GIER©
ELECTRONICS

# PAPER TAPE READER

# RC 2000 PAPER TAPE READER


The RC 2000 Paper Tape Reader provides direct computer input at 2000 characters a second. Developed and manufactured by A/S Regnecentralen to meet today's need for high-speed paper tape reading, RC 2000 doubles the speed of ordinary paper tape input.

RC 2000 ends all format problems too. It read perforated paper tapes in both normal round-hole formats, equivalent to 5, 7, and 8 tracks, and the square-hole, 6-track format used by Olivetti. Changing formats takes only a second, and tapes unwind freely for fast loading and reduced tape breakage.

RC 2000's unique Servo Input Buffer System enables both continuous character reading at 2000 characters a second (without stops or starts until the end of the tape) and intermittent reading at up to 20,000 characters a second; thus RC 2000 transfers bursts of about 100 characters to the computer without reducing reading speed. The Input Buffer, in addition, accepts input from other devices like punched card readers and optical readers.

The RC 2000 Paper Tape Reader is compact, attractive in appearance, and very easy to use. Many different data processing systems already are profiting from RC 2000's speed, versatility, and reliability, while special interfaces for still others are now under development at Regnecentralen.

# FEATURES

**Exceptional Speed**
RC 2000 reads continuously at 2000 char/sec (equivalent to 5 meters) and intermittently at up to 20,000 char/sec (for burst of 128 characters or less), the actual reading speed being dependent on the number of unprocessed characters in the RC 2000 Input Buffer.

**Uniform Feed – Less Breakage**
Tapes unwind freely and continuously – no pinch-rollers or mechanical clutches, no stops or starts till the end of the tape. This means smoother tape flow, reduced tape wear, prolonged tape life. With Regnecentralen's Tape Winder, tapes can be rewound in seconds – the right way round.

**Fast, Easy Loading**
Just put the tape in the tape roll room, pull the leading end through the tape corridor and lay it in the tape guide, then shut the pressure lid to hold the tape in place and close the door to the tape roll room.

**No Format Problems**
RC 2000 reads perforated paper tapes punched in any suitable opaque medium, accepting both normal round-hole formats with widths equivalent to 5, 7, and 8 tracks and the square-hole, 6-track format used by Olivetti.

**Spliced Tapes**
Since the read head allows up to three times the thickness of normal tape, RC 2000 easily reads spliced tapes. Torn or broken tapes can be mended quickly with Regnecentralen's Tape Splicer, and if new holes are required, it is simple to make them with Regnecentralen's Hand Punch.

**Reliability**
RC 2000 is a fully transistorized, photo-electric reader. For greater simplicity and reliability, Regnecentralen has used electronic functions to reduce the number of mechanical parts to an absolute minimum.

**Adaptability On-Line and Off-Line**
RC 2000 can be used for direct input of programs, data, and the like to computers and other processing devices, and the RC 2000 Input Buffer accepts data from alternative input sources like card readers and optical readers as well as from its own paper tape reader. RC 2000 can also be used off-line as a general-purpose input device in conjunction with tape stations, line printers, and other peripherals, and Regnecentralen has accordingly made full use of RC 2000 for off-line data conversion. (A special brochure on Regnecentralen's RC 3000 Converter, which is available on request, explains in detail the advantages of off-line data conversion).

**Interface Experience**
Regnecentralen has built special interfaces for connecting RC 2000 to the following data processing systems: UNIVAC/ICT 1004, ICT Series 1900, Bull GAMMA 30/RCA 301, SAAB D21, Minsk 22, GIER, NCR 315, and Siemens 3003. Current development projects include: EL X8, IBM 1401 and System 360, GE 415/425, Siemens 4004/RCA Spectra 70, Zuse Z23/25, and others.

**Other Advanced Features**

RC 2000 automatically ensures uniform light intensity at the read head.

RC 2000 stops automatically at the physical end of tape: the paper-out control blocks all further input to the Input Buffer and raises the pressure lid to permit reloading.

RC 2000 does not stop on parity errors: this often unwanted check can be programmed as a computer operation if required.

RC 2000 does not require stopping at a particular place on the tape, such as between holes or on holes.

RC 2000 is silent and self-contained – no noise, no awkard protruding parts.

RC 2000 is rugged in construction, modern in design, and very compact – about the size of a large record player.

**Fast Format Changes**

To change tape format, simply turn the two knobs on the front panel. Removing the read head is unnecessary, and the connections between the photocells and the RC 2000 Input Buffer are switched automatically to correspond to the format selected.

**Easy Operation**

Everything needed to operated RC 2000 is found on the front panel – the tape guide, pressure lid, tape format knobs, and only four push-button controls:

RESET to clear the Input Buffer and read in the first 100–200 characters

READ to read in characters in continuation of those already read in

SKIP to run out tape at full speed without reading in characters to the Input Buffer

UP to raise the pressure lid.

# CHARACTERISTICS

**Size**

| | |
|---|---|
| width | 52.0 cm |
| depth | 46.3 cm |
| height | 32.6 cm |
| **Weight** | 36.0 kg |
| **Reading Speed** | 2000 char/sec |

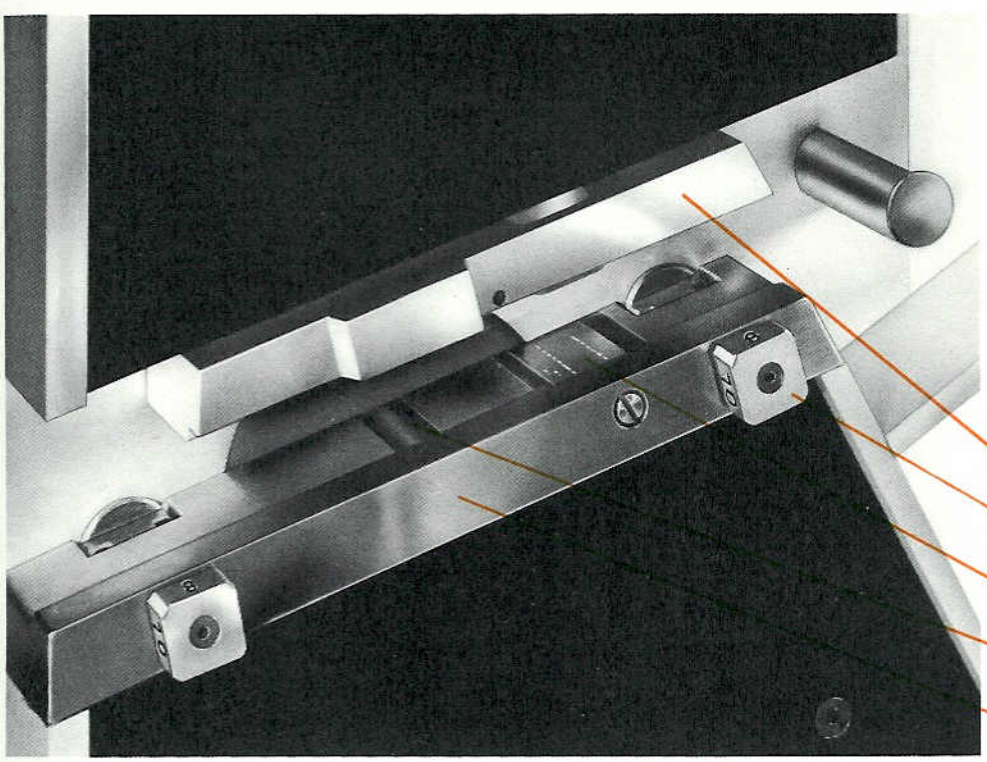
**Tape Formats**

| | |
|---|---|
| round-hole formats | widths equivalent to 5, 7, and 8 tracks |
| square-hole format | width equivalent to 6 tracks |

| | |
|---|---|
| **Power** | 50–60 Hz; 115, 127, 220 V |
| maximum power | 119 kcal/h (138 W) |
| maximum line current | 1 A at 220 V |
| fuses in mains connection | 6 A |

**Environment**

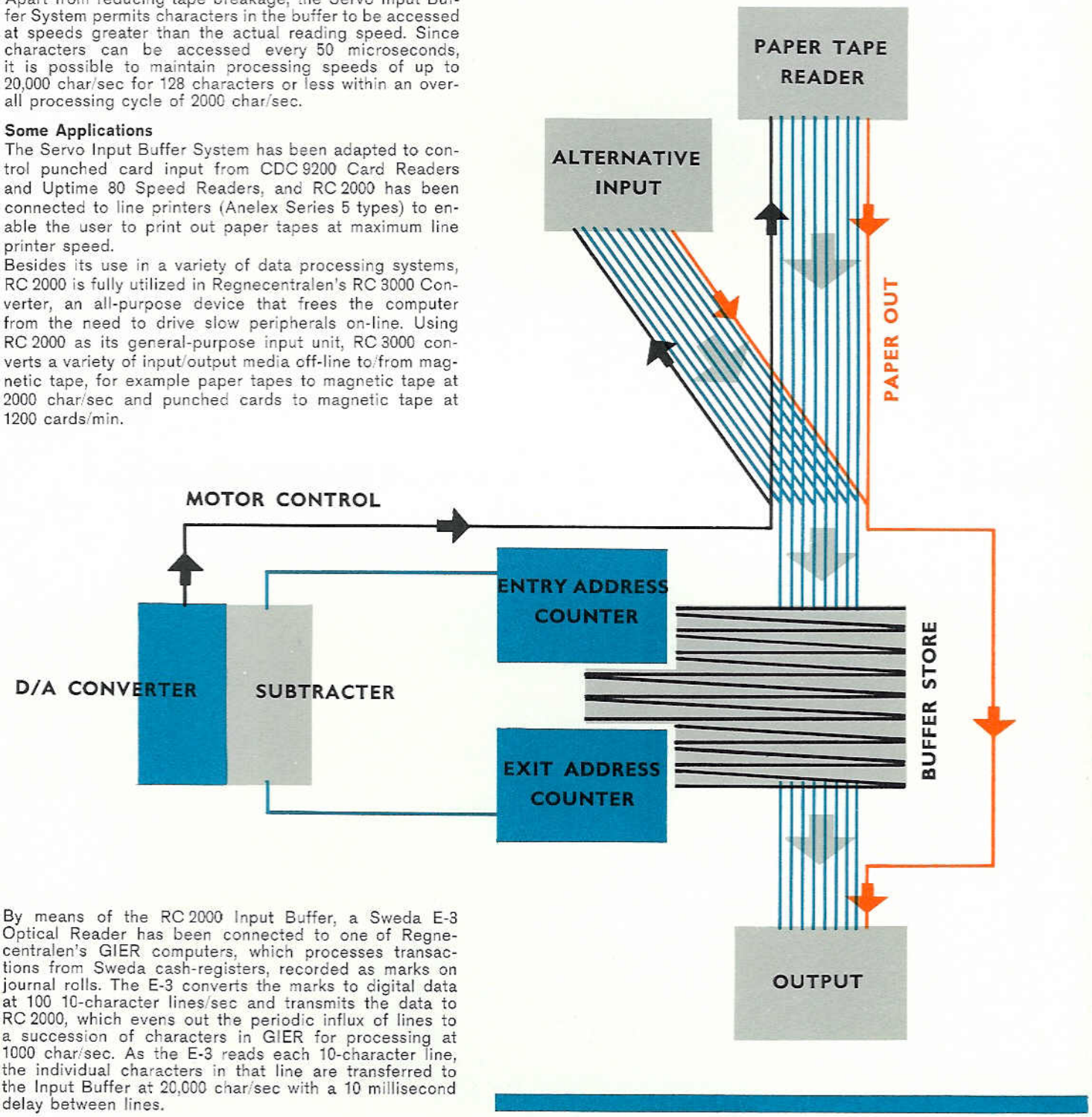
| | |
|---|---|
| cooling air | 120 $m^3/h$ from ambient |
| air temperature | 15–30° C |
| relative humidity | 40–70 % |



**A New Reading Principle**
Unlike most readers, RC 2000 does not use a start-stop character reading operation; instead, characters are read continuously into a buffer store of 256 words (a word equaling up to 8 bits), from which they are read to the computer character by character at a speed set by the computer.
A register system and digital-analog converter check the state of the buffer, this information then operating a servo system to vary the speed of the motor that activates the tape drive capstan; thus the reading speed is continuously regulated according to the rate at which the computer takes in data, without any stops or starts until the end of the tape.
Apart from reducing tape breakage, the Servo Input Buffer System permits characters in the buffer to be accessed at speeds greater than the actual reading speed. Since characters can be accessed every 50 microseconds, it is possible to maintain processing speeds of up to 20,000 char/sec for 128 characters or less within an overall processing cycle of 2000 char/sec.

**Some Applications**
The Servo Input Buffer System has been adapted to control punched card input from CDC 9200 Card Readers and Uptime 80 Speed Readers, and RC 2000 has been connected to line printers (Anelex Series 5 types) to enable the user to print out paper tapes at maximum line printer speed.
Besides its use in a variety of data processing systems, RC 2000 is fully utilized in Regnecentralen's RC 3000 Converter, an all-purpose device that frees the computer from the need to drive slow peripherals on-line. Using RC 2000 as its general-purpose input unit, RC 3000 converts a variety of input/output media off-line to/from magnetic tape, for example paper tapes to magnetic tape at 2000 char/sec and punched cards to magnetic tape at 1200 cards/min.

# THE SERVO INPUT BUFFER SYSTEM




By means of the RC 2000 Input Buffer, a Sweda E-3 Optical Reader has been connected to one of Regnecentralen's GIER computers, which processes transactions from Sweda cash-registers, recorded as marks on journal rolls. The E-3 converts the marks to digital data at 100 10-character lines/sec and transmits the data to RC 2000, which evens out the periodic influx of lines to a succession of characters in GIER for processing at 1000 char/sec. As the E-3 reads each 10-character line, the individual characters in that line are transferred to the Input Buffer at 20,000 char/sec with a 10 millisecond delay between lines.

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