SS205-V3-HS

Technical reference

Preface

- This manual provides complete technical information about **SS205-V3-HS** thermal printer mechanism.
- For customized printers, **A.P.S.** supplies documentation in addition to the present specification.
- The present specification is valid also for customized types, where the different condition has not effects for common data (eg. different length of elec. cables).
- More information is available upon request such as high speed printing applications and reliability figures.

- **A.P.S.** reserves the right to make changes to the product, without notice, to improve reliability, functions or design.

- **A.P.S.** does not assume any liability arising out of the application or use of the product or circuits described within.

- The warranty terms of the product are described in a separate document, ask **A.P.S.** to obtain this document.

Revision history

Rev. Index	Date	Page/ Sec.	Description	Author	TDP
A	6-Feb-2007	-	Preliminary version	OB	NA
B	17-Sept-2007	-	Updated FPC Length	OB	NA
C	4-Oct-2007	4-5, 9, 16-19	Standard FPC Length – 50 km TPH lifetime – opto and thermistor update – mechanical drawing update	OB	NA
D	14-Dec-2007	5, 11, 17	General characteristics corrected, Opto threshold level updated, FPC minimum inside bending radius specified	OB	NA
E	8-Apr-2008	13-15, 18, 20	First issue of official version Add Chapter 4.2 on current driving mode, updated Opto threshold level, APS Ordering Code and Model Name added	OB	2008-079
F	12-Dec-2008	5, 23	Nominal current consumption for 7.2V corrected, roller with plastic bush	OB	2008-184

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1. INTRODUCTION

The **SS205-V3-HS** (Super Small 205, Version 3, High Speed, Low cost) is a new version of latest **SS205-V2-HS** optimized for low cost application. It is compatible with current SS205-V2-HS.

The printer has been designed to be the smallest, wide voltage range (from 5.5V to 9.5V), and high efficiency (20% less consumption than standard 5V mechanisms) easy loading printer on its market. The unique easy loading APS concept makes the **SS205** an ultra compact, reliable and cost-effective mechanism. The rubber roller can be separated from the mechanism and fixed to the customer's door allowing for very easy integration.

The patented locking system of the rubber roller onto the chassis and easy opening lever makes the door position and rotation axe independent of the cover position, giving the customer a total freedom when designing his housing. The ergonomic centred paper path allows uniform and aesthetic housing design. Finally no access to cover sides is required to open the door.

1.1. SS205-V3-HS Features

- **Patented Easy loading and Easy Door Opening System**
- **Ultra compact design (width is 68mm, depth 15mm)**
- **Up to 75 mm/s printing speed**
- **Ultra light (26g)**
- **Starting operating voltage as low as 3.0V for logic and 5.5V for the dots**
- **High resolution printing (8 dots/mm)**
- **Life of 100 million pulses, 50 km**
- **Low consumption**
- **Low noise due to its technology (thermal)**

2. GENERAL CHARACTERISTICS

Item	Specification		
Printing Method	Thermal dot line printing		
Number of dots/line	384		
Main scanning density (dot/mm)	8		
Subsequent scanning density (line/mm)	8		
Printing Width (mm)	48		
Paper Width (mm)	58 +0/-1		
Paper feed pitch (mm) Printing pitch (mm)	0.0625 (every 1 step of the motor drive signal) 0.125 (every 2 steps of the motor drive signal)		
Paper Feed tension (gf)	50 or more		
Paper Hold tension (gf)	80 or more		
Dimension W x D x H (mm)	68 x 24 x 26		
Weight (g)	Approx. 26		
Head temperature detection	Thermistor		
Paper end detection	Photo-interrupter		
Operating voltage range	Logic: from 3.0V to 5.25V Dots & Motor: from 5.5V to 9.5V		
Current consumption	At printing (7.2V): (64 dots ON)	2.79 A (Head power)	
		50 mA (Head logic 5V)	
		0.76 A (Motor in voltage control mode)	
	At paper feeding (7.2V):	0.76 A (Motor in voltage control mode)	
		<100µA (Head logic 5V)	
Recommended Paper (Equivalent types can be used)	JUJO-AF50KS-E (standard grade) JUJO-AF50KS-E3 (high sensitivity)		
Operating temperature range (°C)	0/+50		
Operating humidity (RH%)	20-85 (no condensation)		
Storage temperature range (°C)	-25/+70		
Storage humidity (RH%)	10-90 (no condensation)		

Printer life

	Durability	Basic conditions	Maximum variations
Thermal head pulse resistance	100 million pulses	- Room temp.: 20 ÷ 25 °C - Head temp.: 65 °C max. - Rated energy	Max. 10% average dots resistance value (Ohms) from initial value.
Abrasion/wear resistance	50 km of paper		

3. THERMAL HEAD AND PRINTING CONFIGURATION

3.1. Outlines

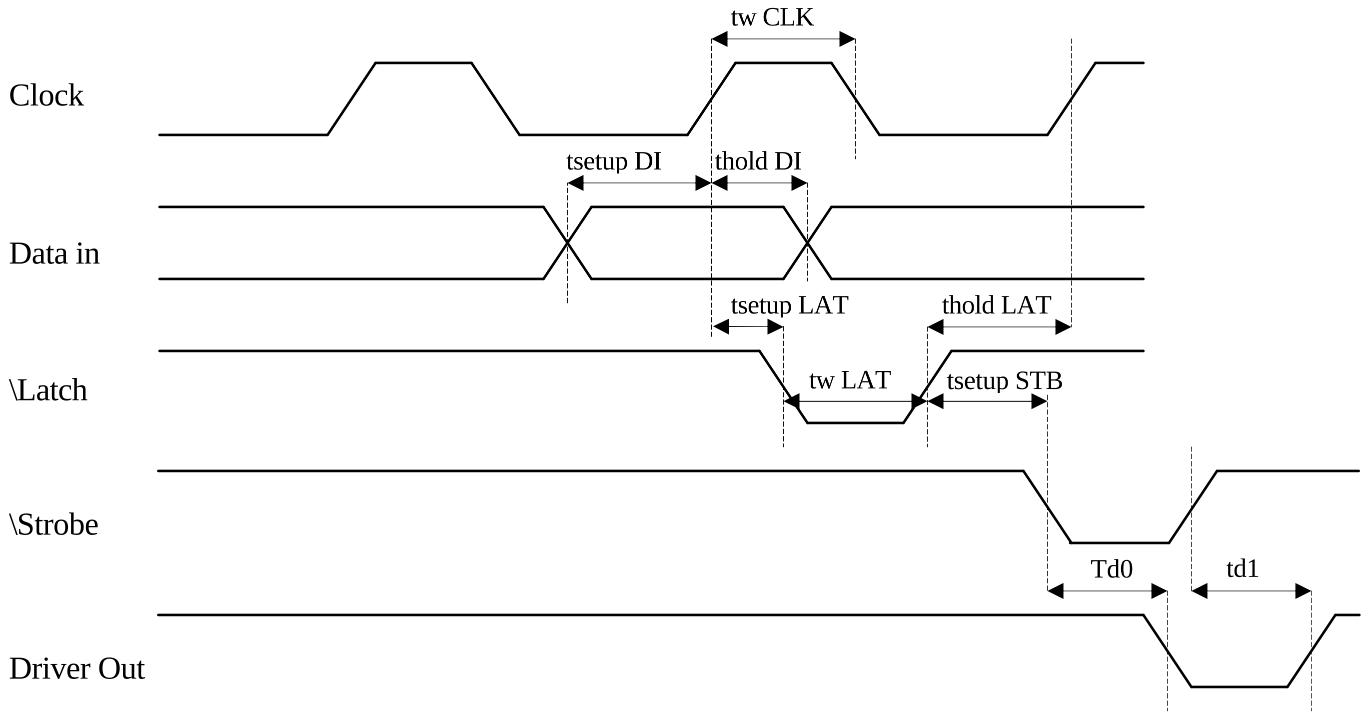
Number of heat elements	384 dots
Heat element pitch	0.125 mm
Print width	48 mm (centred on paper)
Average resistance	165 Ohms ±10%

3.2. Thermal head electrical characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Print voltage	VH	5.5	7.2	9.5	V
Logic voltage	Vdd	3.0	5.0	5.25	V
Logic current	Idd	-	-	55	mA
Input voltage (High)	V_{IH}	0.8xVdd	-	Vdd	V
Input voltage (Low)	V_{IL}	0	-	0.2xVdd	V
Data input current (DI) High	I_{IH} DI	-	-	1	µA
Data input current (DI) Low	I_{IL} DI	-	-	-1	µA
STB input current (High)	I_{IH} STB	-	-	24	µA
STB input current (Low)	I_{IL} STB	-	-	-438	µA
Clock input current (High)	I_{IH} CLK	-	-	1	µA
Clock input current (Low)	I_{IL} CLK	-	-	-1	µA
Latch input current (High)	I_{IH} LAT	-	-	1	µA
Latch input current (Low)	I_{IL} LAT	-	-	-1	µA
Clock frequency	f CLK	-	-	8	MHz
Clock width	tw CLK	30	-	-	ns
Data setup time	tsetup DI	70	-	-	ns
Data hold time	thold DI	30	-	-	ns
Latch width	tw LAT	200	-	-	ns
Latch setup time	tsetup LAT	300	-	-	ns
Latch hold time	thold LAT	50	-	-	ns
Data out delay time	Td0	-	-	3000	ns
STB setup time	tsetup STB	300	-	-	ns
Driver out delay time	Td1	-	-	3000	ns

3.3. *Timing chart*

The following chart gives the timing for driving the print-head:



3.4. Maximum conditions at 25°C

Item	Maximum conditions	Unit
Supply energy	0.367	mJ/dot
Print cycle	1.67	ms/line
Supply voltage	9.5	V
Logic voltage	6.5	V
Head temperature	70	°C
Number of dots to be energized simultaneously[1]	64	dots

Notes:

- If energy above maximum ratings is applied to one dot, the print quality of this dot may be affected (usually by making a “light” print-out).
- If the print cycle is less than that the one indicated above, then the maximum supply energy value is decreased. For these applications, please contact APS for further information.
- When using low energy paper, please contact A.P.S. for more information.

3.5. Typical printing conditions

Item	Symbol	Electrical conditions (64 dots fired at the same time)			Unit	Temp.
TPH/Motor voltage*	VH, VM	7.2			V	25°C
Power consumption	Po	0.212			W/dot	
Print cycle	S.L.T.	Max Speed	60% Speed	Inspection	ms/line	
		2.16	3.57	10		
Energy consumption	Eo	0.18	0.22	0.34	mJ/dot	
ON time	Ton	0.84	1.05	1.5	ms	
Supply current	Io	2.6			A	

* In order to remove effect of voltage drop from drivers, those figures are given in following conditions:
  - ⇒ VH TPH is voltage between VH & GND FPC contacts while printing
  - ⇒ VM Motor is voltage between 2 motor Phases (PHI1/PHI3 or PHI2/PHI4) while running

The print optical density is then 1.0 minimum with a maximum variation of 0,3. This measurement is done at the full black pattern by Macbeth densitometer RD-914. Full black pattern is defined as all dots printing pattern (100% black of 64 dots x 30 scanning lines) printed under correct paper speed on JUJO-AF50KS-E thermal paper.

[1] This condition satisfies the print density as defined in section 3.5

3.6. Heating time calculation

The following formula allows to calculate the heating time T_{on} depending on driving voltage VH:

$$T_{on} = \frac{E_0}{P_0} = E_0 * \frac{(N*R_{com} + R_{av} + R_{ic} + R_l)^2}{V_H^{\,2} * R_{av}}$$

Where:

E_0 is the nominal energy
V_H is the driving voltage
R_{av} is the average resistance
N is the number of dots energized simultaneously
R_{com} is the common resistance (0.05 Ohms)
R_{ic} is the driver saturated resistance (10 Ohms)
R_l is the lead resistance (10 Ohms) (or resistance of TPH contacts)

3.7. Thermistor

When performing continuous printing, it is recommended that the supply energy be reduced so that the substrate temperature monitored through the thermistor will remain below 70°C.

The thermistor specification is the following:

- R25, resistance at 25°C:	10 KOhms +/- 10%
- B value:	3550 KOhms +/- 3%
- Operating temperature:	-20°C to +80°C
- Time constant:	Max.30 s (in the air)

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

$$R_{(T)} = R_{25} * e^{B*(\frac{1}{T+273} - \frac{1}{25+273})}$$

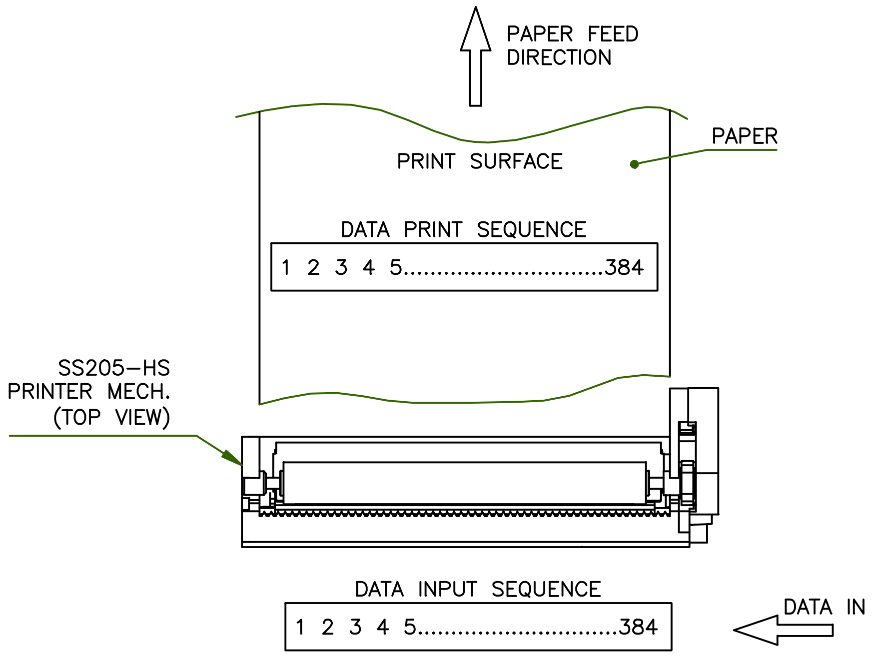
The dot activation compensation time (1% per degree) is defined as follows:

$$T_{on} = T_{on(25°C)} * (1 - (\frac{T-25}{100}))$$

$T_{on(25°C)}$ is given in section 3.3.

3.8. Print position of the data

The first bit of data (dot 1) entered is the first bit of data printed (FIFO), left side of TPH, top view (opposite side of the printer gear box).



3.9. Operating precautions

1. When performing continuous printing, the supply energy should be reduced so that the substrate temperature, monitored through the thermistor, will remain below 65°C.
2. All strobes signals must be disabled during the power and logic voltage on/off sequence.
3. During assembly, printer must be manipulated in ESD protected environment. Do not touch the connector pins with naked hands.
4. It is also highly recommended to warn final user of ESD damage risk by touching with bare hands thermal printhead heater line or opto-sensor.
5. The print-head substrate surface is coated with glass, for this reason, mechanical stresses, shocks, dust and scratches should be avoided to prevent damage.
6. When the print-head operation is completed, print supply voltage (including the charged voltage with capacitor) should be reduced to the ground level and maintained until next print-head operation.
7. Avoid condensation or water projection, if this occurs, do not switch on the print-head power, until condensation or water drops have disappeared.
8. When plugging in and out of the FPC, avoid using excess force as damage may result (Plug in-out cycle for this FPC should not exceeded 20 times). Do not pick up the mechanism by the FPC.
9. Always turn printer off before connection or disconnection of FPC.
10. Print quality would become degraded if paper or ink residue were stuck on the heat element area. In this case, clean the print-head with a soft applicator and alcohol. Do not use sandpaper as this will destroy the heating elements. For same reasons, avoid using printer in dusty environment.
11. If abnormal “sticking sound” is heard while printing, please check and adjust the printing mode to eliminate this sound (printing speed and heating time).
12. Make sure the paper does not have high abrasion factor, low sensitivity or abnormal chemicals.
13. To avoid current surges and voltage losses, VH and GND cable length should be less than 100mm and 47 µF aluminum capacitor between VH and GND is advised on customer’s controller board side.
14. FPC minimum bending radius of 0.5 mm

Important precautions

<u>To prevent any dot element damage:</u>

At power up make sure that logic voltage (Vdd) is present simultaneously or before VH.

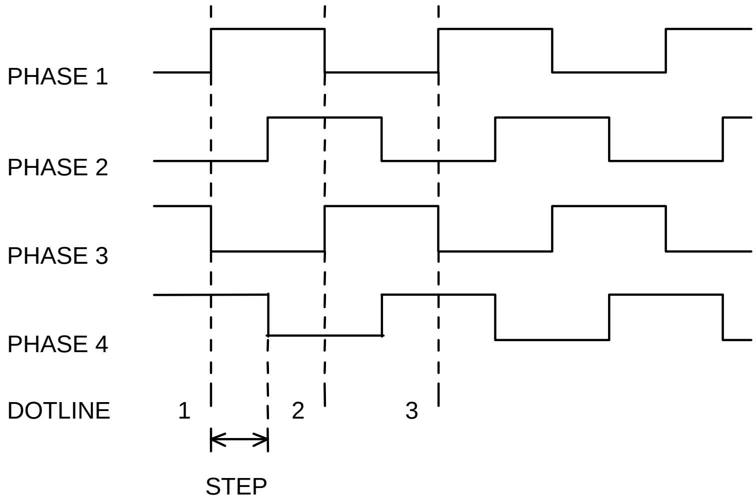
At power down make sure that VH is at 0 V before removing logic voltage.
Do not apply any pulse noise exceeding [2V. 20 ns] to any TPH signal terminals.

4. STEPPER MOTOR DRIVING METHODS

The stepper motor is a bipolar type. This implies to change the voltage polarity applied to the winding with using an “H bridge” power switches.
Few driving techniques are available: Full step and half step modes, which can be both in voltage or current control, and the micro-stepping mode.
Full step and Half step modes are the basic stepper driving mode which offers the simplest electronic control. These can also be combined to a current limitation in order to give smoother movement and to reduce strongly the heat dissipation in continuous printing application. Those driving mode can be achieve with using some drivers available on the market: the Rohm BA6845FS, the Sanyo LB1846, LB1848, or LB11948T which offer a PWM current control. Please refer to the IC’s data sheet for further information.
Micro-stepping mode is fully based on stepper coil current control. It offers a smoothest movement, lower noise and vibrations at low stepping rate.

Voltage drop into stepper motor driver circuit must be compensated to deliver the correct voltage at motor phases as defined in §4.1 (Otherwise, speed has to be reduced).

The following diagram shoes the Full step mode.



For good print quality, it is advised to keep the current into the windings between two successive dot-lines.
It is also recommended to have a few dot lines (usual value is 32 motor steps, about 2 mm) not printed at motor start to avoid print compression effect due to play take-up into gear box.

4.1. Paper feed speed in voltage control driving method

The following chart gives the maximum paper feed speed versus the voltage at stepper motor phases (voltage drop in driver circuit not included)

Voltage	Paper feed	Duty cycle (%)
5.5	40	75
6.0	50	60
6.5	53	50
7.0	57	45
7.5	60	40
8.0	65	35
8.5	70	30
9.5	75	20

Motor coil resistance is 19 Ohms ±10%

In order to avoid stepper motor overheat, it is strongly advised to respect the maximum ON/OFF duty cycle as indicated above. This is given for ambient room temperature (25°C) and may have to be confirmed by test depending customer integration and application conditions (motor overheating is affecting its power and torque performances). Note that the maximum period for the ON time is 30 seconds (when the duty cycle is not 100%).

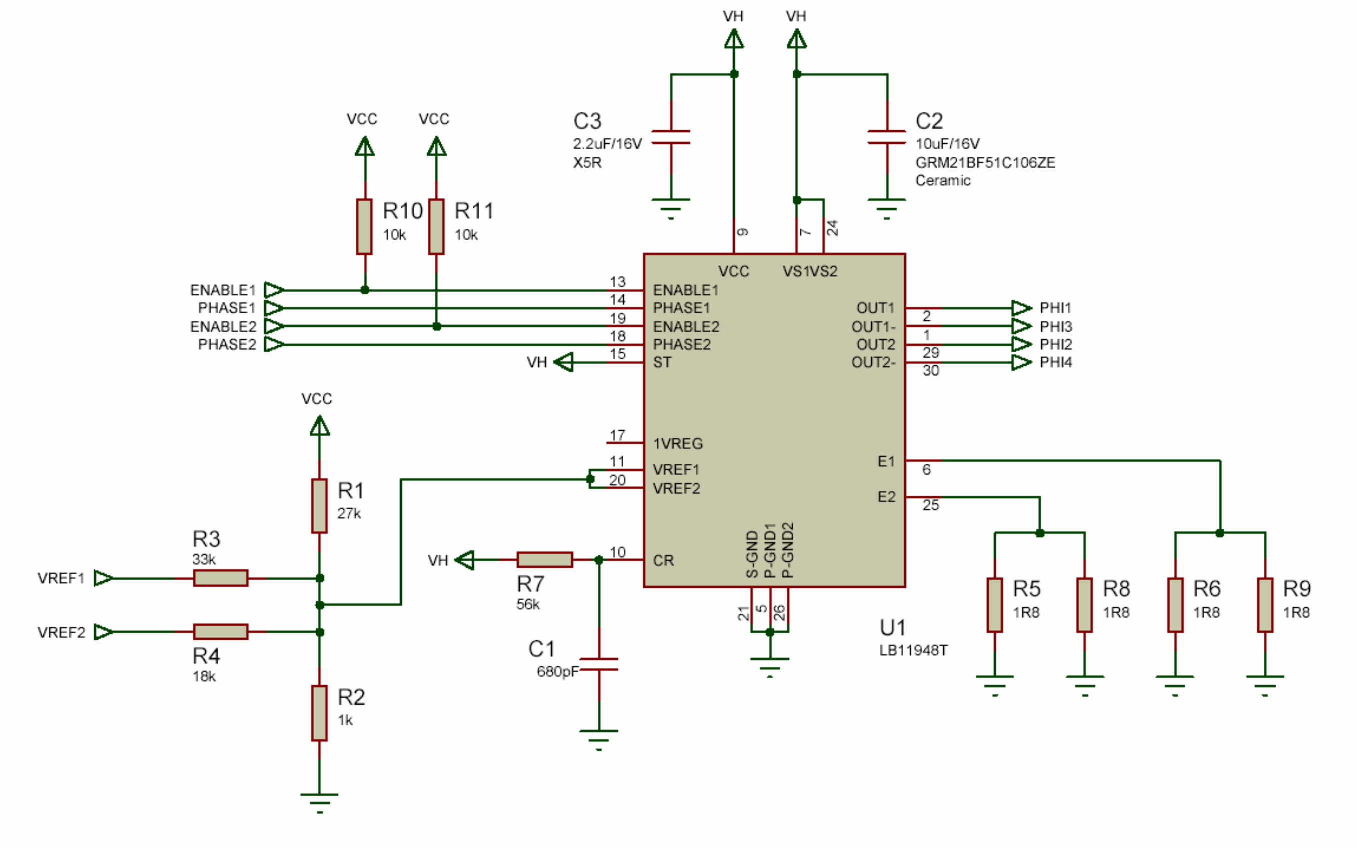
Example: since **Toff = Ton*100 / Duty Cycle – Ton** and maximum permissible Ton is 30s, at a voltage of 7V, we obtain from the table a duty cycle of 45%.
Inserting these values into the formula we obtain: Toff = 30*100/45 – 30 ≅ 37s.
So the maximum ticket length at maximum speed is: 68*30 ≅ 2m.
Then the printer must rest for 37 seconds.

4.2. Current control driving method

The following schematic gives indication of a possible design for current control, based on Sanyo LB11948T motor driver.

Current control mode helps reducing stepper motor heating. This is particularly useful in journal printing applications.

LB11948T Schematic:



Following table indicates value of stepper motor winding current regulated by the driver depending on the configuration of pins VREF[1,2].

VREF1	VREF2	VREF (V)	IOUT (mA)
0	0	0,109	121
1	0	0,198	220
0	1	0,272	302
1	1	0,361	401

Note: VREF and IOUT values are nominal values which do not take into account possible tolerances in resistors. For best accuracy, APS recommends to select resistors with at most 1% tolerance rating (resistors R1, R2, R3, R4, R5, R6, R8, R9).

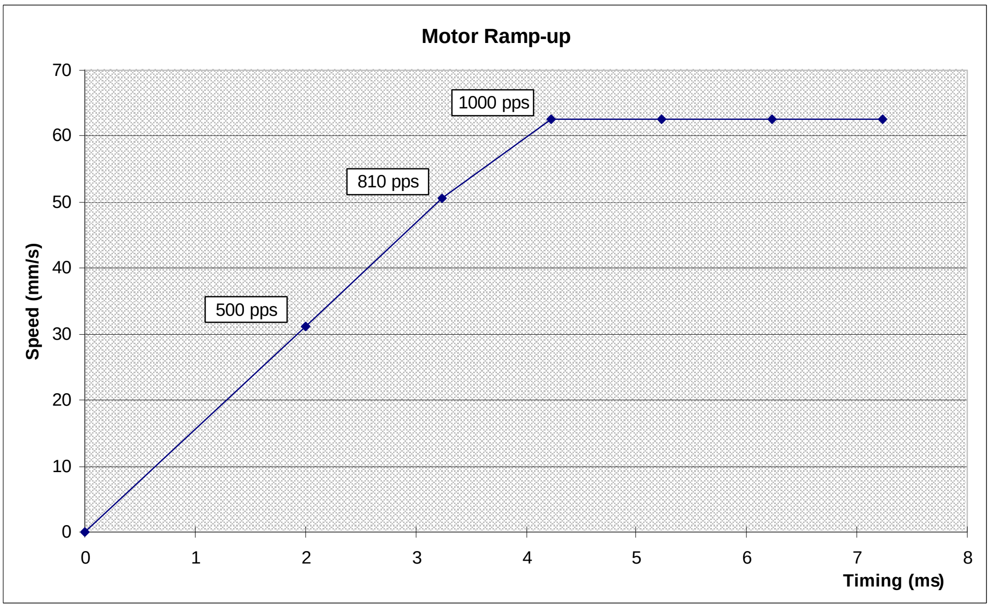
Example of motor ramp-up:
At start, it is recommended to have acceleration ramp-up, mostly with heavy paper load (large paper roll diameter), in order to have a smoother start and avoid motor step loose.

Driving conditions.

Current limitation per coil	250mA
Coil voltage	8v
Paper load	50g
TPH voltage	7v
Heating time	1m
Temperature	Ambient
Duty Cycle	20%

Proposed Motor ramp-up:

Number of steps	Speed (pps)	Speed (mm/s)	Step time (µs)
Start	0	0	2000
1	500	31,25	2000
2	810	50,63	1235
3	1000	62,50	1000



Note: this ramp may be adapted depending on customer integration and driving conditions.

5. PRINTER DRIVING TIMING

Printing is always a compromise between 3 parameters:

- Paper feed speed (function of voltage)
- Head activation time (function of voltage, TPH temperature, printing cycle)
- Maximum peak current available (function of voltage and max number of dots simultaneously activated)

For a given voltage, and a maximum current available, it is easy to determine the maximum paper feed speed (MaxPFS), as indicated on the above chart. Then if the two others parameters are not limiting this speed will also be the printing speed (MaxPS).

MaxPFS gives a time (by inverting) called SLT (scanning line time). In this time, the head must be activated. If this time is not long enough, MaxPS will be subsequently affected.

Then, the way of driving the head is a critical point in the thermal printing application.

A common way to limit the current in the head is to use dynamic division method.

For this, it is necessary to divide datas to the head dynamically, by software counting of actual number of "black" dots. This number of black dots has to be divided by the maximum dot value (64 dots simultaneously). Software will fill remaining dots with "0" and activates the strobes line. Doing so, activation will be always done with maximum number of black dots allowed, optimizing number of times the head needs to be activated. Printing standard text, the average number of black dots is usually less than 64 and sometimes can reach 128.

<u>Example</u>: at 6 V with the **SS205**, the strobe activation time is 0.84ms*$(7.2^2/6^2)$ = **1.21** ms. Max current requested to fire up to 64 dots simultaneously is 2.0A. Max Paper Feed Speed (**MaxPFS**) is **50** mm/s.

If the dot line is not full, the number of strobes pulses can be limited at the number of black dots divided by the maximum number of dots (**DOTSmax**).

If the maximum current available for the head is 1.8A, **DOTSmax** to be simultaneously activated will be **Imax / Idot** (Current per dot) where **Idot=VH / Rdot**.

So, using VH = 6V and Rdot = 185Ω (165Ω for dot + 20Ω for the dots drivers, Rcom omitted), we find: **DOTSmax=1.8/(6/185) = 55 dots** (Lower or equal to 64 max simultaneously activated).

So, for a full black line, the maximum number of strobe pulses per line will be 384/61 = **7** pulses. Thus the total heating time for those pulses will be: **SLT = 7** (pulses/line**)* 1.21** (ms/pulse) **= 8.47** ms/line.

Then **MaxPS** will be **0.125**(mm/line)**/8.47**(ms/line**) = 14.8**mm/s (< **MaxPFS)** as real print speed.

If dotline has 165 max black dots, number of **Pulses** will be: **165 / 55** = **3**, giving **SLT = 3.63** ms/line.

Then **MaxPS** will be **0.125 / 3.63 = 34.4**mm/s (< **MaxPFS)** as real print speed.

If dotline has 110 max black dots, number of **Pulses** will be: **110 / 55** = **2**, giving **SLT = 2.42** ms/line.

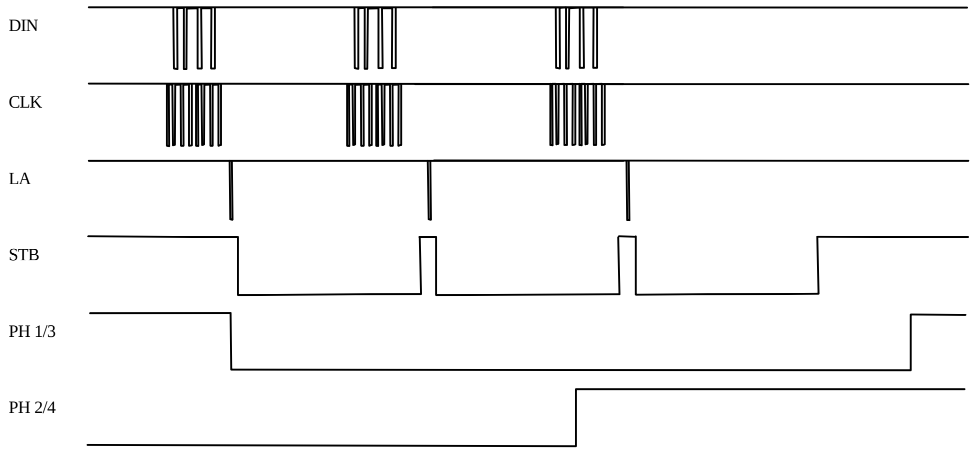
Then **MaxPS** will be **0.125 / 2.42 = 51.7**mm/s (> **MaxPFS)**. So, real print speed will be **50** mm/s.

Print speed can be dynamically adjusted, depending on the dot line to be printed.

Note: It is recommended to have to divide the pulses into portion of equal number of black dots to avoid Optical density variation on same dot line between several pulses of **DOTSmax** and the remaining dots of last pulse.

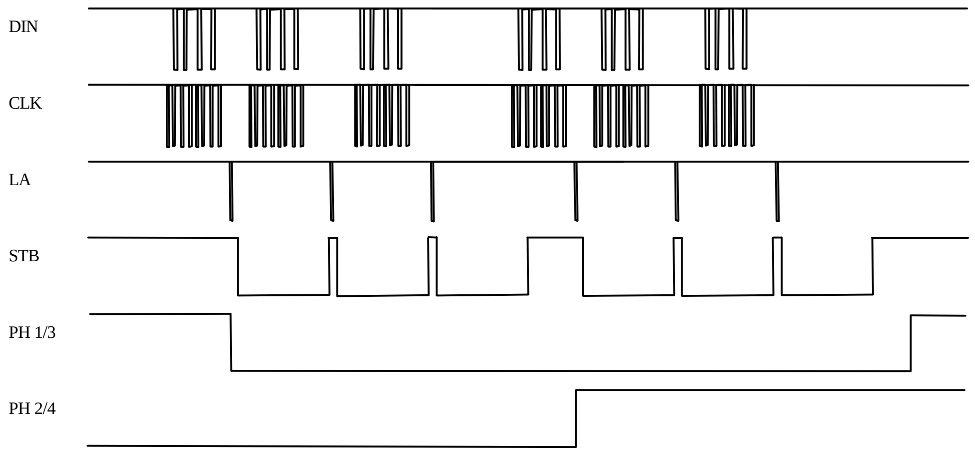
Example 1: Dynamic division, 2 steps per dotline.

This printing mode offers an accurate way of current limitation during heating, and also a way to control the printout speed in function of the number of black dots to heat.



Example 2: Dynamic division, Double scanning : 1 step per dotline.

This mode improves printing quality with increasing of TPH efficiency.



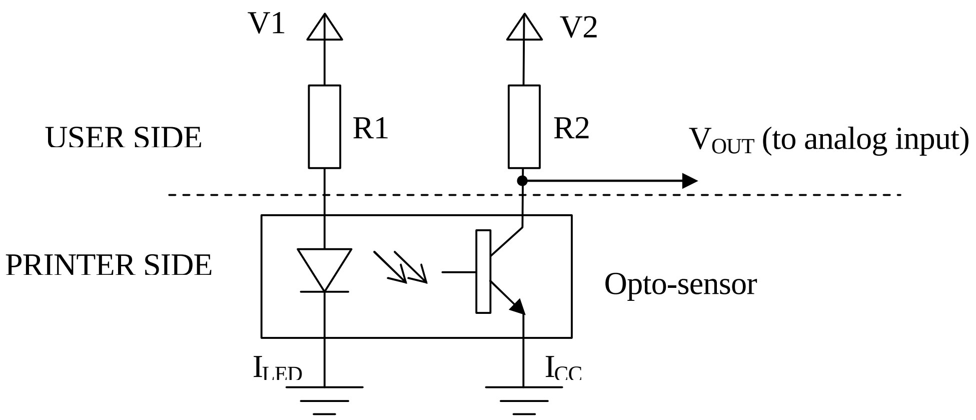
6. END OF PAPER SENSOR

SS205 has an end of paper sensor achieved by a photo-transistor. Arrange the circuitry so that no energy is applied to the head when there is no paper. If the head is energized when there is no paper and the head is in the down position, then both roller and head may be strongly damaged.

The table below contains opto sensor specification.

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward voltage (photodiode)	V_F	$I_F = 20mA$	1.0	1.2	1.5	V
Reverse current	I_R	$V_R = 6V$	-	-	10	µA
Output dark current	I_{CEO}	$V_{CE} = 20V$	-	10^{-9}	10^{-7}	A
Light current	I_L	$V_{CE} = 2V$ $I_F = 4mA$	10	-	400	µA
Rise Time	T_R	$V_{CE} = 2V$ $I_C = 100\mu A$ $R_L = 1K$ Ohms	-	20	100	µs
Fall time	T_F		-	20	100	µs

One possible interfacing of the opto-sensor circuit is shown in the figure below.



Where:

- $V1 = 5V$
- $R1 = 380$ Ohms (for $I_{LED} = 10mA$) or $R1 = 180$ Ohms (for $I_{LED} = 21mA$)
- $V2 = 3.3V$
- $R2 = 4700$ Ohms
- $V_{OUT} = V2 - R2 \cdot I_{CC}$

In such configuration, the phototransistor current threshold can be defined as follows:

Light Current **I_{LED} (mA)**	**Phototransistor Threshold Current** **I_{CC} (μA)**	**Differential V_{OUT}** **DeltaV_{OUT} (V)**
10	43	0.20
21	90	0.42

If phototransistor current is below threshold, printer is in no paper condition.
If phototransistor current is above threshold, paper is detected.

External light can affect reliability of end-of-paper condition detection.
It is recommended to perform differential measurement of the I_{CC} current.

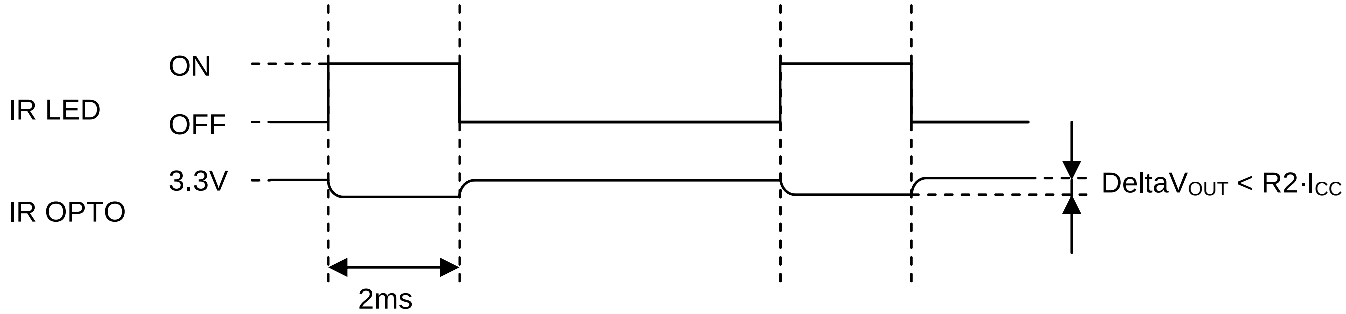
The system should repeatedly switch the IR LED on and off. The system should measure the analog value of V_{OUT} signal with LED on, and with LED off.

The exact procedure may be as follows:

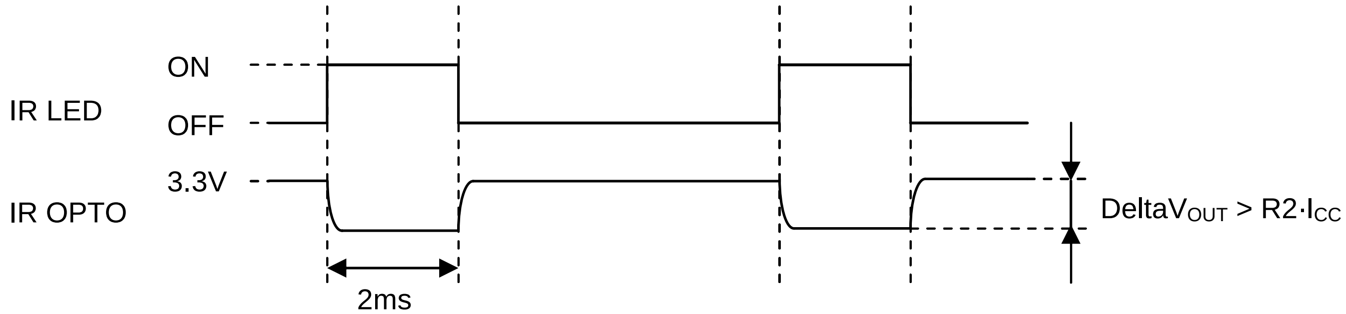
1. Measure opto-sensor level with LED off: V_{OUT}(OFF)
2. Switch on opto-sensor LED
3. Wait 2ms
4. Measure opto-sensor level with LED on: V_{OUT}(ON)
5. Switch off opto-sensor LED
6. Compute differential opto-sensor level DeltaV_{OUT} = V_{OUT}(OFF) - V_{OUT} (ON)
7. Update end-of-paper condition flag based on DeltaV_{OUT} value

The whole procedure may be repeated about every 20ms.

Following figures show typical waveforms, without and with paper presence.



Typical waveform without paper.



Typical waveform with paper.

7. PIN OUT ASSIGNMENT

One Flexible Printed Circuit (FPC) is gathering all signals.
Contacts pitch is 0.5mm and the number of contacts is 32.
FPC connector can be: JST 32FLT-SM1-TB (Non-Zif, straight) or 32FLH-SM1-TB (Zif, right angle). For RoHs type version, add (LF)(SN) at end of JST reference.

Pin number	Signal name	Function
1	VH	Dotline voltage
2	VH	Dotline voltage
3	VH	Dotline voltage
4	VH	Dotline voltage
5	DATA_OUT	Data output signal
6	VDD	Logic Voltage
7	/STB5-6	Strobe signal (dots 1 to 128)
8	GND	Gnd (dotline and logic)
9	GND	Gnd (dotline and logic)
10	GND	Gnd (dotline and logic)
11	/STB4	Strobe signal (dots 129 to 192)
12	CLK	Serial clock signal
13	/STB2-3	Strobe signal (dots 193 to 320)
14	GND	Gnd (dotline and logic)
15	GND	Gnd (dotline and logic)
16	CO	Collector of photo-transistor
17	GND	Gnd (dotline and logic)
18	GND	Gnd (dotline and logic)
19	VF	Anode of photo-sensor
20	TM	Thermistor 1st terminal (2nd is Gnd)
21	/STB1	Strobe signal (dots 321 to 384)
22	VDD	Logic Voltage
23	CLK	Serial clock signal
24	/LATCH	Latch signal
25	DATA_IN	Data input signal
26	VH	Dotline voltage
27	VH	Dotline voltage
28	VH	Dotline voltage
29	PHI1	First phase of stepper motor
30	PHI2	Second phase of stepper motor
31	PHI3	Third phase of stepper motor
32	PHI4	Fourth phase of stepper motor

8. MECHANICAL & HOUSING

8.1. Designing the door

The function of the door is to bring the rubber roller to the chassis' window entrance and to make it follow the external path of the chassis' window.
Given the shape of the chassis and the example in the mechanical drawing section (end of the specification), the cover is fairly easy to design.
In order to keep a good alignment, it is strongly advised to keep the rubber roller fully floating inside the cover to compensate any tolerance problem inside the cover.
Moreover this play must be present in order to allow the rubber roller to follow the shape of the chassis.
However, the cover must ensure a fairly good lateral alignment of the roller gear and chassis' window entrance in order to avoid damage of roller teeth that might cause abnormal friction inside gear box.

8.2. The Easy Door Opening System

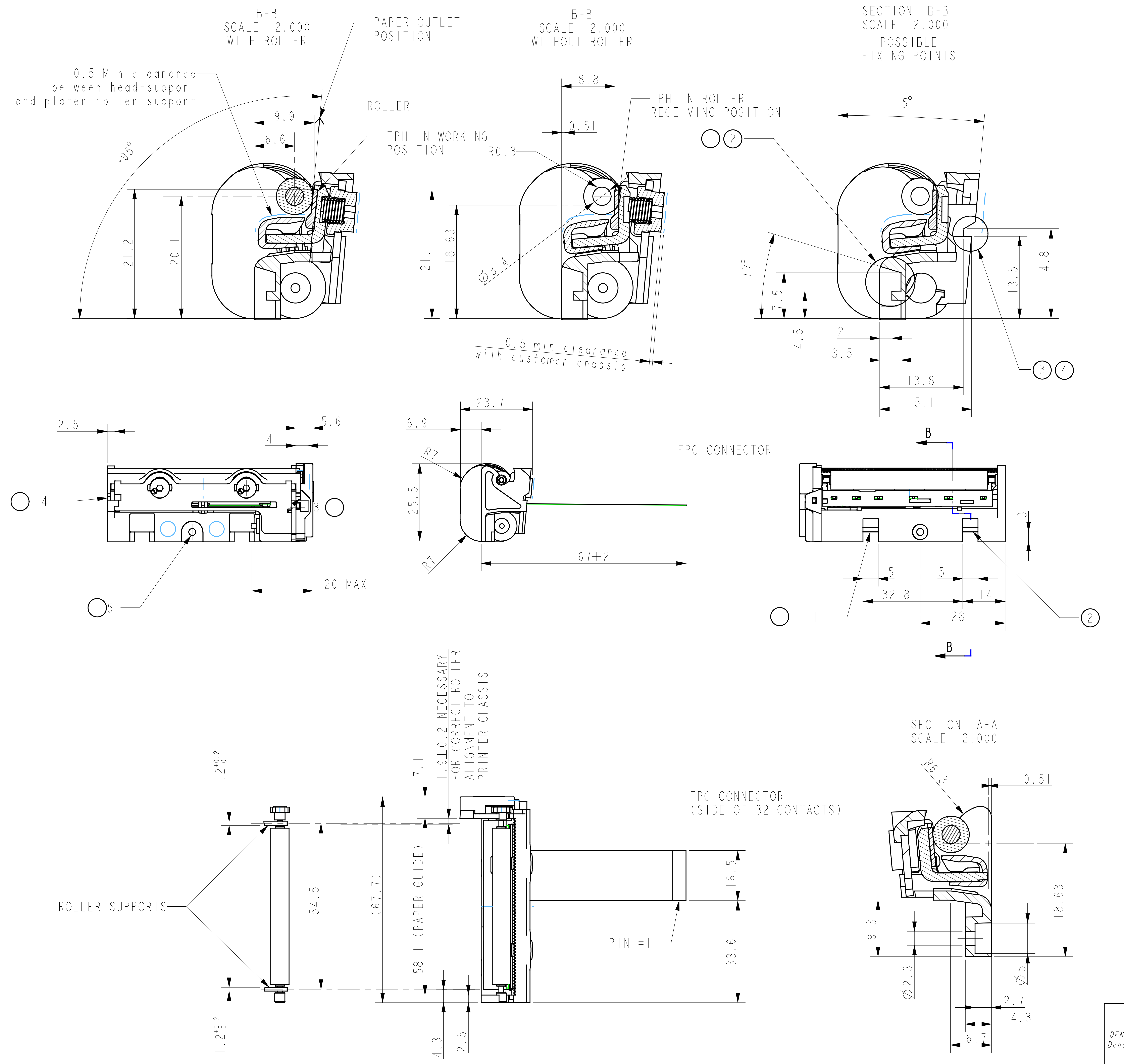
Because the rubber roller is only referenced to the chassis and has no dependence on the cover, the mechanism is very reliable. To achieve this reliability, the rubber roller must be strongly locked inside the chassis.
To avoid any twist, and mechanical stress on the cover and more generally on the customer plastic, so increasing the reliability and quality, APS developed a unique and patented feature to ease the opening of the door, that makes the mechanism very easy to open, and does not require any access to the cover's sides, giving more flexibility and ergonomics to the customer design.
This is achieved by clipping an internal lever inside the cover that pushes symmetrically on both sides of the mechanism. So the mechanism's shape has been optimized to concentrate the effort locally and always refer this effort to the chassis.
Doing so there is no need to have access to the cover side, giving more freedom to deign the cover, and allowing reducing the width of the unit.
Please contact APS for any assistance in designing this lever.

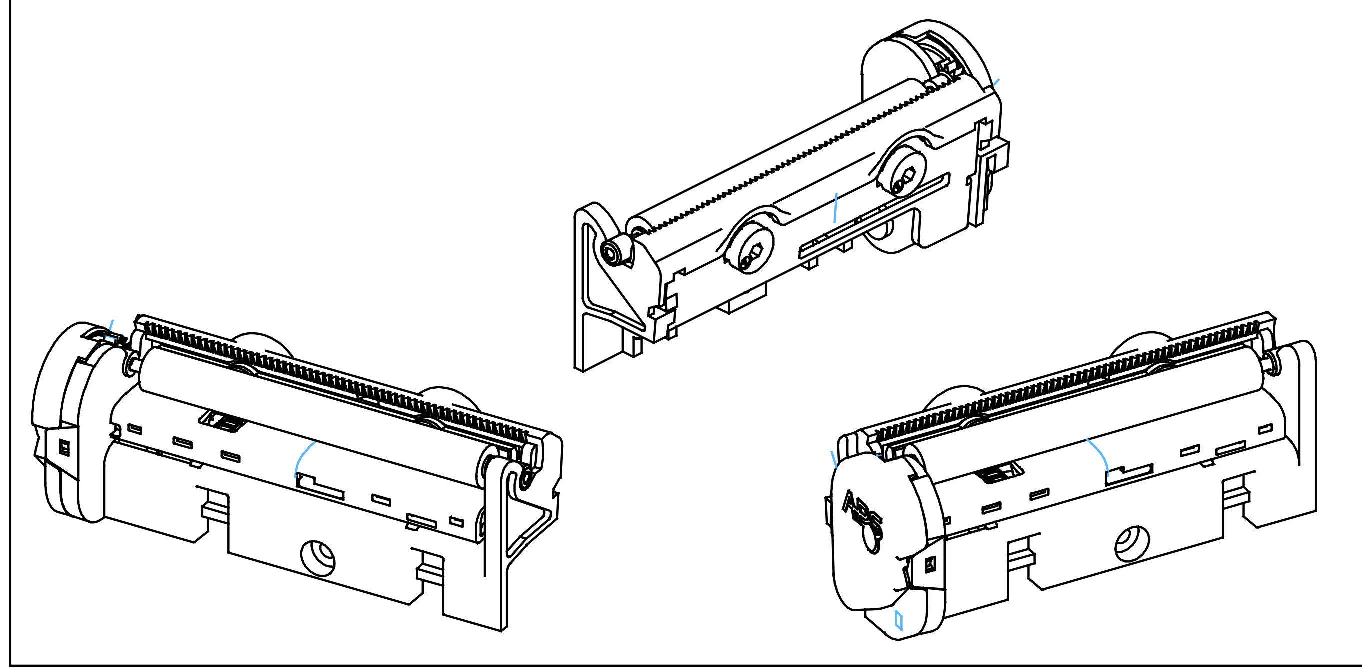
8.3. Overall dimensions and fixing points

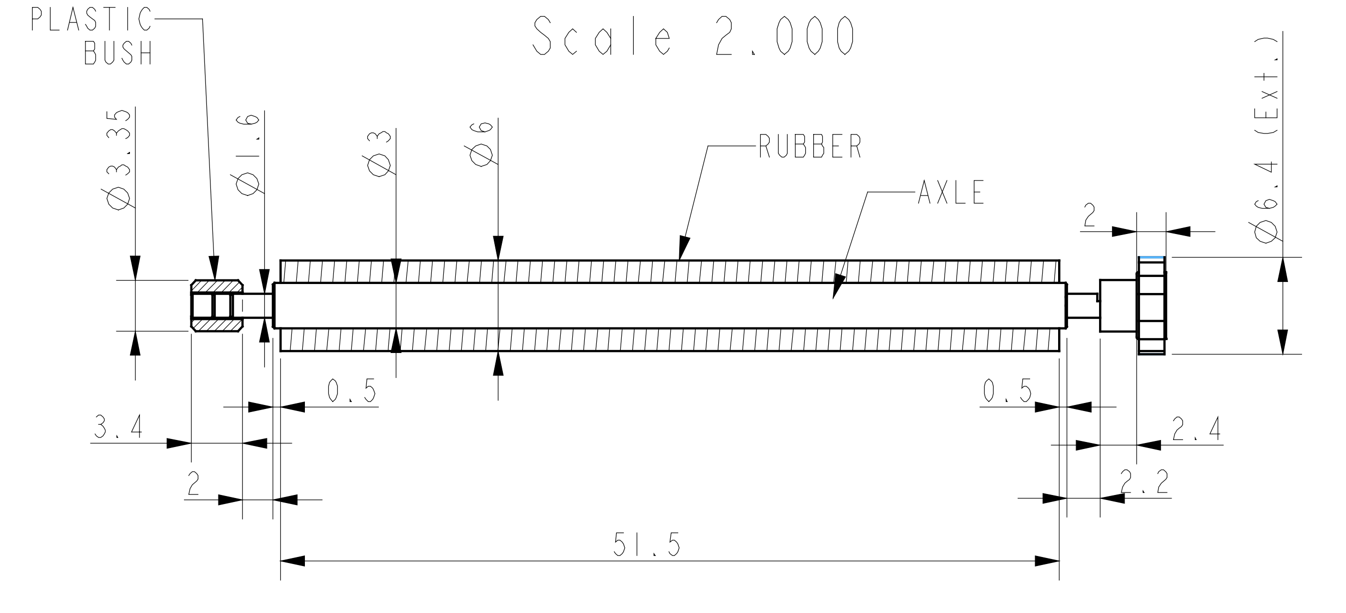
See attached drawing or ask A.P.S. for additional mechanical details.
The printer has to be fixed using its own points as described on the overall dimensions drawing, avoid any kind of deformation or torsion, if not, print quality and printer's life will be drastically reduced.

9. ORDERING CODE

Type	Model Name	Ordering code
SS205 High Speed	**SS205-V3-HS**	**002-90200811**







①②③④⑤⑥ = POSSIBLE FIXING POINTS

FOR MORE INFORMATION ASK APS THE SS205 APPLICATION NOTES.

REVISIONI (Revisions) : A: creation B: TDP 2008-184 / Platen roller with plastic bush (12.DEC.08-OB)

TOLLERANZE GENERALI (SALVO DIVERSA INDICAZIONE A DISEGNO) General tolerances (unless otherwise stated)													Js13
FROM / TO	0 / 3	>3 / 6	>6 / 10	>10 / 18	>18 / 30	>30 / 50	>50 / 80	>80 / 120	>120 / 180	>180 / 250	>250 / 315	>315 / 400	>400 / 500
Tol. ±	0.07	0.09	0.11	0.135	0.165	0.195	0.23	0.27	0.315	0.36	0.405	0.445	0.485

ANGOLI: Angles: ±1° — FILETTATURE: Threading: 6H/6g — RUGOSITA' SUPERFICI: Surfaces Roughness: Ra 3,2

DENOMINAZIONE Denomination	I	STAMPANTE	UNITA'-Unit	mm
	GB	PRINTER	MASSA mass / DISEGNATO DA drawn by / CONTROLLATO DA Checked by	OB
	F	IMPRIMANTE	DATA-Date: 04-OCT-07	SCALA-Scale: 1.000
	D	DRUCKER		
DESIGNO D'INCOMBRO OVERALL DIMENSIONS DRAWING			FOGLIO-Sheet: 1/1	FORMATO-Size: A2
CATALOGO/Catalog: SS205-V3-HS			N° DIS.-Draw.No: 90 200 811	REV: B