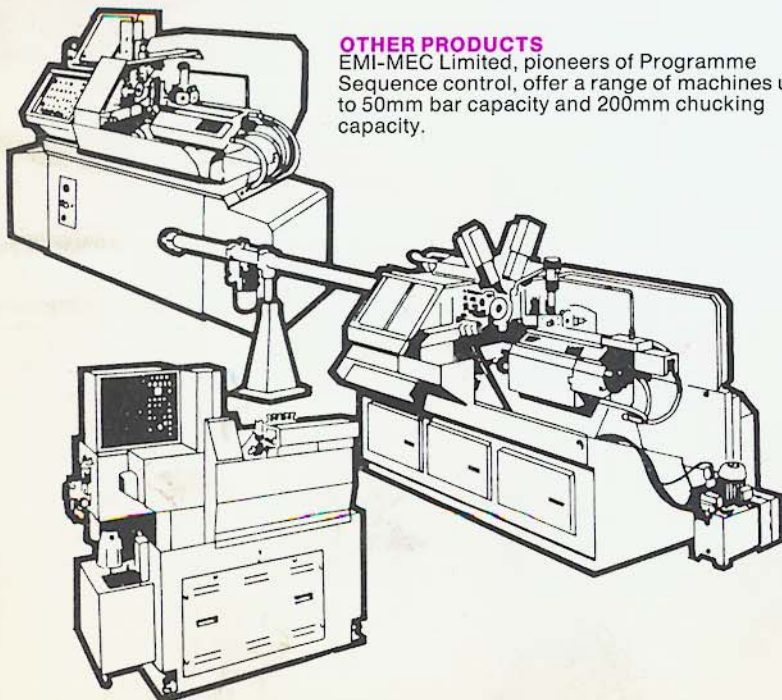
A network of engineers resident throughout the U.K. together with factory trained engineers and stocking distributors in over 25 countries ensure that an efficient after sales service is available to EMI-MEC users.

### Technical Department:

Run solely for the benefit of customers, this special department allows users to contact factory technicians for advice on EMI-MEC machines, by phone or Telex.

## OTHER PRODUCTS

EMI-MEC Limited, pioneers of Programme Sequence control, offer a range of machines up to 50mm bar capacity and 200mm chucking capacity.



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