FD1036A

3.5" FLOPPY DISK DRIVE

PRODUCT DESCRIPTION

806-520236-0

REV. -0

NEC Corporation
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Specifications remain subject to change to allow the introduction of design improvements.
<table>
<thead>
<tr>
<th>Edition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prepared in August 1985</td>
</tr>
</tbody>
</table>
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1. GENERAL

The FD1036 micro-floppy disk drive is a double-sided micro-floppy disk drive with 135 tracks per inch (TPI).

The Micro-floppy disk (abbreviated as disk in this manual) used for the FD1036 is contained in a hard jacket with auto shutter.

The FD1036 micro-floppy disk drive has a total volume one fourth that of conventional 5-1/4" minifloppy disk drives and weights only approximately 560 g, yet has a comparable storage capacity.

The previous FD 1035 series is the short model with short depth (130 mm). The FD 1036 series is the slim model with thin thickness (30 mm).

The drive uses a direct-driven spindle with a brushless DC motor, and by due the low power design it consumes only 2.1 watts of power (Typ).

The low noise design assures silent operations.

In this manual the FD1036 micro-floppy disk drive is abbreviated as FDD.
2. GENERAL SPECIFICATIONS

2.1 Drive specifications

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Recording mode</td>
<td>MFM</td>
<td>FM</td>
</tr>
<tr>
<td>2</td>
<td>Capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unformatted</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Formated (NOTE 1)</td>
<td>640</td>
<td>320</td>
</tr>
<tr>
<td>3</td>
<td>Data transfer rate</td>
<td>250</td>
<td>125</td>
</tr>
<tr>
<td>4</td>
<td>Maximum bit density</td>
<td>8717</td>
<td>4359</td>
</tr>
<tr>
<td>5</td>
<td>Tracks</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Average rotational speed</td>
<td>300</td>
<td>rpm</td>
</tr>
<tr>
<td>7</td>
<td>Seek time (Track-to-track)</td>
<td>3</td>
<td>ms</td>
</tr>
<tr>
<td>8</td>
<td>Seek settling time</td>
<td>15</td>
<td>ms</td>
</tr>
<tr>
<td>9</td>
<td>Track density</td>
<td>135</td>
<td>TPI</td>
</tr>
<tr>
<td>10</td>
<td>Start time (NOTE 2)</td>
<td>800</td>
<td>ms</td>
</tr>
<tr>
<td>11</td>
<td>Standard external dimensions</td>
<td>Width</td>
<td>30 (1.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Height</td>
<td>101.6 (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth</td>
<td>146 MAX (5.75)</td>
</tr>
<tr>
<td>12</td>
<td>Weight</td>
<td>56</td>
<td>gr</td>
</tr>
<tr>
<td>13</td>
<td>Operating environment conditions</td>
<td>Temperature</td>
<td>5 ~ 45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relative humidity</td>
<td>20 ~ 80</td>
</tr>
<tr>
<td></td>
<td>Maximal wet-bulb temperature</td>
<td>29.0</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>(woncondensing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Item</td>
<td>Specification</td>
<td>Unit</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------</td>
<td>----------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>14</td>
<td>Power supply requirement</td>
<td>Voltage (V)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start-up current</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steady-state current</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>90</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Power dissipation</td>
<td>0.3</td>
<td>W</td>
</tr>
<tr>
<td>16</td>
<td>Heat output</td>
<td>0.26</td>
<td>kcal/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Reliability</td>
<td>MTBF (NOTE 6)</td>
<td>POH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12000 (Under standard use condition)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MTTR</td>
<td>h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Device life</td>
<td>15000 POH or 5 years (Design life)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soft errors</td>
<td>$10^{-3}$ (Not including 2 or less retry attempts)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hard errors</td>
<td>$10^{-12}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seek error ratio</td>
<td>$10^{-6}$</td>
</tr>
<tr>
<td>18</td>
<td>Disk life</td>
<td>3.0 x $10^6$</td>
<td>Pass count/track</td>
</tr>
<tr>
<td>19</td>
<td>Disk</td>
<td>Double sided 3.5&quot; diskette specified by NEC</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Drive environment</td>
<td>Operating</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-operating (Storage)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transporting (Packing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>4 ~ 46 (39 ~ 115)</td>
<td>°C (°F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-20 ~ 50 (-4 ~ 122)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40 ~ 60 (-40 ~ 140)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relative humidity</td>
<td>20 ~ 80</td>
<td>%RH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 ~ 90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 ~ 95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum wet-bulb temperature</td>
<td>29 (84)</td>
<td>°C (°F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 (104)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45.5 (113)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Largest temperature</td>
<td>20 (59)</td>
<td>°C/h (°F/h)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 (86)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 (86)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Item</td>
<td>Specification</td>
<td>Unit</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------------------</td>
<td>---------------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>Allowable vibration (Except at resonance point) (NOTE 7)</td>
<td>0.5 (Less than 100 Hz)</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 (Less than 100 Hz)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 (Less than 100 Hz)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allowable shock (Less than 10 ms)</td>
<td>5</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

NOTE1: 16 sectors/track, 256 bytes/sector time

2: Time until READY after MOTOR ON

3: Dimensions not including that of the front bezel.

4: If the disk is not inserted or the MOTOR ON signal is invalid.

5: When FDD is in READY status.

6: Under standard use conditions

(1) Drive service : 8 h/day

   time (POH)

(2) Actual head load : 0.5 h/day

   time (R/W time)

(3) Disk insertion/ ejection : 25 times/day

(4) Motor ON/OFF : 300 times/day

(5) Average use time : 2 h/day

   per disk (4 disks/day/drive)

7: Excitation in three directions one R/W test by our FDD tester for 0 to 79 track

8: Between SG and FG: 90KΩ (DC)
2.2 DRIVE STRUCTURE

The major component of FDD have the following functions:

(1) Base
Constructs the frame.

(2) Spindle motor assembly
Rotate the disk directly by using the DC spindle motor. The disk is set to the spindle with a magnet and is driven by a driving pin.

(3) Head carriage assembly
Contains a pair of magnetic heads facing across the disk. The R/W gap of the head on side one is dislocated 8 tracks inner than that of the head on side zero.

(4) Step motor
Move the carriage Assy by using the steel belt for head position.
(5) Index sensor
Detect the drive position of the spindle motor.

(6) Track 00 sensor
Detect whether the magnetic head is in the 00 track.

(7) Write protect sensor
Detect the open/close of the write prohibition hole.

(8) Eject mechanism
Used for manual insertion and removal of a disk and for automatic shutter control.

(9) P.W.B.
Mounts the electric circuits that controls positioning of magnetic head, read/write operations, etc.

(10) Display lamp
This is a lamp that displays a FDD status.

(11) Front panel
Dress panel installed on the Drive front.
2.3 DRIVE OPERATION

When a diskette is inserted into the FDD, the spindle motor rotates automatically until the chucking of the disk is finished. Then the FDD becomes a standby status. After the MOTOR ON signal is true, the FDD becomes ready when the spindle motor reaches the specified rotation speed.

When the drive is selected, it transfers the READY signal to the controller. The magnetic head moves to a target track according to the STEP pulse and DIRECTION SELECT signals.

The desired magnetic head is selected by the SIDE SELECT signal from the controller. Now FDD is ready for read/write operations.

For a write operation, the WRITE DATA signal which is the serial data sent from the controller converted into magnetized pattern and is recorded on the disk.

For a read operation, the magnetized pattern recorded on the disk is detected by the head and is converted into serial data, and is sent to the controller as a READ DATA signal.
## 2.4 DISK SPECIFICATIONS

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Media type</td>
<td>3.5&quot; double sided medium specified by NEC</td>
</tr>
<tr>
<td>2</td>
<td>Product name</td>
<td>NEC micro floppy disk</td>
</tr>
<tr>
<td>3</td>
<td>Number of disks</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Recording surfaces</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Number of total tracks per disk</td>
<td>160</td>
</tr>
<tr>
<td>6</td>
<td>Disk cartridge size</td>
<td>90 x 94 mm</td>
</tr>
<tr>
<td>7</td>
<td>Operating environment conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>10 ~ 60°C (50 ~ 140°F)</td>
</tr>
<tr>
<td></td>
<td>Relative humidity</td>
<td>8 ~ 80% RH</td>
</tr>
<tr>
<td></td>
<td>Wet-bulb temperature</td>
<td>29°C Maximum (84°F)</td>
</tr>
<tr>
<td></td>
<td>Temperature gradient</td>
<td>20°C/h Maximum (36°F/h)</td>
</tr>
<tr>
<td></td>
<td>External Magnetic field</td>
<td>4000 A/m (50 oersted) or less</td>
</tr>
<tr>
<td></td>
<td>Note</td>
<td>Leave the disk at least 30 minutes in the drive operating environment before use.</td>
</tr>
</tbody>
</table>
2.5 DISK STRUCTURE

The floppy disk is contained in a hard jacket within which liner sheets are provided for disk surface protection. The disk uses a polyethylene terephthalate base coated with magnetic layers. The liner consists of unwoven cloth and protects the disk surfaces from scratch or dust. The hard jacket is made of ABS resin.

The disk has a metal hub which is used to secure itself to the spindle. The hard jacket has a write-protect hole and automatic shutter.

The disk construction is shown in Figure 2.1.
Figure 2.1 shows the disk structure.

Fig. 2.1 Disk Structure
3. INTERFACE

3.1 GENERAL DESCRIPTION

FDD's may be connected to its controller in either parallel or daisy-chain configuration. The number of FDD's which can be connected to one controller depends on individual system and controller. For daisy-chain connection, each controller can control up to 4 FDD's.

Signal line termination resistors are provided on each FDD. The basic FDD connection to the controller is shown in Figure 3.1.

(a) Parallel connection

Signal cable

Controller

R
FDD #0

R
FDD #1

R
FDD #2

R
FDD #3

Power cable

R: Terminating resistor: 2K Ω

Signal cable maximum length 1 m
(b) Daisy Chain connection

Signal cable

Controller

R
FDD #0

R
FDD #1

R
FDD #2

R
FDD #3

Power cable

R: Terminating resistor: 2K Ω

Signal cable total length maximum length 1 m

Fig. 3.1 Basic Connection Modes
3.2 PHYSICAL SPECIFICATIONS

The PDD is connected to its controller through a signal connector and a power connector. A faston terminal is provided for frame ground. The connector locations are shown in Figure 3.2.
Fig. 3.2 Connector Locations
3.2.1 Signal Types and Pin Configuration

The following shows the signal connector pin configuration on the FD 1036:

![Diagram showing pin configuration]

<table>
<thead>
<tr>
<th>Signal name</th>
<th>I/O Signal</th>
<th>Pin Number</th>
<th>Pin Number</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTOR ON 1</td>
<td>Input signal</td>
<td>2</td>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>IN USE</td>
<td>Input signal</td>
<td>4</td>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>DRIVE SELECT 3</td>
<td>Input signal</td>
<td>6</td>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>INDEX</td>
<td>Output signal</td>
<td>8</td>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>DRIVE SELECT 0</td>
<td>Input signal</td>
<td>10</td>
<td>9</td>
<td>GND</td>
</tr>
<tr>
<td>DRIVE SELECT 1</td>
<td>Input signal</td>
<td>12</td>
<td>11</td>
<td>GND</td>
</tr>
<tr>
<td>DRIVE SELECT 2/</td>
<td>Input signal</td>
<td>14</td>
<td>13</td>
<td>GND</td>
</tr>
<tr>
<td>(MOTOR ON 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTOR ON</td>
<td>Input signal</td>
<td>16</td>
<td>15</td>
<td>GND</td>
</tr>
<tr>
<td>DIRECTION SELECT</td>
<td>Input signal</td>
<td>18</td>
<td>17</td>
<td>GND</td>
</tr>
<tr>
<td>STEP</td>
<td>Input signal</td>
<td>20</td>
<td>19</td>
<td>GND</td>
</tr>
<tr>
<td>WRITE DATA</td>
<td>Input signal</td>
<td>22</td>
<td>21</td>
<td>GND</td>
</tr>
<tr>
<td>WRITE GATE</td>
<td>Input signal</td>
<td>24</td>
<td>23</td>
<td>GND</td>
</tr>
<tr>
<td>TRACK 00</td>
<td>Output signal</td>
<td>26</td>
<td>25</td>
<td>GND</td>
</tr>
<tr>
<td>WRITE PROTECT</td>
<td>Output signal</td>
<td>28</td>
<td>27</td>
<td>GND</td>
</tr>
<tr>
<td>READ DATA</td>
<td>Output signal</td>
<td>30</td>
<td>29</td>
<td>GND</td>
</tr>
<tr>
<td>SIDE SELECT</td>
<td>Input signal</td>
<td>32</td>
<td>31</td>
<td>GND</td>
</tr>
<tr>
<td>READY</td>
<td>Output signal</td>
<td>34</td>
<td>33</td>
<td>GND</td>
</tr>
</tbody>
</table>
FG and SG processing as follows:

\[
\begin{array}{c}
\text{SG} \\
\text{R} \\
\text{C} \\
\text{FG}
\end{array}
\]

Impedance Terminator
\[R = 100 \, \text{k}\Omega \ (\pm 10\%), \quad C = 0.1 \mu\text{F} \ (\pm 80\%) \quad (-40\%)
\]

3.2.2 POWER CONNECTOR AND PIN CONFIGURATION

The following shows the power connector pin configuration:

![Printed circuit board diagram with pin numbers 1 to 4 labeled.]

Fig. 3.3 Power Connector in Configuration

Table 3.1 Power Connector Pin Assignments

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+5 V DC</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>+12 V DC</td>
</tr>
</tbody>
</table>
3.2.3 CONNECTOR TYPE

The following connector type are recommended for the signal and power connections for the FDD; equivalent connector types may also be used.

Housing: 171822-4 by Japan AMP. Co., Ltd.
Pins: 170262-1 by Japan AMP. Co., Ltd.

Power connector plug

Socket:
PS-34SEN-D4P1-1C-N
(closed-end type)
PS-34SEN-D4P1-1D-N
(daisy-chain type)
both by Japan Aeronotic Electronics Industry, Co., Ltd.
or equivalent NOTE 1

Cable:
3365-34 by Sumitomo-3M, Co., Ltd.
or equivalent

Fig. 3.4 Connector Locations and Recommended Models
3.3 ELECTRICAL SPECIFICATIONS

3.3.1 SIGNAL LEVEL

All the input/output signals are at TTL level with the following electrical specifications:

TRUE = Logical "0" (LOW level) 0, to +0.4 V
FALSE = Logical "1" (HIGH level) +2.5 to +5.25 V

3.3.2 DRIVER/RECEIVER

The driver which outputs signals from FDD to the controller is an open collector output circuit capable of obtaining sink current of maximum 40 mA at LOW level. The receiver which receives signals from the controller to FDD is a Schmitt trigger gate terminating with 2k Ohm.
Fig. 3.5 Driver/Receiver Circuit Example
3.4 Input Signals

3.4.1 DRIVE SELECT 0 to 3 (DS0 to 3)

DRIVE SELECT 0 to 3 are signals for selecting a specified FDD. Setting one of DS0 to DS3 to LOW level selects the corresponding FDD, which makes effective the input/output lines. FDD is specified by shorting one of the DX selection plugs 0 to 3 on the PWB.

3.4.2 STEP (STP)

Pulse signal which moves the magnetic head in the direction specified by the direction select signal. The head begins moving at the rising from LOW to HIGH level of this signal. The magnetic head moves over as many cylinders as the number of input pulses. Figure 3.6 shows the pulse timing conditions.
3.4.3 DIRECTION SELECT (DIR)

Signal instructing the direction of magnetic head movement. The HIGH level indicates the direction toward the outer tracks and the LOW level indicates toward the inner tracks.

This signal must be switched definitely $0.8 \mu s$ before the trailing edge (positive going) of the STEP signal.

3.4.4 SIDE SELECT (SSL)

Signal selecting one of the heads used for write or read. The HIGH level selects the magnetic head on the side "0" of the disk and the LOW level selects the side "1".

This signal must be switched $100 \mu s$ before start of the read/write operation.
3.4.5 WRITE GATE (WGT)

This signal writes data when at LOW level and reads data when at HIGH level. Do not turn off the HEAD LOAD signal, switch the SIDE SELECT signal, or start positioning, for 1 ms after this signal has gone to HIGH level.

3.4.6 WRITE DATA (WDT)

Pulse signal that supplies data to be written to the disk. Every time the signal changes from HIGH to LOW level, the write current in the magnetic head changes direction, which changes the direction of magnetization on the disk.

Figure 3.7 shows the WRITE DATA specification.
3.4.7 MOTOR ON 0 (MON)

The spindle motor rotates by making this signal LOW when the disk is inserted.

The following signals on the MON plug can be used to rotate the spindle motor.

1. Plug 1: Interface pin 14 (DRIVE SELECT 2)

* 2. Plug 2: Interface pin 16 (MOTOR ON 0)

3. Plug 3: Interface pin 2 (MOTOR ON 1)

NOTE: * mark indicates setting position when delivery.
3.5 Output Signals

3.5.1 INDEX (IDX)

Signal for indicating the origin on the disk. This is output once every revolution. Figure 3.8 shows the output pulse specification.

The reading edge of the pulse is used as a reference.

![INDEX (IDX) Diagram]

\[
T_1 = 1 \sim 8 \text{ms}
\]
\[
T_2 = 200 \pm 3 \text{ms}
\]

Fig. 3.8 INDEX Pulse Specification

3.5.2 TRACK 00 (TK0)

When at LOW level, this signal indicates that the heads are on track "00".

This signal is generated by the signal from the track 00 sensor and the (excitation) phase of the step motor.
3.5.3 READY (RDY)

Signal indicating that FDD is ready to operate. This signal goes to LOW level, when the FDD is selected, if the following conditions are satisfied:

(i) DC power is supplied. (5V, 12V)

(ii) A disk is mounted.

(iii) The rotational speed of the floppy disk has reached 90% of the specification.

(NOTE) When the spindle motor is rotating by the MOTOR ON signal

3.5.4 READ DATA (RDT)

Data read from a disk which is shaped into a pulse string.

Figure 3.9 shows the READ DATA signal obtained when normally recorded data is read.
3.5.5 WRITE PROTECT (PRT)

If a disk with its WRITE PROTECT hole uncovered is inserted into the drive, the PRT line goes low, which places the FDD in the WRITE PROTECT state.
3.6 Interface Signal Timing

3.6.1 Step and Track 00

![Diagram showing signal timing for Step (STP) and Track 00 (TKO)]

2.5 ms (max.)

3.6.2 Access timing

![Diagram showing signal timing for Write gate (WGT), Step (STP), and Direction select (DIR)]

1 ms (min.)
0.8 μs ~ 2 ms
3 ms 18 ms (min.)

(NOTE) An interval of at least 18 ms is required between step pulses when the direction changes.
3.6.3 Write Timing

Step (STP)

18 ms (min.)

1 ms (min.)

Side select (SSL)

100 μs (min.)

Write gate (WGT)

3.6.4 Read Timing

Step (STP)

18 ms (min.)

Side select (SSL)

100 μs (min.)

Write gate (WGT)

Valid read data

Valid
3.6.5 Write Data Timing

Write gate (WGT)

Write data (WDT)

8 μs (max.)

8 μs (max.)

3.6.6 DRIVE SELECT and Output Signal Timing

The drive control and status signals are become valid 500 ns after the DRIVE SELECT line is active.

3.6.7 Autochucking Timing

Power Supply

5 V
12 V

Disk in

X Spindle Index

Ready Status

Spindle

Chucking Completion

X is internal signal of the FDD.
3.7 POWER INTERFACE

3.7.1 INPUT POWER SPECIFICATIONS

Table 3.2 shows the DC power specifications for FDD.

A sequence for each DC power is not needed.

<table>
<thead>
<tr>
<th>Table 3.2 Input Power Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>Voltage (NOTE 6)</td>
</tr>
<tr>
<td>Current (NOTE 1)</td>
</tr>
<tr>
<td>Activating time</td>
</tr>
<tr>
<td>Average when seek</td>
</tr>
<tr>
<td>Average when read/write</td>
</tr>
<tr>
<td>Average when standby</td>
</tr>
<tr>
<td>Ripple voltage (NOTE 2)</td>
</tr>
</tbody>
</table>

NOTE 1: This is FDD average consuming current.

2: This includes the spike voltage.

3: Data is protected in spite of DC power supply ON/OFF when FDD is not in Write operation.

4: If power supply is charged after moving the carriage to the outer or inner side for 1 track, the carriage is returned to track 0 immediately.

5: Do not turn on and off the power supply by the relay, etc.

6: Including ripple voltage.
4. OPERATING PROCEDURES

The basic operating procedures for FDD include the power on/off, disk setting and removal.

4.1 Setting A Floppy Disk

(1) Insert the diskette slowly into the slot until the Eject button pops out.

4.2 Removing the Floppy disk

(1) Make sure the write/read operation of FDD has finished.

(2) To eject the diskette from the drive, just press the Eject button.

4.3 Display Lamp

The Display lamp indicates the FDD status. It comes on while the FDD is selected.
5. EXTERNAL SHAPE AND INSTALLATION

5.1 External Shape and Fitting Hole Positions

Figure 5.1 shows the external shape and fitting hole positions.

NOTE 1: The metric screw type is also available.

Fig. 5.1 External Shape and Fitting Hole Positions
5.2 Installation

(1) FDD may be installed in the following manners:

(a) Vertical

(b) Vertical

(c) Horizontal

Consider the location of FDD in the system, so that it may be protected against the noise from CRT, power supply, etc., especially when installing it inside CRT.
5.3 Recommended Air Flow

(1) Installing one FDD

VENTILATOR

(2) Installing two FDDs

VENTILATOR

NOTE: Appropriate cooling is required if the ambient temperature around FDD rises considerably.
6. PACKING AND TRANSPORTATION

(1) For external packing, either use the packing material used in the carrying in of FDD or make sure no direct shock will be transmitted to FDD.

(2) Make sure that FDD will sustain no excessive shock during transportation.