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SPECIFICATIONS
FOR
MAGNETIC CARD READER
Standardization Models
Manual Slide type

Z U - M 1 Series

APR. 1991

ORIGINAL

MATSUSHITA INDUSTRIAL EQUIPMENT CO., LTD.
ELECTRONIC EQUIPMENT DIV.
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Osaka 561, JAPAN

DAN

CONTENTS

1. Introduction	1
2. Product No. System For Standardized Models	2
3. Standard	3
4. Magnetic head Performance	3
5. Out Dimension	4
6. Basic Performance	6
7. Circuit Diagram	8
8. Interface Requirement	8
9. Output Signal	8
10. Output Signal Timing Chart	9
11. Terminal No. Of Connector	9
12. Period Of Guarantee	11
13. Life Of Parts	11
14. Maintenance Method	11
15. Handling Precautions	11
16. Cable (option)	13

INTRODUCTION

This specification applies to the Panasonic magnetic card reader, featuring small size, light weight and high performance.

1. 1 Composition

The magnetic card reader is composed of the mechanical portion, circuits for read.

1. 1. 1 Mechanical portion

The mechanical portion is mainly composed of the following parts.

- (1) Body
- (2) Magnetic head
- (3) Head support

1. 1. 2 Circuit portion

Read amplifier circuits for 1/2/3 tracks

1. 2 Specification

1. 2. 1 Card standard

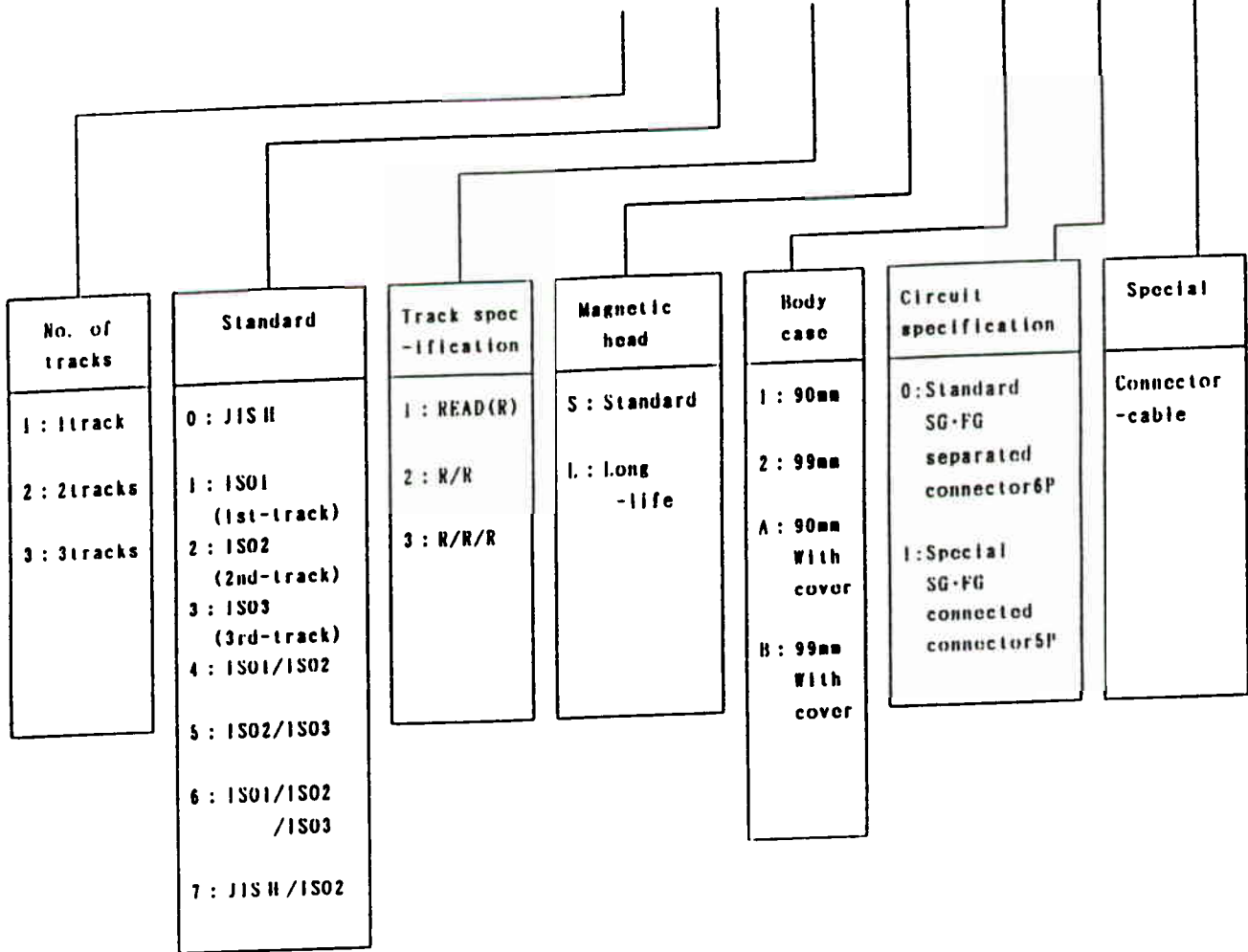
Refer to Magnetic Card Specification

1. 2. 2 Function

- (1) Card feed : One way
- (2) Read/Write : Read only

2. PRODUCT NO. SYSTEM FOR
STANDARDIZED MODELS

1 2 3 4 5 6 7 8 9 10 11 12
Z U — M I

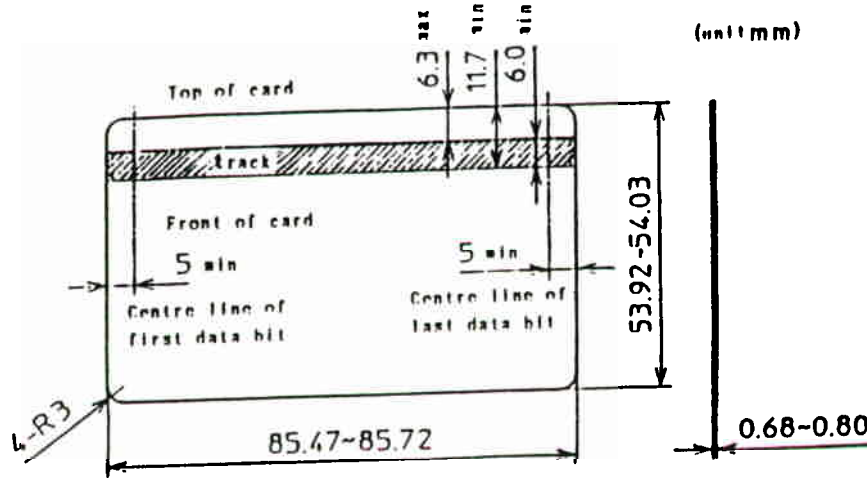


3. STANDARD

3.1 JIS II

(1 Track)

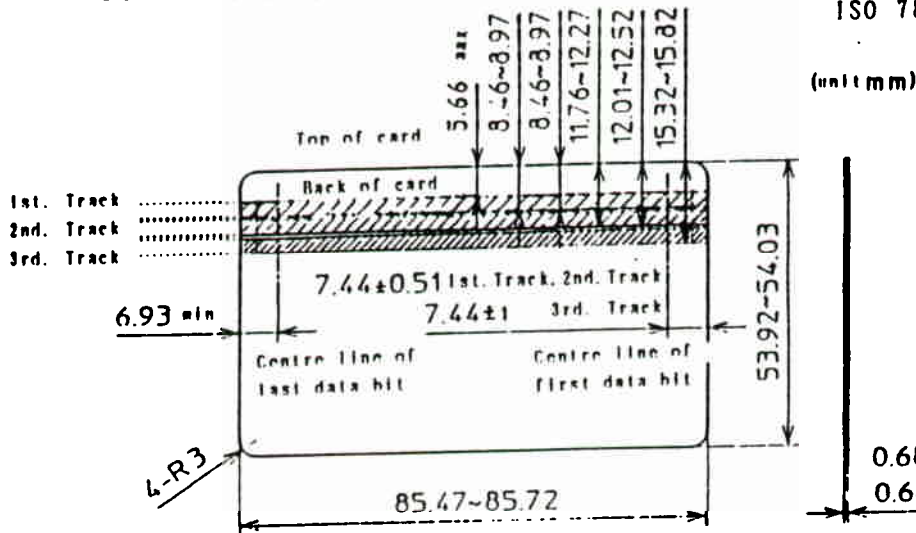
JIS X 6301 II . JIS X 6302 II



3.2 ISO / JIS I (3 Tracks)

JIS X 6301 I . JIS X 6302 I

ISO 7810 . ISO 7811



0.68-0.84 ISO
0.68-0.80 JIS I

3.3 Recording performance

Card Standard	JIS II	ISO / JIS I		
		Track 1st	Track 2nd	Track 3rd
Recording - density	210 BPI	210 BPI	75 BPI	210 BPI
Recording - capacity	72 Characters (8bitcode)	79 Characters (7bitcode)	40 Characters (5bitcode)	107 Characters (5bitcode)
Recording - method	FM	FM	FM	FM

Track 1st ISO 1 (IATA) : International Air Transport Association
 Track 2nd ISO 2 (ABA) : American Bankers Association Standard
 Track 3rd ISO 3 (MINTS) : Mutual Institutions National Transfer

4. MAGNETIC HEAD PERFORMANCE

S : Standard type (Core material: Permalloy) } Channel (width)
 L : Long life type (Core material: Sendust) } 1.5 mm

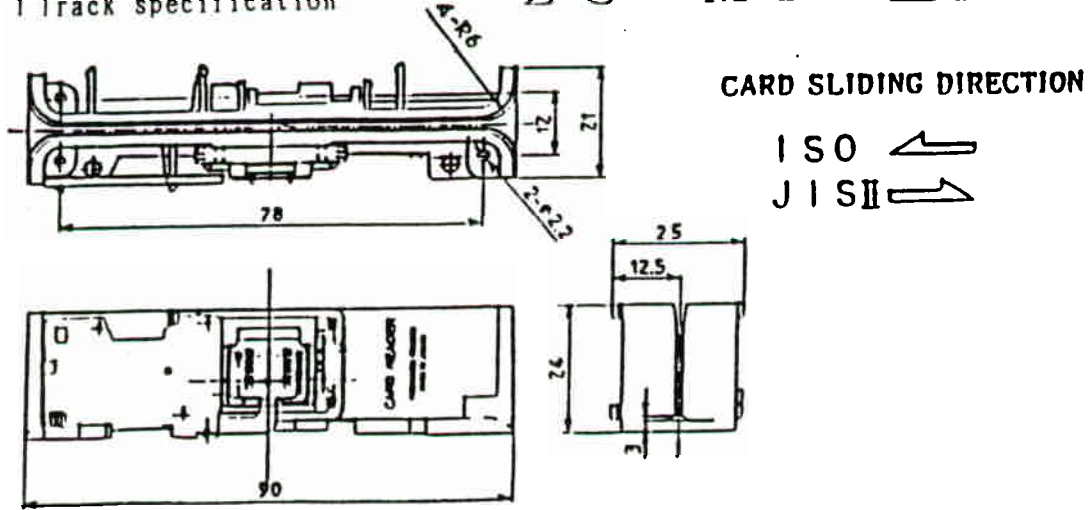
OUT DIMENSION

5. 1 Body length 90mm type (main model)

Z U - M 1 □ □ □ □ 1

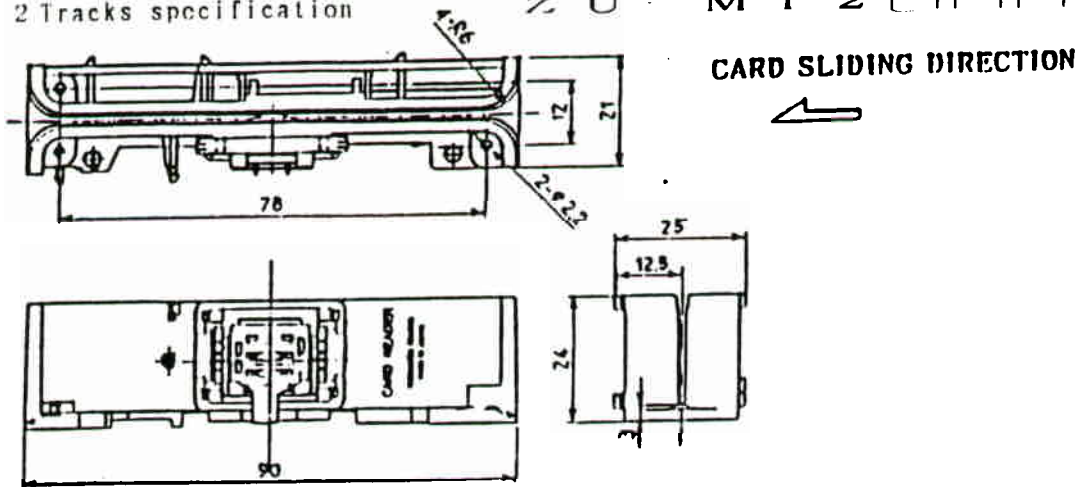
(1) 1 Track specification

Z U - M 1 1 □ □ □ □ 1



(2) 2 Tracks specification

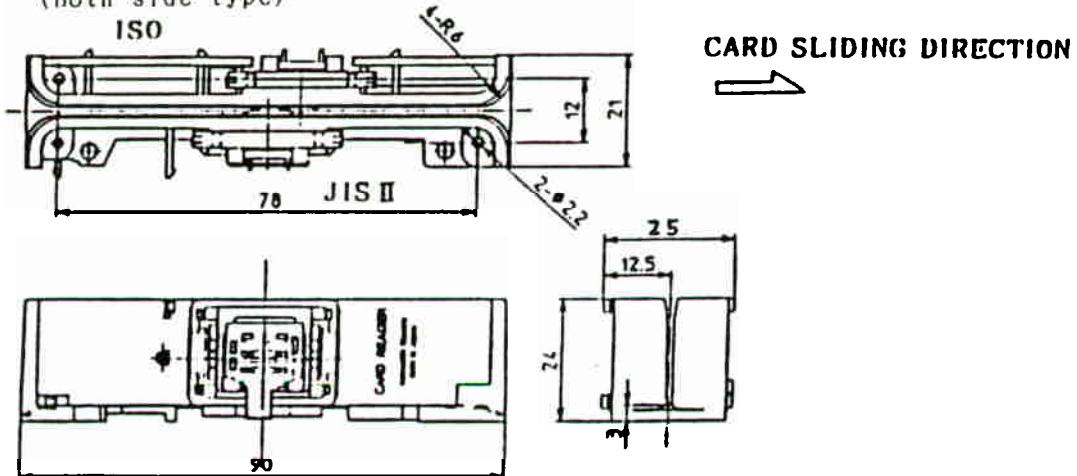
Z U - M 1 2 □ □ □ □ 1



(3) 2 Tracks specification

Z U - M 1 2 7 □ □ □ 1

(Both side type)

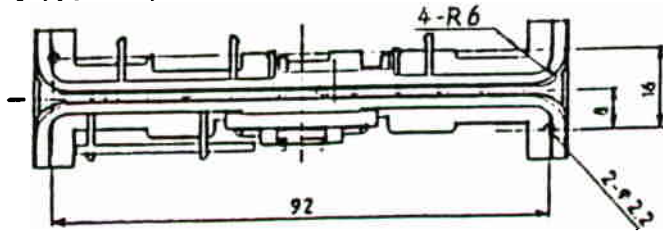


5. 2 Body length 99mm type

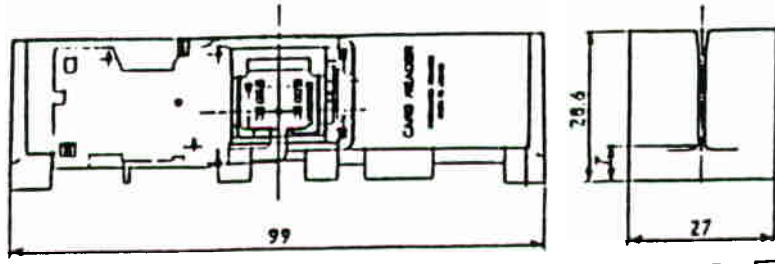
(1) 1Track specification

Z U - M 1 □ □ □ □ 2

Z U - M 1 1 □ □ □ 2 □

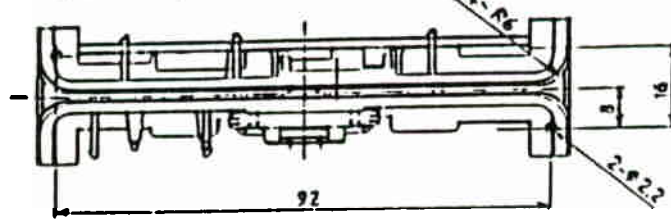


CARD SLIDING DIRECTION
 ISO ←
 JIS II →

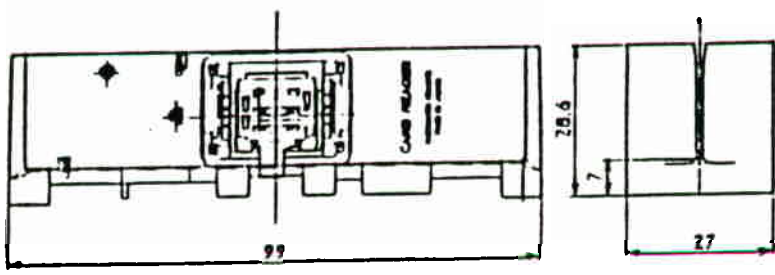


(2) 2Tracks specification

Z U - M 1 2 □ □ □ 2 □



CARD SLIDING DIRECTION
 ←



6. BASIC PERFORMANCE

6. 1 Card operating speed

Model	ZU-M□□□□ 1	ZU-M□□□□ 2
Body Size	90 mm	99 mm
1 Track type	8 ~ 150 cm / s	
2 Tracks type	10 ~ 150 cm / s	
3 Tracks type	10 ~ 120 cm / s	

6. 2 Physical characteristics

Model	ZU-M□□□□ 1	ZU-M□□□□ 2
Body size	90 mm	99 mm
1 Track type 2 Tracks type (Both side)	25mm(W) × 90mm (L) × 24mm(H)	27mm(W) × 99mm (L) × 28.6mm(H)
3 Tracks type	27mm(W) × 90mm (L) × 24mm(H)	27mm(W) × 99mm (L) × 28.6mm(H)
1 Track type	25g	35g
2 Tracks type	28g	38g
3 Tracks type	30g	40g
Both side	33g	—
Supplied voltage	DC5V ± 10%	Lipple (Less than 50mVp-p)
1 Track type	3mA Typ.	
2 Tracks type Both side	6mA Typ.	
3 Tracks type	9mA Typ.	

6. 3 Environment requirements

Model	ZU-M□□□□ 1	ZU-M□□□□ 2
Body size	90 mm	99 mm
Operating Temperature Range	-20 ~ 60°C (No condensation allowed)	
Operating Humidity Range	10 ~ 90%RH (No condensation allowed)	
Storage Temperature Range	-30 ~ 70°C (No condensation allowed)	
Storage Humidity	10 ~ 95%RH (No condensation allowed)	

6. 4 LIFE AND ERROR RATE (at indoor conditions)

Model			ZU-M□□□□ 1	ZU-M□□□□ 2
Body size			90 mm	99 mm
1 Track type	Head	Standard	300,000 times pass	
		Long-life	1,000,000 times pass	
2 Tracks type	Head	Standard	300,000 times pass	
		Long-life	1,000,000 times pass	
3 Tracks type	Head	Standard	300,000 times pass	
		Long-life	1,000,000 times pass	
2 Tracks type Bothside	Head	Standard	300,000 times pass	
		Long-life	1,000,000 times pass	
Error rate			Less than 0.1%	

(Condition) (1) Life

In a clean office room.

In damp or dirty atmosphere, the life may be 1/3 to 1/5 of the above figure.

(2) Error rate

This error rate is obtained when a new normal card (data "1010"...) is horizontally passed at the standard speed (30~60cm/sec.) by manual operation in the clean environment at delivery from our company.

7. CIRCUIT DIAGRAM

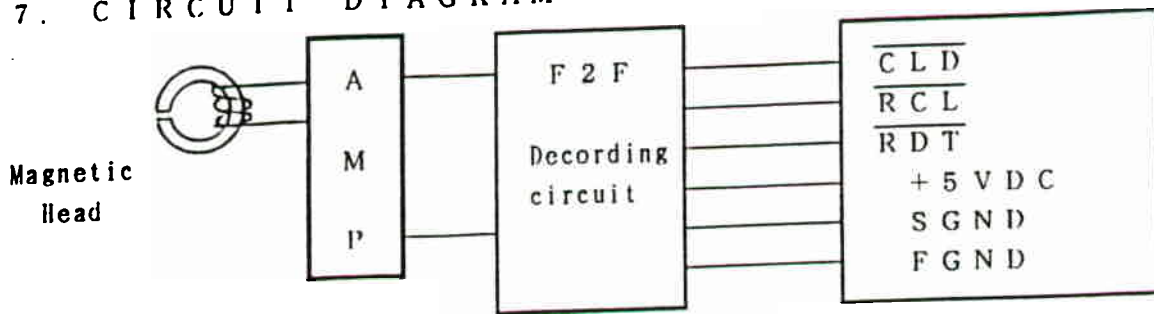


Fig 7.1 Block diagram

8. INTERFACE REQUIREMENT

- (1) Signal Level : TTL level (Used CMOS)
- (2) Signal Logic : Low active
- (3) Connection condition

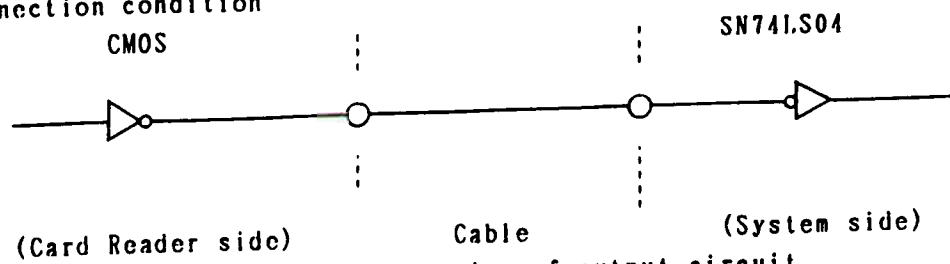


Fig 8.1 Connection of output circuit

- (4) Output voltage

Table 8.1 Output voltage

	Min(V)	Max(V)	Conditions
H level "0"	4.0	V _{cc}	I _{OH} = -1.0mA
L level "1"	-	0.4	I _{OL} = 4.0mA

9. EXPLANATION OF SIGNAL

Input/output signals are \overline{CLD} , \overline{RCL} , \overline{RDT} , SGND, FGND and effective operation Mode for each of these signals shall be "L" level for all.

- (1) \overline{CLD} (CARD LOAD) : The \overline{CLD} line will be Low when a Magnetic Card is running in the Magnetic Card Reader. The \overline{CLD} line will be High when the card is stopped or not present in the card reader.
- (2) \overline{RCL} (READ CLOCK) : This is used to sample the data line by its falling edges. The time relationship of the clock with respect to the other signals is shown in Figure 10.2.
- (3) \overline{RDT} (READ DATA) : At the moment \overline{RCL} change from High to Low; \overline{RDT} is "1" when the \overline{RDT} line is Low, and \overline{RDT} is "0" when the \overline{RDT} line is High.
- (4) SGND : Signal GND
- (5) FGND : Frame GND

10. OUTPUT SIGNAL TIMING CHART

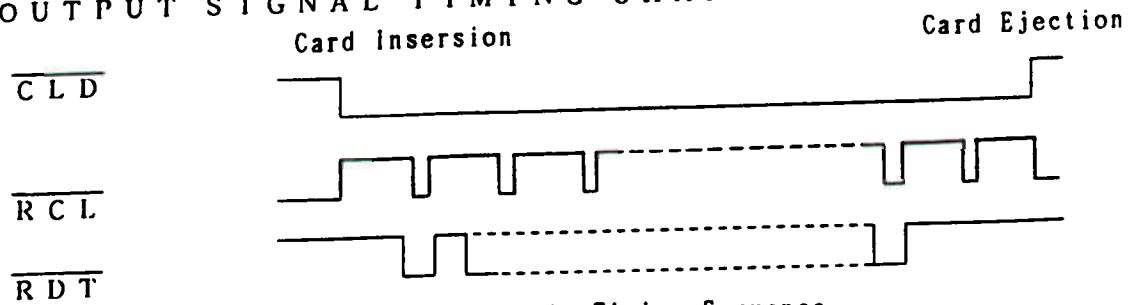


Fig 10.1 Timing Sequence

\overline{RCL} & \overline{RDT} Detail chart

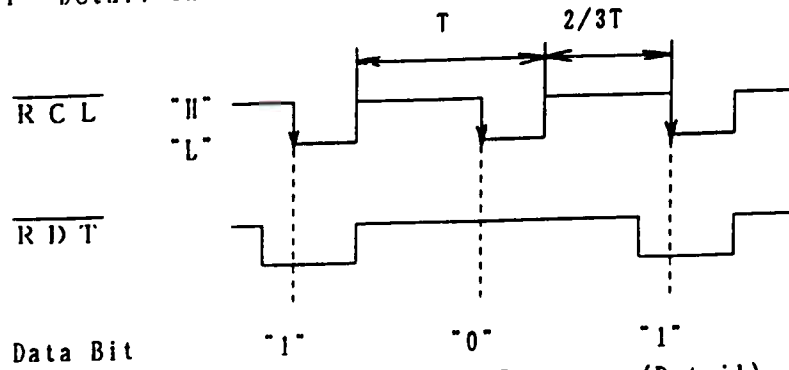


Fig 10.2 Timing Sequence (Detail)

Note) : $T(\text{sec}) = \frac{2.54\text{cm/inch}}{\text{Recording density (BPI)}} \times \frac{1}{\text{Card speed (cm/sec)}}$

11. TERMINAL No. OF CONNECTOR

11.1 1 Track type (Z U - M 1 1)

- (1) Maker : Molex-Japan Co., Ltd.
- (2) Model No. : Connector 53261-0690 (Connecot for PC. Board)
Housing 51021-0600
Terminal 50079-8000

(3) Pin No. & Signal Name

Connec PinNo.	Signal Name
1	FGND
2	SGND
3	+5VDC
4	\overline{RDT}
5	\overline{RCL}
6	\overline{CLD}

1 1. 2 2 Tracks type (Z U - M 1 2)

(1) Maker : Molex-Japan Co., Ltd.

(2) Model No. : Connector 53261-0990 (Connecot for PC. Board)
 Housing 51021-0900
 Terminal 50079-8000

(3) Pin No. & Signal Name

ZU-M1242

Connec- tor PinNo.	Signal Name
1	FGND
2	SGND
3	+5VDC
4	$\overline{\text{RDT}}2$
5	$\overline{\text{RCL}}2$
6	$\overline{\text{CLD}}2$
7	$\overline{\text{RDT}}1$
8	$\overline{\text{RCL}}1$
9	$\overline{\text{CLD}}1$

ZU-M1252

Connec- tor PinNo.	Signal Name
1	FGND
2	SGND
3	+5VDC
4	$\overline{\text{RDT}}2$
5	$\overline{\text{RCL}}2$
6	$\overline{\text{CLD}}2$
7	$\overline{\text{RDT}}3$
8	$\overline{\text{RCL}}3$
9	$\overline{\text{CLD}}3$

ZU-M1272

Connec- tor PinNo.	Signal Name
1	FGND
2	SGND
3	+5VDC
4	$\overline{\text{RDT}}2$
5	$\overline{\text{RCL}}2$
6	$\overline{\text{CLD}}2$
7	$\overline{\text{RDT}}$
8	$\overline{\text{RCL}}$
9	$\overline{\text{CLD}}$

$\overline{\text{CLD}}\square$, $\overline{\text{RCL}}\square$, $\overline{\text{RDT}}\square$

...None : JIS II

1 : ISO/JIS I Track 1st Specification

2 : ISO/JIS I Track 2nd Specification

3 : ISO/JIS I Track 3rd Specification

1 2. PERIOD OF GUARANTEE

If defects should occur within one year after acceptance inspection of the machine due to improper material or workmanship, the defective parts shall be replaced or repaired, free of charge.

1 3. LIFE OF PARTS

Magnetic head: 300,000 passes (*1: 1 Track Magnetic Head
standard type)
1,000,000 passes (*2: 2 or 3 Tracks Magnetic Head
standard type)
(*3: 1 Track Magnetic Head
Long life type)

* Condition In a clean office room.
In damp or dusty atmosphere, the life may be
1/3 to 1/5.

1 4. MAINTENANCE METHOD

When replacing parts, exchange the card reader unit.

1 5. HANDLING PRECAUTIONS

1 5. 1 MOUNTING METHOD

- (1) Mount on a flat surface, with due care not to apply excessive force on the card reader main body.
- (2) When mounting on the equipment, take due care so that faces of the constructive device except for the attaching face shall not contact the flexible printed circuit board.
- (3) The controllability is most stable when installed so that the card may run in the vertical direction.
- (4) The controllability will be further stabilized when card guide plates are installed before and after the card running part of the card reader.

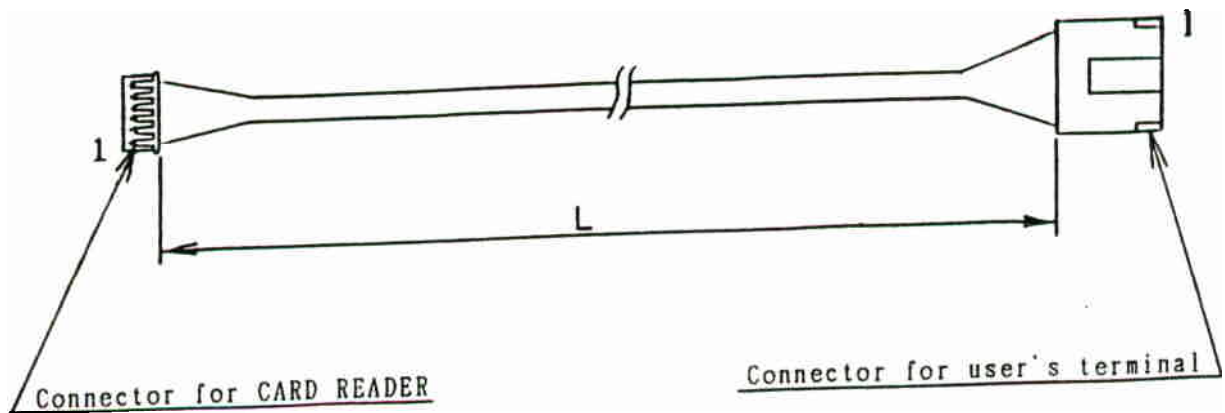
1 5. 2 HANDLING METHOD

- (1) Since the reading performance depends on the card inserting direction, insert correctly in the specified direction. The inserting direction is specified in the outline drawing of the specification.
If the card is inserted obliquely, the contact of the card and magnetic head is poor, and it may lead to reading error.
- (2) When inserting the card, the card hits against the head and the action may be dull only for a moment to cause reading error. It must be noted that this phenomenon is likely to occur when the card is inserted slowly.
- (3) As for card running speed, manipulate within specified speed range. It may result in an error if card operation is interrupted or extremely accelerated or decelerated. A stable card handling speed by man is usually 30 to 60 cm/sec.

1 5. 3 CAUTIONS

- (1) Use specified card. (JIS ISO)
Use the card with the coercive force of 650 Oe for JIS type II, or 300 Oe for ISO.
- (2) Store the card carefully so as not to soil, injure or deform it.
In particular, deposit of solid matter on the magnetic stripe surface may result in a trouble.
- (3) To prevent wear of the magnetic head, clean the head by periodically passing a cleaning card.
For example, in a clean office room, pass the cleaning card about once a week. If the magnetic head is heavily stained, clean the head by soaking the felt part of the cleaning card in alcohol properly.
(Example of cleaning card)
C-103 of Tokyo Magnetic Printing
(life: 100 to 200 passes)
- (4) When installing the card reader, avoid dusty, hot or damp place, or near magnetic field or object generating inductive noise (printer, LED display unit, CRT, etc.).
Do not use in a place exposed to direct sunlight.
- (5) When storing, pay attention to dust, heat, humidity and other environmental conditions.
- (6) Do not touch the printed circuit board with bare hand.
Note particularly static electricity.
- (7) Do not touch the flexible printed circuit board with hands.
- (8) Do not supply power from other outlet than connector.
Pay special attention to the polarity of power source and wrong connection of connector.
- (9) Check the noise, static electricity, etc., with the card reader being incorporated in the equipment.

16. Cable (option)



16.1 Cable No.

	L = 100mm	L = 200mm	L = 300mm
Cable for 1 track type	J-1L-06A100	J-1L-06A200	J-1L-06A300
Cable for 2 tracks type	J-1L-09A100	J-1L-09A200	J-1L-09A300
Cable for 3 tracks type	J-1L-12A100	J-1L-12A200	J-1L-12A300

Note) Refer to explanation of special specifications as to covered cable specifications.

16.2 Connector for user's terminal

(1) Maker : J A E

(2) Model No.

	1 track type	2 tracks type	3 tracks type
Connector (User's terminal)	1L-6P-S3EN2	1L-9P-S3EN2	1L-12P-S3EN2
Housing	1L-6S-S3L-(N)	1L-9S-S3L-(N)	1L-12S-S3L-(N)
Terminal	1L-C2	1L-C2	1L-C2

(3) Pin No. and signal name

for ZU-M11□□□

Connec-tor PinNo.	Signal Name
1	\overline{CLD}
2	\overline{RCL}
3	\overline{RDT}
4	+5VDC
5	SGND
6	FGND

for ZU-M1242□□

Connec-tor PinNo.	Signal Name
1	$\overline{CLD1}$
2	$\overline{RCL1}$
3	$\overline{RDT1}$
4	$\overline{CLD2}$
5	$\overline{RCL2}$
6	$\overline{RDT2}$
7	+5VDC
8	SGND
9	FGND

for ZU-M1252□□

Connec-tor PinNo.	Signal Name
1	$\overline{CLD3}$
2	$\overline{RCL3}$
3	$\overline{RDT3}$
4	$\overline{CLD2}$
5	$\overline{RCL2}$
6	$\overline{RDT2}$
7	+5VDC
8	SGND
9	FGND

for ZU-M1272□□

Connec-tor PinNo.	Signal Name
1	\overline{CLD}
2	\overline{RCL}
3	\overline{RDT}
4	$\overline{CLD2}$
5	$\overline{RCL2}$
6	$\overline{RDT2}$
7	+5VDC
8	SGND
9	FGND