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POTTER

SC 1051 SINGLE CAPSTAN TAPE TRANSPORT



FEATURES

- Low Cost
- Bi-directional tape speed up to 75 ips
- Single Capstan Tape Drive
- In-line tape threading, automatic tape loading — stops on Load Point
- Retractable Read/Write Head
- Information density to 800 bpi, NRZI; 1600 cpi, PE
- IBM 7- and 9-channel (IBM 360 and ASCII) capability
- Unrestricted programming capacity
- Data reliability — only surface in contact with oxide is read/write head. Head retracts during rewind.
- No mechanical adjustments required
- Photoelectric tape position sensors
- All solid-state servo controls; no relays are used
- Simplified operator controls
- Speed tolerance $\pm 3\%$
- Long life . . . minimum servicing

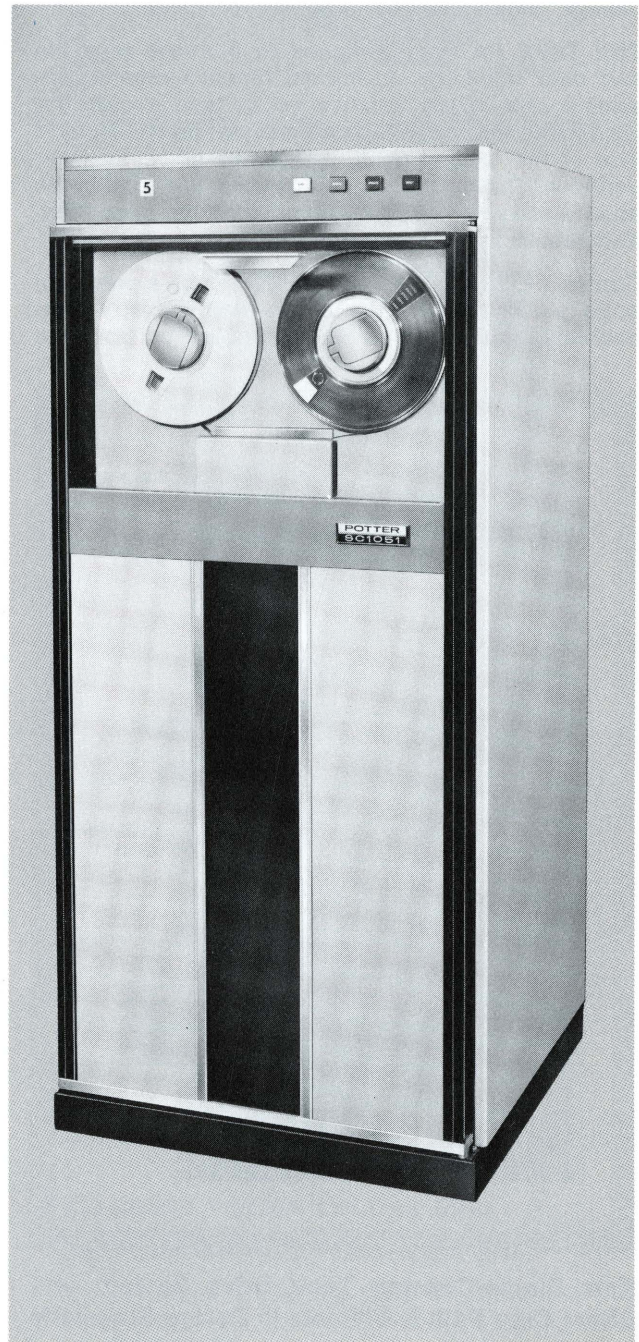
INTRODUCTION

The Potter Model SC1051 is part of a family of the industry's lowest cost, medium-performance tape transports.

Capable of bi-directional tape speeds to 75 ips with no program restrictions, the Potter SC 1051 provides industry compatible read/write operation at densities to 800 bpi, NRZI, and 1600 cpi, PE.

The system features an advanced single-capstan design, dual vacuum columns and state-of-the-art electronics; all field-proven on Potter SC-series transports. A precision edge guidance system provides reliable tape control.

Designed for use with the highest performance computer systems, the SC 1051 features operator convenience, high transfer rate and high speed rewind. The unit's basic simplicity assures maximum data reliability and system up-time.



TAPE LOADING is the easiest and fastest in the industry. All that is necessary is to first mount the supply reel on the QUICK-LOCK® hub assembly. Tape is then manually threaded from the supply reel directly to the take-up reel. From this point on, loading is accomplished automatically at the touch of the OPERATE button. A prewind mode advances several more turns of tape around the take-up reel and tape is pulled into the vacuum tanks. The read/write head then swings into position and tape is driven forward beyond BOT, then run reverse to stop on BOT. Automatically the transport switches to "Remote" and becomes ready for the first computer command. Threading around rollers, multiple capstans, and guides are completely eliminated. No manual winding of reel after unload cycle.

THE TAPE PATH is designed to increase tape life and data reliability. In normal forward/reverse operation tape oxide touches no surface except the read/write head and tape cleaner, while the Mylar™ side of the tape is gently guided to eliminate wear particles. During high speed rewind the read/write head is retracted to a neutral position out of contact. This results in longer head/tape life.

Control of the tape path is maintained by a precision edge guidance system guaranteeing industry-compatibility. Data may be transferred to or from the

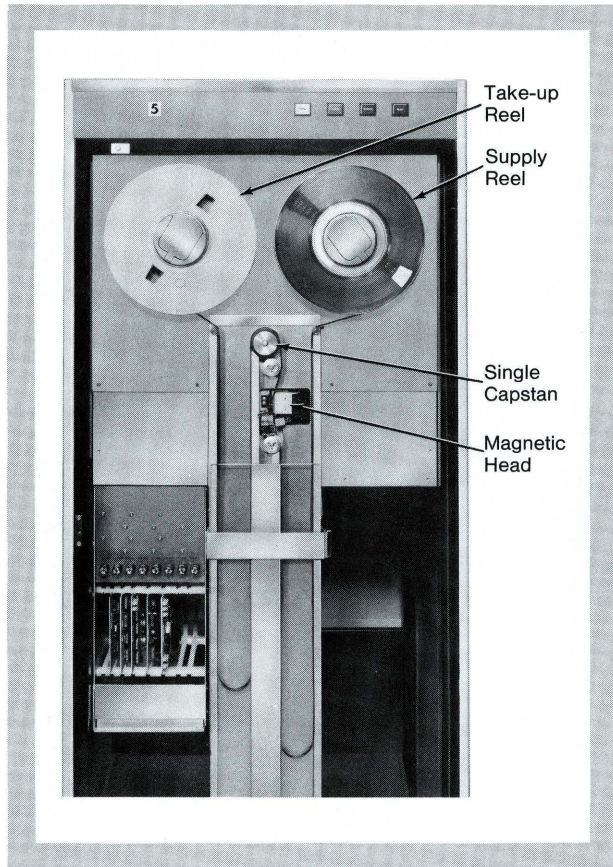
tape transport at standard bit densities of 200, 556, 800 bpi and 1600 cpi, Phase Encoded or at any other transfer rate up to 120 kc at 75 ips. Tape tension is uniform throughout the entire reel, resulting in a smooth, even pack.

During rewind a vacuum column maintains constant tension. Special circuits have eliminated tape loop bounce and flutter. There are no guide rollers, air guides or tension arms to restrict performance. Complicated mechanical adjustments are eliminated.

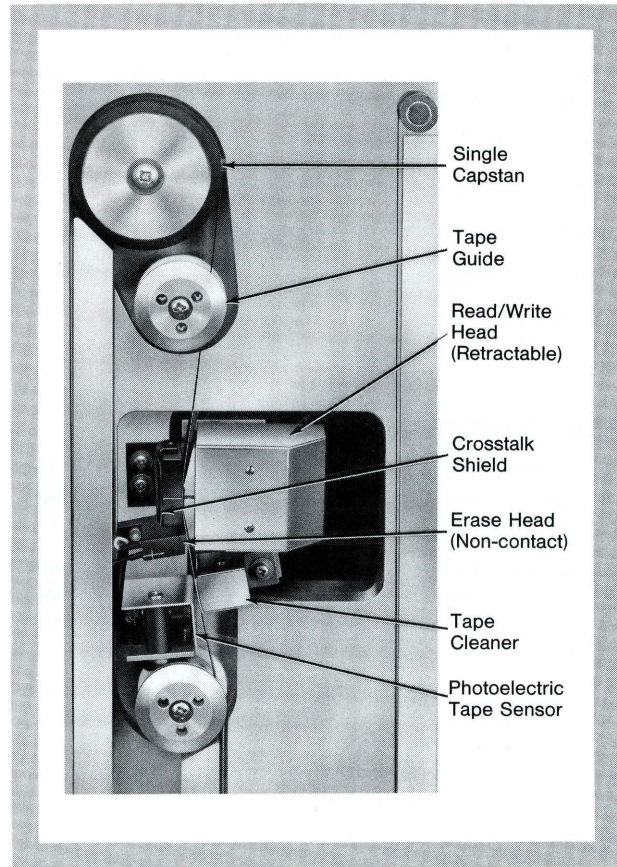
THE TAPE GUIDANCE SYSTEM of the SC 1051 is compatible with IBM 729, 2401, and 2420 series tape transports. This design enables tapes to be freely interchanged between the above machines. Dynamic skew of the SC1051 is specified in terms of the IBM 2401 Mod 3 (see "specifications" back page).

A LOW INERTIA SINGLE CAPSTAN DRIVE provides rapid linear acceleration and deceleration while maintaining control of the tape on the capstan at all times.

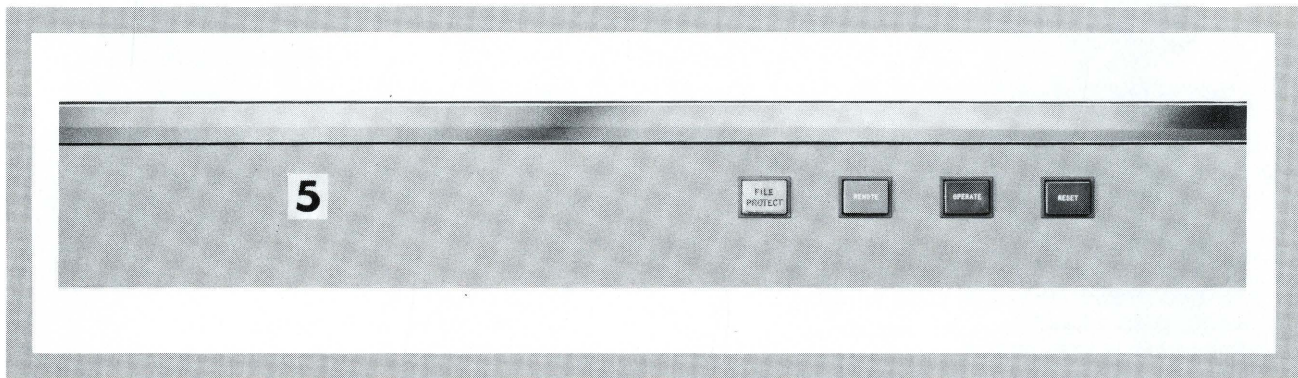
The tape is driven by passing the tape 180° around a neoprene coated metal capstan. Sufficient force is applied to the tape by the vacuum columns to preclude slippage of the tape with respect to the capstan. The capstan is directly driven from a high performance dc motor which utilizes a combination of



New Single-Capstan Tape Drive System and Direct Tape Path is Ultimate in Design Simplicity



Close-up of Precision Tape Guidance System



Operator Control Panel

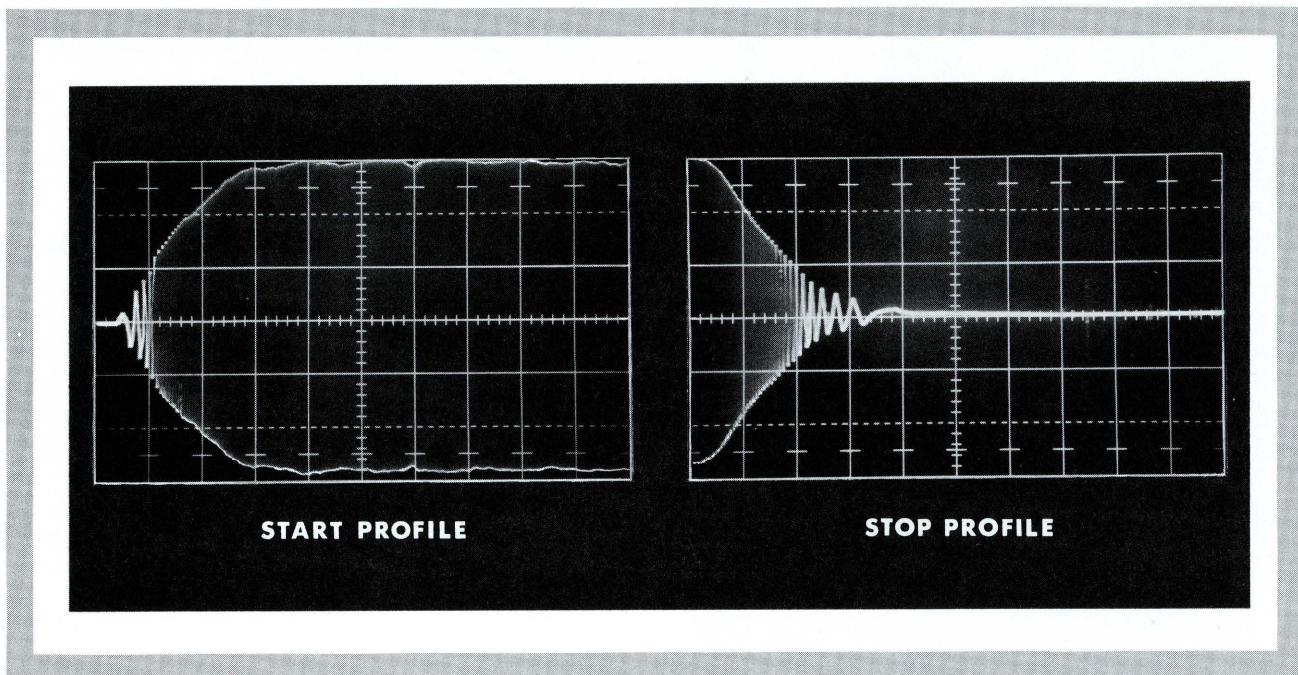
integrated and discrete solid state circuitry. Any sequence of commands, FWD/REV, FWD/STOP, or REV/STOP may be given with no intermediate delays up to a maximum of 150 commands/second. No longer are "stop-delays" or "FWD/REV delays" required. Internal circuitry "remembers" command sequences and executes them properly, eliminating any requirements in tape control units. Maximum input rate may be sustained up to 5 minutes at 75 ips.

THE READ/WRITE HEAD ASSEMBLY is mounted on a two-position hinged plate: retracted to permit vacuum column loading (position 1), or for rewind, and in contact with tape for reading and writing (position 2). This action is controlled by a cam controlled positioning motor. Special construction methods have been employed to insure repeated positioning accuracy. With a retractable read/write head,

both head and tape life are dramatically increased.

AN OPERATOR CONTROL PANEL provides the necessary indicators and switches for local operation. The local controls include FILE PROTECT, REMOTE, OPERATE, and RESET. The OPERATE pushbutton controls the load, unload and rewind modes. Mode selection is automatically determined by the transport. This simplified approach to operator control increases the unit's convenience, and decreases operator training time. The FILE PROTECT indicator depicts the presence of a write enable ring on the tape reel.

"CLOSED-LOOP" REEL SERVO SYSTEMS control tape position in the vacuum columns. Each reel has a corresponding vacuum column. Position is detected by photoelectric cells in the vacuum tank. These cells, through a servo amplifier, control the servo motor



Start/Stop Profiles at 75 ips (1ms/cm)

to pay out tape into, or take up tape from the vacuum columns as required to follow capstan movement.

Further simplicity and control is provided by the servo motor's dynamic braking system. This new system has eliminated mechanical brakes and adjustments and is fail-safe even if AC power is interrupted during high speed rewind. Tape is afforded maximum protection.

DRIVE ELECTRONICS are all solid-state silicon or integrated circuitry. No relays are used.

All circuits are mounted on removable printed circuit modules. Test points are provided where required for routine maintenance or service checks. The drive electronics include all modular power supplies required for transport operation.

RELIABILITY OF OPERATION is a prime requisite of computer peripheral equipment. The SC 1051 has been planned with this consideration receiving major attention. The mechanical design incorporates a minimum of moving parts with all electronic components derated to conservative levels. There are no mechanical adjustments, and only a minimum number of electrical adjustments are necessary in the operation of the SC 1051 tape transport. All normal and periodic service is accomplished from the front of the unit.

THE BASIC SC 1051 TRANSPORT consists of the following subassemblies:

- Tape transport assembly including all tape drive components
- Transport drive electronics and power supply

- BOT/EOT sensors, photoreflexive IBM-type
- Master reel write lockout (file protect) IBM-type switch
- Operator control panel
- Retractable head mount
- Tape cleaner
- Two IBM-type QUICK-LOCK hubs
- One empty IBM-type plastic take-up reel
- Cabinet and cover door

OPTIONAL ACCESSORIES include:

Dual gap read/write head assembly for 7-channel (IBM 729) operation

Dual gap read/write head assembly for 9-channel (IBM 2401 or ASCII) operation

Dual gap read/write head assembly for 9-channel PE 1600 cpi operation

Erase head

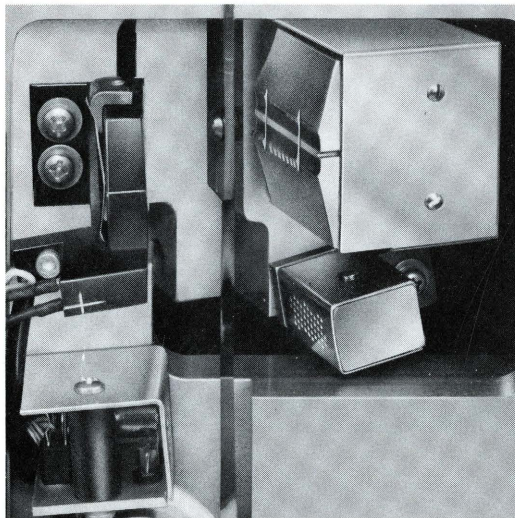
Maintenance control module

208/230 Volt, 50 Hz Power

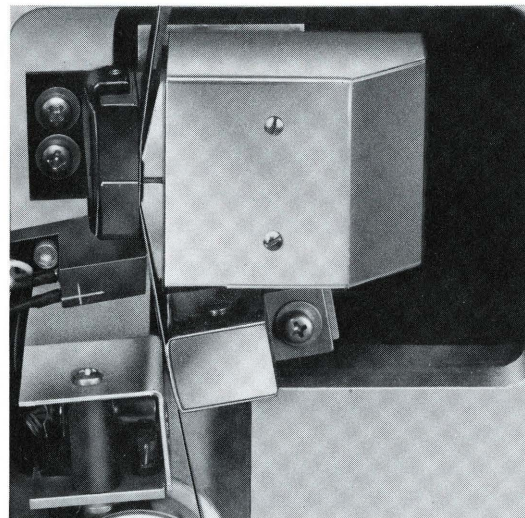
Special paint (paint supplied by customer)

All Potter equipment is supplied with mating connectors.

For further information, write, wire, or call OEM Product Manager, Potter Instrument Company, Inc., East Bethpage Road, Plainview, N. Y. 11803. Telephone: (516) 694-9000. TWX: 510-224-6485. Cable: PICO.



POSITION 1 for vacuum column loading and non-contact hi-speed rewind



POSITION 2 for tape contact for reading and writing

**Retractable
Read/Write Head Assembly**

THE DUAL-GAP READ/WRITE HEAD ASSEMBLY uses an all-metal flush surface housing for longer tape life and greater reliability. The assembly is non-adjustable and can be replaced by normally skilled maintenance personnel. The read/write head assembly is designed for operation at transfer rates to 120 kc (75 ips and 1600 cpi).

A complete selection of magnetic heads is available, including heads for IBM 7- or 9-channel format. Heads are all-metal, precision fabricated for maximum tape life and minimum interchannel time displacement.

EOT/BOT SENSING is accomplished with a dual-channel phototransistor sensor immediately adjacent to the read/write head assembly. It detects the presence of standard IBM photoreflective strips attached to the Mylar™ side of the tape, and indicates Load Point or End-Of-Tape positions.

A NON-CONTACT WRITE LOCKOUT, or file protect, switch is mounted at the supply reel hub. A single Form C contact is brought to the transport interface connector. This switch may be wired to Potter MA-series amplifiers to provide automatic write inhibit.

THE MAINTENANCE CONTROL MODULE allows the unit to be cycled in the FORWARD and REVERSE directions at a rate of 1 to 150 commands-per-second; or allows the machine to run in a continuous mode in the FORWARD or REVERSE direction, with automatic stopping provided at EOT and BOT markers. The module also includes an all "1" pattern generation to facilitate amplifier de-skewing at densities of 200, 556, or 800 bpi.

STANDARD READ/WRITE AMPLIFIERS are available to accommodate recording densities up to 800 bpi, NRZI format and 1600 cpi, PE format. Since the amplifiers are designed on a modular basis, each system can be customized to comply with unique customer requirements.

Amplifier variations include:

- Complete NRZI and PE amplifiers for single transport application in parallel operation.
- Daisy chained amplifiers with common electronics for both NRZI and PE applications.
- Complete PE system typically includes up to one-by-eight or two-by-eight channel transport system. Phase encoded channel provides coding/decoding, envelope check, preamble and postamble validity check, error correction, file mark generation and recognition, and miscellaneous "housekeeping" functions.

THE NEWLY STYLED MODULAR CABINET with welded steel frame is equipped with front and rear access doors and sliding glass cover door for ease of loading and removal of file reels. The cabinet includes an AC power switch, Hubbel™ twist lock 3-wire receptacle with mate, and a fan with filter.

The cabinet will accommodate all transport components, drive electronics, power supply and accessories that comprise the system, as well as read/write electronics.



STANDARD POTTER COLORS ARE:

Cabinet — Armorhide™ U621, Light Gray.

Control Panel & Feature Strip — Armorhide U1169, Ocean Blue.

Front Door & Dress Panels — Armorhide U242, Gray.

™Mylar is a trademark of E. I. du Pont de Nemours Company, Inc.

™Hubbel is a trademark of Harvey Hubbel, Inc.

™Armorhide is a trademark of J. L. Armitage Company

SPECIFICATIONS

TAPE DRIVE	Single Capstan
TAPE LOADING	In-line tape threading with automatic tape loading in less than 15 seconds. Automatic BOT searching
TAPE SPEED	75 ips
TAPE SPEED VARIATION (steady state)	±3%
REWIND SPEED AND TIME (2400 ft. reel)	150 sec. maximum
RECORDING DENSITY	200, 556, 800 bpi NRZI, 1600 cpi PE
PROGRAM RESTRICTIONS	none; within IBM IRG specifications
TYPICAL PERFORMANCE AT 75 IPS	
Start time (to within 10% of speed)	3.5 ms 0.150" ± .025"
Start distance — inches175 ± .030
Stop time (maximum)	3.5 ms 0.115" ± .020"
Stop distance — inches160 ± .020
Command repetition rate (max.)	150 command/sec. see text p. 2 "LOW INERTIA SINGLE CAPSTAN DRIVE" section
SPEED STABILITY (long term 1 sec)	±3%
(short term 15 ms)	±3%
SKEW (½" tape) at 75 ips	
(a) Static usec	3 usec
(b) Dynamic* usec	
guidance + reading all 1's tape	2.5 usec
guidance + head + reading random tape	4.0 usec
*The dynamic skew figure is specified when reading on the SC1051 a tape which has been generated on an IBM 2401 or for reading tapes on the IBM 2401 generated on the SC 1051	
TAPE WIDTH	½"
TAPE TYPE	3M777, or equal; 1.5 mil Mylar
TAPE REELS	Potter QUICK-LOCK IBM-compatible ½"
REMOTE CONTROL INPUTS	
a. Logic Levels	Logic "0" = +5V Logic "1" = 0V
b. Input Commands	Unit Select, Direction, Run, Rewind, Rewind and Unload
STATUS REPLIES	
EOT/BOT, Ready, Unit Selected and Ready, Rewinding	
Write Lockout (Form C contact)	
ELECTRONICS	All control circuits fully transistorized or integrated, modular plug-in construction throughout
SERVO CONTROL	All solid state with dynamic braking eliminating mechanical brakes
ENVIRONMENTAL CONDITIONS	
Ambient Temperature — Operating (within tape characteristic)	45°F to 110°F
Non-Operating	—30°F to 165°F
Humidity	20% to 80% (without condensation)
POWER	120V ± 10%, 60 Hz, single-phase 208/230V, 50 Hz Optional Power consumption at 120V: 6 amperes — Standby 7 amperes — Running 10 amperes — Peak (less than 100 ms)
DIMENSIONS	Height Width Depth
With Control Panel	62½" 27½" 20"
WEIGHT	
Transport with Cabinet	380 lbs. Approx.
U.L. APPROVAL PENDING	Underwriters' Laboratories U.L. Listing applied for.



POTTER INSTRUMENT COMPANY, INC.
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