

Panasonic

TECHNICAL
SPECIFICATION

EME-150M
3" COMPACT FLOPPY DISK DRIVE

All the specifications are subject to change without notice.

1. Specification Summary

1.1 Performance

Encoding Method	FM	MFM
Recording Capacity (Unformatted)	Single Density	Double Density
Single side	125K Byte	250K Byte
Double side	---	---
Per track	3125 Byte	6250 Byte
(Formatted)		
Byte/Sector(Byte)	128 256 512	256 512 1024
Sector/Track	16 9 5	16 9 5
Single side(Byte)	82K 92K 102K	164K 184K 204K
Double side(Byte)	164K 184K 205K	328K 369K 410K
Per track(Byte)	2048 2304 2560	4096 4608 5120
Transfer rate	125K bits/sec.	250K bits/sec.
Latency (average)	100msec.	
Access time		
Track to track	12msec.	
Average	171msec.	
Settling time	15msec.	
Motor start 1	1.0 sec. max.	
Index	1	
Rotational Speed	300rpm	
Max. recording density	4473bpi	8946bpi
Track density	100tpi	
Number of tracks	40	
Mechanical dimensions		
Height	35mm (1.4")	
Width	90mm (3.5")	
Depth	150mm (5.9")	
Weight	460g	

Table 1-1.

1.2 Environmental Requirements

Operational

The following shall be applied to the drive in operation as described in Table 3.

Temperature Range: 5°C to 46°C
Humidity Range : 20% to 80% RH without condensation
Maximum Wet Bulb : 29°C

Table 3. Operational Environments

Non-Operational

In non-operation situation such as during shipping or storage, the following requirements shall be applied to the drive as described in Table 4.

Temperature Range: -25°C to 60°C
Humidity Range : 5% to 95% RH without condensation
Maximum Wet Bulb : 29°C max. (No condensation)

Table 4. Non-Operational Environments

2. Electrical specifications

2.1 Sensors and Light Emitting Diodes (LEDs)

2.1.1 This disk drive shall include a red LED driving indicator, the index track 00, and the write protect switch.

2.1.2 Terminal assignment

Pin#	Signal	Description
1	ALA	Drive LED anode
2	ALC	Drive LED cathode
3	ILA	Index LED anode
4	ILC	Index LED cathode
5	IPC	Index phototransistor collector
6	IPE	Index phototransistor emitter
7	TZLA	Track LED anode
8	TZLC	Track 00 LED cathode
9	TZPC	Track 00 phototransistor collector
10	TZPE	Track 00 phototransistor emitter

11	WPA	Write protect LED anode
12	WPC	Write protect LED cathode
13	WPPC	Write protect phototransistor collector
14	WPPE	Write protect phototransistor emitter

2.1.3	LED CURRENT	20 mA
2.1.4	Photosensor voltage (illuminated)	1.0 V max. ($I_c = 250 \mu A$)
2.1.5	Photosensor current (non-illuminated)	45 μA max. (leakage)

2.2 Stepper Motor

- 2.2.1 The disk drive assembly shall include a stepper motor for read/write head positioning. It shall increment four step per track. (2 msec/step)

2-2-2 Nominal voltage 12 VDC — 5 VDC

* 12 VDC shall be held at the common terminal for 25 ms only when moving the phase as a measure for raising temperature.

2-2-3 Winding resistance 110 Ω (BIPOLAR)

2-2-4 Cable connector

2-2-5 PC board connector

2-2-6 Terminal assignment

Pin#	Signal	Description
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	PH3	Phase 3
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	PH1	Phase 1
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	PH4	Phase 4
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	PH2	Phase 2
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2-3 SPINDLE Motor

2-3-1 This drive shall employ a FG motor to rotate the disk at 300 RPM.

2-3-2 Motor specifications

1 Nominal voltage 12 VDC

2 Rotation CCW (as viewed from output shaft side)

3 Torque constant 10 g-cm/mA

2-3-3 Cord Connector

2-4 Read/write Head

- 2-4-1 The disk drive assembly shall include a read/write head capable of reading and writing on a three-inch Compact Floppy Disk.
- 2-4-2 The head should include a center-tapped read/write winding and an erase winding.
- 2-4-3 R/W gap $1.5 \pm 0.3 \mu\text{m}$
- 2-4-4 The head shall have tunnel-erase configuration.
- 2-4-5 Read voltage
- | | | |
|-------------|----|---------------|
| 1. Track 39 | 2F | 1.2 mVp-p min |
| 2. Track 00 | 1F | 3.5 mVp-p max |
- 2-4-6 Write current 3.5 mA o-p
- 2-4-7 Erase current 30 mA o-p

2-4-8 DC resistance

- 1. R/W full coil 45.6Ω ± 3Ω
- 2. Erase coil 5.3Ω ± 0.5Ω

2-4-9 ^dInuctance

- 1. R/W full coil 1.95 mH ± 20% (at 1 kHz)
- 2. Erase coil 48.5 μH ± 20% (at 100 kHz)

2-4-10 Resonance frequency

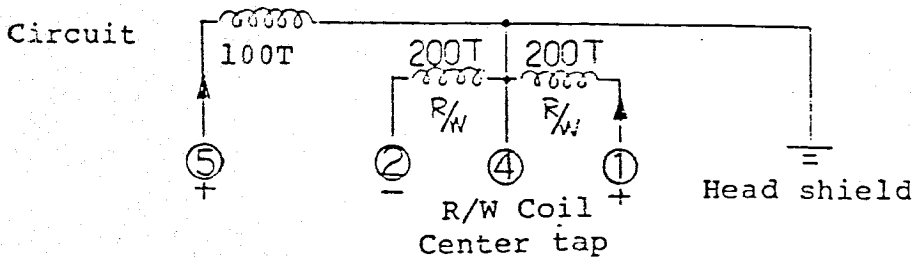
- 1. R/W full coil 400 kHz min

2-4-11 Cable connector Molex 2695-5 (Gold)

2-4-12 PC board connector Molex 7478-5 (Gold)

2-4-13 Terminal assignment

Pin#	Signal	Description
1	RW	R/W coil
2	RW	R/W coil
3		Shield (cable)
4	CT	R/W coil center tap and shield
5	Era	Erase coil



Alignment Specifications

3. Positioning precision

$$R_n = X - \frac{N}{100} \times 25.4 \pm 0.03$$

Rn : Distance from spindle motor center to track center.

X : 32,500

N : 0 — 39

Measuring track: N = 19

Measuring attitude: Lateral and longitudinal

4 Backlash

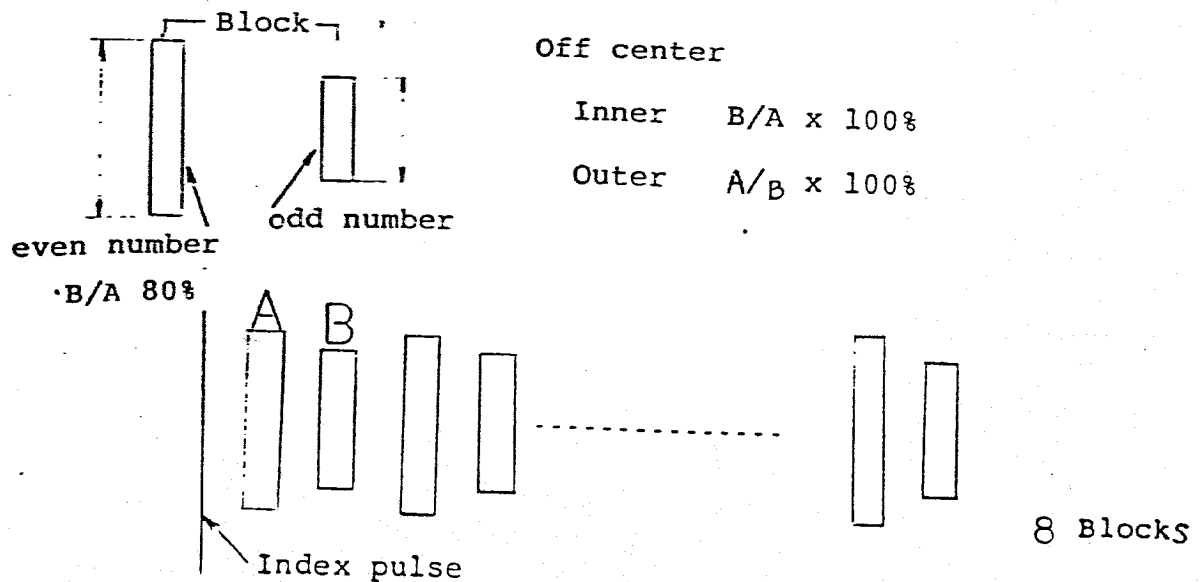
The following specification shall be met.

$$\text{Backlash} = | a - b | \leq 15 \mu\text{m},$$

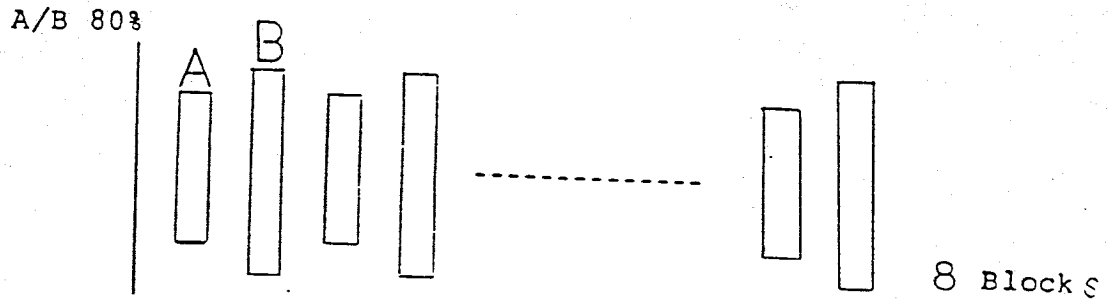
where, a: Amount of deviation with respect to the reference track position when sought to TR19 in the direction away from outer.

b: Amount of deviation with respect to the reference track position when sought to TR19 in the direction away from the inner.

5 . Positioning Sig (Track 19)



10 μm off track in the direction towards the spindle.



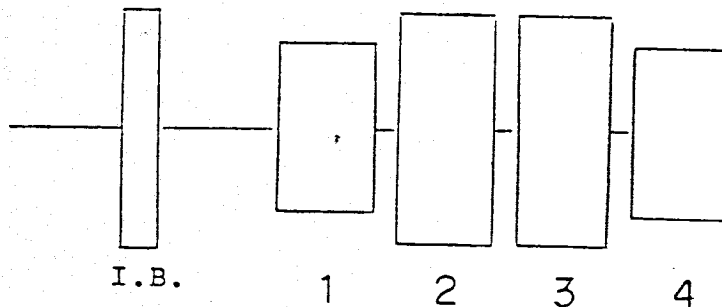
10 μ m off track in the direction away from the spindle.

6. Azimuth

The azimuth at track 39 shall be within 12 minutes of ϕ degree using the following CFD Alignment Disk.

Azimuth Alignment Disk

Track 39 contains the following information:



(Index Burst)

Each burst is written at an angle determined by the deviation from a radial line passing through the center of the written transition as viewed from the recorded side of the disk.

Burst #

1

2

3

4

Angle

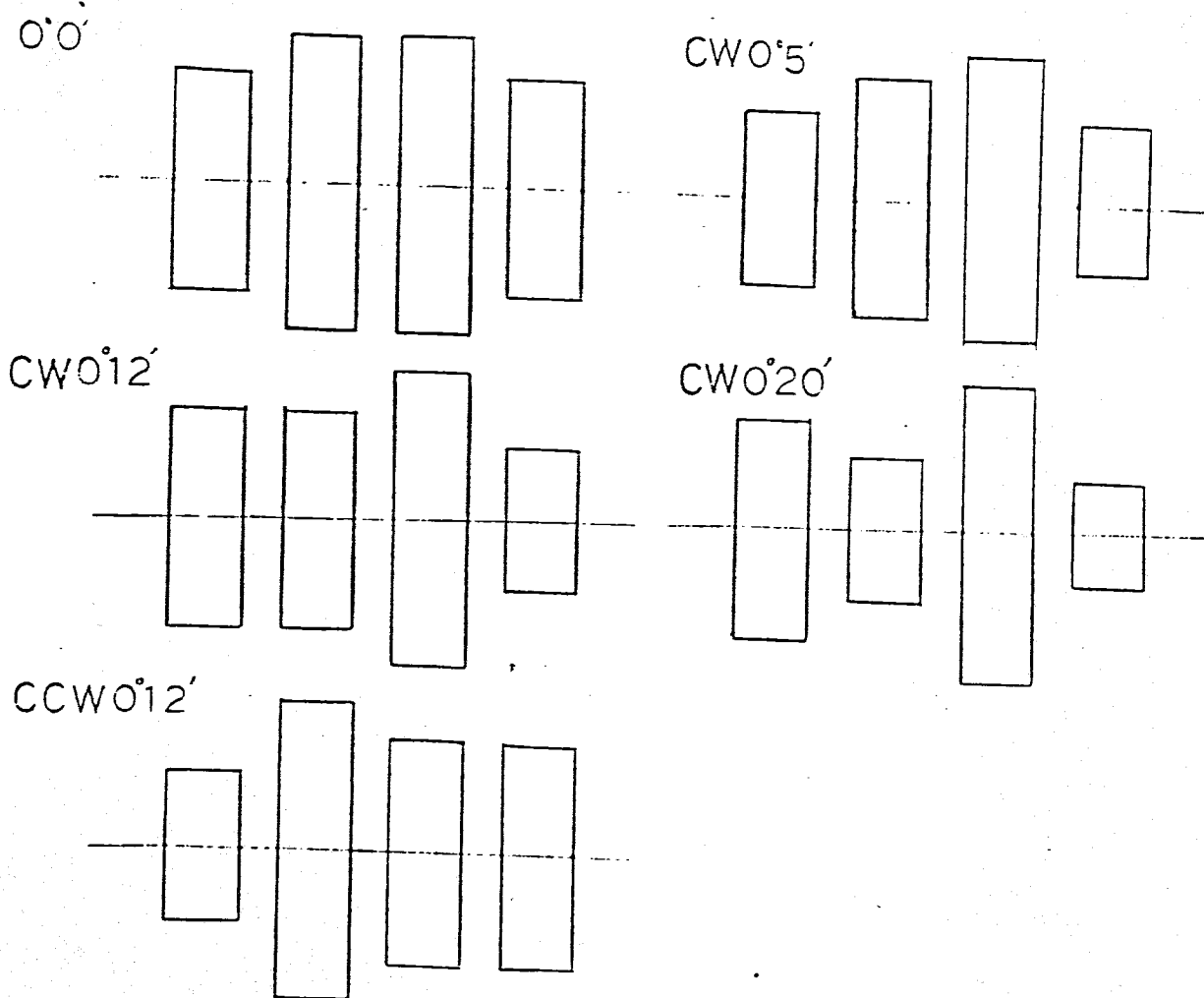
0 72' CW

0 48' CCW

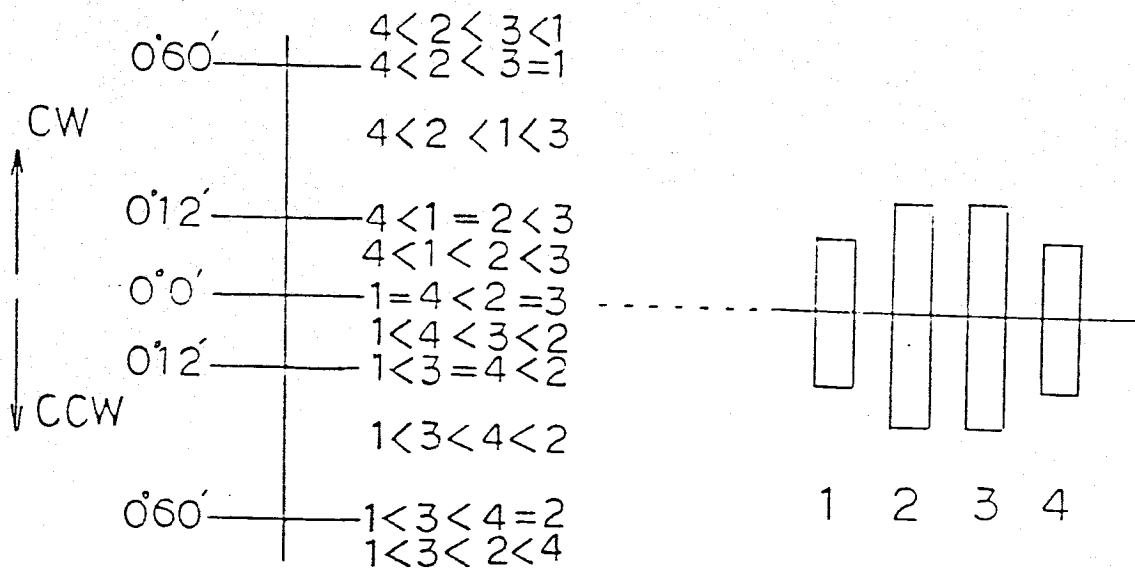
0 48' CCW

0 72' CW

Change in waveform depending upon the head azimuth angle

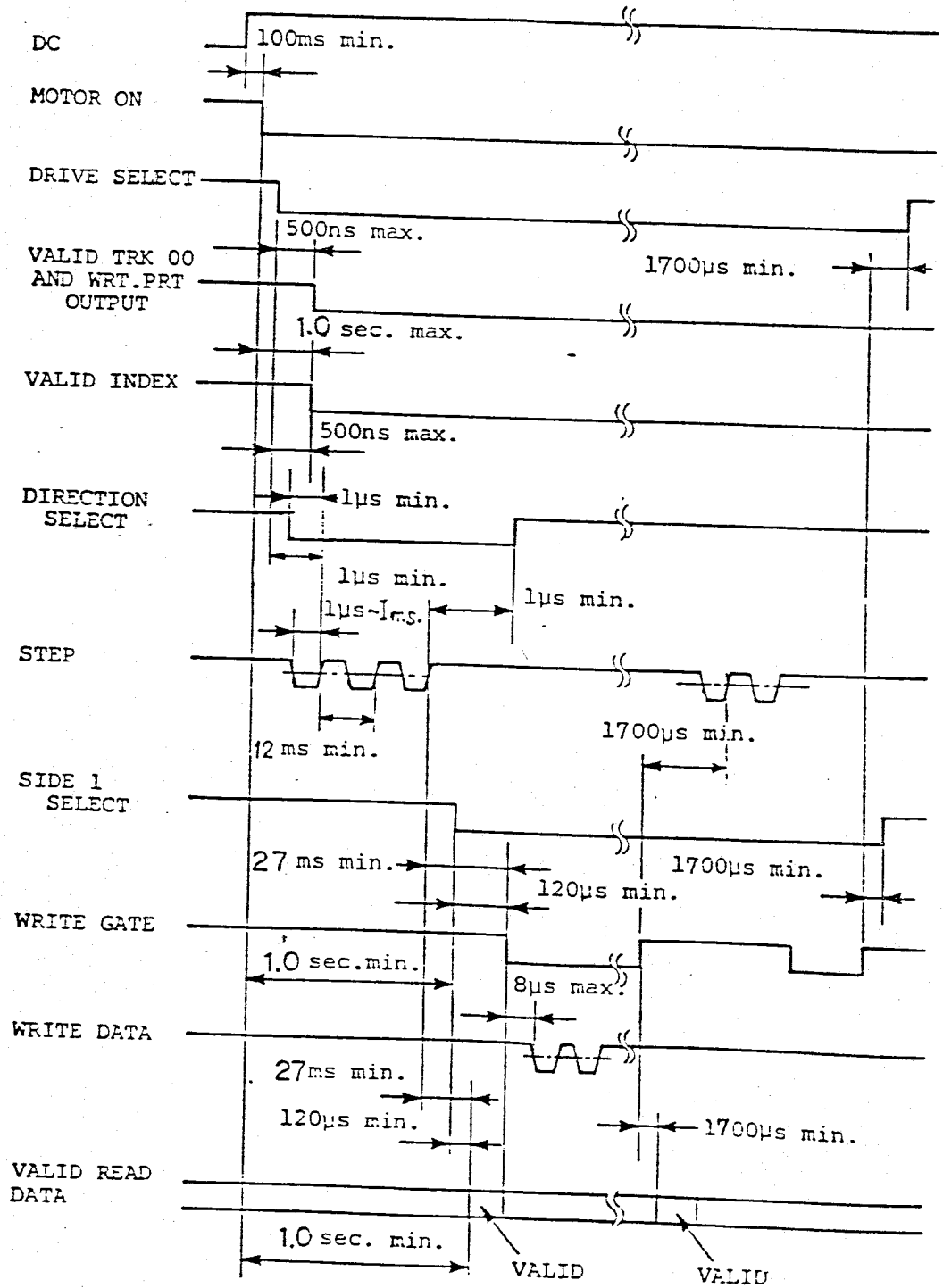


As obvious from the above photos, the relative amplitude of each burst varies as follows depending upon the azimuth angle.



Modulation. After writing a 1F pattern on track 39 of a Compact Floppy Disk, the media is re-lamped five times, and the amplitude of the envelope is measured. The ratio of the minimum value to the maximum value shall not be less than 75%.

7 Timing



Mounting and Drive Dimensions

Mounting is by means of (4) M3 screws located as shown in Figure 11.

Outside Dimensions are: Width : 90 mm $+0.5/-0.5$ mm
Height : 35 mm $+1/-0.5$ mm
Length : 150 mm $+1/-0.5$ mm
Weight : 0.46 kg (1.0 pounds)

Mounting Recommendations

See Figure 10.

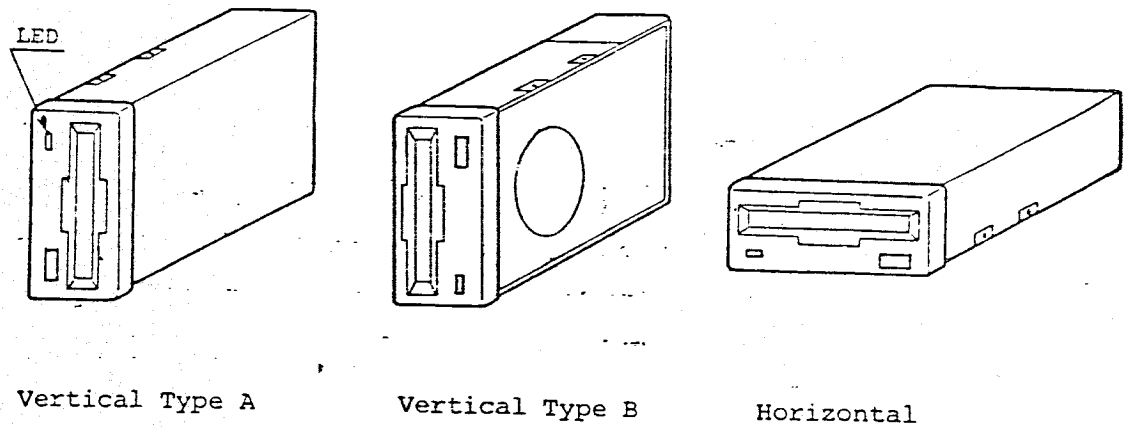
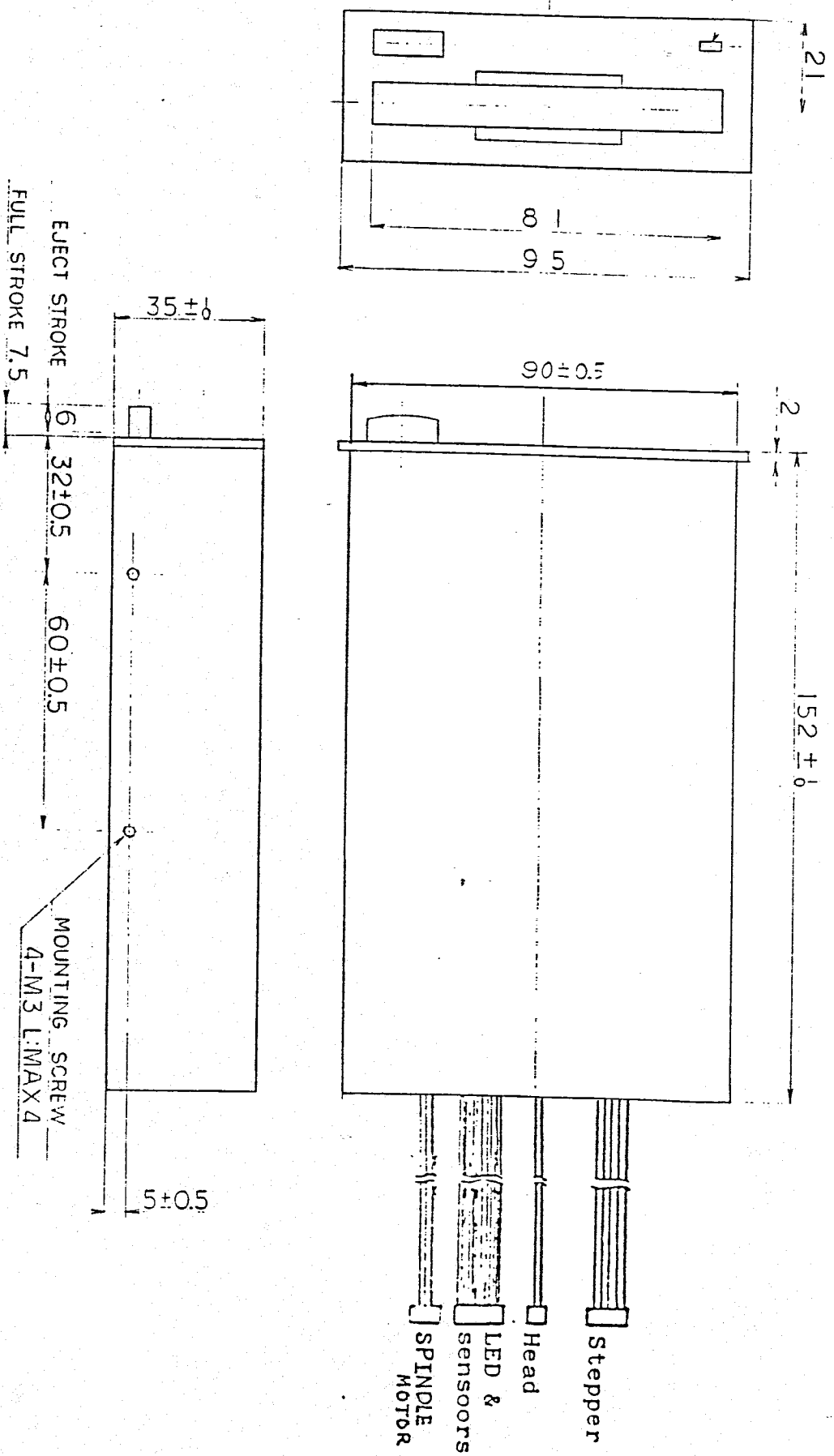


Figure 10. Installation Direction

Dimensional Drawing

IN USE LED



3rd Angle System Unit : mm Drawing Not to Scale