

TEAC[®]

3.5-Inch Micro Floppy Disk Drives

FD-35 Series

- Eight 3.5-inch micro floppy disk drive models
- Choice of capacities from 250 kbytes to 1 Mbyte
- Use of custom LSI ICs for reduced power consumption and improved reliability
- Brushless direct-drive spindle motor for longer service life
- High-accuracy stepping motor for higher-speed access
- Interface compatible with 5-1/4" floppy disk drives (standard type)
- PS (power save) type also available for portable applications



Turn TEAC's Long Experience in Precision Engineering and Microelectronics to Your Advantage

TEAC has accumulated a great deal of experience in producing floppy disk drives; now we invite manufacturers of data processing and data acquisition equipment to turn this to their advantage by incorporating our new 3.5-inch FDDs in their systems. Based, as they are, on our proven ability as a manufacturer of floppy disk drives, these drives feature TEAC reliability and dependability and will provide mass storage that saves space and power.

Two versions are available at every capacity, a standard model and a PS power save model. The standard models are fully compatible with the equivalent 5-1/4-inch model, while the PS models have a greatly reduced power consumption, making them ideal for use in portable and even hand-held units. Whichever you choose, you should be congratulated on your choice because it allows you to share TEAC's outstanding record.





Low power consumption

To maintain the required dimensional accuracy and thereby reliability, the drive must not generate heat, as this could result in thermal expansion. To achieve this, FD-35 FDDs use custom-made LSI chips for efficient control over all functions of the drives; an added advantage of these advanced ICs is that they also reduce power consumption.

Designed for high-density recording

Using our long experience with floppy disk drives, we first developed the 1 Mbyte model which uses a track density of 135 tpi. Then, using the design data acquired with this drive, we developed models with a track density of 67.5 tpi. In this way, we are able to guarantee the performance of the drives, even models with the highest recording density

New **PS** (Power Save) models for greater flexibility

PS models have typical power consumptions of 27 mW in the standby mode and 1.72 W when in operation.

To achieve this low power consumption, PS drives use CMOS technology

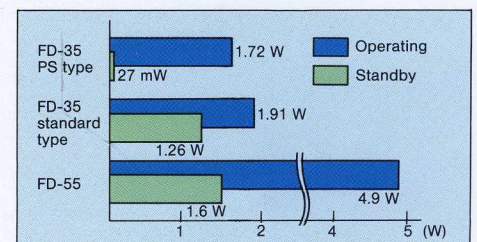


instead of the usual TTL technology; it is the lower signal levels of CMOS ICs that make possible the saving in power.

With their reduced power consumption, PS drives can be operated using batteries and can be used in hand-held portable computing and data acquisition devices. The low 27 mW power consumption in the standby mode makes them ideal for applications where they will be required to be in the standby mode for most of the time.

PS drives use single-phase motors with a memory backup so that there is no head positioning error when they are switched from standby to operation and back to standby.

No additional position checking cycle is required; switching from standby to operation is smooth and fast. If the disk is changed during the standby period, a special circuit in the drive sends a signal to the host computer so that accidental erasure of the data on the disk and other malfunctions are eliminated.



High-precision head positioning mechanism

The mechanism which positions the magnetic head uses a high-precision band actuator. As the stepping motor, a newly developed motor is used. Measures have been taken to suppress vibrations of the motor spindle for even greater precision. And, by shortening the gap between the band actuator and the head, errors due to thermal expansion have been further reduced so that reading and writing are stable even at high track densities.

High-precision chucking mechanism

3.5" micro floppy disk drives use a clamping mechanism different from 8" and 5-1/4" drives; accurate positioning is ensured by a chucking pin which locates the disk in exactly the specified position with respect to the motor spindle. The chucking mechanism uses a high-precision miniaturized bearing which assures high accuracy throughout the drive's long service life.

Contact Start-Stop system

In the Contact Start-Stop (CSS) system used in the FD-35, the head loading solenoid has been eliminated. When the disk is loaded in the drive, the heads land on the disk automatically and, after this, the heads are in contact with the disk at all times and the reading and writing of data are controlled by the disk's starting and stopping. Because a head loading solenoid is not used, power consumption is reduced and another possible source of electrical interference is eliminated.

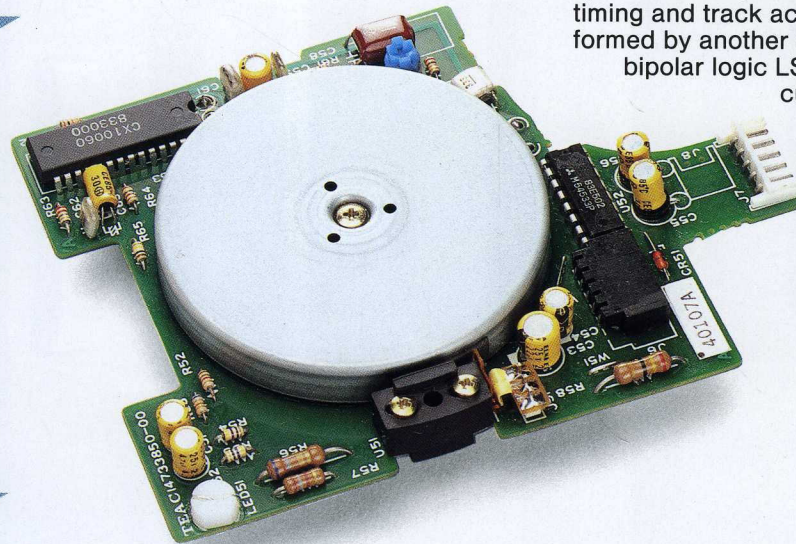
Highly reliable brushless direct-drive motor

The newly-designed motor which drives the disk is a brushless direct-drive motor with low power consumption. With optimum spacing between the bearings, vibrations of the spindle are eliminated. Since the motor has no brushes, maintenance and inspection are eliminated together with electrical interference. And, as the motor has been reduced in size and is flat and extremely compact, this contributes to the overall reduction in size of the drive.

Two custom-made LSI chips

The read/write circuitry is contained in a CMOS LSI IC specially designed by TEAC for use in these drives. The analog read/write IC incorporates the read amp, the waveform shaper, the read data output gate, the write data input latch, the write/erase driver and a circuit which prevents write errors when the power is switched on and off.

Overall control of drive operations including the control of input/output signals, the stepping motor, the speed of the spindle motor, erase timing and track access, are performed by another custom-built IC, a bipolar logic LSI chip. These two custom-made LSI ICs make a major contribution to the drive's performance, reducing the amount of heat that it generates and the number of components, as well as improving reliability.



FC-55 floppy disk drive controller can be used

The FC-55 floppy disk drive controller was developed for the connection of up to four 5-1/4" FDDs to a personal computer; because FD-35 FDDs are compatible with 5-1/4" drives, the same controller that was previously used for connection between the computer and FDDs can be used, which makes implementation possible with minimum changes.

Attractive front bezel

The standard color of the front bezel — panel and eject button — is ivory. Dark grey, light grey and black front bezels are optionally available to match the personal computer or data terminal device in which the disk drive will be installed.

Full Range of Standard and PS Models

FD-35A

- Single sided
- Track density: 67.5 tpi
- Data capacity: 250 KB

FD-35B

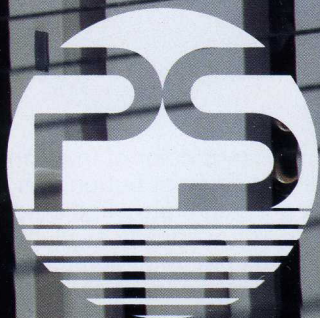
- Double sided
- Track density: 67.5 tpi
- Data capacity: 500 KB

FD-35E

- Single sided
- Track density: 135 tpi
- Data capacity: 500 KB

FD-35F

- Double sided
- Track density: 135 tpi
- Data capacity: 1 MB



FD-35 series SPECIFICATIONS

Recording Method:

FM (single density), MFM (double density)

Motor Starting Time: 400 ms or less

Average Latency Time: 100 ms

Disk Speed: 300 rpm

Index: 1/revolution

Detection Cycle: 200 ms ±1.5 %

MTBF: More than 10,000 hours or more
(in normal use)

MTTR: 30 min. or less

Error Rates

Soft Read Errors: 1 per 10⁹ bits or less

Hard Read Errors: 1 per 10¹² bits or less

Seek Errors: 1 per 10⁶ seeks or less

Temperature

Operating: 4° to 50°C

Transportation: -40° to 70°C

Storage: -22° to 60°C

Temperature Gradient

Operating: 15°C/hour or less

(noncondensing)

Storage/transportation: 30°C/hour or less
(noncondensing)

Relative Humidity

Operating: 20 to 80 % (noncondensing)

Max. Wet Bulb Temperature: 29°C

Transportation: 5 to 95 % (noncondensing)

Max. Wet Bulb Temperature: 45°C

Storage: 10 to 90 % (noncondensing)

Max. Wet Bulb Temperature: 40°C

Power Requirements

Standard Type

DC +12 V ±10 %, 45 mA max. during the
standby mode; 80 mA typ. during R/W

DC +5 V ±5 %, 220 mA max. during the
standby mode; 190 mA typ. during R/W

PS Type

DC +12 V ±10 %, 1 mA max. during the
standby mode; 85 mA typ. during R/W
DC +5 V ±5 %, 3 mA max. during the standby
mode; 140 mA typ. during R/W

Power Consumption

Standard Type

Operating: 1.91 W typ., 3.01 W max.

During standby: 1.26 W typ., 1.64 W max.

PS Type

Operating: 1.72 W typ., 2.77 W max.

During standby: 27 mW max.

Dimensions

(W x H x D): 101.6 x 40 x 135 mm

(4" x 1-5/8" x 5-3/8") excluding projections

Weight: 750 g (1.7 lb.)

Safety Standard: Complies with UL and CSA

Media: 3.5-inch micro floppy disk

	FD-35A		FD-35B		FD-35E		FD-35F		
	FM	MFM	FM	MFM	FM	MFM	FM	MFM	
Transfer Rate (kbits/sec)	125	250	125	250	125	250	125	250	
	Per Track	3.125	6.25	3.125	6.25	3.125	6.25	3.125	6.25
Capacity (kbytes)	125	250	250	500	250	500	500	1,000	
	Per Sector	0.128	0.256	0.128	0.256	0.128	0.256	0.128	0.256
(16 sectors/track)	Per Track	2.048	4.096	2.048	4.096	2.048	4.096	2.048	4.096
	Per Disk	81.92	163.84	163.84	327.68	163.84	327.68	327.68	655.36
Inside Track Recording Density (bpi)	4063	8126	4324	8647	4094	8187	4359	8717	
Inside Track Flux Density (frpi)	8126	8126	8647	8647	8187	8187	8717	8717	
Tracks/Disk	40		80		80		160		
Track Density (tpi)		67.5				135			
Number of cylinders		40				80			
Track Radius (mm)	Outside	39.500	side 0 : 39.500		39.500	side 0 : 39.500			
	Inside	24.875	side 1 : 38.000		24.875	side 1 : 38.000			
Average Access Time (ms)*		93			94				
Track Access Time (ms)		6			3				
Settling Time (ms)			15						

*Including settling time

3.5-inch floppy disk — reduced size for greater convenience

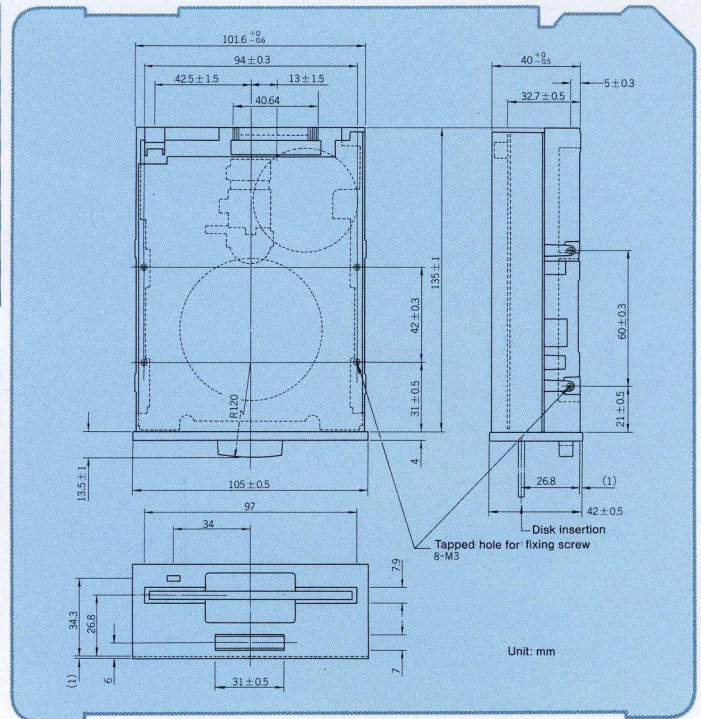
Even though they are so very much smaller than 5-1/4" floppy disks have comparable storage capacities.

Pocketable size — the hard case that encloses the 3.5" disk measures only 94 mm x 90 mm, so that it can be slipped into a shirt pocket, and mailed and stored easily.

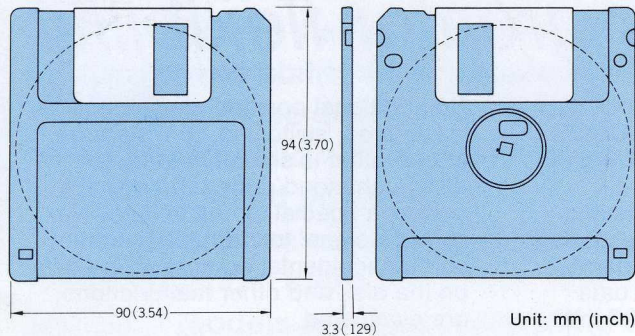
High density — the maximum storage capacity of the 3.5" disk is 500 kbytes per side, 1.0 Mbyte per double-sided disk.

Hard case with automatic shutter — the disk is protected by being enclosed in a hard case with a shutter that opens only when the case is inserted in the drive.

Sliding erase prevention tab — the write protect tab is easy to slide, thereby protecting valuable data.

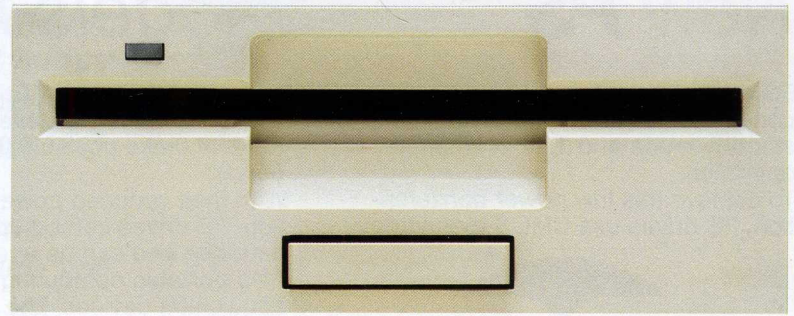


Outline of 3.5" floppy disk case (Actual size)



Unit: mm (inch)

Features and specifications are subject to change without notice.



(Actual size)

TEAC

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