

STANDARD MAGNETIC HEADS



Figure 1—POTTER Standard Read/Write Head Assemblies.
(Photo shows 7, 21 and 9-track heads, l. to r.)

INTRODUCTION

Potter Instrument Company manufactures a wide variety of magnetic tape recording heads both for commercial and military applications. A complete selection of standard designs is provided, including types to meet the demands of all state-of-the-art applications in the digital recording field. Standard heads can be readily modified to meet special requirements, or Potter's design and manufacturing know-how and long experience can be applied to producing new types as required.

Potter manufactures magnetic heads compatible with virtually all formats, including IBM, Univac, RCA, IRIG, TIAC, ICT and ASCII.

STANDARD HEAD DESIGNS

Standard designs are "all-metal" construction with lamination stacks fitted into precisely machined metal blocks so that a minimum of plastic material can come in contact with the tape. The contour of the head surface facing the tape is carefully shaped to avoid spurious outputs from the ends of the lamination stacks and to allow the tape to remain in contact with the head gaps at the highest tape speeds.

Most heads used for computer applications consist of an erase head, a write head and a read head. When energized, the erase head removes previously recorded data and premagnetizes the tape in a standardized direction. The write head and read head

record and reproduce data on command. The write and read head gaps are separated by a short distance so that written data can be immediately checked for errors and rewritten if necessary.

Any one of the three types is also available as a single purpose write, read, or erase head.

The track configuration (width, spacing, windings, etc.) is completely flexible. Heads have been built for all existing computer tape formats and IRIG compatibility as well as for many unusual applications.

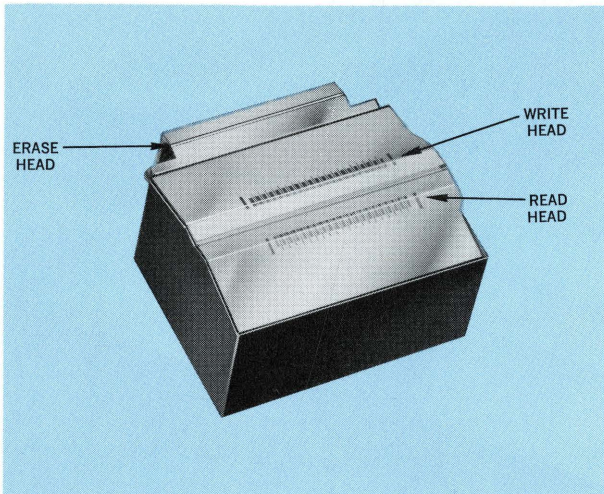


Figure 2—Typical Read/Write Head Assembly consists of three heads—read head, write head, and erase head.

CHARACTERISTICS FOR STANDARD HEADS

Mechanical Characteristics

Outline and mounting dimensions (see outline drawing on last page).

- Track Density— 1/2"—up to 9 tracks.
1"—up to 21 tracks.
For additional number of tracks on 1/2" and 1" configurations, interlacing or a non-standard design may be used.
- Track Width— minimum—10 mils.
- Tape Widths— 1/4 to 1 inch.
- Tape Approach Angle— 10°.
- Tape Speeds— to 150 ips.
- Gap Lengths— 100 microinch minimum.
- Gap Scatter— all within 100 microinch per 1/2 inch of tape width.
- Gap Azimuth— best line through gaps within 100 microinches per 1/2 inch of a true perpendicular to the head mounting surface.
- Gap Tilt— less than 1° from true perpendicular to the head mounting surface.
- Minimum Dimensions— Head base to edge of first track—.240
- Undercut at Tape Edge (Gutters)— optional.

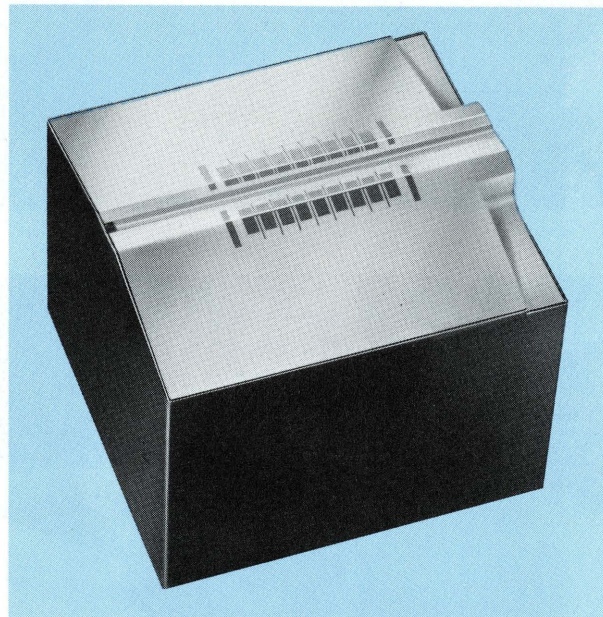


Figure 3—Potter Standard 9-channel Read/Write Head Assembly.

Electrical Characteristics

Write current requirement at saturation. Function of tape speed, flux rise time, density, tape type.*

Typically less than 2.2 ampere turn for 800 bpi NRZ—recording at 75 ips for 9-track heads.

Output—Function of many variables—Peak-to-peak output for low density isolated pulses is given approximately by

$$E = N_r V_r W K_e \text{ Millivolts}$$

where N_r = Read head winding turns.

V_r = Tape velocity in ips when reading.

W = Track Width in inches.

K_e = Function of tape type and head construction. Typically, for a 7- or 9-track—IBM/ASCII head with 3M 8938 tape, $K_e = .05$. and for 75 ips, 140 turns output would be about 17 mv.

Inductances

Function of track and shield dimensions— for estimating, $L = K_1 N^2$ microhenries

and for 7-track read heads, Width = .030", $K_1 = .08$

7-track write heads, Width = .048", $K_1 = .12$

9-track read heads, Width = .040", $K_1 = .11$

9-track write heads, Width = .044", $K_1 = .14$

*Pear, C. B.—Factors Influencing Write Current in NRZI Recording—Intermag Conference—1967.

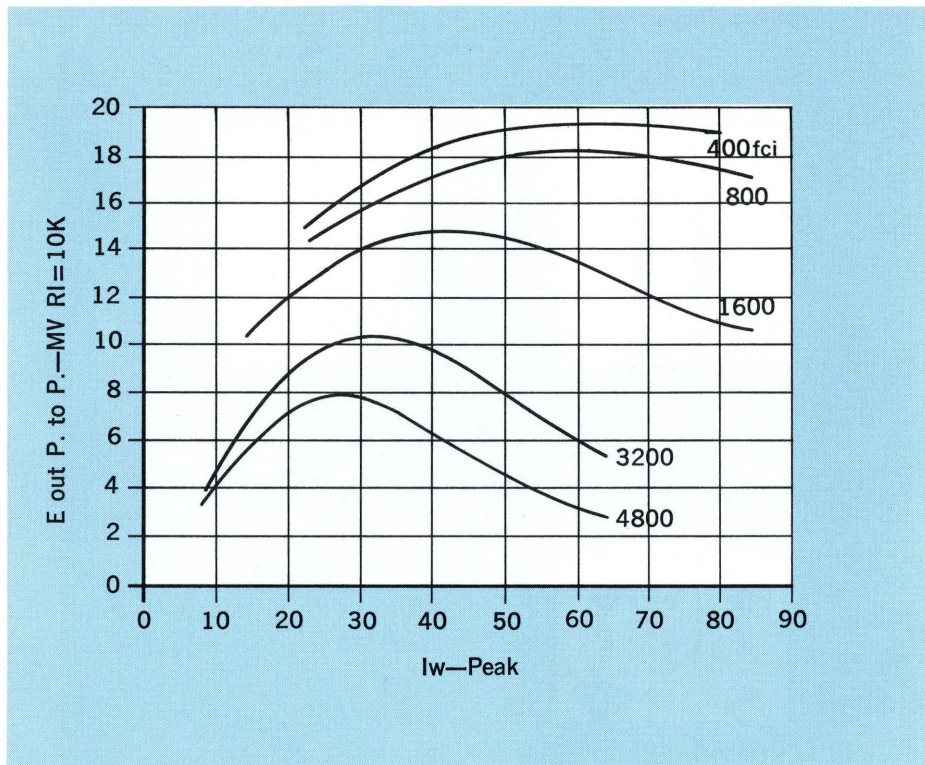


Figure 4—Typical Electrical Performance Curves for 1600 bpi Head.

Write to Read Crosstalk—with .150 inch gap spacing <0.4 MV. peak/100 T of the read winding when fitted with appropriate shield on opposite side of tape.

Read-to-read crosstalk < 5% of output.

Spurious Pulses < 3% of output.

Resolution—Depends on application and customer requirements. In heads for 800 bpi NRZ systems, the output at 800 bpi will not be less than 80% of the low density output.

STANDARD HEAD DESIGNS

Representative heads for 800 bpi NRZI systems to meet IBM or ASCII standards would be:

7-track heads—Model 18517-7

$N_w = 43, N_r = 140$

9-track heads—Model 19506-9

$N_w = 55, N_r = 180$

Heads can also be provided for 1600 bpi Phase Encoding systems.

ERASE HEADS

Auxiliary erase heads which mount on the write/read blocks can be supplied for 1/2 or 1 inch wide tape. These provide 99% reduction of the recorded amplitude when energized, and less than 1% reduction when not energized.

When operating out-of-contact with the tape, typical DC current of 100 milliamperes is used.

REPLACEMENT HEADS

Orders for replacement heads must reference the Model No. and Serial No. of the head being replaced.

MOUNTING HARDWARE

To assure optimum alignment of head and trough guide, heads and transport mounting hardware are sold as a matched set. Potter will supply heads mounted on customer mounts as required.

Potter Head Mounting Hardware includes (where required):

- Precision Trough Guides
- Ferrite Shields
- Pressure Pad Assembly

REPAIRING & REFINISHING

Head repairing for seven (7) or nine (9) channel heads is available. Repairing may include:

1. Replacement of any burned out or damaged channels up to a quantity of three (3).
2. Replacement or rework of any worn hardware.
3. Replacement of worn or damaged erase head.
4. Replacement of ferrite and drag pads.

If inspection indicates that repairing would be less economical than replacement, inspection costs are applied to the cost for a new head.

Send returned heads to Potter Instrument Company, Inc., Magnetic Head Dept., 151 Sunnyside Boulevard, Plainview, L.I., New York 11803.

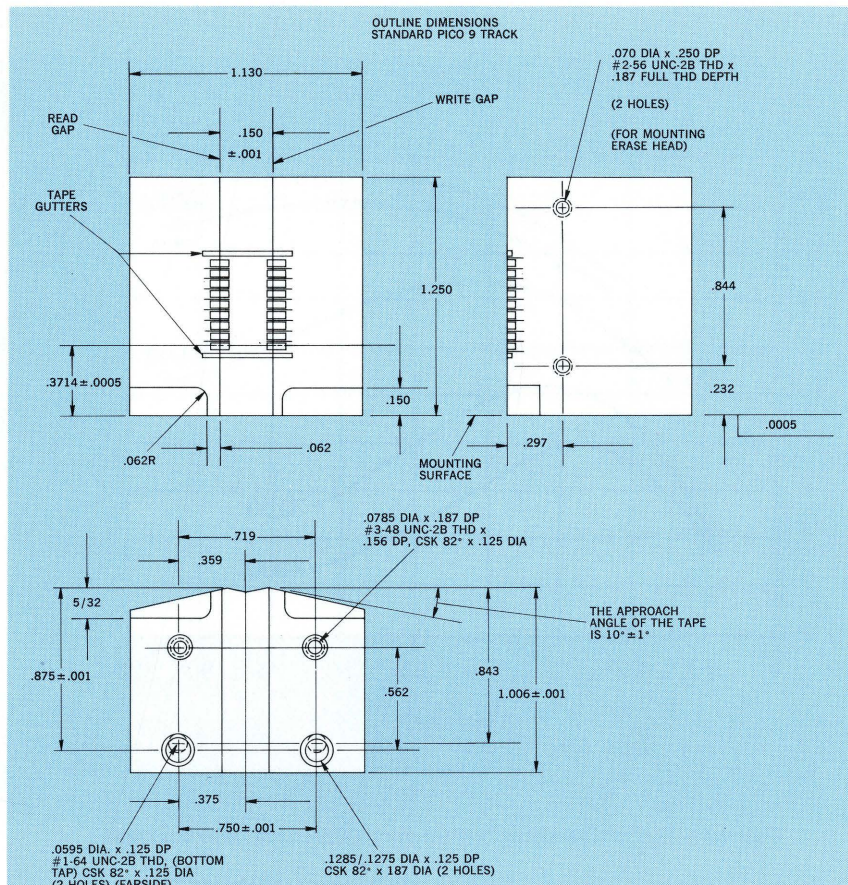


Figure 5—Standard Potter 9-Track Head.

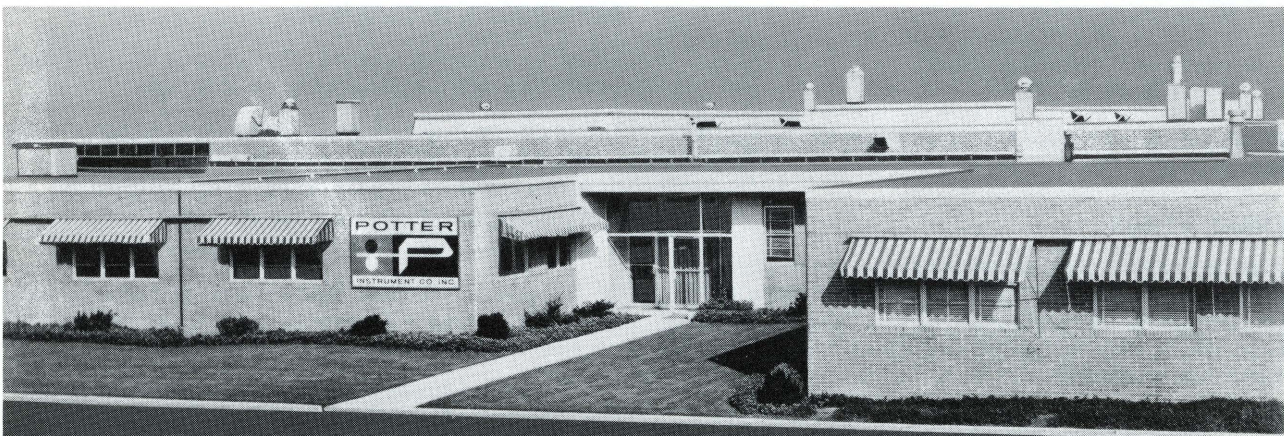
POTTER WORLDWIDE FIELD SERVICE AND LOGISTICS PROGRAM

Repair centers in strategic locations within the continental United States and abroad have been established to support the entire Potter product line.

Staffed by highly-trained field representatives, these repair centers are equipped to effect on-site installation of equipments and to perform quality repair, maintenance and overhaul.

Supplementing this capability, if a customer prefers to provide his own equipment support, Potter has established standard instruction courses to train customer personnel, either at Potter or in the field.

A Spare Parts Department, backed up by an extremely large inventory, and streamlined order processing, is available for customer convenience and economy. This inventory permits the customer to realize virtual elimination of downtime as well as savings on spare parts dollars by offering expeditious delivery for replaceable parts. Delivery is available in 24 hours to meet customer emergency requirements—within 1 week for standard parts under normal conditions. Potter also offers provisioning and logistics capabilities to meet all existing military specifications.



Information subject to change without notice.



POTTER INSTRUMENT COMPANY, INC.

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