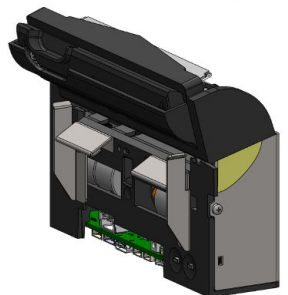
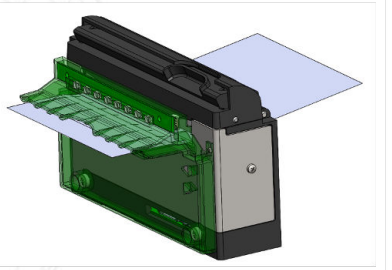
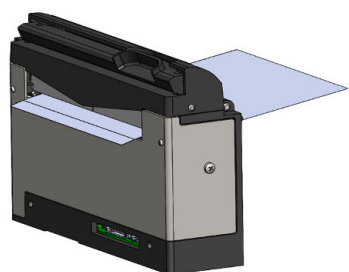
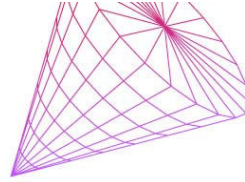




EKP 3"-M0

Technical Manual





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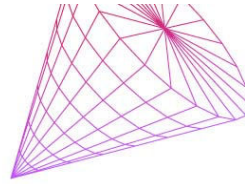
The contents of the present document are subject to change without notice. Please contact A.P.S. offices for the latest updates.

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Preface

- This manual provides Preliminary technical information about the **EKP 3"** thermal printer mechanism 200 dpi with driver board.
- 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 no effects on common data (eg. different length of elec. cables).

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Revision History

Rev. Index	Date	Page/ Sec.	Description	Author
Prel.1	28/02/2020	-	Issuing preliminary	P.S.
Prel.2	03/11/2020	-	Design update	P.S.
Prel.3	21/07/2021	-	Features updated	P.S.
Prel.4	08/04/2022	-	Driver board Connection + Drawings updated	R&D + PS
Prel.5	13/06/2024		Change main title in EKP3"-M0	O.B.

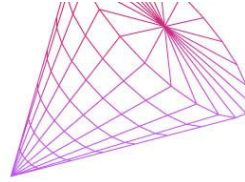
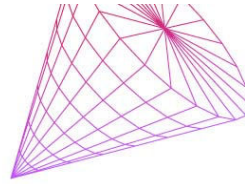


Table of contents

1. INTRODUCTION.....	4
1.1. EKP 3" – M0 Features	4
2. GENERAL CHARACTERISTICS	5
3. THERMAL HEAD AND PRINTING CONFIGURATION	6
3.1. Outlines.....	6
3.2. Operating precautions	6
4. CONTROL BOARD.....	7
4.1. General features.....	7
4.2. Control board interfaces	7
4.3. Control board printing engine	7
4.4. General Specifications	8
4.5. Printer device interconnections	8
4.5.1. Interconnections summary	8
4.5.2. Interconnections details	9
4.6. Control board operations.....	12
4.6.1. Self-test mode	12
4.6.2. Control code sequences.....	13
5. MECHANICAL AND HOUSING	13
5.1. Basic module version	13
5.2. Paper tensioner module (option).....	14
5.3. Paper Jam detection module (option).....	15
5.4. Overall dimensions and fixing points.....	15
5.5. Application notes	16
6. ORDERING CODES.....	17
7. ADDITIONAL ACCESSORIES	17



1. INTRODUCTION

The EKP printer has been designed to be the most compact kiosk printer with cutter and driver board, operating at 12V (24V optional). The EKP3"-M0 printer can be used easily to make a kiosk or a box printer. Its really compact dimensions associated with the unique APS easy loading concept make the integration very simple. The lighted exit bezel module accessory is integrating an anti-Jam feature.

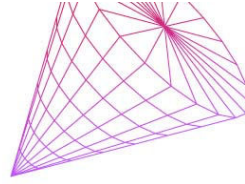
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1.1 EKP 3" - M0 FEATURES

- Max 3 inches paper width - up to 82.5 mm (adjustable from 54 to 82.5 thanks to its paper guiding system)
- High resolution printing 8 dots/mm
- High printing speed (up to 200 mm/s)
- Guillotine cutter (full & partial cuts)
- Optional module with anti-Jam feature and lighted exit bezel
- Easy to integrate in your design
- Top opening system to access to the TPH and platen roller
- Powerful controller board (M0)
- 2 Communication ports
- Programmable energy consumption
- Full control over printing quality/speed
- Four resident fonts
- Downloadable character set
- Powerful text / Graphic Modes and 2D barcodes
- Hardware QR barcode support
- Hole/Mark Detection/Correct Paper
- Easy firmware and font upgrades



2. GENERAL CHARACTERISTICS

Item	Specification	
Printing method	Thermal dot line printing	
Number of dots/line	576	640 (option)
Main scanning density (dot/mm)	8	8
Printing width (mm)	72	80
Paper width (mm)	Range of 5 paper width : 82,5 mm 0/-1 80,0 mm 0/-1 60,0 mm 0/-1 58,0 mm 0/-1 54,0 mm 0/-1	
Paper feed pitch (mm)	0.0846 (every half step of the motor drive signal)	
Max. paper thickness (µm)	60 to 150µ basic module	
Dimension W x D x H (mm)	Basic module : 124 x 31 x 77	
Weight (g)	Approx.220	
Head temperature detection	Thermistor	
Cover opened detection	Hall effect sensor	
Paper end detection	Opto sensor	
Black Mark detection (option)	Opto sensor	
Operating voltage range	Power voltage	12V typical (11V to 15V max) 24V typical (18,1V to 27V max)
Current consumption max	At printing (320 dots on)	~11.8 A (Head power)
		70 mA (Head logic)
	At paper feeding	1000 mA (Motor)
		<100 µA (Head Logic)
Cutting	1 A Cutter Motor	
Recommended Paper	JUJ0-AF50KS-E (standard grade), JUJ0-AF50KS-E3 (high sensitivity), Kanzan KP 470 Equivalent types can be used	
Operating temperature range (°C)	-25/+70 (the printed optical density is not guaranteed out of the range -5°C ~ +50°C)	
Operating humidity (RH %)	10-90 (no condensation)	
Storage temperature range (°C)	-40/+80	
Storage humidity (RH %)	5-90 (no condensation)	
Character set	3 resident + downloadable	
Character size	8x16 / 7x16 / 12x20	
Interfaces	USB / UART / RS232C	
Graphics	Optional - 3 modes	
Barcodes	UPC A-E, EAN 13-8, Code 39, ITF 2/5, Codabar, Code 128, PDF417, QR code	
Drivers / SDK	Windows (Driver) / Linux (SDK) / Android (SDK)	
Label/Black mark detection	Option	

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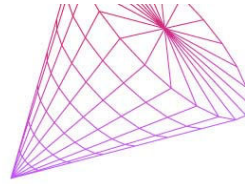
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Printer life			
	Durability	Basic conditions	Maximum variations
Thermal head pulse resistance	100 million pulses	<ul style="list-style-type: none"> Room temp.: 20 ÷ 25 °C Head temp.: 65 °C max. Rated energy 	Max. 15% in resistance value (Ω) of any dot, from its initial value
Abrasion/wear resistance	100 km of paper /duty cycle 12.5%		
Cutter life	2 million cuts		

Commented [2]: Achieved on ECP with 63µm paper thickness

3. THERMAL HEAD AND PRINTING CONFIGURATION

3.1 OUTLINES

Number of heat elements	576 dots	<u>640 dots (option)</u>
Heat element pitch	0.125 mm	
Print width (centered on paper)	72 mm	<u>80mm (640 dots)</u>
Average resistance	3000 Ω \pm 3% for EKP3212 - 12V version	<u>6500 Ω \pm3% for EKP3224 - 24V version</u>

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3.2 OPERATING PRECAUTIONS

1. The print-head substrate surface is coated with glass, for this reason, mechanical stresses, shocks, dust and scratches should be avoided to prevent damage.
2. Avoid condensation, if condensation occurs, do not switch on the print-head power, until condensation has disappeared.
3. 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 an applicator and alcohol. Do not use sandpaper as this will destroy the heating elements.
4. If sticking sound is heard while printing, please check and adjust the paper feed mechanism and the electrical pulse program to eliminate the sound.
5. Make sure the paper does not have high abrasion factor, low sensitivity or abnormal chemicals.

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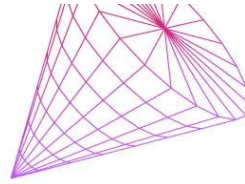
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4. CONTROL BOARD

4.1 GENERAL FEATURES

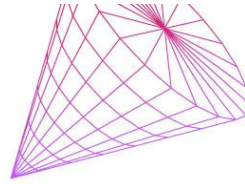
- **Full APS set or ESC/POS compatibility**
- **High-speed printing with historic control**
- **Windows, Linux and Android drivers**
- **Wide operating temperature range**

4.2 CONTROL BOARD INTERFACES

- **Serial communication interface**
- **USB communication interface**
Complies with the *Universal Serial Bus specification Rev. 2.0 (basic speed)*

4.3 CONTROL BOARD PRINTING ENGINE

- **Full control over printing quality/speed**
- **Powerful text printing modes**
- **Powerful graphic printing modes**
- **Page mode printing**
- **Macro support**
- **Barcode support**
Support for UPC-A, UPC-E, EAN13, CODE39, ITF, CODABAR and QR code
- **Dedicated user non-volatile (NV) memory**
- **Four resident characters fonts, easy font upgrades**
Fonts are:
 - 16 x 24 (36 characters/line)
 - 12 x 10 (48 characters/line)
 - 12 x 24 (48 characters/line)
 - 8 x 8 (72 characters/line)User fonts may be of any width and height
- **Easy firmware and font upgrades**



4.4 GENERAL SPECIFICATIONS

Climatic conditions already defined in chapter 2 / those conditions have to be verified according to main components spec (motor, TPH...)

Item	Specification
Voltage range (V)	From 10V to 28V
Current consumption (A) ^(*)	From 1 to 7, 3.5 typical
Operating temperature (°C) ^(**)	From -25 to +70
Operating humidity (%RH) ^(**)	From 20 to 85 (no condensation)
Storage temperature (°C)	From -40 to +80
Storage humidity (%RH)	From 10 to 90 (no condensation)
EMC standard	Designed to comply with FCC/CE class B

(*) Dynamic current consumption can be programmed through the use of firmware commands.

(**) Extended temperature and humidity ranges information is available from APS upon request.

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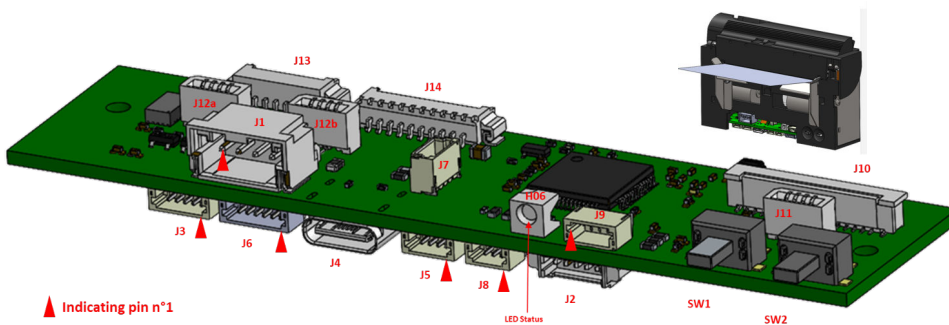
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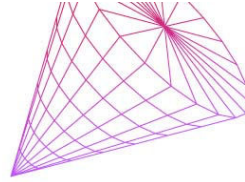
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4.5 PRINTER DEVICE INTERCONNECTIONS

4.5.1 INTERCONNECTIONS SUMMARY





Pin	Signal
1	VIN
2	VIN
3	GND
4	GND

Parameter	Symbol	Min.	Typ.	Max.	Unit
Recommended supply input voltage	Power VIN	11	24	27	V

- **USB interface**

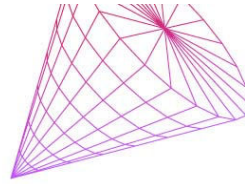
The control board offers a USB communication interface using **USB-C** or **Chyao Shiunn*** connector.

- **USB-C**

Pin	Signal	Direction	Description
A4/B9 A9/B4	VBUS	Power	USB bus 5V power
A7/B7	D-	I/O	Differential data signal
A6/B6	D+	I/O	Differential data signal
A8/B8	SBU1/SBU2		Unconnected
A5/B5	CC1/CC2		Connected to gnd. through 5.1 K Ω resistance.
A1/B12 A12/B1	GND	Ground	USB bus ground

- USB **Chyao Shiunn (1-4P-90-JS-1254R-04)**

Pin	Signal	Direction	Description
1	VBUS	Power	USB bus 5V power
2	D-	I/O	Differential data signal
3	D+	I/O	Differential data signal
4	GND	Ground	USB bus ground



- **A.P.S keyboard port**

The standard A.P.S keyboard gathers user buttons and status LED.
 One standard A.P.S. keyboard port is provided on the control board.
 Switches are normally open, and connect signal to ground when closed.
 Internal pull-up resistors are provided on the control board.
 During normal board operation, pressing paper feed switch triggers a paper feed sequence.
 During normal board operation, pressing ON/OFF line switch continuously during more 3s triggers a hardware reset.
 Self-test is being executed by pressing and holding button ON/OFF line and twice quick pressing FEED button.

The control board integrates a current limiting resistor for status LED to minimize external components count.

Pin	Signal	Direction	Description
1	GND	Ground	Ground
2	OFFLINE_SW	Input	ON/OFF line switch
3	FEED_SW	Input	Paper feed switch
4	SYS_LED	Output	Status LED

Parameter	Symbol	Min.	Typ.	Max.	Unit
Status LED current ($V_F=2V$)	I_{LED}		9		mA

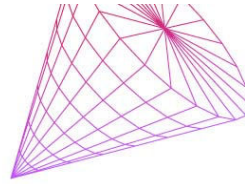
These connectors enable the user to design a remote interface including paper feed, online/offline buttons and status LED.

- **NEOP opto-sensor**

The Driver board provides an interface for near end-of-paper sensor.

Near end-of-paper triggers when paper roll is nearly empty.

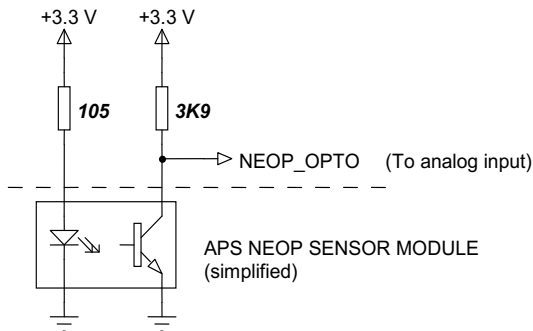
The controller board integrates a 3.9K resistor pull-up on opto-sensor collector signals.
 The controller board integrates a current limiting resistor (105 Ohm) for opto-sensor LED to minimize external components count.



Pin	Signal	Direction	Description
1	NEOP_LED	Output	NEOP opto-sensor LED anode
2	NEOP_OPTO	Input	NEOP opto-sensor collector output
3	GND	Ground	Ground

Parameter	Symbol	Min.	Typ.	Max.	Unit
Sensor LED current ($V_F=1.2V$)	I_{LED}		20		mA
Sensor HIGH level input voltage	V_{IH}	2.31		3.3	V
Sensor LOW level input voltage	V_{IL}	0		1.15	V

Here is a simplified schematic of the electronics driving the NEOP sensor on the M0 driver board:



4.6 CONTROL BOARD OPERATIONS

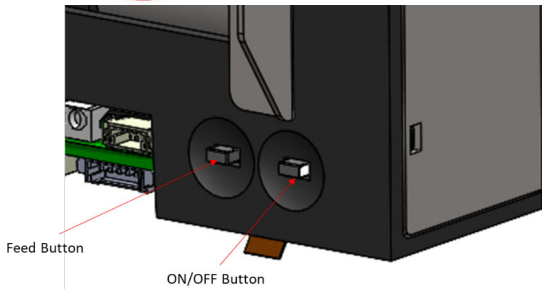
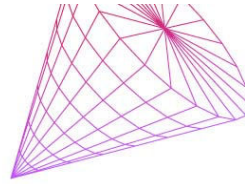
4.6.1 SELF-TEST MODE

The control board enters self-test mode when pressing and holding button ON/OFF line and twice quick pressing FEED button.

The self-test ticket can be also printed by sending the control sequence <ESC GS T 1>.

In this mode, the board prints a ticket containing board name and main features, A.P.S code, firmware revision, communication settings and finally all internal character sets

The board reverts to default state once self-test printing is over.



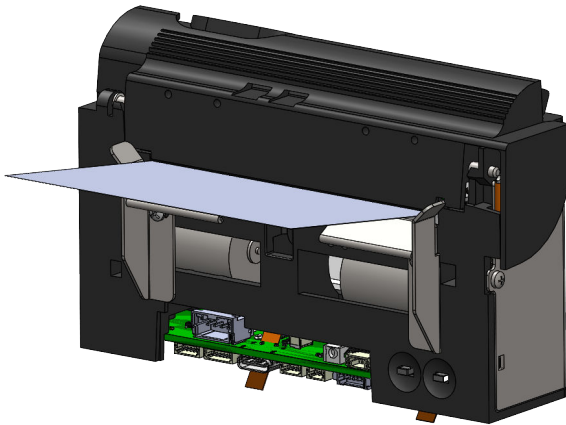
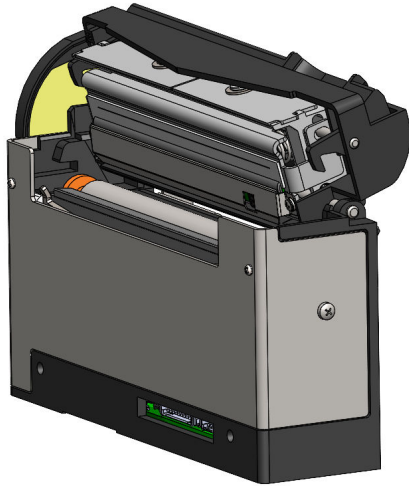
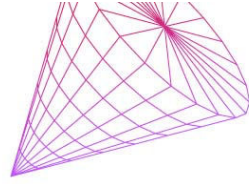
4.6.1 CONTROL CODE SEQUENCES

Please refer to the programming manual of the **M0 driver board architecture**.

5. MECHANICAL AND HOUSING

5.1 BASIC MODULE VERSION

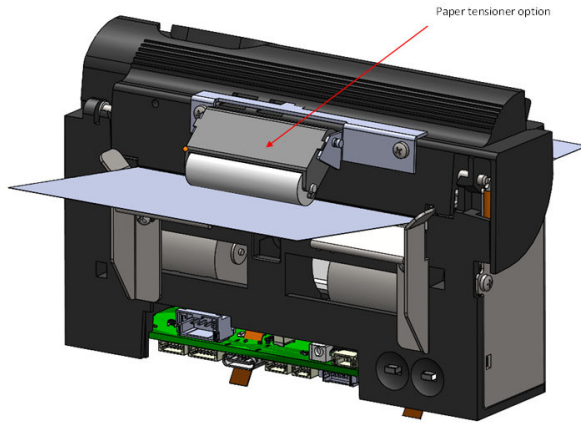
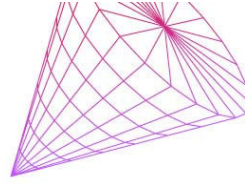
It can be a stand-alone mechanism for Kiosk applications. The TPH support is fixed to the top of the mechanism which can rotate around a shaft. The small lever allows customer to rotate the print head support and thus easily clean the thermal head. This is "**Basic module**" version.



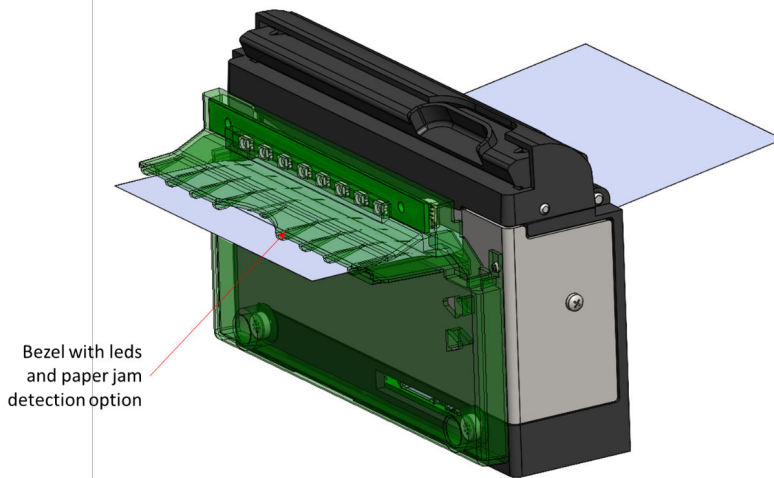
The paper guiding system at the rear of the printer allows the use of paper of different width.

5.2 PAPER TENSIONER MODULE [\(OPTION\)](#)

There is also a paper tensioner to absorb the pulling resistance due to large paper rolls.



5.3 PAPER JAM DETECTION MODULE (OPTION)



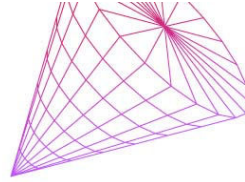
This anti Jam detection module can be attached to the Basic module. If the exit bezel is blocked this module will stop the printing process. The printing process will continue when the exit bezel is cleared. There is also internal LED (green or red) to deliver the printer status.

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5.4 OVERALL DIMENSIONS AND FIXING POINTS

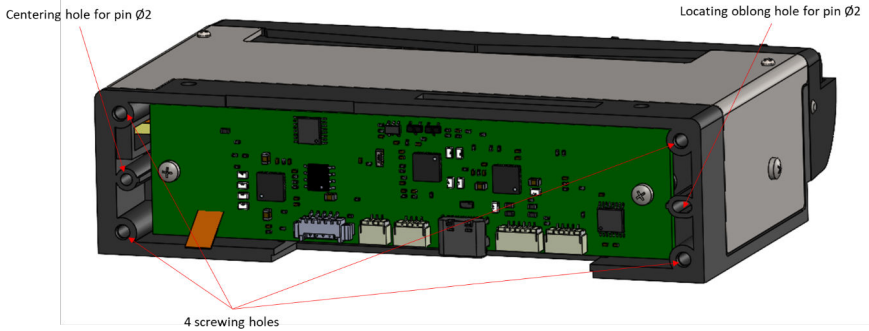
APS FRANCE - 14 RUE OLIVIER DE SERRES, 49070 BEAUCOUZÉ
SAS au capital de 20 000,00 € - SIRET 85289421100022 - TVA : FR58852894211 - RCS ANGERS



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 in the end of this document, avoiding any kind of deformation or torsion or, if not, the print quality and printer's life will be drastically reduced.

The EKP mechanism has 4 holes (1, 2, 3, 4) for fixation by screws (Self tapping screw with thread for plastic, Ø3, screwed length 8mm) as well as two blind holes (5, 6) at the bottom for positioning. They are depicted on the image below. Their exact sizes and positions are shown on the drawings at the end of this document.



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Commented [10]: To be updated with new mechanical design: 4 screwing holes + 2 centering holes on bottom face

5.5 APPLICATION NOTES

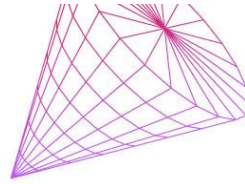
For further information and a better EKP integration, refer to APS

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6. ORDERING CODES

Product codification table to be updated for 12V version in priority (24V not available for the moment) + option management (Black mark, TPH dot number 576 / 640 Wide, Bezel, Presenter, Easy-loading...). Schematic of options and codification to be added (see MKL)

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Product Name	Ordering code
EKP3212-M0 KIOSK Prt 3" 12V KS BM	90EK3A00Axxxx
EKP3212-M0 KIOSK Prt 3" 12V KS BZ	90EK3A01Axxxx
EKP3224-M0 KIOSK Prt 3" 24V KS BM	90EK3B00Axxxx
EKP3224-M0 KIOSK Prt 3" 24V KS BZ	90EK3B01Axxxx

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xxxx : Firmware revision

7. ADDITIONAL ACCESSORIES

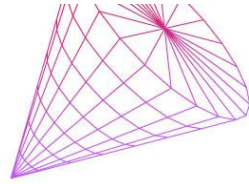
(To be checked / updated for EKP board)

Product Name	Ordering code
<p><u>Cable USB</u></p>	91301329
<p><u>Cable UART</u></p> <p>Cable RS232 (L=200 mm, JST 5 pins 1 mm pitch only on one side)</p>	To be defined
<p><u>"2 switches/LED" keyboard</u></p>	91311033

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<p>Keyboard cable (L=180mm)</p>	<p>91301104</p>
<p>NEOP + cable</p>	<p>To be defined</p>
<p>Power supply</p>	<p>To be defined</p>

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Mechanical drawing to be added