



# PRELIMINARY DATA SHEET

## WIEGAND HARVESTER SAMPLE KIT

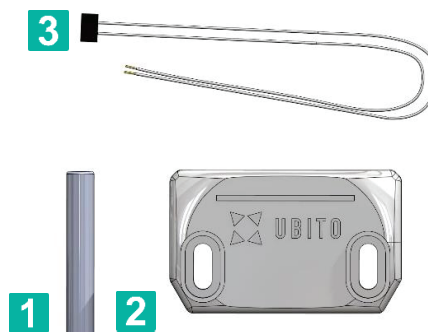
The Wiegand Harvester Sample Kit is provided as a Technology Demonstrator for the purpose of familiarizing and assisting users in evaluating Wiegand Energy Harvesting Technology. It is important to note that the Wiegand Harvester (included within the Sample Kit) is an experimental unit and not a serially produced product. Furthermore, it is not certified for any specific use or application.

### 1. Content

Wiegand Harvester Sample Kit consists of the following components:

**Table 1 – Wiegand Harvester Sample Kit Components**

Position	Article Name	Article Number	Quantity
1	Magnet NdFeB. N45. Ø5x30 mm	10067506	2
2	Wiegand Harvester	10067395	1
3	Cable Assembly		1

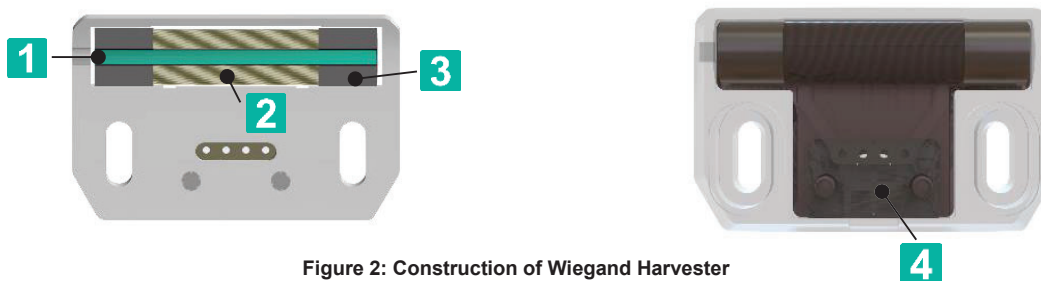


**Figure 1: Content of Wiegand Harvester Sample Kit**

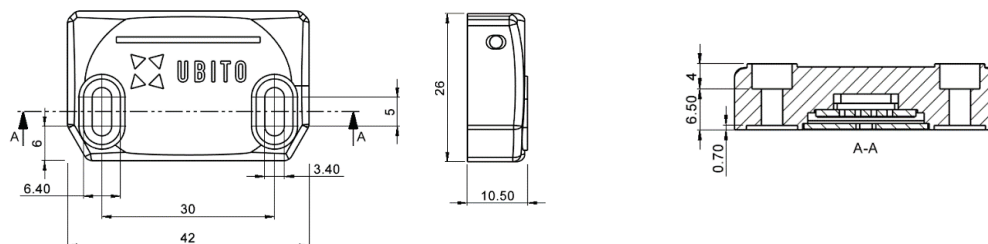
### 2. Wiegand Harvester

#### 2.1 Physical characteristics

The Wiegand Harvester is an inductive energy harvesting transducer based on Wiegand effect. It consists of four major components: 1. Wiegand Wires, 2. Pickup coil, 3. Ferrites, 4. PCB with Cable Connector



**Figure 2: Construction of Wiegand Harvester**



**Figure 3: Physical Dimensions of Wiegand Harvester**



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**Table 2 – Physical Characteristics**

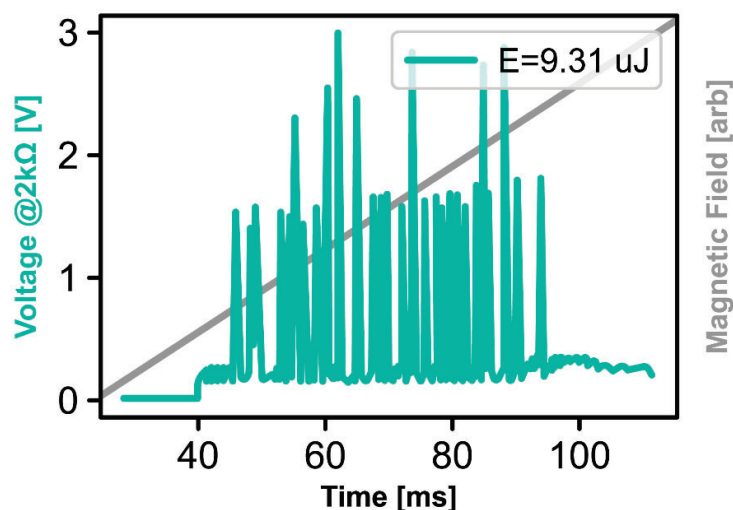
Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
301	DC-Resistance	R		500		$\Omega$	@20 - 27°C, DC
302	Pick-Up Coil Inductance	L		420		mH	measured @1 Hz with magnet (polarity) parallel to wire axis.
303	Mass	M	15,1	15,3	15,5	g	

### 2.2 Electrical Characteristics

Each 180° rotation/reversal of an external magnetic field triggers a Pulse Train Event (alternately of positive and negative polarity). Each Pulse Train Event is a series of individual small pulses. A typical Pulse Train Event, after rectification, is shown in Figure 4.

**Table 3 – Pulse Train Event Electrical Characteristics**

Item No.	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
101	Individual Pulse Peak Voltage Resistive	$U_{rpi}$		1,5	3	V	Measured on Resistive Load of 2k $\Omega$
102	Pulse Train Energy	$E_p$		9		$\mu J$	Integrated Energy. Measured on Resistive Load of 2k $\Omega$



**Figure 4: Pulse Train Event Signal, Load resistor 2k $\Omega$**



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### 2.3 Pinout

The Wiegand Harvester can be connected to the load via the Cable Assembly - plugged into connector '1', or via the contact pad on the bottom side of the sensor. '2' (see Figure 5)

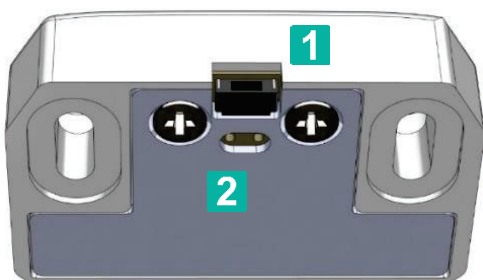


Figure 5: Wiegand Harvester Connection Interface

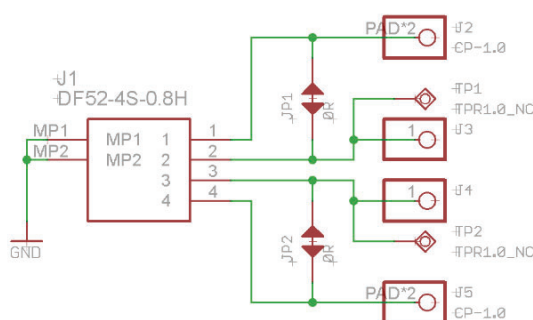


Figure 6: Wiegand Harvester Circuit Diagram

### 3. Magnet

The Wiegand Harvester Sample Kit is equipped with a cylindrical neodymium magnet, which can be used as the source of changing magnetic field required to trigger Pulse Train Events.

Table 3 – Characteristics of the Magnet

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Material	Nd		N45		-	Neodymium, Axial Magnetisation
Legth	l		30		mm	
Diameter	r		5		mm	

### 4. Operation Conditions

The Wiegand Harvester harnesses the Wiegand Effect, requiring alternating magnetic fields for functionality. It can be employed in rotary (Figure 7a), linear (Figure 7b), or inductive (Helmholtz coil) magnetic systems. Maintaining parallel alignment between the harvester and the magnet's magnetization line optimizes field strength at a specified distance.

Typically, the included magnet achieves sufficient field strength at around 10mm, but this distance can be reduced by using multiple magnets, as demonstrated in Figure 7b.

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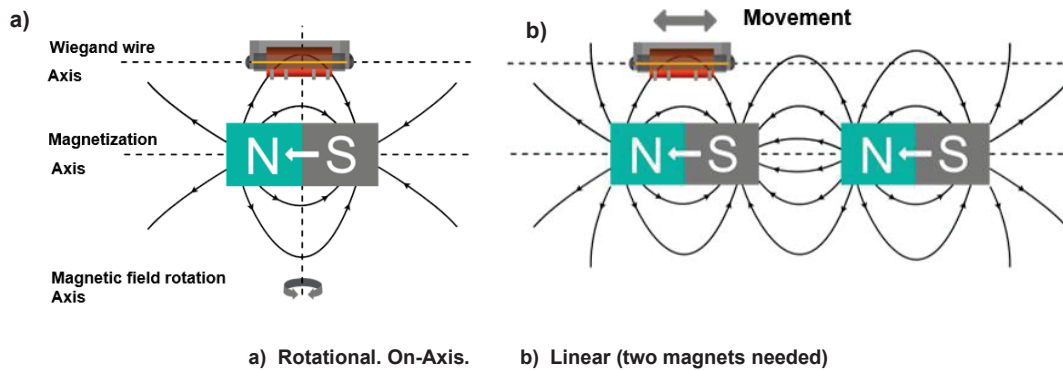


Figure 7: Magnetic system

The optimal conditions to trigger Pulse Train Events using a rotating magnet are described in Figure 8. The distance between magnet and harvester main axis must be  $10 \pm 2$  mm. The Wiegand wire should be aligned with, and parallel to, the magnetization direction. Typically, the included magnet achieves sufficient field strength at specified distance, but this distance can be reduced by using multiple magnets, as demonstrated in Figure 7b. The Wiegand Harvester was developed to be used in the UBITO WINK (10066357 WS-Wiegand IoT Node Developer's Kit) with defined magnet type, size and distances. Variations to the recommended parameters are possible and would require additional experimentation or/and computer simulation.

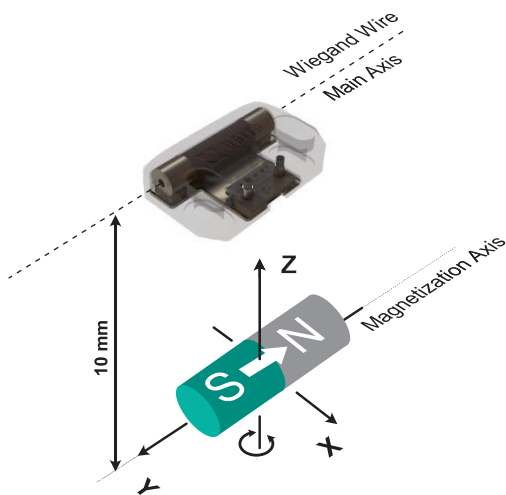


Figure 8: Position of the Wiegand Harvester.  
Rotation Scenario

## 5. Recommendations for Testing

Open Load testing using an Oscilloscope is a good starting point. All Pulses in a Pulse Train have uniform polarity but varying height. Consecutive Pulse Trains have alternating Voltages. Depending on the Load parameters, a rectifier should be used. For example, NSR1030QMUTWG.

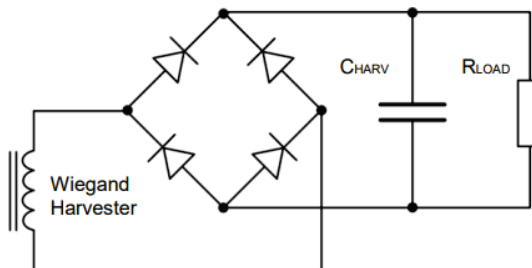


Figure 9: Recommended evaluation circuit



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### 6. Revision History

Rev.:	Date	BY	Remarks
0.01	12.11.2023	EKE	Initial release, Wiegand sensor data as per WS Wiegand Harvester datasheet.
0.02	04.03.2023	ABA/STY	Added technical informations and images

Editor: EKE, STY, ABA

Reviewer: TBE

Date: 04.03.2024

Module Type: WS-WINK-Harvester-1

### 7. Legal Information

Fraba Group, while providing this kit, does not assume responsibility for any damages, losses, or injuries that may occur as a result of its use or misuse. Users are advised to exercise caution and follow all appropriate safety guidelines and procedures for handling electronic equipment.

By using the Wiegand Harvester, users acknowledge and accept these terms and conditions, and agree to hold Fraba Group harmless from any liabilities arising from its use.

### 8. Contact Information

For technical support, information about prices and terms of delivery please contact.

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All dimension in [inch] mm. This drawing and the information contained is for general presentation purposes only. Please refer to the "Download" section for detailed technical drawings.

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