

Battery-less Remote Controls

KAPRION-10/22 Switch (OEM version)

- Remote Control without Batteries
- Self Contained Panel Mount Push switch Energy Harvester
- Produces 18V_{pk}
- +10 dBm RF Transmission (highest power available from any energy harvester)
- Up to 250m Range
- 433 MHz FM Technology
- CE Compliant, UL, CUL listed
- Various Receivers Available
- SIL RX Module
- DIN Rail Module
- Housed 4 . Relay unit IP68
- Standard 22mm DIA Push Switch format
- Complete Self contained Unit



Applications:

- General Industrial switching, conveyors, machinery, pumps.
- Panel Mount Switch Replacement.
- Hand Held Push Button 'Clicker.'

Description

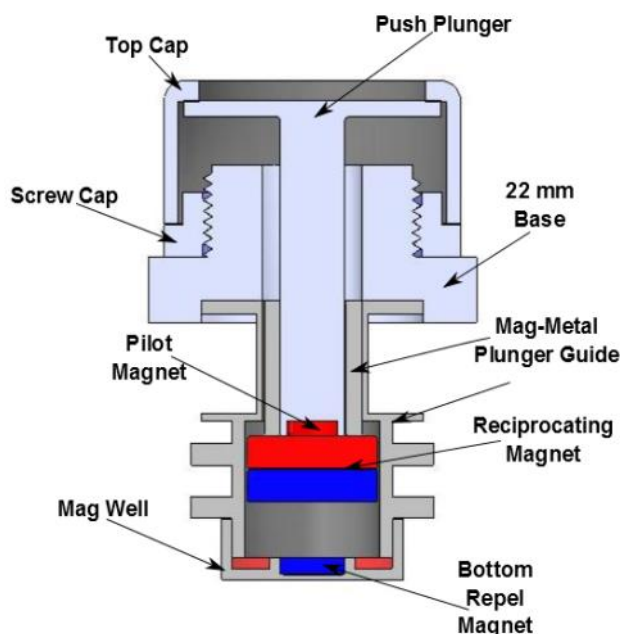
KAPRION-10/22 is the most powerful energy harvesting transmitter available on the market. Supplied ready to go, it can be fitted to any panel (22mm hole). Each time the user presses the switch the internal energy harvester generates power and a unique RF signal is generated and sent to the receiver. The KAPRION-10/22 produces a +10 dBm RF output power over twice the power of the nearest competitor thus providing a reliable battery-less remote control system. When combined with the matching RF receiver, a remote control system with up to 250m range may be achieved.

Description of operation

The energy harvester uses patented technology to provide a simple and reliable power generator connected to an RF Transmitter which transmits a unique data transmission on each press of the switch. The unit is completely self contained and requires no connections or servicing. The screw on cap can be removed to enable the switch to be panel mounted. . The receivers can learn one or many KAPRION-10/22 ID codes providing a remote control system.

How it works

Using a unique magnet arrangement held between two opposing magnetic poles (plunging and reciprocating). When the user presses the switch the KAPRION-10/22 generates maximum power from the natural oscillation of the magnet.



KAPRION Receivers

Three versions of receivers are available:

KAPRION Receiver

Available as SMT or SIL Package, 3V operating, 4 channels output

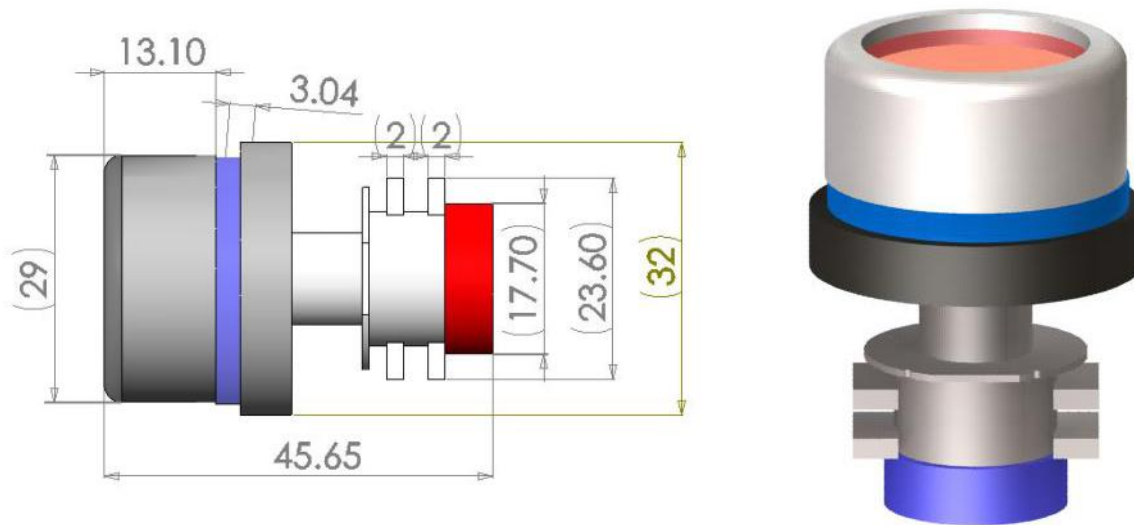


DINRION

12-30Vdc Supply, 2 x Relays, expandable to 32



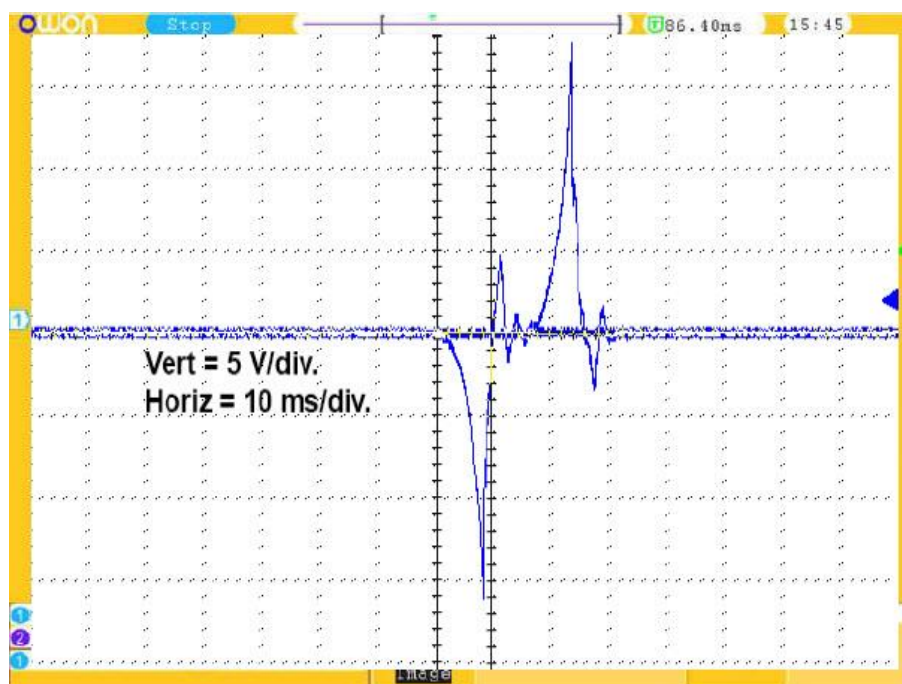
KAPRION-10/22 Mechanical Dimensions (in millimetres)



Power Output

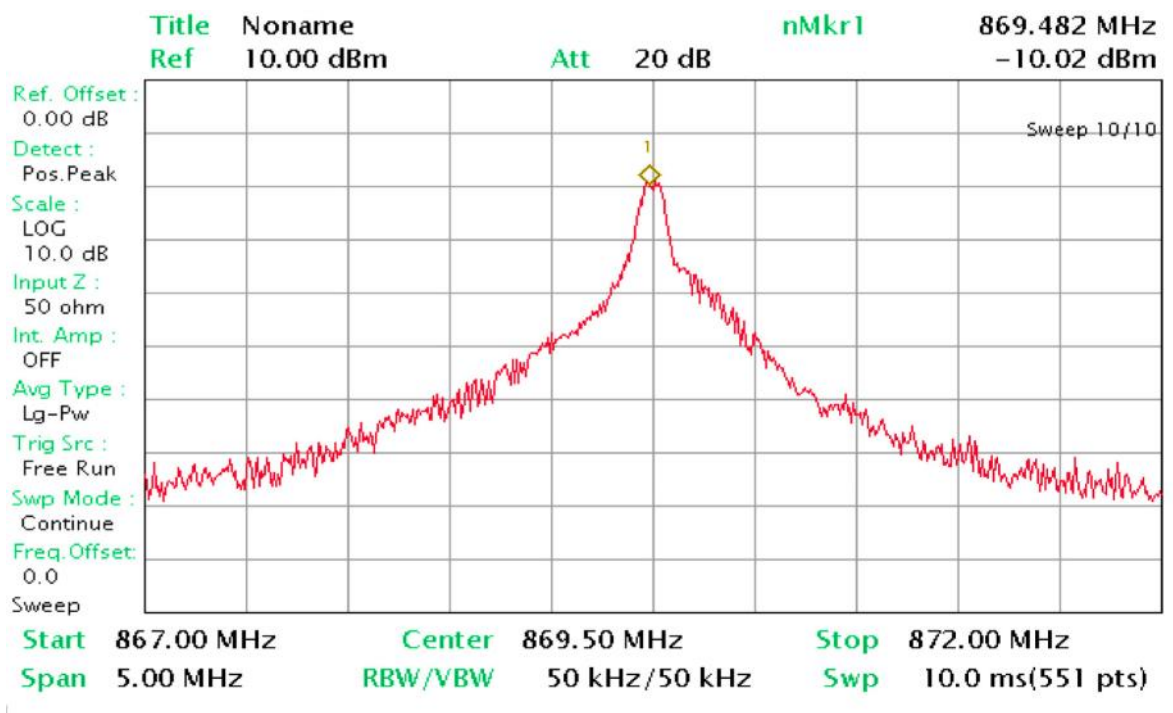
The unique free floating magnet action (patented) within the KAPRION-10/22 continues to generate power even after the switch has been pressed therefore generating the maximum power from a single operation. This unique feature generates up to 50 times more power than any other Energy Harvester.

The unique feature (patent protected) of the KAPRION-10/22 series is the free floating magnet. When the switch is operated the magnet oscillates, generating an extended decaying sinewave of energy over a longer time period than simply the time of switch press only .



RF Transmitter Output

KAPRION-10/22 contains an RF transmitter. On each press the RF Transmitter sends a unique RF data packet. Each KAPRION-10/22 has a unique ID number which can be individually paired to the receiver thus creating a remote control system.



Technical Specifications:

Operating temperature: -20°C to +85°C

Storage Temperature: -25°C to +85°C

Electrical Characteristics Energy Harvest	Min	Typical	Max	Units
Peak Voltage Generated			18	Vdc
Time of Voltage Out			30	mSecs
Operating Force		10		N

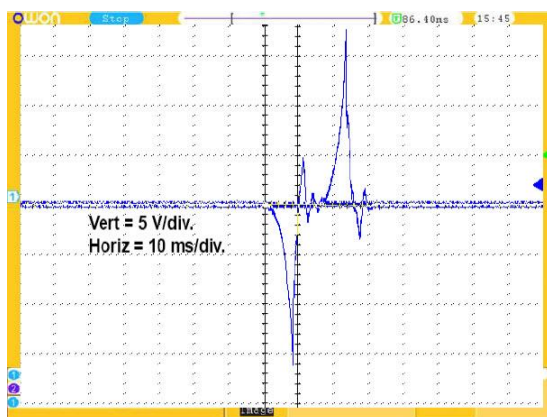
Electrical Characteristics RF Transmitter	Min	Typical	Max	Units
Frequency of Operation		433 868* 915*		MHz
RF Transmitter Power		+10		dBm
RF Transmit Time		20		mSecs

Appendix: A Comparison of Energy Harvesters

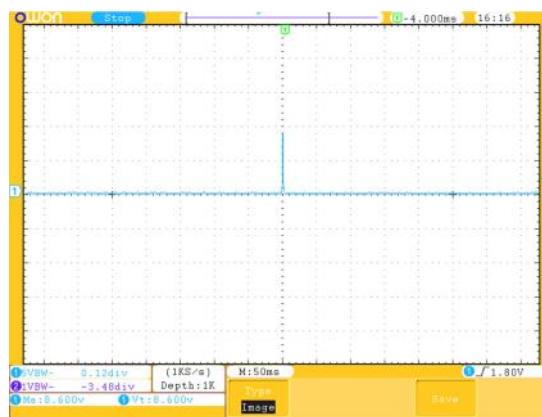
At the time of writing there are three suppliers of energy harvesting products, EnOcean, Cherry and RF ENIGMA.

The RF ENIGMA produces most power, as a comparison we have measured the Cherry energy output and shown them below as a direct comparison. The EnOcean power is lower than this.

KAPRION-10/22 Energy Output



Cherry AFIS Energy Output



The following table provides a comparison of each of the technologies and performances :

Manufacturer	RF ENIGMA	Cherry AFIS	EnOcean
Transmitter	KAPRION-10/22	AFIS	PTM210
RF Transmit power	+10dBm	+5dBm	+3dBm
Range			
Actual Measured (Claimed)	250m	10m (300m)	25m (300m)
Operating Force	10N	13N	8N
Operating Temp. Range	-20°C to +85°C	N/A	N/A

Manufacturer	RF ENIGMA	Cherry AFIS	EnOcean
Receiver	KAPRION	AFZE	TCM310
Sensitivity	-121dBm	-95dBm	-96dBm
Supply V	1.8 - 3.3V	5V	2.6 - 3.5
Temp	-40 to +85C	-40 to +85C	-40 to +85C

Range and Obstructions

Because of building obstructions such as walls and ceilings, signal losses indoors can vary significantly. This occurs because of a combination of attenuation by walls and ceilings, and blockage due to equipment, furniture, and even people. For example, a “2 x 4” wood stud wall with drywall on both sides results in about 6dB loss per wall. Because of the huge variation in losses RF Systems are generally quoted as direct line of sight range (LOS).

KAPRION Transmitters - FSK Modules

FEATURES:

- **FM Radio Transmitters**
 - **Available 433/868 MHz**
 - **Transmit Range up to 250 metres**
 - **Miniature Package**
 - **No adjustable Components**
 - **Very Stable Operating Frequency**
 - **Operates at -20°C to $+85^{\circ}\text{C}$**
 - **EMC Compliant for use in Europe**
 - **FCC Compliant for use in USA (Currently being certified)**
- **Applications**
 - **Wireless Security Systems**
 - **Car Alarms**
 - **Remote Gate Controls**
 - **Remote Sensing**
 - **Data Capture**

Description:

These miniature RF modules provide a cost effective high performance FM Radio data link at 433.92MHz. The module uses no adjustable components ensuring very reliable operation.

These modules have been designed specifically to be powered from Energy Harvesting Generators. Their small size, low power requirements and unique design allow them to use a high speed proprietary RF Protocol to provide a reliable RF Link.

This transmitter and receiver pair enables the simple implementation of a data link at distances up to 75 metres in-building and 250 metres open ground.

The modules have been approved for operation with Europe and USA within FCC part 15.

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