

DES02821

# User manual

## F/V converter

### Frequency/Voltage

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# **F/V converter**

## **Frequency/Voltage**

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## 1. Foreword

The F/V 1525628 converter is built in accordance with European directive 89/336/EEC on electromagnetic compatibility and intrinsic European safety standards.

EMC conformity is assumed by reference to the following specifications:

- Standard EN 50081-2(emission, industrial environment)
- Standard EN 50082-2(immunity, industrial environment)

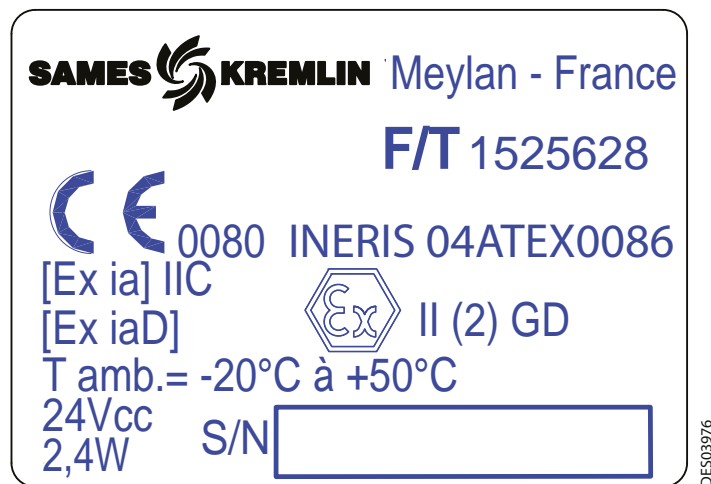
The protection by Intrinsic safety is created according to:

- Standard EN 60079-0: 2006
- Standard EN 60079-11: 2007

For implementation, [see § 7 page 8](#): Connection diagrams for this user manual.

### 1.1. Markings

The equipment is marked by a self-adhesive plastic or metallic label placed on the outer packaging.



## 2. Safety Instructions

The F/V converter is associated equipment that should be installed away from explosive atmospheres or protected by a standardised protection method. It must be connected via its X5 and X7 connectors to electric equipment certified for use with IIC group gaseous or dusty explosive atmospheres. Together they must be compatible in terms of intrinsic safety. The converter and all its related equipment must be installed in the same building.

### 3. Description

The module is designed to convert rotation information into a quantifiable electric signal. It is made up of components assembled on a printed circuit board.

The assembly is inserted into a box made of plastic with a degree of protection higher than or equal to IP20.

### 4. Electrical features

Operating voltage Ue	24 V DC
Sink current Ia	100 mA
Power output Pe	2.4 W
Maximum current on 0-10V output (output F)	10 mA
Maximum current on 0-10V pulsed output (output D)	10 mA
<b>Maximum characteristics on relays (output E)</b>	
Current	1A
Voltage	30 V DC/120 V AC

Maximum characteristics of intrinsic safety output at X5,X7 connectors:

Terminals	U0 (V)	I0 (mA)	Co (μF)	Lo (mH)
X5.1 to X5.4	9.81	57.36	3.2	7.8
((X5.2 or X5.3) / (X5.1 or X5.4)) or ((X5.2 or X5.3) / (X7.1 to X7.4))	8.61	28.68	5.9	26

### 5. Operation

The F/V converter is designed to feed and convert pulses from the speed sensor on a turbine:

- into direct current voltage (0-10 V), to provide an equivalent measurement of the rotation speed,
- into a frequency as 24V pulses for 300 μs.
- into NO/NC information indicating stop state of the turbine.

The operating temperature should range from 0 to 5°C.

#### 5.1. Measuring turbine speed

The input signal (\*) is amplified, then a frequency is set by a simple signal processing algorithm.

Two configurations are possible:

- A: 100 krpm with one pulse by rotation (from 3Hz to 1,667 kHz), example: sound high velocity turbine.
- B: 100 krpm with two pulses by rotation (from 6Hz to 3.333 kHz), example: optical high velocity turbine.

The module supplies:

- direct current voltage proportional to the speed measured with a maximum value of 10 volts (=/- 0.1 V) for the maximum speed. Scale: 10 V = 100 krpm
- 24V slot for 300 μs at a input frequency and according to the configuration:
  - **Configuration A:** the period between 2 pulses is equal to 500μs for a input frequency of 1.667 kHz, that is to say 100 krpm.
  - **Configuration B:** the period between 2 pulses is equal to 500μs for a input frequency of 3.333 kHz, that is to say 100 krpm.

**Note.\* The microphone cable should be less than 30 m long.**

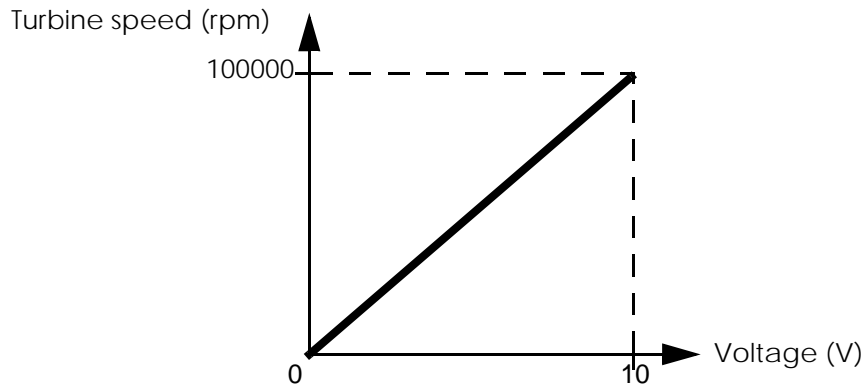
## 5.2. Configuration

Jumpers are used to configure the module.

- 1 jumper on the side of the box allows the sensor to be placed the converter in mode 2 pulses by rotation.
  - jumper located: Mode 2 pulses by rotation - Configuration B.
  - jumper missing: Mode 1 pulse by rotation - Configuration A.
- 1 jumper on the front face supplies **the 24 V pulsed mode** through the box.
  - jumper in: 24 V from the box. Connect terminals X2.2 and X4.1 ([see § 7 page 8](#)).
  - jumper missing: 24 V supplied from outside. Place a minimum 5k $\Omega$  resistor between the equipment and connector X4.2 ([see § 7 page 8](#)).

## 5.3. Testing

- Green LED: speed sensor switched on.
- Red LED:
  - extinguished: LED problem, out of service or other (microcontroller failure).
  - blinking: steady input signal
  - continuous: inconsistent input signal or stopped
- 0-10V output: power value of turbine rotation proportionally.



- Pulsed output: turbine rotation frequency in pulse form.
- Relay:
  - open: turbine stopped
  - closed: turbine rotating (> 180 rpm)

## **6. Installation and Maintenance**

SAMES KREMLIN carries out the initial commissioning.

Should the converter fail, please return it to:

SAMES KREMLIN

13 chemin de Malacher - INOVALLEE

CS 70086

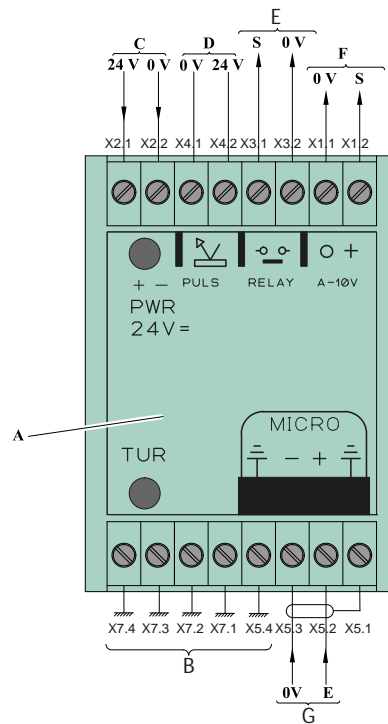
38243 MEYLAN cedex

France.

The converter may however be replaced by the operator.

## 7. Connections diagram

(Complying with EMC directive n° 89/336)



DES02822

A	Frequency voltage converter ref. 1525628
B	Earth braid 20 x 2
C	Converter supply
D	Pulsed output *
E	Turbine stopped relay
F	0-10V output - turbine speed
G	Microphone signal

**Reminder: input cables must be shielded.**



**WARNING :** If the jumper supplying the 24V pulsed mode is in position, terminals X2.2 and X4.1 should be connected.

If the jumper supplying the 24V pulsed output is not used, remember to install a minimum 5kW resistor between the equipment and connector X4.2.