

Section 1

Specification of Omron Motor Driven Magnetic/IC Card Reader/Writer type 3S4YR-MKW.

1.	Product Description and Model	2
2.	Outline of Capabilities	2
3.	machine Specification	4
4.	Interface Circuit	6
5.	Required Power Specifications	7
6.	Functional Diagram of Machine	7
7.	Ambient Conditions	8
8.	Resistance to Vibration and Shock	8
9.	Machine Life and Reliability	8
10.	Explanation of Signals	9
11.	Connector Pin Assignment	15
12.	Timing Charts	16

Attached Figures & Tables

IC Card Figure	21
Block Diagram (for full function)	22
Outline Dimensions Drawings	24
Electrical Device Layout Drawing	25

1. Product description and model

Description	Motor driven type magnetic/IC card reader
Model	3S4YR-MKW series

2. Outline of capabilities

1) For machine compatible with magnetic cards

- | | | |
|---|---|--|
| (1) Read direction | Read can be made in both forward and reverse transfer directions.
* Can read from each track simultaneously. | |
| (2) Write direction | Write should be made in forward transfer direction only
* Can write to each track simultaneously. | |
| (3) Write-pulse generation | In synchronous with motor rotation | |
| (4) STX write start signal | Output to interface by internal generation circuit. | |
| (5) Ability to write and to read from magnetic tracks | Applicable to all cards specified in ISO 7810 "ID-1" | Designation required at time of ordering.
See (Note 1) on page 2. |

2) For machine compatible with IC cards (optional)

(1) Applicable IC cards

- | | | |
|--|--|--|
| Card size | ISO 7810 "ID-1" type | |
| Contact location | One of the three location shown in Figures 2 and 3 of ISO 7816/2 | Locations:
Designation required at time of ordering |
| (2) IC card contact under-hold-down signal | Echo signal representing "contact is being held down" is provided. | |
| (3) Ability to add IC card capabilities on customer's part | By adding main PCB (if necessary) assembly unit and changing main PCB. | Another order needs to be placed specifying contact location.
(Mountable by customer) |

3) Common items

- | | |
|--------------------------|-----------------------------------|
| (1) Card transfer method | Motor-driven and belt-transferred |
|--------------------------|-----------------------------------|

- | | | |
|--|--|--|
| (2) Card transfer and read/write | Externally controlled | How to use given in this Specification. See Notes and explanations on control method |
| (3) Direction of machine installation (optional) | Stripe up/Stripe down | Designation required at time of ordering. Either direction is possible by changing components on customer's part. (Another order needs to be placed) |
| (4) Card position detection sensor | Number of sensors provided for N version
For model available to IC card: PC/PD/JD/BD/UD version | |
| (5) Compatibility with MM sensor card | MM sensor unit can be installed by customer. | Designation required at time of ordering. Associated components need to be ordered. |
| (6) Compatibility with out-of-specification card thickness | 0.2mm thickness is applicable by changing components. | Card thickness can be designated at time of ordering. Components can be changed by customer. |
- (OPT. GROUP: A) See Note 2.
- | | | |
|--------------------------------------|--|--|
| (1) Gate shutter | Provided with anti-pullback method. | |
| (2) Closed-shutter detection sensor | Provided with sensor for detection of shutter blade operation. | |
| (3) Magnetic-stripe detection | Track 2 position is defined as standard position. | |
| (4) Card width detection microswitch | Provided at card insertion slit entrance as standard. | Can be used as sensor to monitor card for insertion and removal. |
- (Note 1) "Designation required at time of ordering" means the item concerned is at factory's option.
- (Note 2) "OPT. GROUP: A" Partial provision of items in this group cannot be designated.

3. Machine specifications

- 1) Weight
- | | |
|-----------------------|----------|
| Main body: | 1,350 g |
| Shutter unit: | 350 g |
| IC contact assembly: | 200 g |
| (When fully equipped: | 1,900 g) |

2) External dimensions

	H (mm)	W (mm)	D (mm)	
With shutter unit	92	105.3	247	
Without shutter unit				
* With stripe at bottom	92	98	222	See Fig. 3 outline drawing.
* With stripe at top	92	101	222	

- 3) Applicable card ISO 7810 "ID-1" type magnetic/IC card
- 4) Card transfer speed Within 200 mm/sec $\pm 10\%$ (Standard specification)
- 5) Recording method By F2F modulation, to ISO 7811/2 "Two frequency coherent phase recording"

6) Recording-density variation range (Ranges to ISO specification)	For data "0"		For data "1"
	Track 1:	Track 3:	Track 2:
	(210BPI) $0.121 \pm 0.012 \text{ mm} (\pm 10\%)$	ditto	$0.060 \pm 0.006 \text{ mm} (\pm 10\%)$
	(75BPI) $0.339 \pm 0.017 \text{ mm} (\pm 5\%)$	ditto	$0.170 \pm 0.0085 \text{ mm} (\pm 5\%)$

- 7) Magnetic head
- | | |
|-------------------|------|
| Write core width: | 3 mm |
| Read core width: | 1 mm |
- 8) Allowable degree of card deformation
- | | |
|-----------------|--------------------------------------|
| Magnetic cards: | 3 mm (including card thickness) |
| IC cards: | 2 mm max. (including card thickness) |
- 9) Contact location of applicable IC card
- One of following three locations
- * US type card contact location:
See Figure 2 of ISO 7816/2.
 - * BULL type card contact location:
See Figure 3 of ISO 7816/2.
 - * Japan type card contact location:
See Figure 2 of ISO 7816/2.

- 10) Write-pulse frequency Tracks 1 and 3: 1,654 Hz nominal
(card transfer speed = 200mm/sec)
Track 2: 591 Hz nominal
(ditto)
- 11) Regeneration bit Tracks 1 and 3: 605 μ sec. nominal
internal (ditto)
Track 2: 1,694 μ sec. nominal
(ditto)
- 12) Installation/connection conditions
- (1) Installation conditions
- a. Installation frame and card reader frame should be connected through FG wire.
 - b. Installation environment: Products for indoor equipment.
 - c. Installation should be accomplished so that PCBs and transfer mechanism are not damaged by other machines and structures.
- (2) Connection conditions
- a. Output signal from card reader should be interfaced through CMOS circuit.
 - b. Interface cable should be ribbon cable type with wire diameter of over AWG 28 (including AWG28).
- 13) Mechanical noise generation Within 60 dBA
- 14) Insulation resistance 10 M Ω or more, as measured with 250 VDC megger between all interface connectors collectively and card reader frame.
- 15) Dielectric strength 250 VDC for one minute, as measured between all interface connectors collectively and card reader frame.

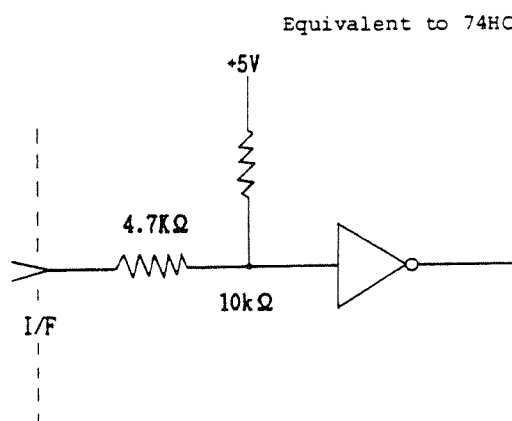
16) Interface connector

	Card reader	Controller	Note
For mag. card	3433-5302JL	3425-6550EL	2X25=50pin 3M
For IC card	3408-5302JL	3452-6516EL	2X8=16pin 3M

Long crimp latch, One slot

4. Interface circuit

- 1) Logic level Low active
- 2) For dealing with magnetic cards
 - (1) Input circuit



Used for power lines.

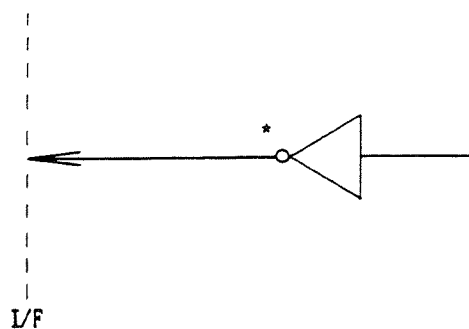
Signals: MRV, MFW, ISOL,
IMSL and ISOL

* HC14 I/F:

Used for all systems
except above power lines.

(2) Output circuit

* : TTL with open collector, equivalent to 74 LS06



- 2) For dealing with IC cards From interface connector through IC card terminals

5. Required power specifications

	Name of signal	method
1) For motor/ solenoid drive	P24 POV	Voltage: 24 VDC \pm 10% (Ripple: 2.4 V _{p-p} or less) Current: At motor startup: 1,700 mA or less (within 100 msec) : Insertion slit shutter opening: 320 mA max. 320 mA max. : IC card header drive: 200 mA max.
2) For amplifier	+24V +0V	Voltage: 24 VDC \pm 10% (Ripple: 240mV _{p-p} or less) Current: 260 mA or less at time of writing to all tracks.
3) For logical operation	+5V +0V	Voltage: 5V \pm 5% (Ripple: 50mV _{p-p} or less) Current: 330 mA or less
	(Note 1)	When "P24V" and "+24V" are supplied from a single power supply, the sum of both currents should apply and ripple should meet specification for "+24V."
	(Note 2)	For machine compatible with IC cards, "+5V" and "0V" should be supplied to both CN1 and CN2 connectors.

6. Functional diagram of machine See Fig. 2

7. Ambient conditions

Temperature and humidity	Operating temperature range:	-5 to +55°C
	Operating humidity range:	30 to 85% RH, without dew condensation
	Storage temperature range:	-25 to +70°C
	Storage humidity range:	20 to 90% RH, without dew condensation

8. Resistance to vibration and shock

1) Vibration resistance

Standby vibration 10 to 50 Hz/minute, within 2 mm in double amplitude, for 30 minutes in vertical, transverse, or front-to-back directions.

Operating vibration 5 to 55 Hz/minute, within 0.5 G or less
in acceleration

2) Shock resistance

30 G max. 3 times or less, in vertical, transverse or front-to-back directions.

9. Machine life and reliability (when in continuous service in room)

1) 1,200,000 passes or more

1 pass denotes 1 card pass under the magnetic head.

2) Reliability

(1) Bit error ratio at time of magnetic card read and write
: 1/1,000,000 bits or less

(2) Error rate for IC card contact reliability
: 1/1,000 or less (including repetitions of card
insertion, contacting, data send/receive and
card ejection)

10. Explanations of signals

1) For magnetic cards

(1) Input signals (controller → card reader)

Name of signal	Explanation	Option or standard	Supplementary															
CNTn	Designates which mode to engage (Read or write) for each track of card reader. n = 1: Track 1 n = 2: Track 2 n = 3: Track 3 n = 4: JIS track	Provided differently for each model.	Can designate read or write made for all tracks simultaneously. L: Write mode H: Read mode															
WDTn	Data to be written to each track of magnetic card * Effective when CNTn signal has brought corresponding track in write mode. n = 1: n = 2: Ditto n = 3: n = 4: * WDTn should be input in sync fall rise of WCPn and be held it until fall of next WCPn.	Provided differently for each model.	L: Data "1" H: Data "0" See timing chart No. 2. See timing chart No. 3.															
MFW	Instruction to cause forward rotation of card transfer motor.	Provided as standard.	Forward card transfer direction: Direction in which card is accepted. Reverse card transfer direction: Direction of card ejection.															
MRV	Instruction to cause reverse rotation of card transfer motor.	Provided as standard.																
Truth table for transfer motor control modes																		
<table><tr><th>Mode</th><th>MFW</th><th>MRV</th></tr><tr><td>Forward transfer</td><td>L</td><td>H</td></tr><tr><td>Reverse transfer</td><td>H</td><td>L</td></tr><tr><td>Stop (brake)</td><td>L</td><td>L</td></tr><tr><td>Stop (brake)</td><td>H</td><td>H</td></tr></table>				Mode	MFW	MRV	Forward transfer	L	H	Reverse transfer	H	L	Stop (brake)	L	L	Stop (brake)	H	H
Mode	MFW	MRV																
Forward transfer	L	H																
Reverse transfer	H	L																
Stop (brake)	L	L																
Stop (brake)	H	H																

(Note) At time of changeover between forward and reverse rotation of, a stop time of 100 msec min. should be allowed.

Name of signal	Explanation	Option or standard	Supplementary
SOL1	Instruction to drive solenoid for card insertion slit shutter.	Option	L: Open shutter H: Close shutter
WEN	Watermark read circuit enable or disable. Watermark and ISO track can not be read simultaneously.	Option	L: Enable H: Disable

(2) Output signals (card reader → controller)

RCPn	Clock signal for reading corresponding track of magnetic card. Data (RDPn) should be received upon fall of RCPn. n = 1: n = 2: Ditto n = 3: n = 4: n = 5: Watermark track	Provided differently for each model.	See timing chart No. 1.
RDPn	Data signal for demodulation of F2F of corresponding track of magnetic card. n = 1: n = 2: Ditto n = 3: n = 4: n = 5: Watermark track	Provided differently for each model.	RCPn + × RDPn "H" = Data "0" RCPn + × RDPn "L" = Data "1"
WCPn	Sync pulse for writing of data to magnetic card. WCP1: For tracks 1 and 3 (for 210BPI) WCP2: For track 2 (for 75BPI) * One period of WCPn corresponds to a single bit length for data "0" on corresponding track of magnetic card.	Provided differently for each model.	One period of WCP1= 121 μm (theoretical value) One period of WCP2= 339 μm (theoretical value) * Travel distance of card can be known by counting WCPn.

Name of signal	Explanation	Option or standard	Supplementary
STW	<p>Sync signal for starting write of "STX code's first bit"</p> <p>* Shows that magnetic card has reached position at which to start writing "STX code's first bit."</p> <p>(Note) WDTn should start to be sent upon first fall of WCPn (for corresponding track of magnetic card) after receipt of STW.</p>	Option	<p>L+: Position at which to start writing STX code has been reached.</p> <p>L : Card is being passing S2 photo sensor</p> <p>H : Card is not positioned over S2 photo sensor.</p> <p>See timing chart No. 3</p>
S0	<p>Card position photo sensor</p> <p>* Position 25 mm in front of S1</p>	Option	Contact hold-down position for US type IC card
S1	<p>Ditto</p> <p>* Position 70 mm in front of S2</p>	Provided as standard	<p>(Note)</p> <p>When IC card is involved card stop should be sensed upon arrival at specified position.</p>
S2	<p>Ditto</p> <p>* Same position as that of magnetic head</p>	Provided as standard	L: Card is present over sensor.
S3	<p>Ditto</p> <p>* Position 70 mm behind S2</p>	Provided as standard	H: Card is not present over sensor.
S4	<p>Ditto</p> <p>* Position 25 mm behind S3</p>	Option	<p>Contact hold-down position for BULL type IC card</p> <p>(Note)</p> <p>When IC card is involved card stop should be sensed upon arrival at specified position. Sensor arrangement: See drawing provided separately.</p>

Name of signal	Explanation	Option or standard	Supplementary
SHD	Output signal from magnetic head for magnetic card detection * Shows magnetic card has been inserted into insertion slit. * Track 2 position is taken as standard position.	Option	L: Magnetic card present. H: No magnetic card is present.
SHE	Shows insertion slit shutter is closed. (Note) Because of shutter blade bounce, closed state is stabilized 350 msec. after release of SOL1 signal.	Option	L: Shutter is closed H: Shutter is not closed. See timing chart.
WID	Output signal from microswitch for detection of card at insertion slit.	Option	L: Card width is present. H: Card width is absent. Located at frontmost position of insertion slit, this microswitch can be used to monitor card insertion and removal.
WDV	Watermark card data valid.	Option	L: WM card passing mag. head H: Abnormal WM card passing mag. head

2) For IC cards

Following signals are provided as standard when machine is compatible

Name of signal	Explanation	Option or standard	Input or Output	Supplementary
IVCC	Extension line from IC card's VCC terminal * IC card location: C1 (to ISO 7816/2)	Standard	* Applicable IC card's power ON/OFF sequence should be followed. * Applicable IC card's I/F specification should be complied with.
IRST	Extension line from IC card's RESET terminal. Location: C2	Standard	Input	Ditto
ICIO	Extension line from IC card's INPUT/OUTPUT terminal. Location: C7	"	Output	Ditto
IGND	Extension line from IC card's GROUND terminal. Location: C5	"	Ditto
IVPP	Extension line from IC card's PROGRAM terminal. Location: C6	"	Input	Ditto
ICLK	Extension line from IC card's CLOCK terminal. Location: C3	"	Input	Ditto
IRS1	Extension line from IC card's RESERVE terminal 1. Location: C4	"	Reserve
IRS2	Extension line from IC card's RESERVE 2 terminal. Location: C8	"	Reserve
ISOL	Signal for energizing IC card contact hold-down solenoid (Note) Contact should not be held down for more than 10 minutes in a row.	"	Input	L: Solenoid is energized (contact is held down) H: Contact hold-down solenoid is released.
IECO	Signal for operating mechanism (IC contact mechanism) in response to ISOL signal.	Option	Output	L: Contact is being held down. H: Contact is not being held down.

Name of signal	Explanation	Option or standard	Input or Output	Supplementary
INSL	<p>Instruction to decelerate IC card transfer speed for stopping it at specified position.</p> <p>* Causing IMSL to go "L" during IC card transfer in forward/reverse direction stops the card at IC contact hold down position (S0/S4= specified position).</p> <p>* Change to low speed should be effected through stop state (100 msec. min.).</p> <p>* Upon arrival of IC card at specified position at low speed, internal circuit automatically stops transfer, bringing motor into temporary stop state.</p> <p>(Note) After IC card has been found through software to arrive at specified position. Change to complete motor stop state should be effected by MFW or MRV signal.</p>	Standard	Input	<p>See timing chart.</p> <p>Decision about arrival at specified position should be made based on state of photosensor (S0/S4).</p>

Truth table for transfer motor control modes
(when IC card is involved)

	IMSL	MFW	MRV	Note
High-speed, forward transfer	H	L	H	
Low-speed forward transfer	L	L	H	Note *1
High-speed reverse transfer	H	H	L	
Low-speed reverse transfer	L	H	L	Note *2
Stop (brake)	X	H	H	
	X	L	L	

Note *1: BULL/JPN type IC card stops at position S4 after change is made to low speed.

Note *2: US type IC card stops at position S0 after change is made to low speed.

X : Don't care

High speed: Card transfer speed to specification

Low speed : 50mm/sec, TYP.

11. Connector pin assignment

1) Connectors for machine compatible with magnetic cards

"CN1" signal assignment

	PIN	Signal	PIN	Signal
Protruded ♦	1	+5V	2	+5V
	3	0V	4	0V
	5	P24V	6	P24V
	7	POV	8	POV
	9	MFV	10	MRV
	11	SOL1	12	★ SOLX
	13	★ B24V	14	★ B24V
	15	**	16	**
	17	WEN	18	**
	19	RCP5	20	RDP5
Notched ⊙	21	SHD	22	WDV
	23	SHE	24	WID
	25	S0	26	S1
	27	S2	28	S3
	29	S4	30	STW
	31	RCP1	32	RDP1
	33	RCP2	34	RDP2
	35	RCP3	36	RDP3
	37	RCP4	38	RDP4
	39	WCP1	40	WCP2
	41	WDT1	42	CNT1
	43	WDT2	44	CNT2
	45	WDT3	46	CNT3
	47	WDT4	48	CNT4
	49	+24V	50	+24V

★ B24V: Reserve. Should be left unwired for upper PCB.

** : Without connection. Should be left unwired for upper PCB.

(Note) Viewed from the cable side

2) Connectors for machine compatible with IC cards

* For machine compatible with IC cards, two connectors (with 50 and 16 pins) are required for I/F.

"CN2" signal assignment

	PIN	Signal	PIN	Signal
Protruded ♦	1	IVCC	2	IRST
	3	ICIO	4	IGND
	5	**	6	ICLK
Notched ⊙	7	IVCC	8	IVPP
	9	IRS1	10	IRS2
	11	IECO	12	★ SOLY
	13	IMSL	14	ISOL
	15	+5V	16	OV

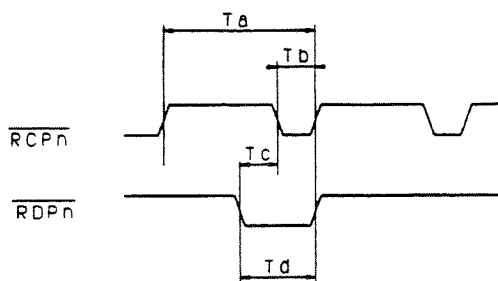
** : Without connection. Should be left unwired for upper PCB.

★ SOLY: Reserve. Should be left unwired for upper PCB.

(Note) Viewed from cable side.

12. TIMING CHARTS

Detailed timing chart NO. 1 (RCPn, RDPn)

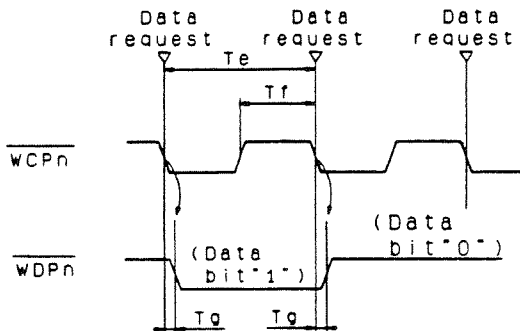


*75BPI
 $T_a = 1694 \mu\text{sec.}$
 $T_b = 423 \mu\text{sec.}$
 $T_c = 423 \mu\text{sec.}$
 $T_d = 846 \mu\text{sec.}$

*210BPI
 $T_a = 605 \mu\text{sec.}$
 $T_b = 151 \mu\text{sec.}$
 $T_c = 151 \mu\text{sec.}$
 $T_d = 302 \mu\text{sec.}$

(at card transport speed
 of 200mm/s)
 Note: Nominal value only

Detailed timing chart NO. 2 (WCPn, WDTn)



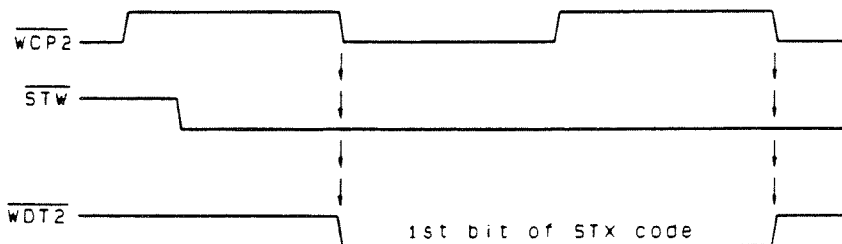
*75BPI
 $T_e = 1694 \mu\text{sec.}$
 $T_f = 846 \mu\text{sec.}$
 $T_g = 381 \mu\text{sec. max.}$

*210BPI
 $T_e = 605 \mu\text{sec.}$
 $T_f = 302 \mu\text{sec.}$
 $T_g = 136 \mu\text{sec. max.}$

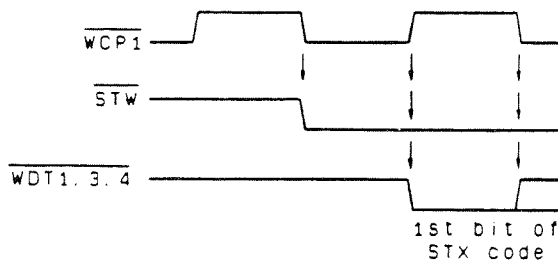
(at card transport speed
 of 200mm/s)
 Note: Nominal value only

Detailed timing chart NO. 3 (WCPn, STW, WDTn)

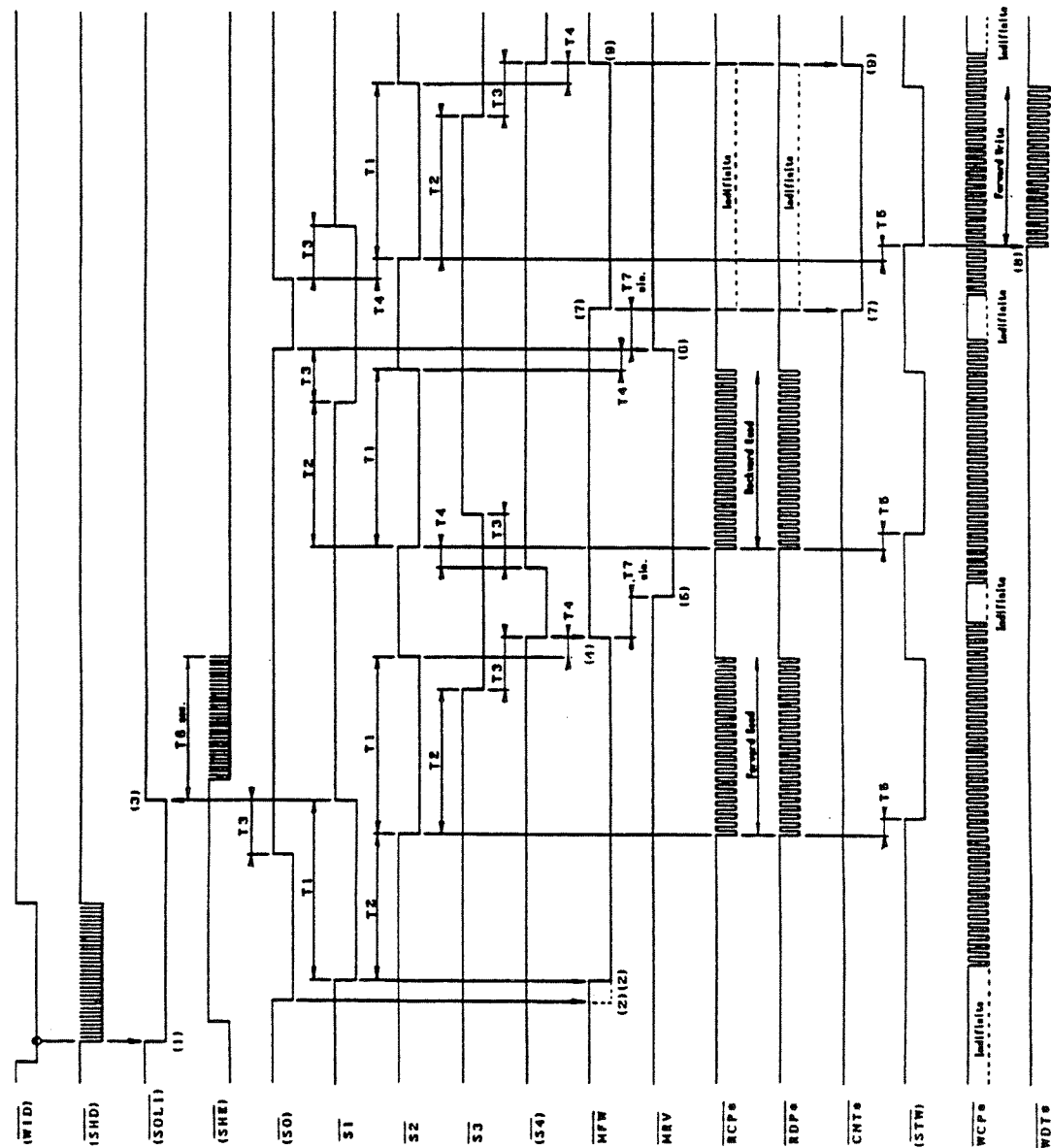
—— write for the first bit of STX code. ——
 1) 75BPI track (No. 2 track)

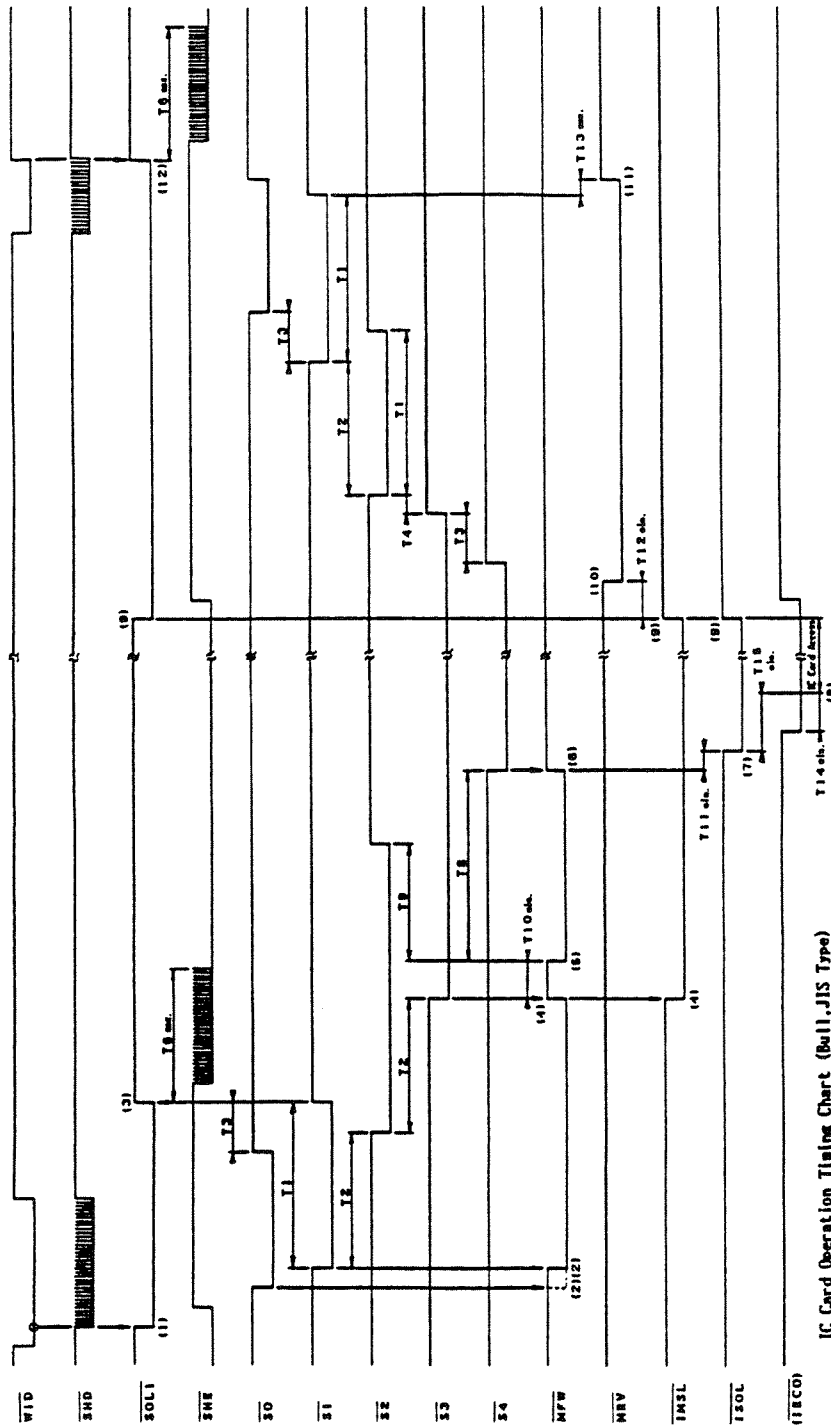


2) 210BPI track (No. 1 track/No. 3 track)



Magnetic Card Operation Timing Chart





IC Card Operation Timing Chart (Bull. JIS Type)

- | | | | | |
|-----------------|------------------|---|---|---|
| T1=428sec | T10=100msec min. | (1) $\overline{WID} = "L"$ and $\overline{SHD} = "L" \Rightarrow \overline{SOLI} = "L"$ | (5) $\overline{MFW} = "H"$ and after T10 $\Rightarrow \overline{MRV} = "L"$ | (9) $\overline{SOLI} = "L"$, $\overline{ISOL} = "H"$, $\overline{INSL} = "H"$ |
| T2=350msec | T11=100msec min. | (2) $\overline{S0} = "L"$ or $\overline{S1} = "L" \Rightarrow \overline{MFW} = "L"$ | (Motor forward by slow speed) | (Shutter open, IC contact off. |
| T3=125msec | T12=100msec min. | (3) $\overline{S1} = "H" \Rightarrow \overline{SOLI} = "H"$ | (Motor stop) | Motor not slow mode) |
| T4= 47msec | T13= 40msec max. | (4) $\overline{S3} = "L" \Rightarrow \overline{MRV} = "H"$ and $\overline{INSL} = "L"$ | (IC contact on) | (10) T12 after above (9) |
| T6=350msec max. | T14=100msec min. | (Motor stop, set slow mode for motor speed) | (Motor reverse) | $\Rightarrow \overline{MRV} = "L"$ (Motor reverse) |
| T8=500msec | T15=150msec min. | | (11) $\overline{S1} = "L"$ and after T13 | $\Rightarrow \overline{MRV} = "H"$ (Motor stop) |
| T9=312msec | | | (12) $\overline{WID} = "H" \Rightarrow \overline{SOLI} = "H"$ | (Shutter close) |
- NOTE : Nominal Value except T8,
T10, T11, T12, T13, T14 and T15

IC Card Operation Timing Chart (US Type)

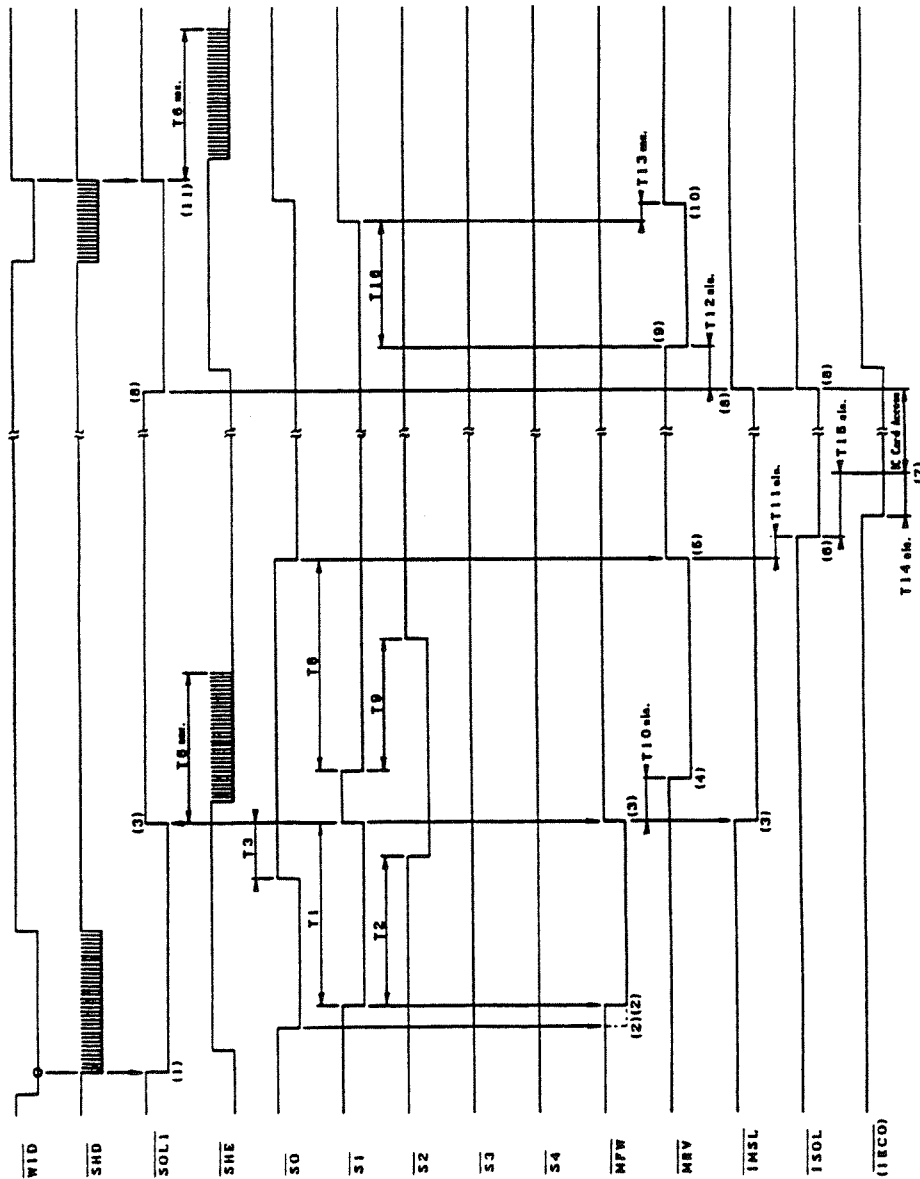
T1=428 msec	T10=100 msec min
T2=350 msec	T11=100 msec min
T3=125 msec	T12=100 msec min
T8=350 msec max	T13= 40 msec max
T8=500 msec	T14=100 msec min
T9=312 msec	T15=150 msec min
	T16=303 msec

(at card feed speed of 200mm/sec)

NOTE : Nominal Value except T0, T10.

T11, T12, T13, T14, T15 and T16

- (1) $\overline{\text{VID}}=\text{"L"}$ and $\overline{\text{SHD}}=\text{"L"}$ \Rightarrow $\overline{\text{SOL}}=\text{"L"}$
(Shutter open)
- (2) $\overline{\text{SO}}=\text{"L"}$ or $\overline{\text{SI}}=\text{"L"}$ \Rightarrow $\overline{\text{MPV}}=\text{"L"}$
(Motor forward)
(Shutter close, Motor stop, set slow mode for motor speed)
- (3) $\overline{\text{SI}}=\text{"f"}$ \Rightarrow $\overline{\text{SOL}}=\text{"H"}$, $\overline{\text{MPV}}=\text{"H"}$, $\overline{\text{IMS}}=\text{"L"}$
(Motor reverse with slow mode)
- (4) $\overline{\text{MPV}}=\text{"H"}$ and after T10 \Rightarrow $\overline{\text{MRV}}=\text{"L"}$
(Motor stop)
- (5) $\overline{\text{SO}}=\text{"f"}$ \Rightarrow $\overline{\text{MRV}}=\text{"H"}$
(Motor stop)
- (6) $\overline{\text{MRV}}=\text{"H"}$ and after T11 \Rightarrow $\overline{\text{SOL}}=\text{"L"}$
(IC contact on)
- (7) $\overline{\text{ISOL}}=\text{"L"}$ and after T15 or $\overline{\text{ICEO}}=\text{"L"}$ and after T14
 \Rightarrow IC Card Access
- (8) $\overline{\text{SOL}}=\text{"L"}$, $\overline{\text{ISOL}}=\text{"H"}$, $\overline{\text{IMS}}=\text{"H"}$
(Shutter open, IC contact off, Motor not slow mode)
- (9) T12 above (8) \Rightarrow $\overline{\text{MRV}}=\text{"L"}$
(Motor reverse)
- (10) $\overline{\text{SI}}=\text{"f"}$ and after T13 \Rightarrow $\overline{\text{MRV}}=\text{"H"}$
(Motor stop)
- (11) $\overline{\text{VID}}=\text{"H"}$ \Rightarrow $\overline{\text{SOL}}=\text{"H"}$
(Shutter close)



Water Mark Card Operation Timing Chart

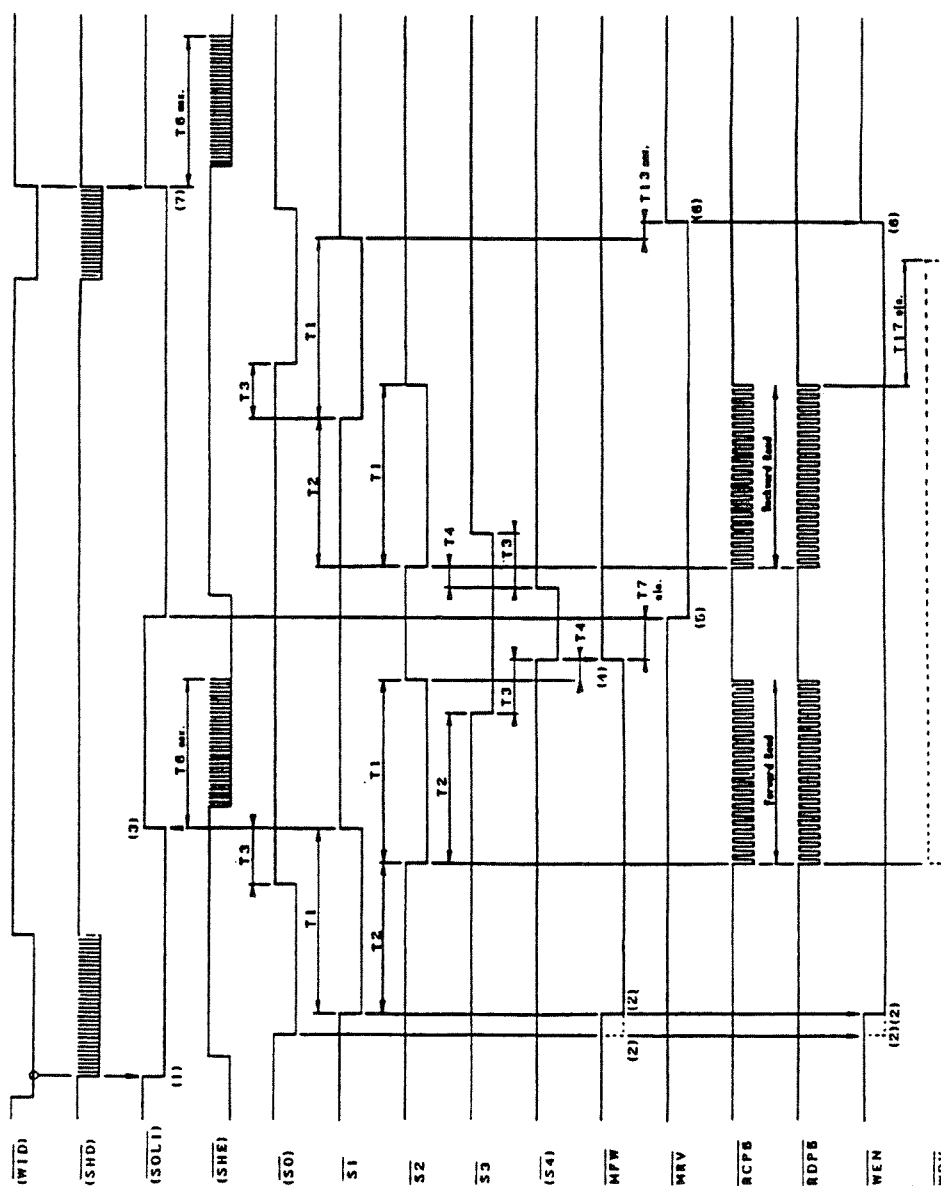
T1=428msec	T5 = 37msec
T2=350msec	T8 = 350msec max.
T3=125msec	T7 = 100msec min.
T4= 47msec	T13= 40msec max.
	T17=300msec min.

(at card feed speed of 200mm/sec)

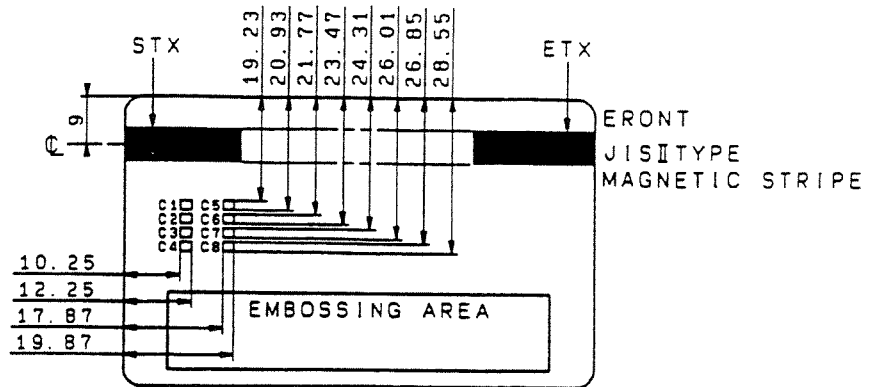
NOTE : Nominal Value except

T6, T7, T13 and T17

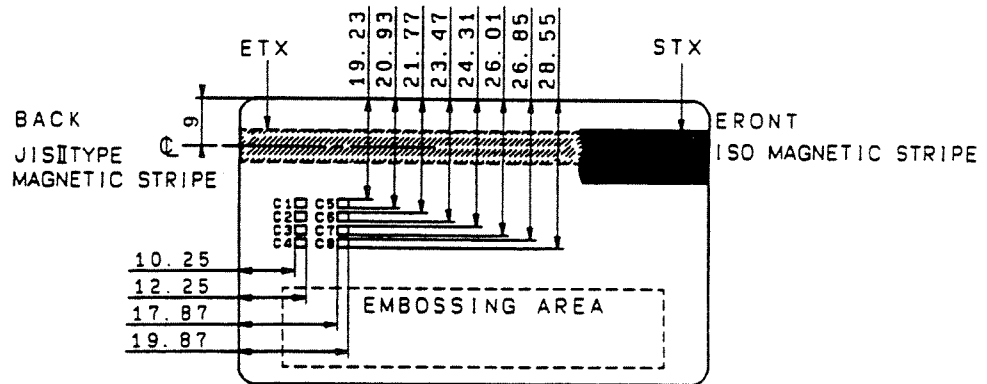
- (1) $\overline{WID} = \text{"L"}$ and $\overline{SID} = \text{"L"}$ \Rightarrow $\overline{SOL} = \text{"L"}$
(Shutter open)
- (2) $\overline{SO} = \text{"L"}$ or $\overline{SI} = \text{"L"}$ \Rightarrow $\overline{MFV} = \text{"L"}$, $\overline{VEN} = \text{"L"}$
(Motor forward, VM circuit enable)
- (3) $\overline{SI} = \text{"H"}$ \Rightarrow $\overline{SOL} = \text{"H"}$
(Shutter close)
- (4) $\overline{S4} = \text{"L"}$ or $\overline{S2} = \text{"L"}$ and after T4 \Rightarrow $\overline{MFV} = \text{"H"}$
(Motor stop)
- (5) $\overline{MFV} = \text{"H"}$ and after T7 \Rightarrow $\overline{MFV} = \text{"L"}$
(Motor reverse)
- (6) $\overline{SI} = \text{"L"}$ and after T13 \Rightarrow $\overline{MFV} = \text{"H"}$, $\overline{VEN} = \text{"H"}$
(Motor stop, VM circuit disable)
- (7) $\overline{WID} = \text{"H"}$ \Rightarrow $\overline{SOL} = \text{"H"}$
(Shutter close)



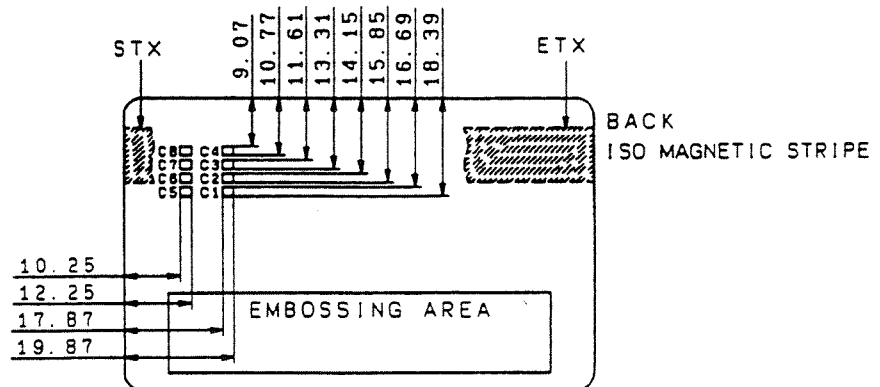
JAPAN TYPE IC CARD



US TYPE IC CARD



BULL TYPE IC CARD



UNIT:mm

FIG. 1 IC CARD FIGURE

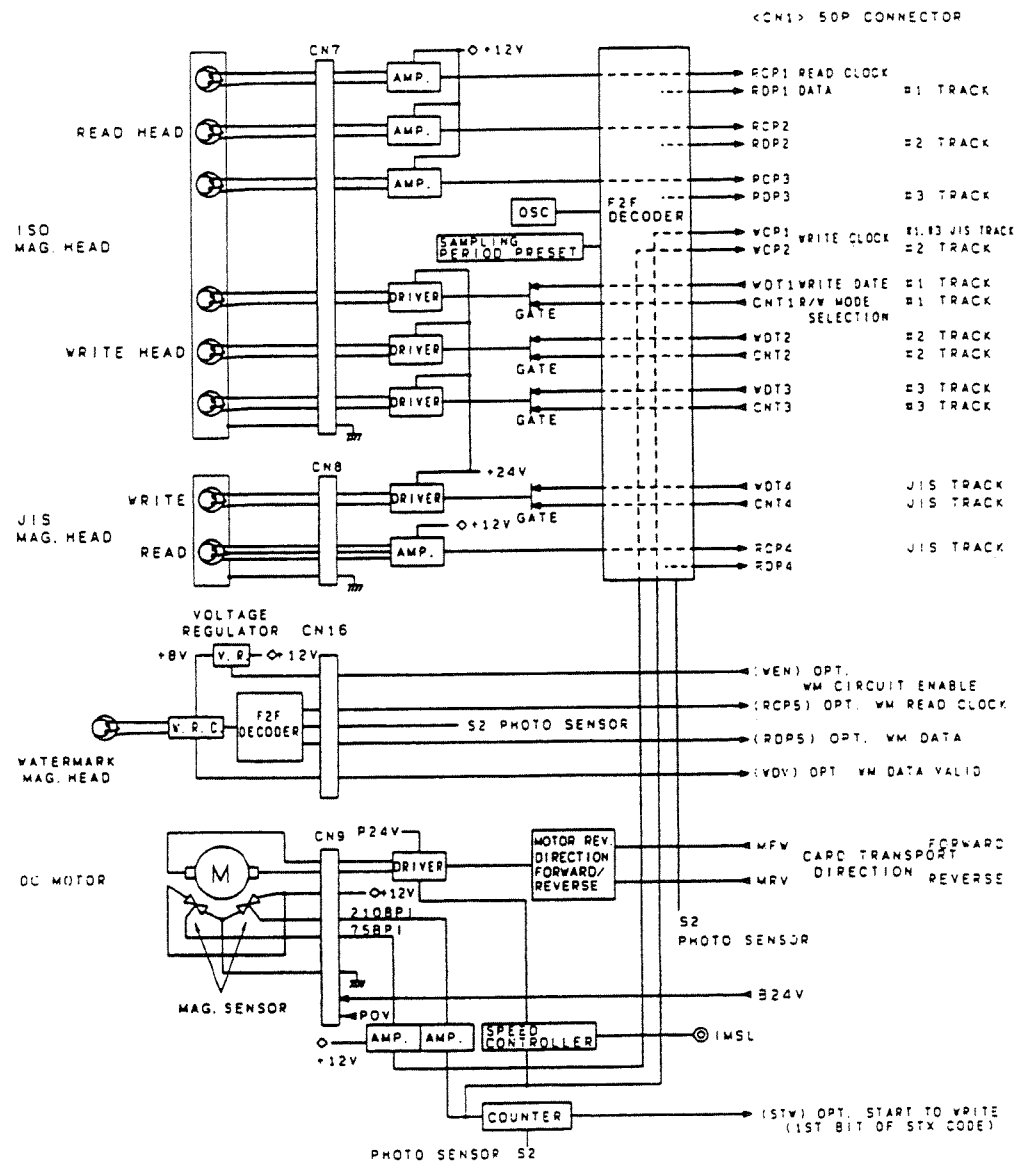


FIG. 2 (1/2) BLOCK DIAGRAM (FOR FULL FUNCTION)

NOTE
(000) : OPTION

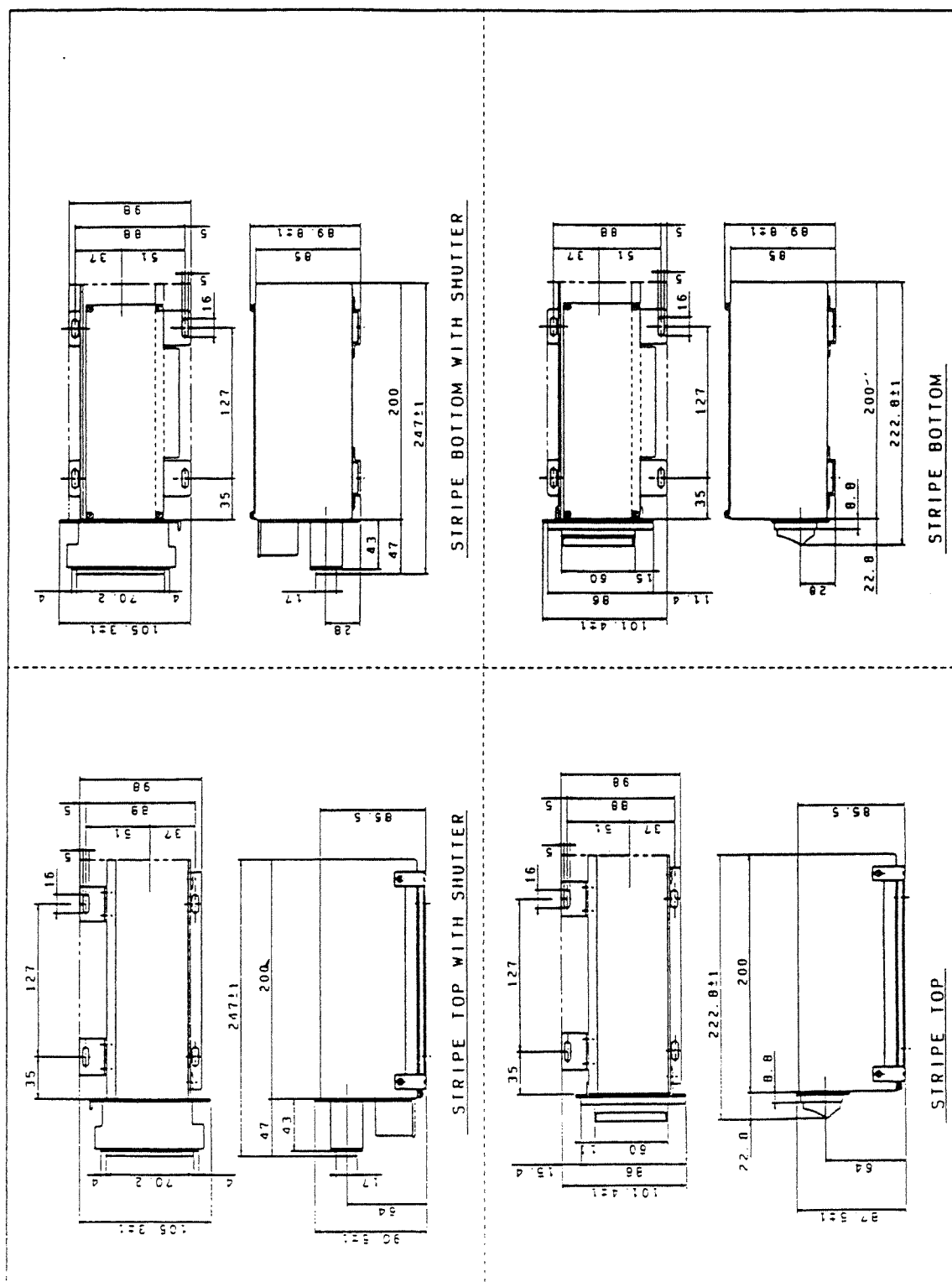


FIG. 3 OUTLINE DIMENSIONS DRAWING

