

Thermal printing mechanism CMxxx User's Manual



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COD. DOME - CMxxx

VERS. PRELIMINARY

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Printing mechanism models

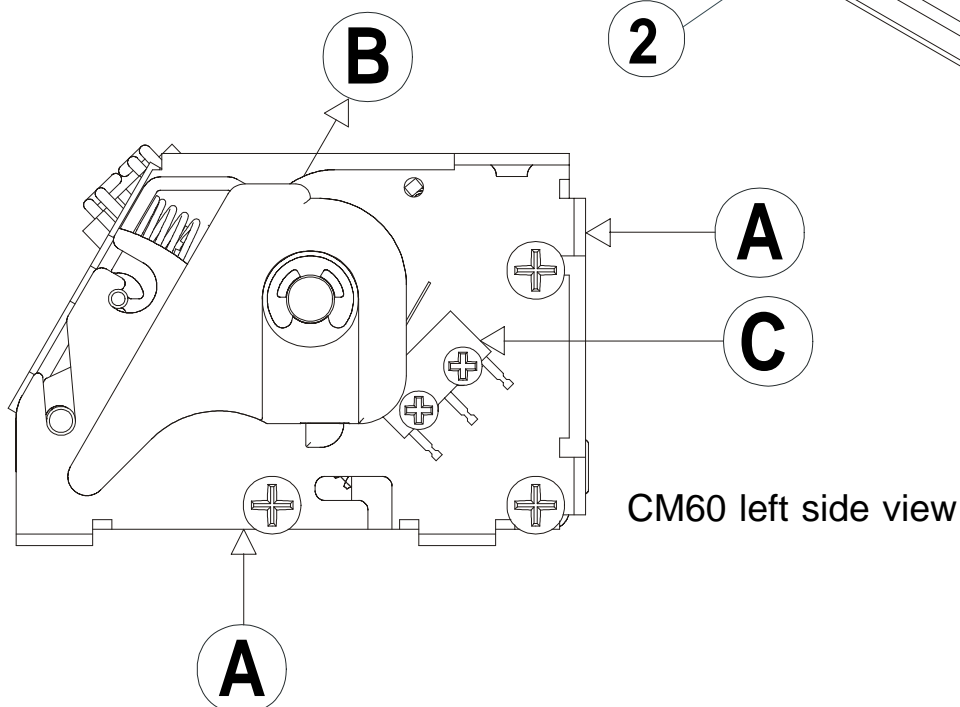
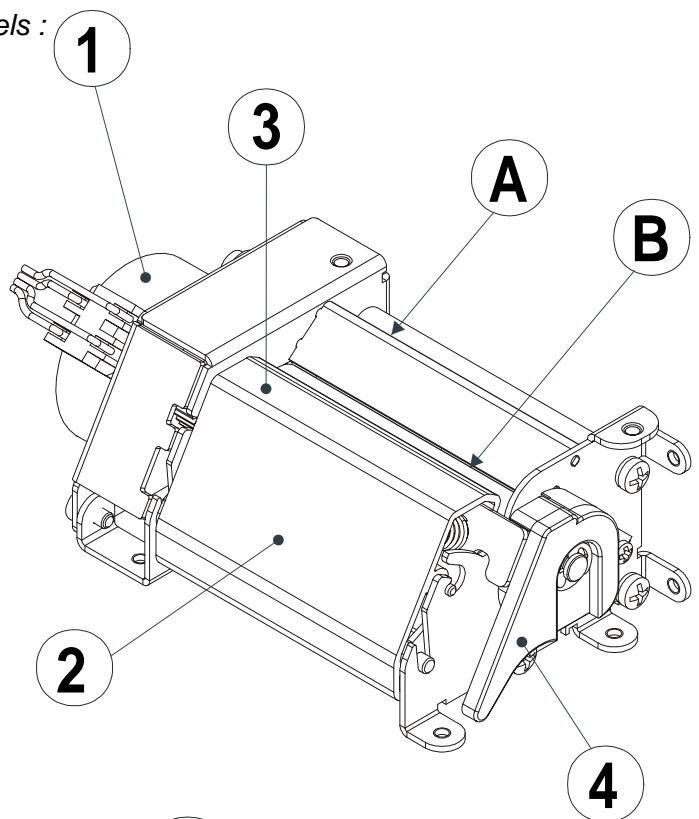
A. Front exterior view CMxxx ⁽¹⁾

- 1- Motor
- 2- Head Set
- 3- Print Head
- 4- Head lever
- A- Paper outfeed
- B- Paper input
- C- Sensor Head up detection

⁽¹⁾ The XXX suffix indicates the following models :

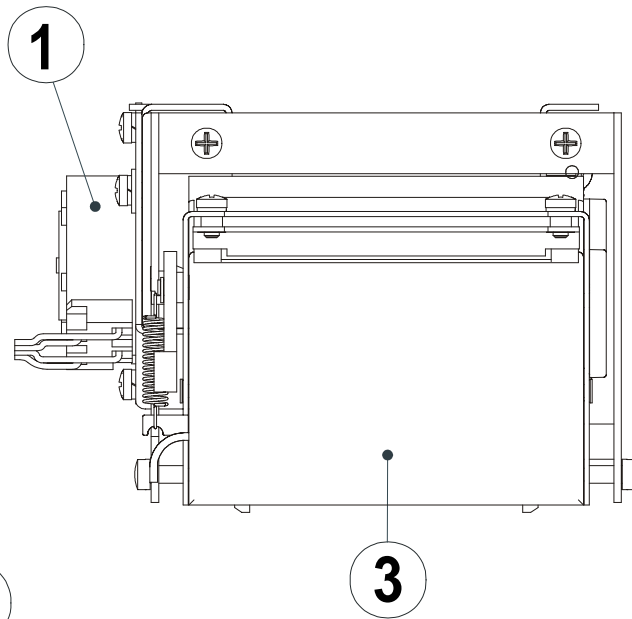
- CM58
- CM60
- CM60A ⁽²⁾
- CM80
- CM112
- CM112A ⁽²⁾
- CM210
- CM210A ⁽²⁾
- CM216
- CM216A ⁽²⁾

⁽²⁾ The versions CM60A, CM112A, CM210A and CM216A are complete with auto-cutter.

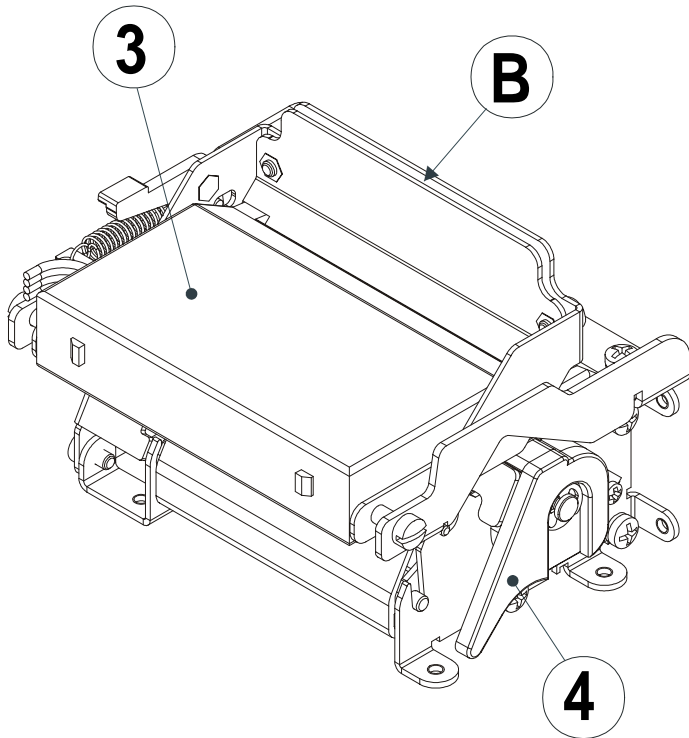


B. Front exterior view CM60A

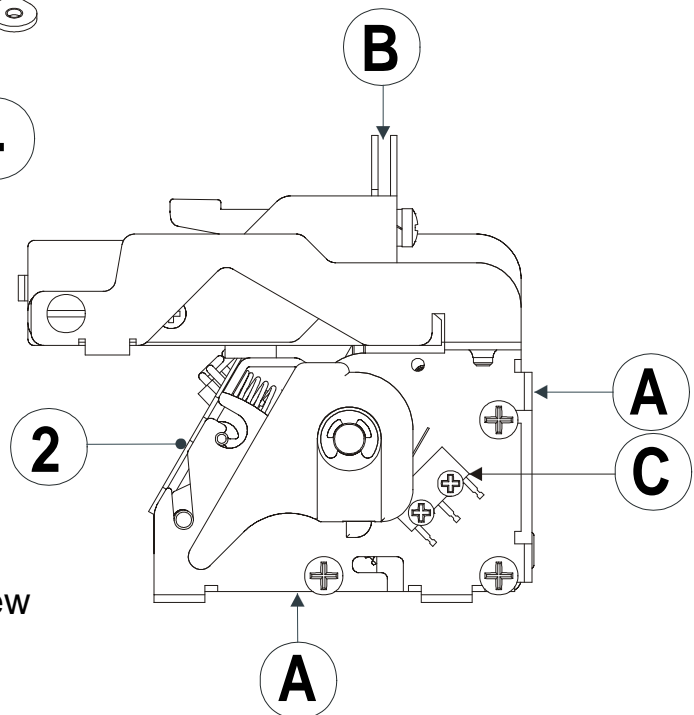
- 1- Motor
- 2- Head Set
- 3- Cutter
- 4- Head lever
- A- Paper outfeed
- B- Paper input
- C- Sensor Head up detection



CM60A top view



CM60A left side view



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CONVENTIONS USED IN THE MANUAL



N.B.

Gives important information or suggestions relative to the use of the printer



WARNING

The information marked with this symbol must be carefully heeded to safeguard against damaging the printer



DANGER

The information marked with this symbol must be carefully heeded to safeguard against injury to the operator.

MECHANISM GENERAL SPECIFICATIONS

(Tab. 1)

Item	Specification					
	CM58	CM60	CM80	CM112	CM210	CM216
Printing method	Thermal line dot method					
Effective printing width	48mm	56mm	72mm	104mm	216mm	216mm
Head configuration (dots/line)	384	448	576	832	1728	1728
Dot Pitch	0.125 mm horizontal 0.125 mm vertical					
Printing Speed (see power consumption and energy for dots)	150 mm/s				75 mm/s	
Paper width (mm)	58 ± 0,5	60 ± 0,5	80 ± 0,5	112 ± 0,5	210 ± 0,5	216 ± 0,5
Paper feed method	Friction feed, 1 dot line/1 pulses, bipolar 2-2 phase excitation				Friction feed, 1 dot line/2 pulses, bipolar 2-2 phase excitation	
Head temperature sensor	Thermistor					
Paper detection	Reflective type photosensor					
Maximum number of dots activated at a time	128	192	192	256	448	448
Dot resistance (Rav)	700 Ω ± 3%					
Number of strobes	3			4		
Header energy	5°C		0,165mJ/dot (0,22 ms)			
	25°C		0,15mJ/dot (0,20 ms)			
	40°C		0,14mJ/dot (0,19 ms)			
Driver saturated resistance (Ric)	23 Ω					
External dimensions (W x D x H)	106,6 x 60,2 x 40,9	108,6 x 60,2 x 40,9	128,6 x 60,2 x 40,9	160,6 x 60,2 x 40,9	284,6 x 60,2 x 40,9	284,6 x 60,2 x 40,9
Weight	262 gr.	264 gr.	294 gr.	340 gr.	562 gr.	562 gr.
Operation Voltage range logic	5V ± 10%					
Operation Voltage dotline head	22,8 ÷ 25,2 V					
Current consumption	31 mA/dots					
Life/Reability	50 Km					
Recommanded paper	Kanzan KF50 or equivalent					

Maximum ratings

(Tab. 2)

Parameter	Specification					
	CM58	CM60	CM80	CM112	CM210	CM216
Heater energy consumption	0,27 mJ/dot (note 2,5 ms/line) 0,18 mJ/dot (note 1,25 ms/line) 0,15 mJ/dot (note 0,625 ms/line)					
Head voltage	25,2 V (note between connectors)					
Logic voltage	Vdd = +5V ± 0,25V					
Environment operating temperature range	0 ÷ 50°C					
Operating humidity	10 ÷ 90% RH no condensation					
Storage environmental	-40 ÷ 80°C Humidity 10 ÷ 90% no condensation, Paper excluded					
Maximum operating temperature	Detected temperature of thermistor shall not exceed 65°C					

DESCRIPTION OF THE MECHANISM

The main characteristics of the series CM thermal printing mechanism are definitely the reliability, the quality and the long lasting performance, making it the suitable product for industrial environments such as weighting, control, safety systems, as well as medical and portable applications.

The sturdy aluminium alloy casing for a higher thermal efficiency and a much better rigidity of the structure.

The series CM mechanisms prints at a high 203 dpi resolution on paper weights between 58 and 80 gr/m² (also labels).

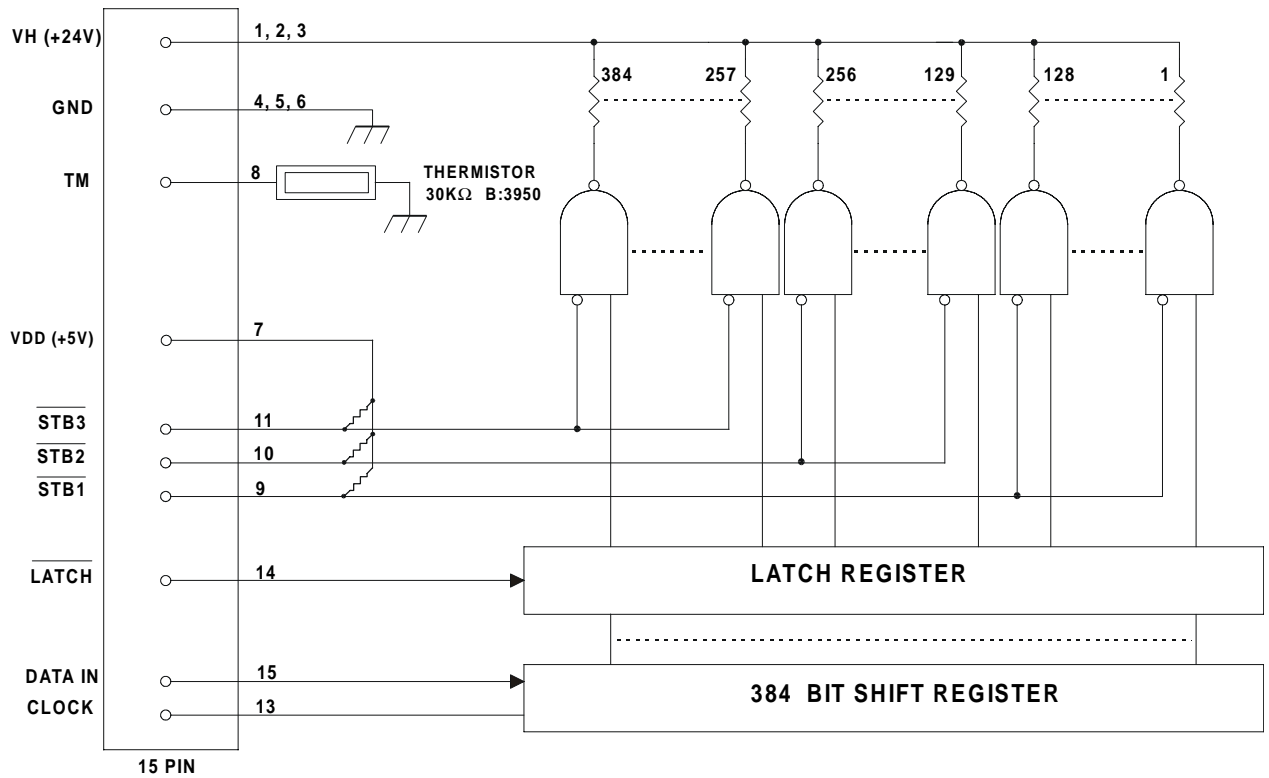
The mechanism is featured with a high torque paper-pulling motor, and with a silicon rubber roll.

SERIES CMxxx MAIN FEATURES

- Printing width from 58 to 216 mm
- High speed 75 ÷ 150 mm/sec
- Logic voltage 24V
- High resolution 8 dots/mm 203 dpi
- Sensors: Paper detection photosensor, paper end sensor
head up detection, temperature sensor thermistor 30K
- Life 50 Km Printed paper or 100 millions of pulses
- Front or rear paper inlet
- CM216 can print into US A4 letter format (216mm paper width)
- CM210 and CM216 can print both A5 and A4 format
- The models of series CM availables are : CM58, CM60, CM60A, CM80, CM112, CM112A, CM210, CM210A, CM216 and CM216A
- The versions CM60A, CM112A, CM210A and CM216A are complete with auto-cutter.

1. CONNECTIONS

1.1 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF CM58 MODEL



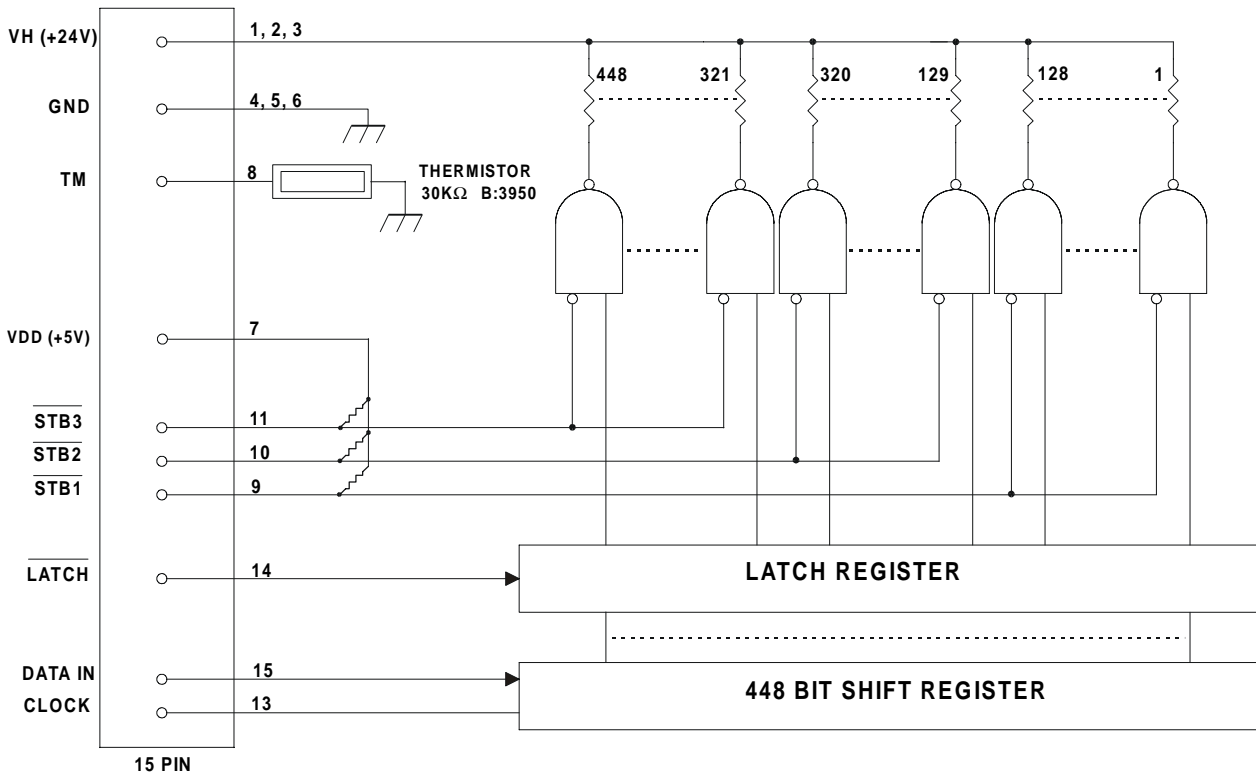
(Fig.1.1)

(Tab.1.1)

Pin assignments

No.	Signal	Function
1	VH	HEAD POWER SUPPLY
2	VH	HEAD POWER SUPPLY
3	VH	HEAD POWER SUPPLY
4	GND	GROUND
5	GND	GROUND
6	GND	GROUND
7	VDD	LOGIC POWER SUPPLY
8	TM	THERMISTOR
9	STB1	STROBE1 SIGNAL
10	STB2	STROBE2 SIGNAL
11	STB3	STROBE3 SIGNAL
12	N.C.	NOT CONNECTED
13	CLOCK	SERIAL CLOCK
14	LATCH	LATCH
15	DATA IN	DATA INPUT

1.2 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF CM60 MODEL



(Fig.1.2)

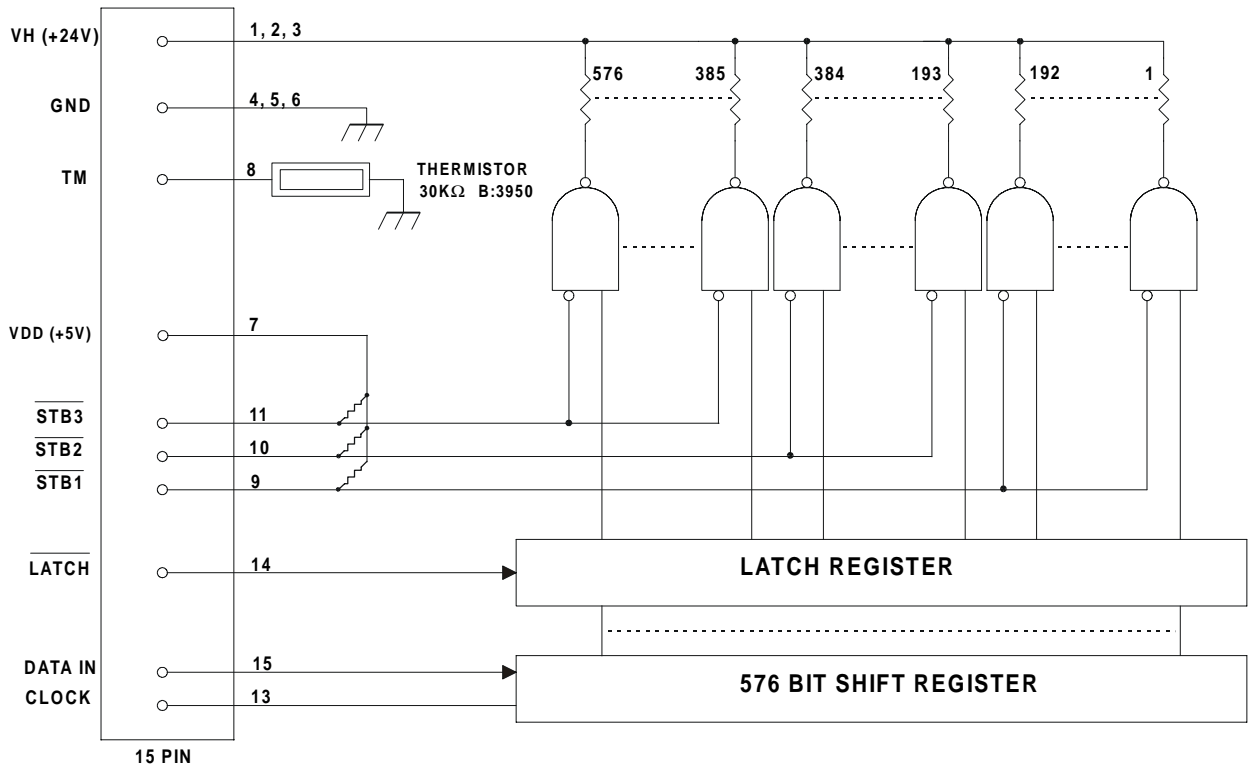
Pin assignments

(Tab.1.2)

No.	Signal	Function
1	VH	HEAD POWER SUPPLY
2	VH	HEAD POWER SUPPLY
3	VH	HEAD POWER SUPPLY
4	GND	GROUND
5	GND	GROUND
6	GND	GROUND
7	VDD	LOGIC POWER SUPPLY
8	TM	THERMISTOR
9	STB1	STROBE1 SIGNAL
10	STB2	STROBE2 SIGNAL
11	STB3	STROBE3 SIGNAL
12	N.C.	NOT CONNECTED
13	CLOCK	SERIAL CLOCK
14	LATCH	LATCH
15	DATA IN	DATA INPUT

1. CONNECTIONS

1.3 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF CM80 MODEL



(Fig.1.3)

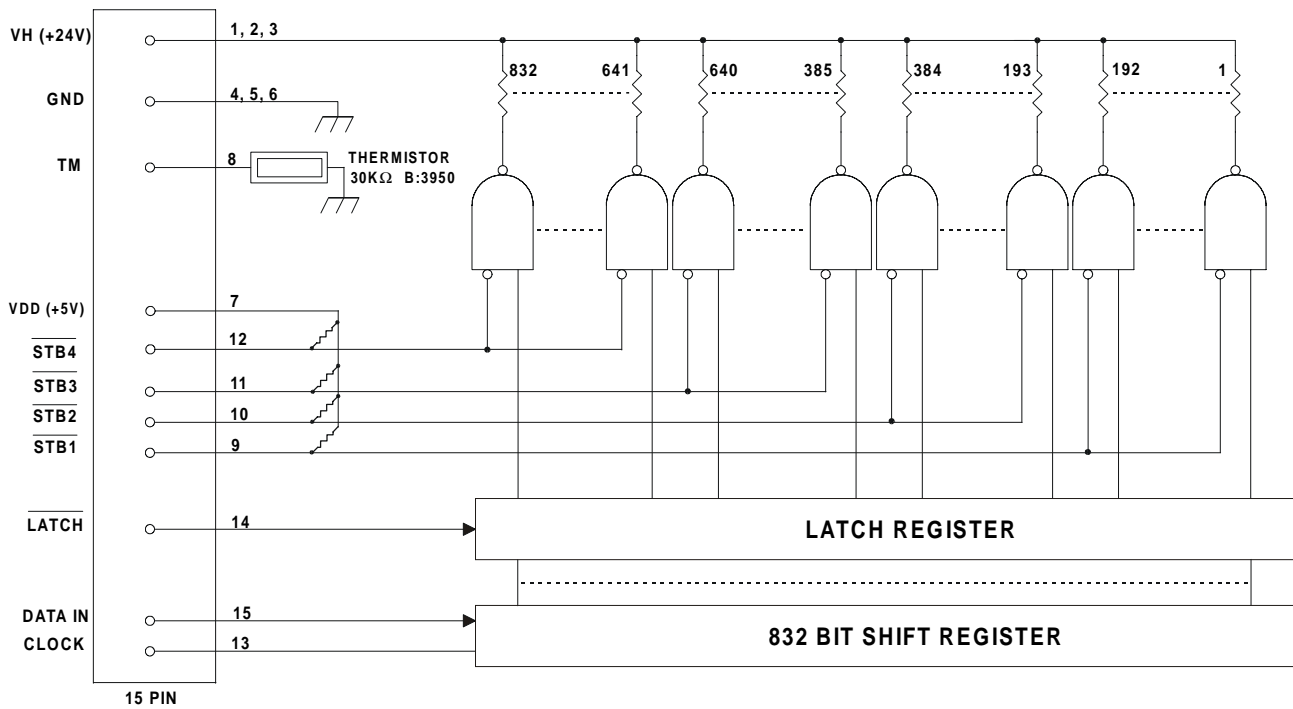
Pin assignments

(Tab.1.3)

No.	Signal	Function
1	VH	HEAD POWER SUPPLY
2	VH	HEAD POWER SUPPLY
3	VH	HEAD POWER SUPPLY
4	GND	GROUND
5	GND	GROUND
6	GND	GROUND
7	VDD	LOGIC POWER SUPPLY
8	TM	THERMISTOR
9	STB1	STROBE1 SIGNAL
10	STB2	STROBE2 SIGNAL
11	STB3	STROBE3 SIGNAL
12	N.C.	NOT CONNECTED
13	CLOCK	SERIAL CLOCK
14	LATCH	LATCH
15	DATA IN	DATA INPUT

1. CONNECTIONS

1.4 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF CM112 MODEL



(Fig.1.4)

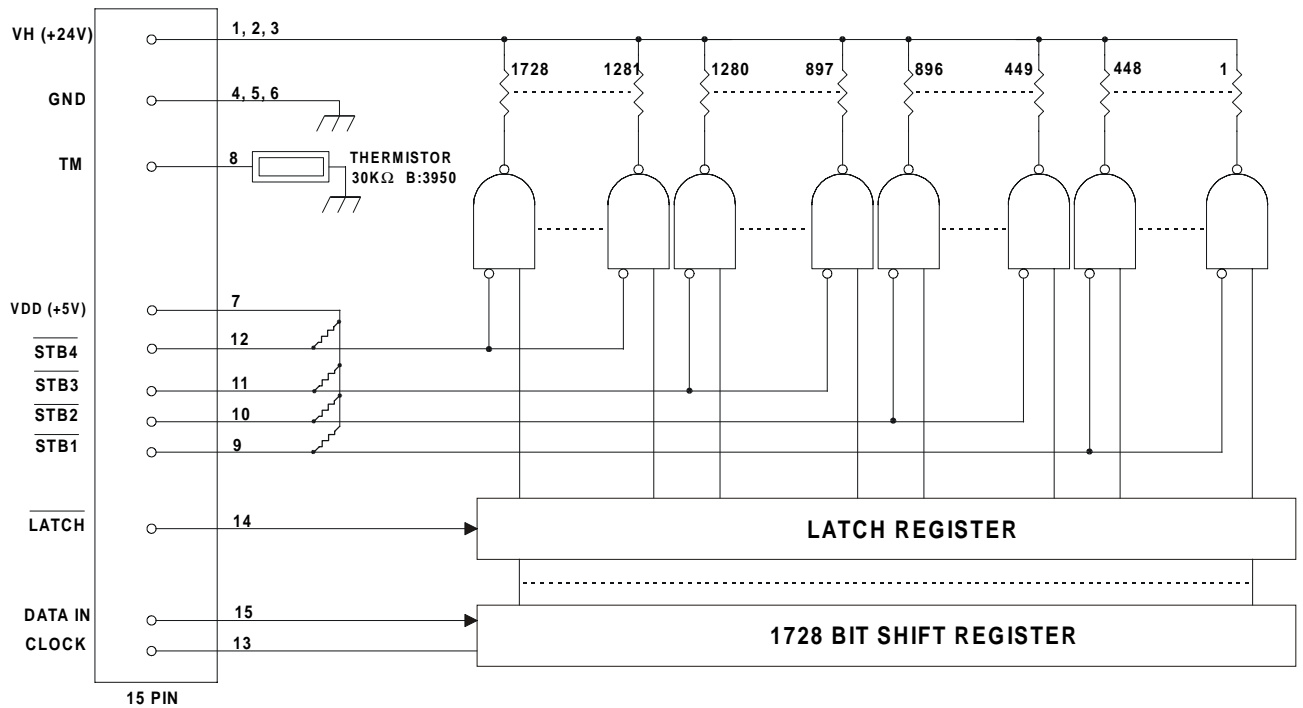
Pin assignments

(Tab.1.4)

No.	Signal	Function
1	VH	HEAD POWER SUPPLY
2	VH	HEAD POWER SUPPLY
3	VH	HEAD POWER SUPPLY
4	GND	GROUND
5	GND	GROUND
6	GND	GROUND
7	VDD	LOGIC POWER SUPPLY
8	TM	THERMISTOR
9	STB1	STROBE1 SIGNAL
10	STB2	STROBE2 SIGNAL
11	STB3	STROBE3 SIGNAL
12	STB4	STROBE4 SIGNAL
13	CLOCK	SERIAL CLOCK
14	LATCH	LATCH
15	DATA IN	DATA INPUT

1. CONNECTIONS

1.5 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF CM210 MODEL



(Fig.1.5)

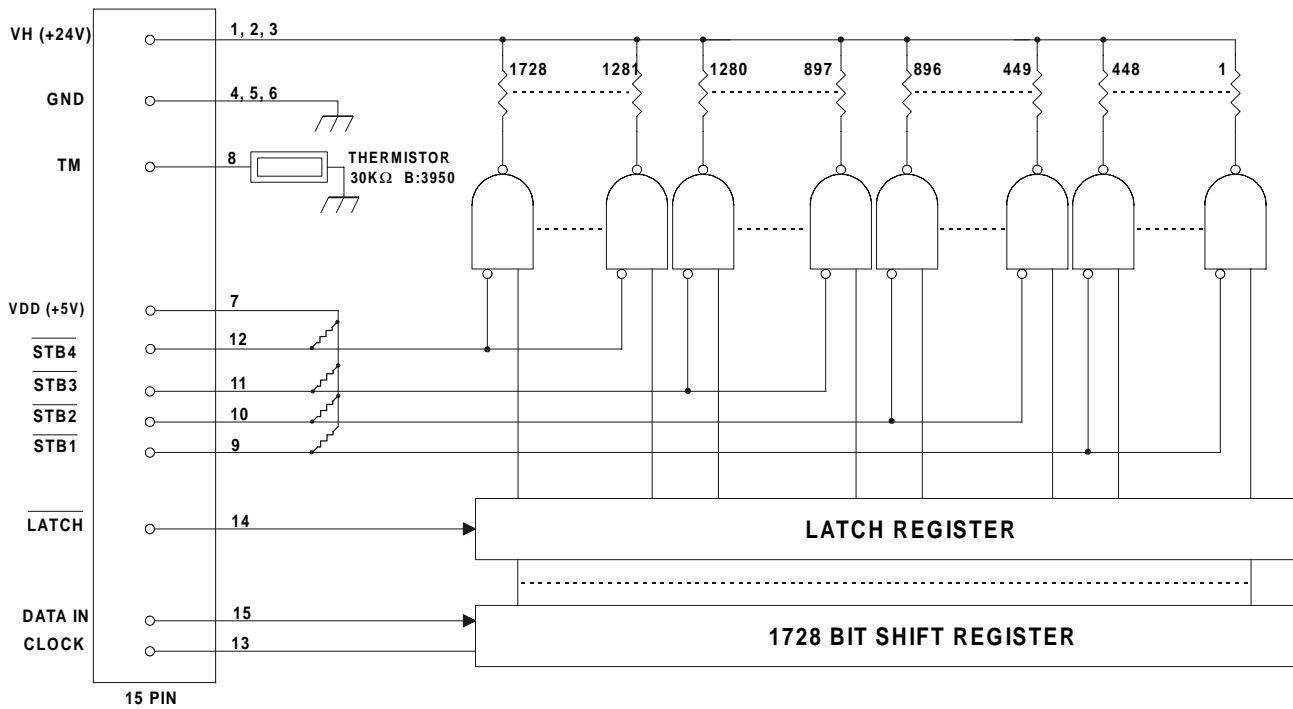
Pin assignments

(Tab.1.5)

No.	Signal	Function
1	VH	HEAD POWER SUPPLY
2	VH	HEAD POWER SUPPLY
3	VH	HEAD POWER SUPPLY
4	GND	GROUND
5	GND	GROUND
6	GND	GROUND
7	VDD	LOGIC POWER SUPPLY
8	TM	THERMISTOR
9	STB1	STROBE1 SIGNAL
10	STB2	STROBE2 SIGNAL
11	STB3	STROBE3 SIGNAL
12	STB4	STROBE4 SIGNAL
13	CLOCK	SERIAL CLOCK
14	LATCH	LATCH
15	DATA IN	DATA INPUT

1. CONNECTIONS

1.6 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF CM216 MODEL



(Fig.1.6)

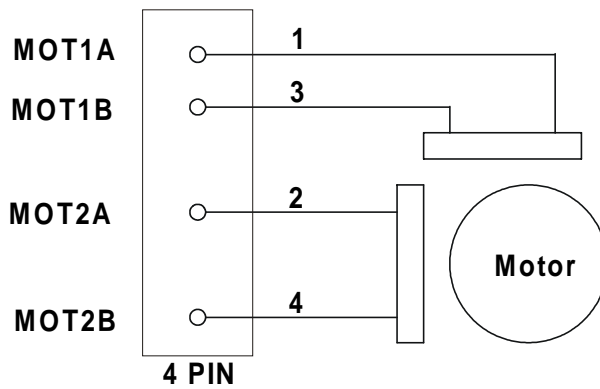
Pin assignments

(Tab.1.6)

No.	Signal	Function
1	VH	HEAD POWER SUPPLY
2	VH	HEAD POWER SUPPLY
3	VH	HEAD POWER SUPPLY
4	GND	GROUND
5	GND	GROUND
6	GND	GROUND
7	VDD	LOGIC POWER SUPPLY
8	TM	THERMISTOR
9	STB1	STROBE1 SIGNAL
10	STB2	STROBE2 SIGNAL
11	STB3	STROBE3 SIGNAL
12	STB4	STROBE4 SIGNAL
13	CLOCK	SERIAL CLOCK
14	LATCH	LATCH
15	DATA IN	DATA INPUT

1. CONNECTIONS

1.7 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF MOTOR



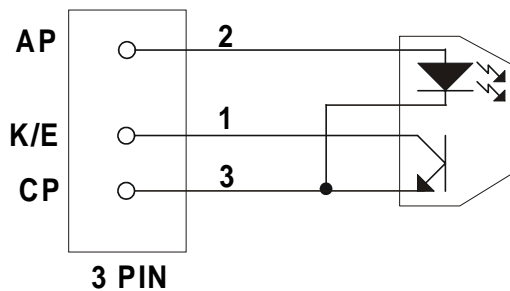
(Fig.1.7)

Pin assignments

No.	Signal
1	MOT1A
2	MOT2A
3	MOT1B
4	MOT2B

(Tab.1.7)

1.8 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF PAPER SENSOR



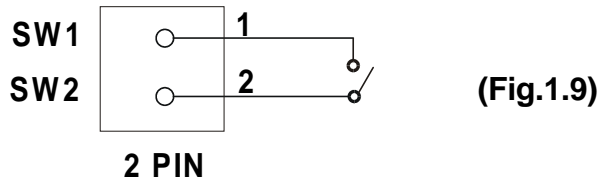
(Fig.1.8)

Pin assignments

No.	Signal	Function
1	CP	COLLECTOR PHOTO TRANSISTOR PAPER
2	AP	ANODE DIODE PAPER
3	K/E	CATHODE / EMITTER PAPER

(Tab.1.8)

1.9 ELECTRICAL CIRCUIT BLOCK DIAGRAM OF HEAD UP SENSOR



Pin assignments

No.	Signal	Function
1	SW1	SWITCH SIGNAL 1
2	SW2	SWITCH SIGNAL 2

(Tab.1.9)

2. PRINT HEAD

2.1 PRINT HEAD

CMxxx has a thickfilm thermal printhead. Scanning Line Time (SLT) is the time to print one complete line using all strobes available.

The relation between the printhead supply voltage and “On Time” (Ton) is as follows:

$$P_o = I_o^2 \times R_{av} = \frac{V_{Head}^2 \times R_{av}}{(R_{av} + R_{ic})^2}$$

$$T_{on} = \frac{E_o}{P_o}$$

Symbol	Parameter	Unit
Rav	Average resistance	700 Ω
Ric	Driver Saturated Resistance	23 Ω

(Tab.2.1)

2.2 OPERATION PRECAUTIONS

1. When continuous printing is performed the supply energy should be reduced so that the substrate temperature show in Maximum Condition Table
2. Power On and Off sequence must be in the following order to prevent the dot element damage: Turn On= Apply the logic supply voltage (Vdd) first and then the printhead supply voltage. Turn Off= Switch off the printhead supply voltage first and then turn the logic voltage off.
3. The printhead shall be disabled in STB during Power ON/OFF, or Power (VH)-Logic(Vdd) sequence described in note 2 shall be kept.
4. Heat elements and IC's shall be anti-electrostatic in order to prevent the electrostatic destruction. Do not touch the connector pins with naked hands.
5. The printhead substrate surface is coated with glass and mechanical stress or shock (including dust scratch damage) should be avoided to prevent damage.
6. When the printhead operation is finished, printsupply voltage (including the charged voltage with capacitor) should be reduced to the ground level and remained until next printhead operation occur.
7. Condensation should be avoided. If condensation occurred, do not switch on the printhead power until condensation disappear.
8. If printing sound, for example sticking sound, occured, please adjust the paper feed speed or pulse to avoid these kind of mechanical resonance.
9. Please pay attention that the paper used does not include bad factor to affect printhead life.

10. The print density variation may become larger if the number of dots energized at same time becomes greater than the values specified in the table 2.2 :

(Tab.2.2)

Item	CM58	CM60	CM80	CM112	CM210	CM216
Maximum number of dots activated at a time	128	192	192	256	448	448

2.3 ELECTRICAL CHARACTERISTICS OF CMxxx SERIES CIRCUIT

2.3.1 CM58 Table

Item	SYMBOL	MINI	TYP.	MAXI.	Unit
Head power supply	VH	23.5	24.0	24.5	V
Logic power supply	Vdd	4.75	5.0	5.25	V
Logic supply current	Idd	-	-	27	mA
Input Voltage (High)	VIH	0.8xVdd	-	Vdd	V
Input Voltage (Low)	VIL	0	-	0.2xVdd	V
Data input current (DI) High ⁽¹⁾	ILHDI	-	-	0.5	uA
Data input current (DI) Low	ILLDI	-	-	-0.5	uA
STB 1 to 3 input current (High) ⁽¹⁾	IIHSTR	-	-	1	uA
STB 1 to 3 input current (Low)	IILSTR	-	-	-110	uA
Clock input current (High) ⁽¹⁾	ILHCLK	-	-	3	uA
Clock input current (Low)	IILCLK	-	-	-3	uA
Latch input current (High) ⁽¹⁾	IIHLAT	-	-	3	uA
Latch input current (Low)	IILLAT	-	-	-3	uA
Data out output voltage (High)	VDOH	4.45	-	-	V
Data out output voltage (Low)	VDOL	-	1.3	2.0	V
Clock frequency	f_{CLK}	0.1	1.0	3.5	MHz

(Tab.2.3)



⁽¹⁾ **Note:** Each strobe includes pull-up resistance of $300K\Omega \pm 50\%$.

2. PRINT HEAD

2.3.2 CM60 / CM60A Table

Item	SYMBOL	MINI	TYP.	MAXI.	Unit
Head power supply	VH	23.5	24.0	24.5	V
Logic power supply	Vdd	4.75	5.0	5.25	V
Logic supply current	Idd	-	-	31.5	mA
Input Voltage (High)	VIH	0.8xVdd	-	Vdd	V
Input Voltage (Low)	VIL	0	-	0.2xVdd	V
Data input current (DI) High ⁽¹⁾	ILHDI	-	-	0.5	uA
Data input current (DI) Low	ILLDI	-	-	-0.5	uA
STB 1 to 3 input current (High) ⁽¹⁾	IHSTR	-	-	1.5	uA
STB 1 to 3 input current (Low)	IILSTR	-	-	-165	uA
Clock input current (High) ⁽¹⁾	ILHCLK	-	-	3.5	uA
Clock input current (Low)	IILCLK	-	-	-3.5	uA
Latch input current (High) ⁽¹⁾	IHLAT	-	-	3.5	uA
Latch input current (Low)	IILLAT	-	-	-3.5	uA
Data out output voltage (High)	VDOH	4.45	-	-	V
Data out output voltage (Low)	VDOL	-	1.3	2.0	V
Clock frequency	f _{CLK}	0.1	1.0	3.5	MHz

(Tab.2.4)



⁽¹⁾ **Note:** Each strobe includes pull-up resistance of 300KΩ ± 50%.

2.3.3 CM80 Table

Item	SYMBOL	MINI	TYP.	MAXI.	Unit
Head power supply	VH	23.5	24.0	24.5	V
Logic power supply	Vdd	4.75	5.0	5.25	V
Logic supply current	Idd	-	-	41	mA
Input Voltage (High)	VIH	0.8xVdd	-	Vdd	V
Input Voltage (Low)	VIL	0	-	0.2xVdd	V
Data input current (DI) High ⁽¹⁾	ILHDI	-	-	0.5	uA
Data input current (DI) Low	ILLDI	-	-	-0.5	uA
STB 1 to 3 input current (High) ⁽¹⁾	IHSTR	-	-	1.5	uA
STB 1 to 3 input current (Low)	IILSTR	-	-	-165	uA
Clock input current (High) ⁽¹⁾	ILHCLK	-	-	4.5	uA
Clock input current (Low)	IILCLK	-	-	-4.5	uA
Latch input current (High) ⁽¹⁾	IHLAT	-	-	4.5	uA
Latch input current (Low)	IILLAT	-	-	-4.5	uA
Data out output voltage (High)	VDOH	4.45	-	-	V
Data out output voltage (Low)	VDOL	-	1.3	2.0	V
Clock frequency	f _{CLK}	0.1	1.0	3.5	MHz

(Tab.2.5)



⁽¹⁾ **Note:** Each strobe includes pull-up resistance of 300KΩ ± 50%.

2.3.4 CM112 Table

Item	SYMBOL	MINI	TYP.	MAXI.	Unit
Head power supply	VH	23.5	24.0	24.5	V
Logic power supply	Vdd	4.75	5.0	5.25	V
Logic supply current	Idd	-	-	59	mA
Input Voltage (High)	VIH	0.8xVdd	-	Vdd	V
Input Voltage (Low)	VIL	0	-	0.2xVdd	V
Data input current (DI) High ⁽¹⁾	ILHDI	-	-	0.5	uA
Data input current (DI) Low	ILLDI	-	-	-0.5	uA
STB 1 to 4 input current (High) ⁽¹⁾	IHSTR	-	-	2	uA
STB 1 to 4 input current (Low)	IILSTR	-	-	-220	uA
Clock input current (High) ⁽¹⁾	ILHCLK	-	-	6.5	uA
Clock input current (Low)	IILCLK	-	-	-6.5	uA
Latch input current (High) ⁽¹⁾	IHLAT	-	-	6.5	uA
Latch input current (Low)	IILLAT	-	-	-6.5	uA
Data out output voltage (High)	VDOH	4.45	-	-	V
Data out output voltage (Low)	VDOL	-	1.3	2.0	V
Clock frequency	f _{CLK}	0.1	1.0	3.5	MHz

(Tab.2.6)



⁽¹⁾ **Note:** Each strobe includes pull-up resistance of 300KΩ ± 50%.

2.3.5 CM210/CM210A/CM216/CM216A Table

Item	SYMBOL	MINI	TYP.	MAXI.	Unit
Head power supply	VH	23.5	24.0	24.5	V
Logic power supply	Vdd	4.75	5.0	5.25	V
Logic supply current	Idd	-	-	122	mA
Input Voltage (High)	VIH	0.8xVdd	-	Vdd	V
Input Voltage (Low)	VIL	0	-	0.2xVdd	V
Data input current (DI) High ⁽¹⁾	ILHDI	-	-	0.5	uA
Data input current (DI) Low	ILLDI	-	-	-0.5	uA
STB 1 to 4 input current (High) ⁽¹⁾	IHSTR	-	-	3.5	uA
STB 1 to 4 input current (Low)	IILSTR	-	-	-385	uA
Clock input current (High) ⁽¹⁾	ILHCLK	-	-	13.5	uA
Clock input current (Low)	IILCLK	-	-	-13.5	uA
Latch input current (High) ⁽¹⁾	IHLAT	-	-	13.5	uA
Latch input current (Low)	IILLAT	-	-	-13.5	uA
Data out output voltage (High)	VDOH	4.45	-	-	V
Data out output voltage (Low)	VDOL	-	1.3	2.0	V
Clock frequency	f _{CLK}	0.1	1.0	3.5	MHz

(Tab.2.7)



⁽¹⁾ **Note:** Each strobe includes pull-up resistance of 300KΩ ± 50%.

2. PRINT HEAD

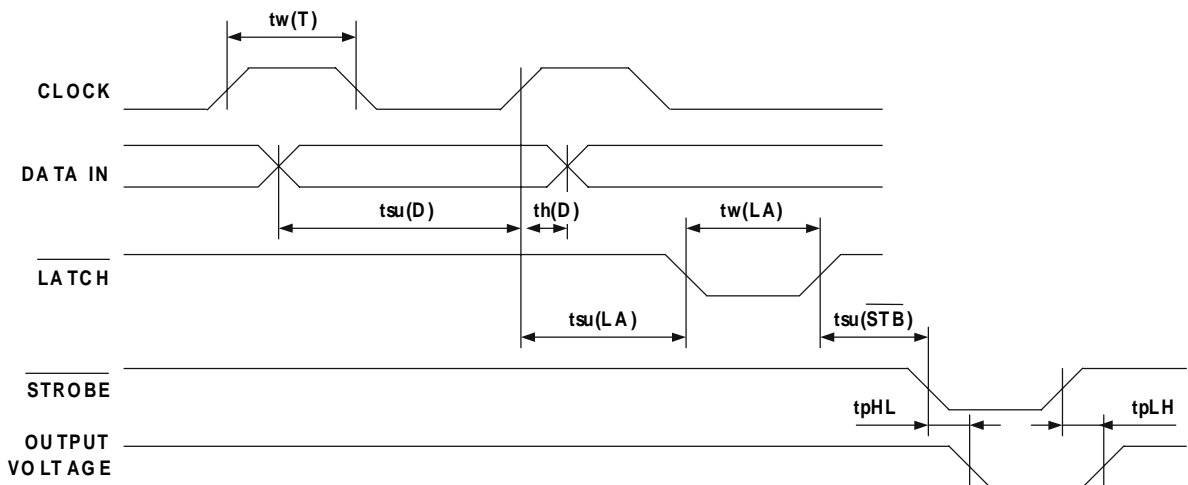
2.4 SWITCHING CHARACTERISTICS OF CIRCUIT

The switching characteristic summarized in the table 2.8, are the same for all models.

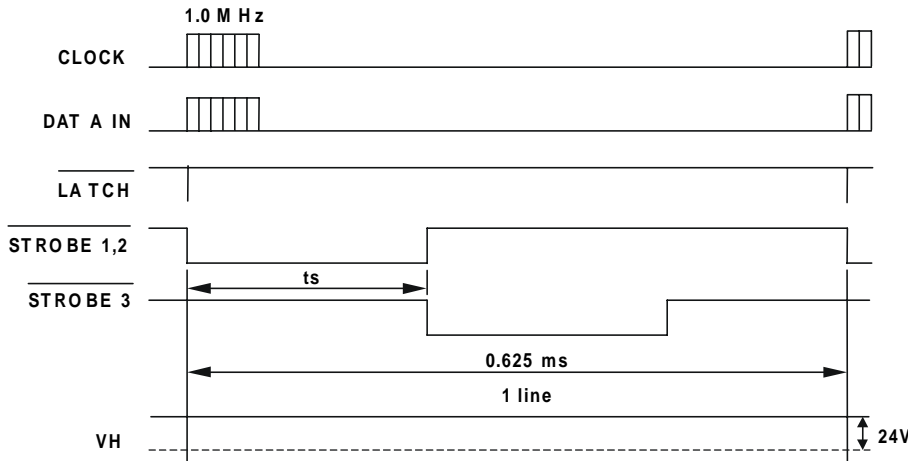
(Tab.2.8)

Item	SYMBOL	MINI	TYP.	MAXI.	Unit
Clock frequency	f_{MAX}	-	-	4.0	Mhz
Clock pulse width	$tw(T)$	70	-	-	ns
Data setup time	$tsu(D)$	50	-	-	ns
Data hold time	$th(D)$	40	-	-	ns
Latch setup time	$tsu(LA)$	100	-	-	ns
Latch pulse width	$tw(LA)$	100	-	-	ns
Strobe setup time	$tsu(STB)$	100	-	-	ns
Strobe to driver Output delay time	$TpLH$ $TpHL$	-	-	3.5	μs

2.5 TIMING CHART OF CM58, CM60, CM80, CM112, CM210 and CM216 MODEL

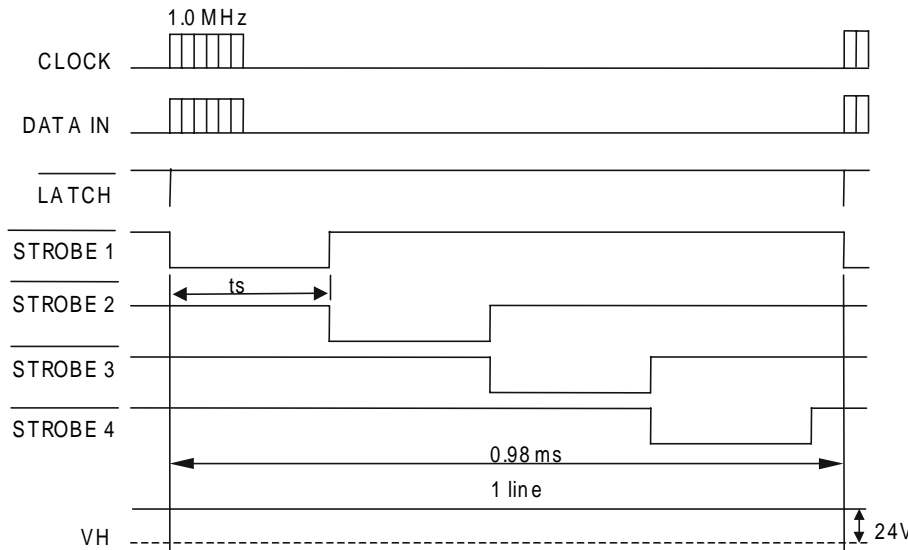


(Fig.2.1)



(Fig.2.2)

Only for CM210 and CM216



(Fig.2.3)

2.6 THERMISTOR

The thermistor is very important to adjust the strobe time (T_{strobe}) ~ (SLT) in function of the head temperature and to monitor the temperature to prevent the head damage if the temperature is over the limit described in the Maximum conditions table

- Resistance $R_{25} = 30 \text{ K}\Omega \pm 5\%$ at 25°C
- Operating temperature $-20 \sim + 70^\circ\text{C}$
- Time constant 30 sec.

2. PRINT HEAD

Then the resistance value, R, versus temperature , T (in °C) is given by the formula :

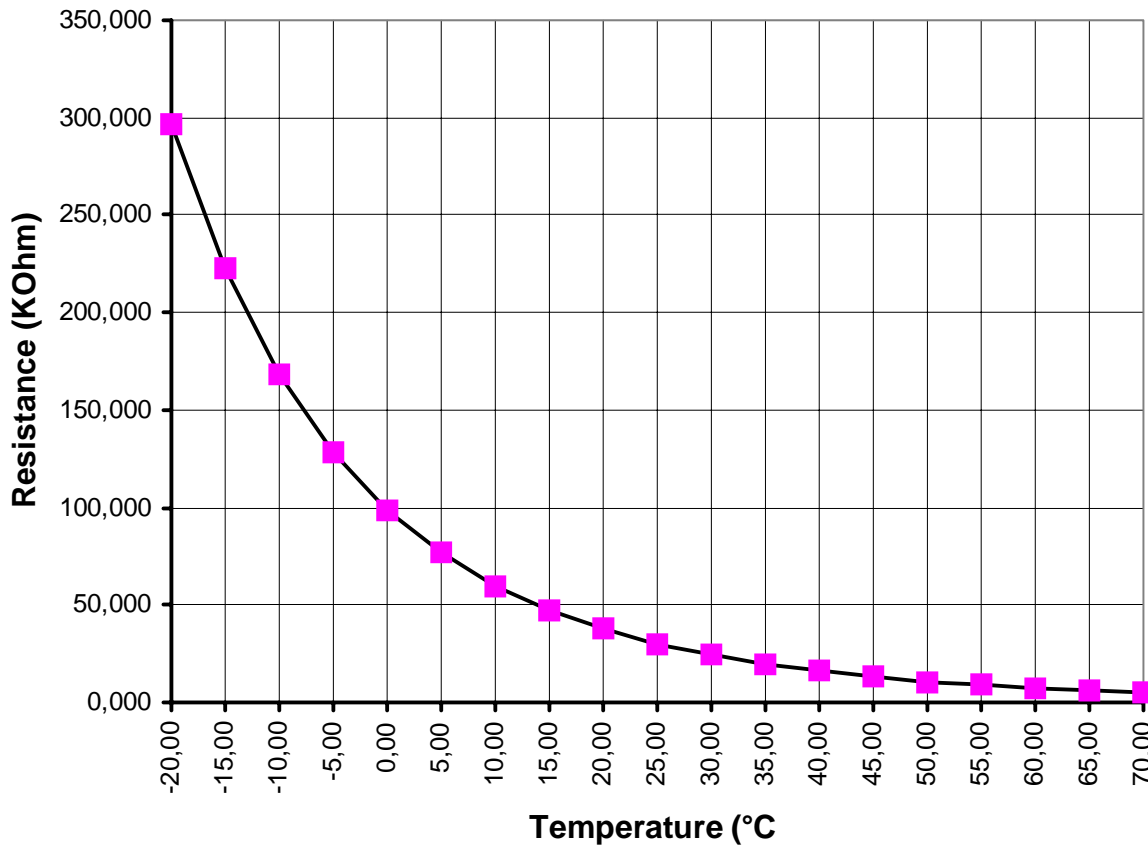
$$R(T) = R_{25} * e [3950*(1/(T+273) - 1/(25+273))]$$

Temperature (°C)	Thermistor Resistance (R)		
	MIN. (KΩ)	TYP. (KΩ)	MAX. (KΩ)
-20.0	268.8	296.6	326.5
-15.0	202.7	222.3	243.2
-10.0	154.2	168.2	182.9
-5.0	118.4	128.4	138.9
0.0	91.70	98.90	106.4
5.0	71.65	76.71	82.10
10.0	56.20	59.99	63.88
15.0	44.50	47.27	50.10
20.0	35.49	37.53	39.58
25.0	28.50	30.00	31.50
30.0	22.84	24.14	25.46
35.0	18.42	19.55	20.71
40.0	14.95	15.93	16.94
45.0	12.20	13.06	13.94
50.0	10.02	10.76	11.54
55.0	8.271	8.920	9.596
60.0	6.864	7.430	8.021
65.0	5.726	6.219	6.738
70.0	4.799	5.230	5.686

(Tab.2.9)

2.6.1 Thermistore Curves

(Fig.2.4)



3. STEPPER MOTOR

3.1 STEPPER MOTOR

The paper feed pitch for stepper motor is :

- 1 step for one dotline⁽¹⁾ for the CM58, CM60 and CM112 model;
- 2 steps for one dotline⁽¹⁾ for the CM210 and CM216 model.



⁽¹⁾ **Note:** 1 dotline = 0.125 mm.

Item	Specification
Drive voltage	DC 24V
Drive mode	Bipolar drive
Pull out torque	316.1 g.cm MIN
Max slew speed	1100 pps MIN
Winding resistance	9Ω ± 10% at 25 °C
Winding inductance	9 mH (1kHz, 1Vrms)
Insulation resistance	100 MΩ MIN
Dielectric strength	AC 500V * 1 minute leak.
Life	8000 h. MIN
Maximum coil temperature	115°C

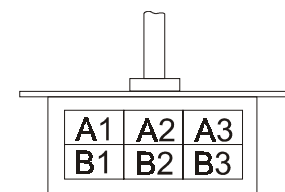
(Tab.3.1)

CMxxx switching sequence (viewed from mounting surface)

Color	Motor
Black	A1
Brown	A3
Orange	B1
Yellow	B3

(Tab.3.2)

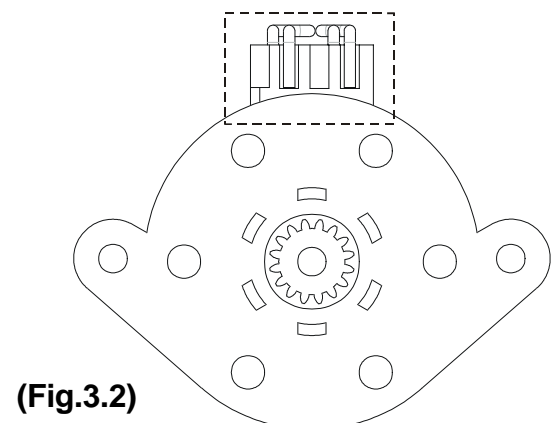
Motor Lead Termination



(Fig.3.1)

Step	Color			
	Black	Brown	Orange	Yellow
1	-	+	+	-
2	-	+	-	+
3	+	-	-	+
4	+	-	+	-

(Tab.3.3)



(Fig.3.2)

3.1.1 Dynamic torque characteristics

Frequency (pps)	Pull-out (10⁻⁴Nm)	Pull-in (10⁻⁴Nm)	Current (mA)
200	597.2	596.3	3159
400	639.4	502.1	2282
600	478.7	409.1	1624
800	395.2	314.3	1147
1000	319.7	217.7	836
1200	117.7	0.0	681

(Tab.3.4)**3.2 PRECAUTION**

Precaution :

1. To prevent stepper motor over temperature, CUSTOM ENGINEERING SPA recommends to drive the motor with a PWM current control circuit.

4. SENSOR

4.1 SENSOR

Absolute Maximum Ratings

(Ta = 25°C)

(Tab.4.1)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P	75	mW
	Peak forward current Pulse width $100 \leq \mu s$, duty cycle = 1%	I_{FP}	1	A
Output	Collector-emitter voltage	V_{CEO}	30	V
	Emitter-collector voltage	V_{ECO}	5	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	75	mW

Electro-optical Characteristics

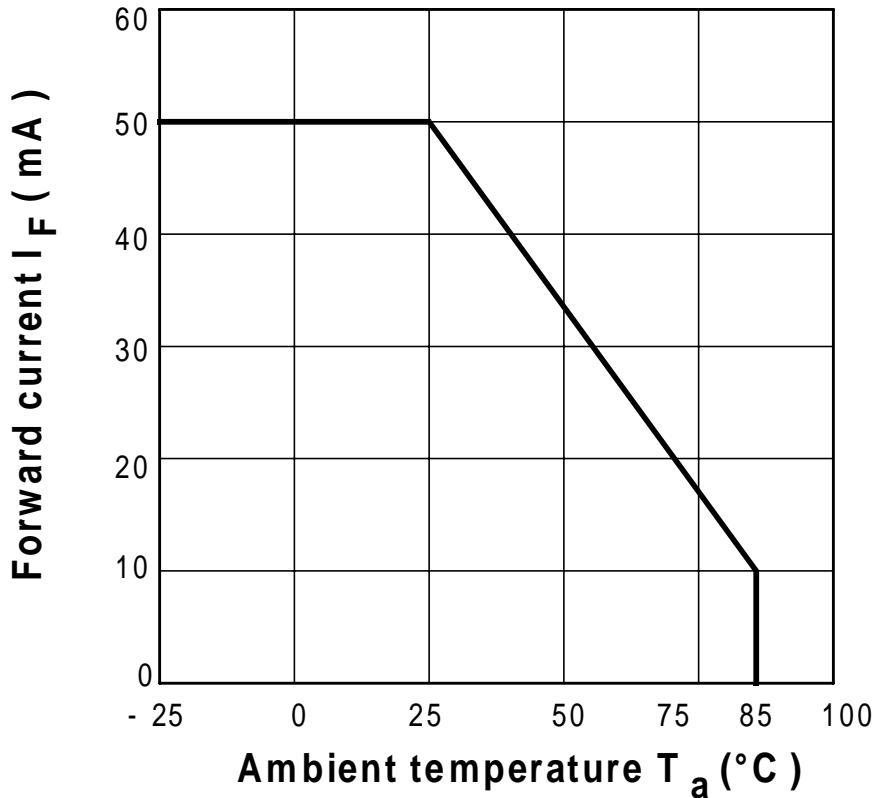
(Ta = 25°C)

(Tab.4.2)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F = 20mA$	-	1.2	1.6	V
	Reverse current	I_R	$V_R = 5V$	-	-	10	μA
	Peak wavelength	λ_p		-	940	-	nm
Output	Collector dark current	I_{CEO}	$V_{CE} = 10V$	-	-	100	nA
Speed	Rise time	t_r	$V_{CE} = 2V, I_C = 100 \mu A$ $R_L = 1K\Omega$	-	20	-	μs
	Fall time	t_f		-	20	-	μs
Leakage current		I_{CEO0}	$I_F = 20mA, V_{CE} = 5V$	-	-	1	μA

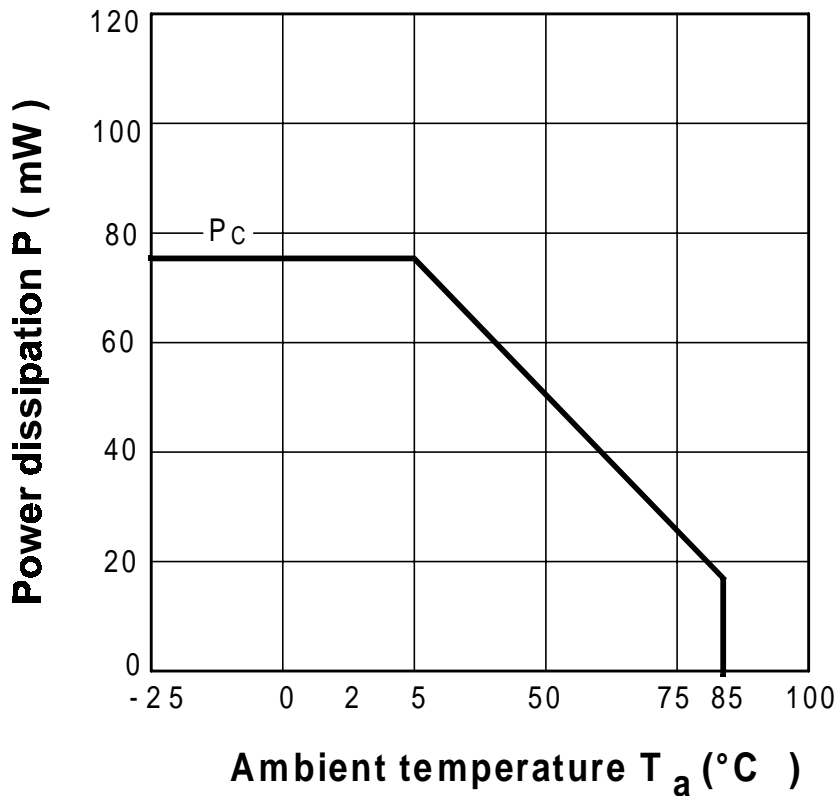
4.2 GRAPHICS OF TYPICAL CHARACTERISTICS

Forward Current vs. Ambient Temperature



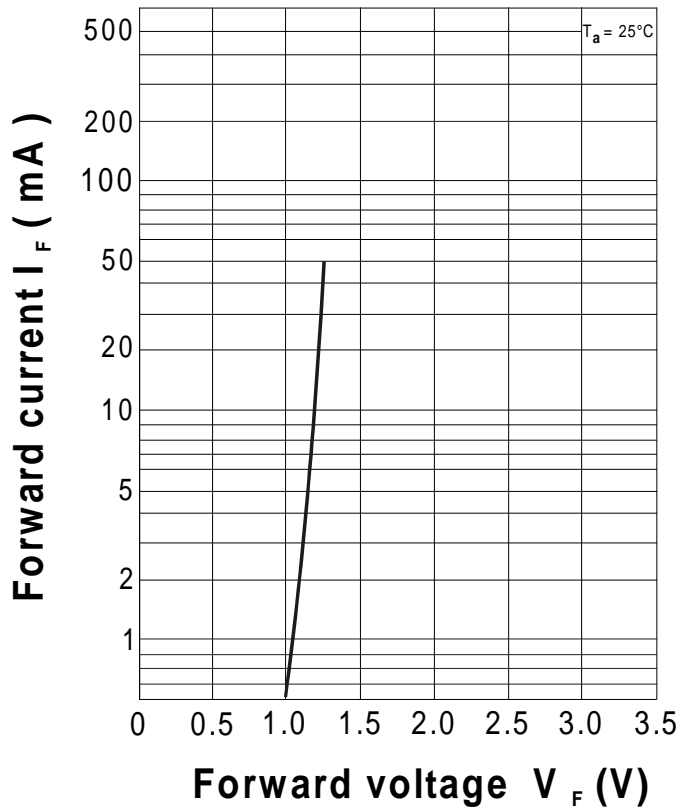
(Fig.4.1)

Power Dissipation vs. Ambient Temperature



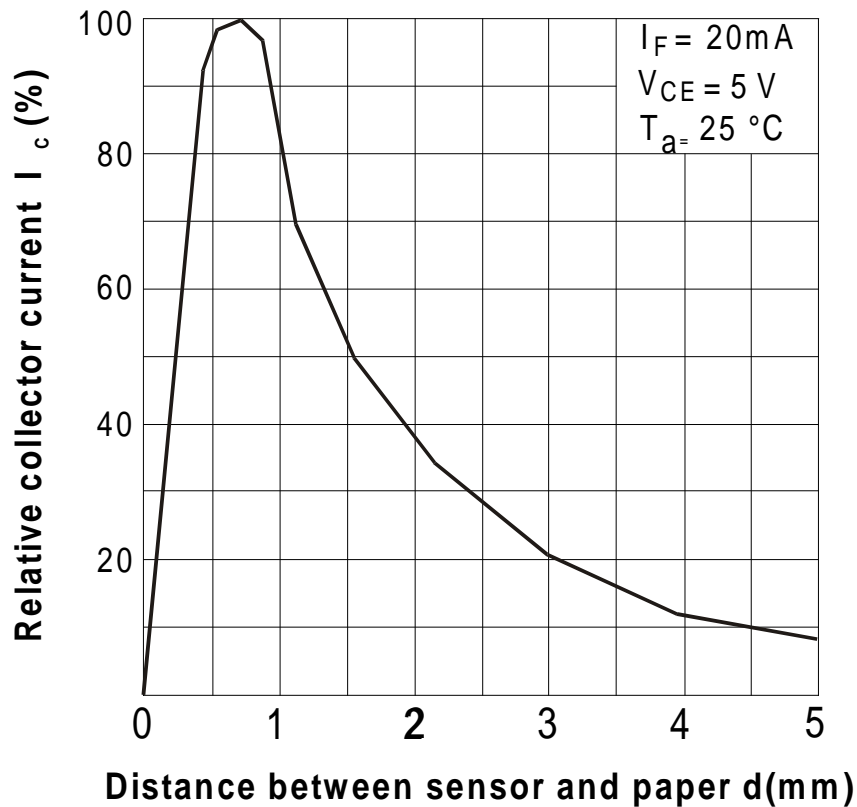
(Fig.4.2)

Forward Current vs. Forward Voltage



(Fig.4.3)

Relative Collector Current vs. Distance from sensor to paper



(Fig.4.4)

5. DIMENSIONS

5.1 DIMENSIONS

The figure 5.1 illustrates the overall dimensions for the CM series thermal printing mechanism.

MODEL	A	B	C	D	E
CM58	106.6	59	41	38	71.5
CM60	108.6	61	42	39	73.5
CM80	128.6	81	52	49	93.5
CM112	160.6	113	68	65	125.5
CM210	284.6	237	130	127	249.5
CM216	284.6	237	130	127	249.5

(Tab.5.1)

(Dimensions in mm)

