INSTALLATION MANUAL

Z111

PRELIMINARY WARNINGS

The word **WARNING** preceded by the symbol ⚠ indicates conditions or actions that put the user's safety at risk.

The word **ATTENTION** preceded by the symbol ⚠ indicates conditions or actions that might damage the instrument or the connected equipment. The warranty shall become null and void in the event of improper use or tampering with the module or devices supplied by the manufacturer as necessary for its correct operation, and if the instructions contained in this manual are not followed.

⚠	**WARNING**: Before operating, read this document thoroughly and retain it for future reference. Non-respect of these instructions may reduce performances and safety of the devices and cause danger for people and property. The products must be installed, operated, serviced and maintained by qualified personnel in compliance with applicable standards and regulations. Don't open the device, it does not contain replaceable components, the tripping of the internal fuse (if included) is caused by an internal failure. Don't repair or modify the device, if malfunction or failure should occur during operation, send unit to the factory for inspection. No responsibility is assumed by SENECA for any consequences deriving from the use of this material.
	The module must be repaired and damaged parts replaced by the Manufacturer. The product is sensitive to electrostatic discharges. Take appropriate measures during any operation.
	Electrical and electronic waste disposal (applicable in the European Union and other countries with recycling). The symbol on the product or its packaging shows the product must be surrendered to a collection centre authorized to recycle electrical and electronic waste.

DOCUMENTATION
Z111

SENECA

QUALITY MANAGEMENT SYSTEM
ISO 9001:2015

SENECA s.r.l.; Via Austria, 26 – 35127 – PADOVA – ITALY; Tel. +39.049.8705359 - Fax +39.049.8706287

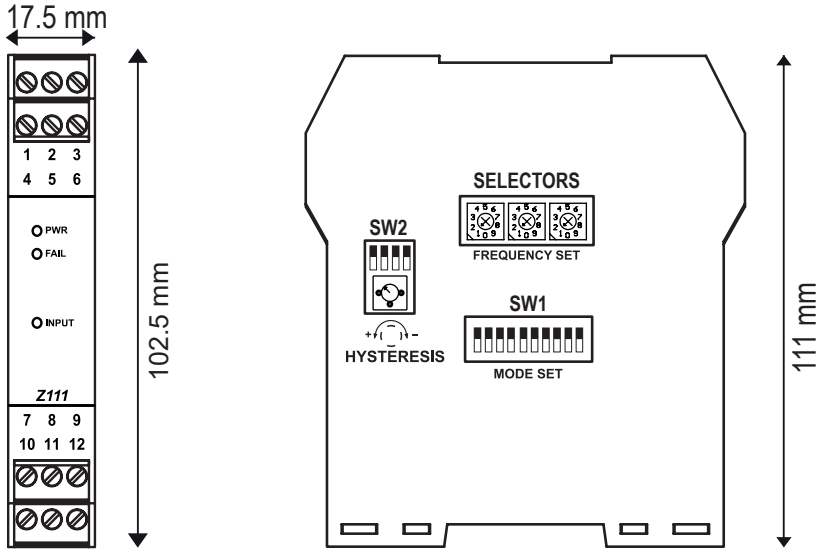
CONTACT INFORMATION

Technical support	support@seneca.it	Product information	sales@seneca.it

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MODULE LAYOUT

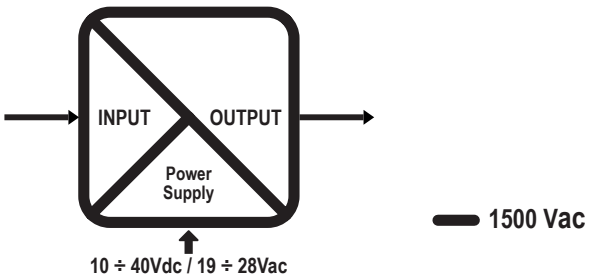


Dimensions: 17.5 x 102.5 x 111 mm
Weight: 100 g
Container: PA6, black

SIGNALS VIA LED ON FRONT PANEL

LED	STATUS	LED meaning
PWR	ON	The device is powered correctly
FAIL	ON	Instrument in error state
INPUT	ON	Closed Input
	OFF	Open Input

TECHNICAL SPECIFICATIONS

CERTIFICATIONS	CE c UL us LISTED 3LUT UKCA
POWER SUPPLY	11 ÷ 40Vdc; 19 ÷ 28Vac; 50-60Hz; Max 2.5W Supplied with limited energy according to UL 61010-1 3rd Ed, section 9.4 or LPS in conformance with UL 60950-1 or Class 2 in compliance with UL 1310 or UL 1585 Pollution degree 2 Overvoltage category II
ENVIRONMENTAL CONDITIONS	Operating temperature: from -25°C to +70°C; Humidity: 10% ÷ 90% non condensing; Degree of protection: IP20 (not UL evaluated) Open Type;Altitude up to 2000m
INPUT	Pulses: mechanical contact, reed, 2 and 3 wire NPN, 3 wire PNP with 24V DC power supply, Namur, photoelectric, “HALL” sensor, variable reluctance. Maximum frequency 9.99 KHz
OUTPUT	Applied current 0..20 mA / 4..20 mA, max load resistance 600 Ω Voltage 0..5 V / 0..10 V / 1..5 V / 2..10 V, min load resistance 2500Ω. Error: < 0.3% of F.S.; Resolution: 0.1%
ASSEMBLY	35mm DIN rail IEC EN60715
CONNECTIONS	3-way removable screw block pitch 5 mm
INSULATION	

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N.B.: A delayed fuse with a maximum rating of 2.5 A must be installed in series with the power supply connection, near the module.

INSTALLATION REGULATIONS

The module has been designed for vertical installation on a DIN 46277 rail. For optimal operation and long life, adequate ventilation must be provided. Avoid positioning ducting or other objects that obstruct the ventilation slots. Avoid mounting modules over heat-generating equipment.
Installation in the bottom part of the electrical panel is recommended.

⚠ CAUTION

These are open type devices intended for installation in a final casing/panel that offers mechanical protection and protection against the spread of fire.

SETTING THE DIP-SWITCHES

⚠ CAUTION

Dip-switches must be set with the power supply disconnected from the module, to avoid any damage to the module.

KEY	
	**ON**
	**OFF**

FILTER SETTING:

SW1: FILTER	
1 2 3 4	
	FILTER ON
	FILTER OFF

If you have an unstable input frequency, you can set a filter to stabilize the output signal.
To set this filter, simply position dip-switch no.1 of SW1 to ON (move it upwards).

INPUT FREQUENCY SETTING:

Multiplier setting

SW1: MULTIPLIER	
1 2 3 4	
	X 0.0001
	X 0.001
	X 0.01
	X 0.1
	X 1
	X 10

It is possible to easily set the full scale frequency of the input signal.
The three rotary selectors allow you to set a value which, multiplied by the multiplication factor, will give the input full scale frequency.

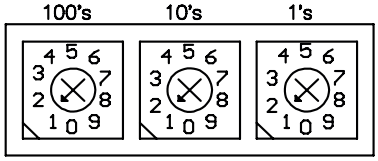
Example 1: if you have a full scale value of the input frequency = 563 Hz, you will have to set the hundreds selector (100's) to 5, the tens selector (10's) to 6, and the units selector to 3 (1's) and set the multiplier x1 (563 x1 = 563Hz).

Example 2: if you have a full scale value of the input frequency = 7850 Hz, you will have to set the hundreds selector (100's) to 7, the tens selector (10's) to 8, and the units selector to 5 (1's) and set the multiplier x10 (758 x10 = 7850Hz).

NOTE 1: The hundreds (100's) selector cannot be set to 0; the minimum full scale is therefore 0.01Hz.

NOTE 2: The “Error” LED flashes if the input frequency is lower than that indicated in the table or higher than the set full scale.

Frequency setting selectors



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N.B.: Dip-switches and rotary selectors must be set with the power supply disconnected from the module, to avoid any damage to the module.

AVERAGE PULSE SETTING:

SW1: AVERAGE PULSES	
5 6 7 8	
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
	15

In the event that there are input signals with a cyclically unstable frequency, it is possible to set a number of pulses on which the frequency measurement will be calculated.

Example: the input signal is provided by a proximity sensor which detects the passage of some bolts mounted on a wheel; if these bolts are not equidistant, there will be an unstable frequency value at the output of the sensor and consequently an unstable value of the voltage and/or current at the output of the Z111 module.
By setting the number of bolts applied to the wheel as "average pulses", for example 10, as the number of pulses for the average, the instrument will count 10 pulses and then divide the time elapsed between the first and last pulse by 10; this operation will allow a very stable signal as output from the module.

NOTE: if you do not want the average of the input pulses to be carried out, leave all the dip-switches of the SW7 selector in OFF (downwards).

N.B.: Normally the minimum measured frequency is 0.001 Hz. When pulse averaging is set above 6, the minimum frequency becomes n / 6000.

Example: pulse average = 8, f. min = 8/6000=0.00133Hz

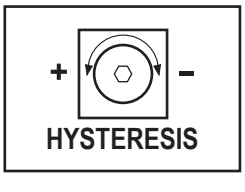
OUTPUT SECTION:

SW1: OUTPUT MODE / VOLTAGE	
9 10	
	0/1..5V
	0/2..10V
	4÷20mA / 1÷5V / 2÷10V
	0÷20mA / 0÷5V / 0÷10V

Dip-switch number 9 of the SW1 group allows you to select the output voltage.
Dip-switch number 10 of the SW1 group allows you to set the output with or without zero elevation.

INPUT TYPE SETTING

SW2: INPUT	
1 2 3 4	
	OTHERS
	RELUCTANCE



HYSTERESIS CALIBRATION:
This operation must only be carried out when the “Variable reluctance” input is used.
For calibration, after appropriately setting the DIP-SWITCH and the full scale frequency, it is necessary to provide an input signal with an amplitude similar to the working one. Using a screwdriver, rotate the hysteresis trimmer (T1) completely clockwise and then slowly rotate the trimmer anti-clockwise until the “INPUT” LED lights up (flashing in relation to the applied frequency).
At this point, further rotate the trimmer clockwise by approximately 10% to have a safety margin on the calibration.
NOTE: remember that the minimum signal amplitude is 100mV.

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ELECTRICAL CONNECTIONS

⚠ CAUTION

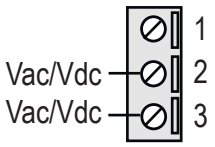
To meet the electromagnetic immunity requirements:
- use shielded signal cables;
- connect the shield to a preferential instrumentation earth system;
- separate shielded cables from other cables used for power installations (transformers, inverters, motors, etc...).

⚠ CAUTION

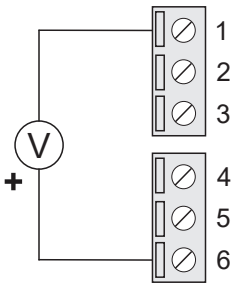
Use AWG size 30-12 or two 24-16, torque 5 lb in. (For UL approval)

OUTPUT RETRANSMITTED

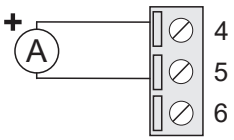
POWER SUPPLY



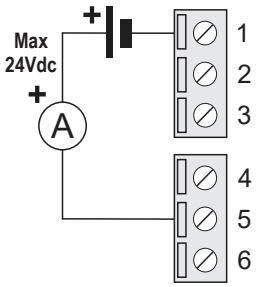
VOLTAGE



APPLIED CURRENT

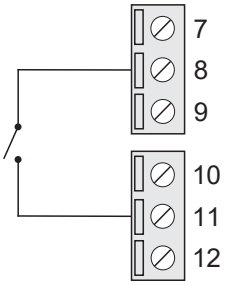


APPLIED CURRENT With external power

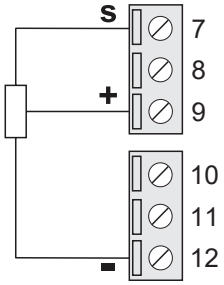


INPUTS

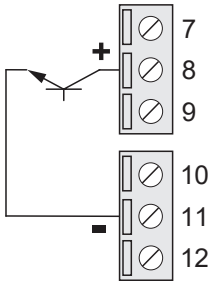
CONTACT / REED



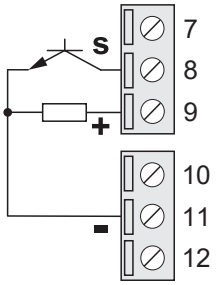
"HALL" SENSOR



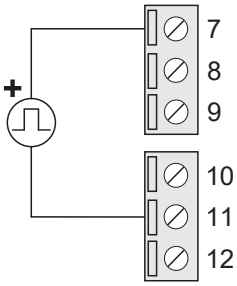
NPN (2 FILI)



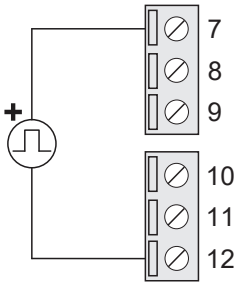
NPN 24 V (3 WIRES)



24 V INPUT



TTL INPUT



PNP 24 V (3 WIRES)

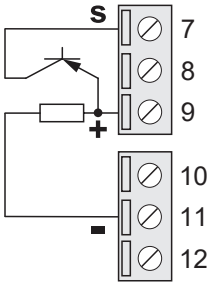
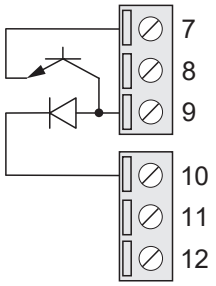
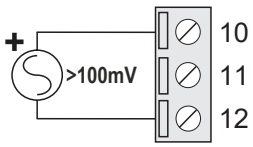


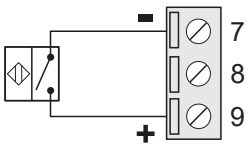
PHOTO-ELECTRIC



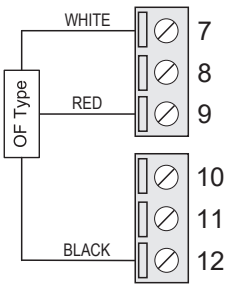
VARIABLE RELUCTANCE

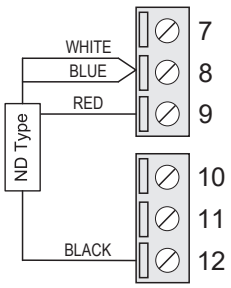


NAMUR



"AICHI" OVAL WHEEL TURBINE





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