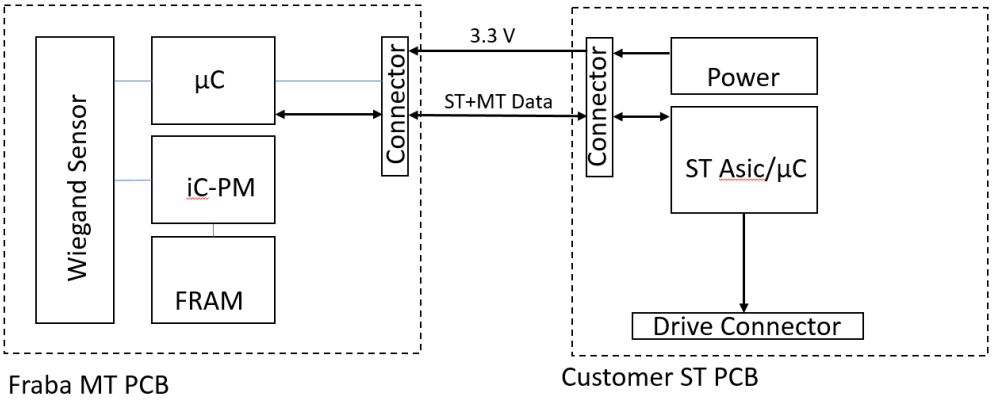
POSITAL
FRABA

DATASHEET
MULTITURN COUNTER MODULE

Basic Function:

The Fraba MT Module PCB is designed to count up to 40 bit revolutions without the need of a battery or a transmission gear and can be used to combine it with a high resolution ST base sensor[1]. The MT module provides MT and ST data via an SPI slave interface. The ST data are of low resolution and are needed to for the synchronization between ST and MT PCBs.

The based concept is shown in the attached overview:



The specifications of the MT counter kit (counter PCB + magnet) are shown in the following chapters:

[1] Devices and processes for energy harvesting by Wiegand wire within position encoders are protected by several worldwide patents (such as WO 2004/046735 A1) and require licensing by the inventors and applicants. Use of the Multiturn Counter Module is restricted by application type. Please contact POSITAL for more details.

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Specifications:

1. Counter Characteristics

Item No.	Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
101	Multi-turn Counting Range		0	16	40 bit	Turn	
102	Allowed Acceleration		0		80.000	Rad/s²	
103	Rotational Speed		0		12.000	rpm	
104	Software Version			Tbd.			

2. Electrical Characteristics (@ Ambient Temperature: 25°C)

Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
201	Main power supply voltage	R	3	3.3	3.6	V	@25°C, DC
202	Current Consumption Counter PCB (Without ST PCB)	IC		35	50	mA	-40 to 105°C
203	Serial Communication Format	SPI 3.3 V TTL					
204	Communication Rate			5		Mbaut	
205	Power-on standby time				0.5	s	Time needed before PCB is ready to operate
206	ST Data bit			8			
207a	ST Data accuracy		-1.5		+1.5	degrees	@25°C, 100 r/min
207b	Worst case ST position error		-14		+14	degrees	@12000 r/min, @ -40/105°C
208	Communication cycle			100		µs	SPI Communication
209	Error bit			9		Bit	

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3. Environmental Conditions

Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
301	Ambient operating temperature	T_a	-20		+105	°C	
302	Storage temperature	T_s	-20		+105	°C	
303	Relative humidity	rF			90%		+ 40°C, 96 hours, No condensation
304	Shock resistance	S_r			200	G	half sine 6 ms, EN 60068-2-27
305	Permanent shock resistance	S_{rp}			20	G	half sine 16 ms, EN 60068-2-29
306	Vibration resistance	V_r			20	G	10 Hz – 2000 Hz, EN 60068-2-6
307	EMC						No special EMC protection
308	External Magnetic Field				20	mT	Assuming Design requirements (section 9) are fulfilled

4. Electrical Connection

In the following tables the connection assignments (see figure 1) are summarized:

Pin number	Through hole connection	SMD pads
1	SPI_MOSI	SPI_MOSI
2	VCC=3.3V	VCC=3.3V
3	SPI_MISO	SPI_MISO
4	GND	GND
5	SPI_CLK	SPI_CLK
6	SPI_CS	SPI_CS

5. Connnector

There are two connection options:

1. 6x 1.8mm pitch through-holes
2. 6x 0.93mm pitch SMD pads

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6. Mechanics

Item No.	Parameter	Symbol	Min.	Typ.	Max.	Unit	
601	Mass PCB	Mpcb		5		gr	
602	Mass Magnet (WS-Magnet-SmCo-DIA-8x2.5-A2)	Mmag	--	1.26	--	gr	Article no. 10034032. For more details see product manual
603	Dimensions						See PCB Outline, see Magnet ouline

7. PCB Outline:

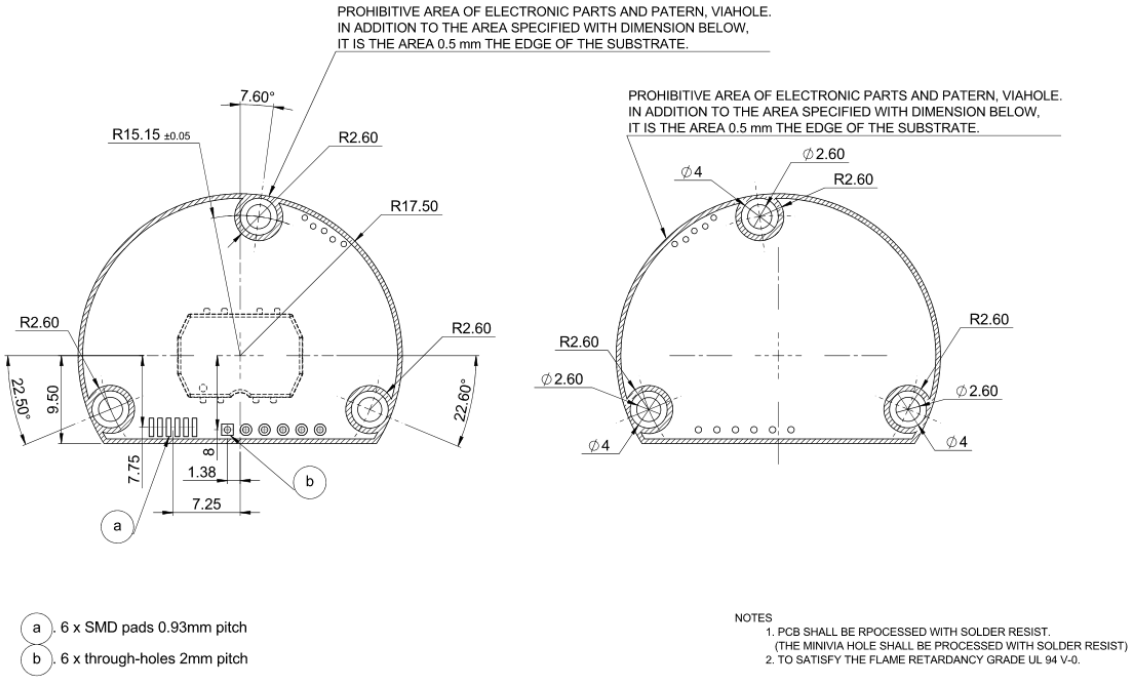

Figure 1: PCB Outline

8.Remarks

RoHS 2 (2011/65/EU)
Silicone free - a very small amount is in Sensor manufacture
Care must be taken to avoid direct contact between magnet and Wiegand sensor

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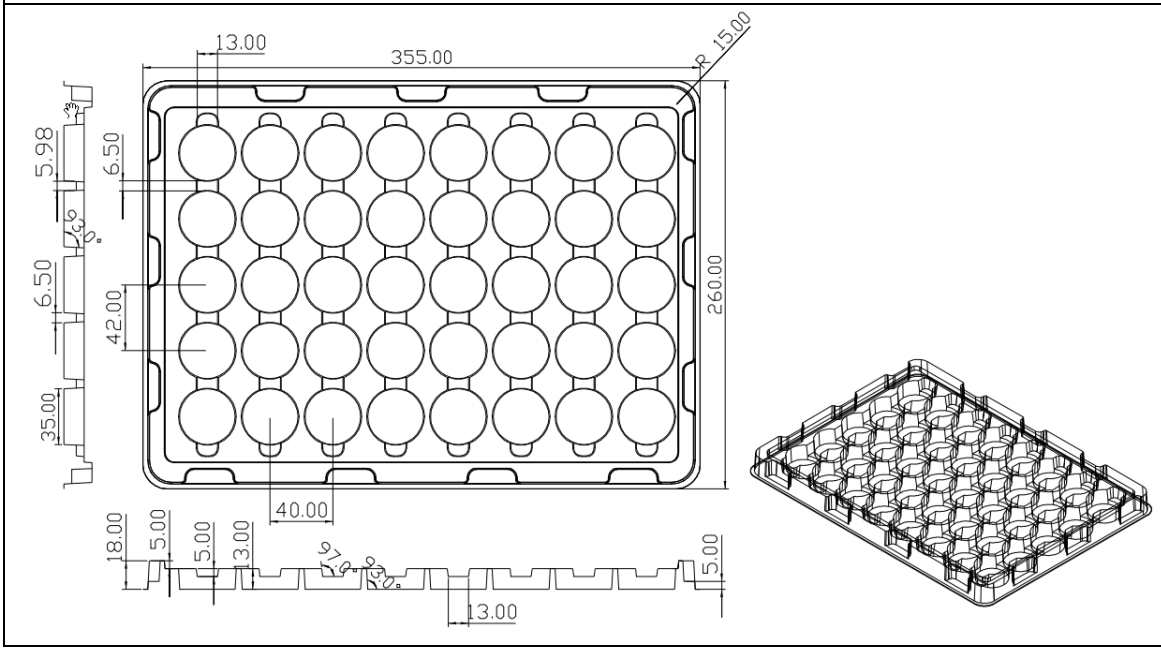
9. Packaging Information

320 pcs packed in 8x stacked plastic tray (article no: 10046745), sealed in ESD bag with one empty tray on top.

SPQ: 320 MT-PCBs



10. Label

Shipping label to include the following information:

Product name: (Article name)

11. Ordering Information

Article Name	Article Number
KCD-FS00B-4008-PF1B-070	10048869

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12. Revision History

Rev.:	Date	BY	Remarks
1.0	13.11.2019	TBE	Initial Version
1.1	04.08.2020	TBE	Release Version

Editor: TBE
Reviewer: MLO, UKE
Date: 08.04.2020
Mod

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