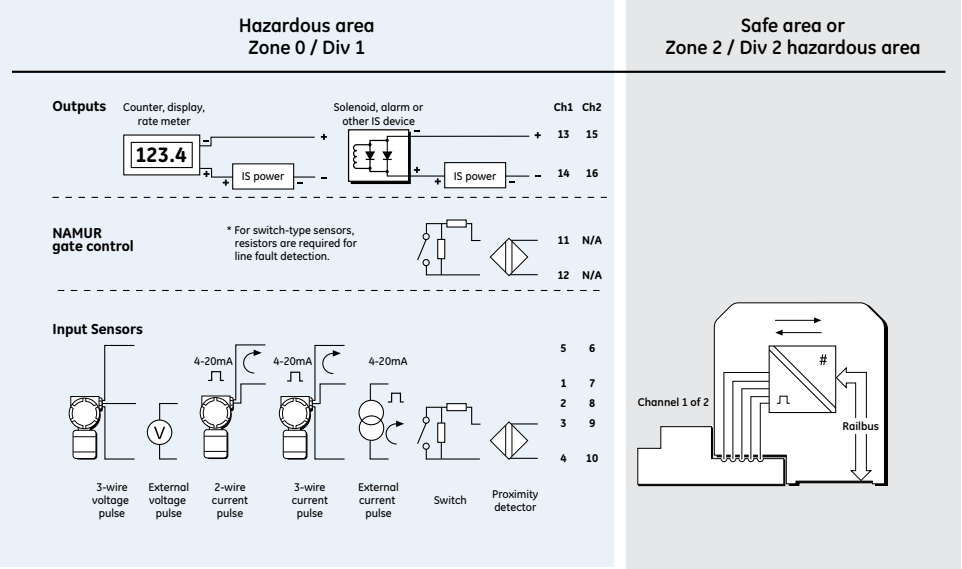
Pulse Input Module

2-channel pulse input

8223-PI-IS

- 2 input channels with power supplies or single quadrature input
- 1 Hz to 50 kHz signal capability
- Frequency and acceleration measurement
- 2 alarm/repeater retransmitted output channels
- 2- and 3-wire pulse transmitter format
- Pulse counting (with gate control)
- Channels independently configurable
- Open circuit, short circuit and missing pulse detection



MODULE SPECIFICATION

See also System Specification

PULSE/FREQUENCY

Number of channels
- 2

Frequency range
- 50 kHz
- In quadrature mode – 12.5 kHz

Accuracy (25°C)
- ± 0.05% of span

Temperature Stability
- 0.005% / °C

CONTROL GATE (FOR GATING CHANNEL 1 ONLY)

Switching thresholds
- 1.2 mA / 2.1 mA

Input impedance
- 1 kΩ

Supply voltage
- 8.1 V (nom.) at 8 mA

SENSOR INPUT CHARACTERISTICS

NAMUR 1

Switching thresholds
- 1.2 mA / 2.1 mA

Input impedance
- 1 kΩ

Supply voltage
- 8.1 V (nom.) at 8 mA

CURRENT

Input signal
- 20 mA (max.)

Threshold
- Configurable in 8 levels

Input impedance
- 25 Ω

Open circuit current
- <0.5 mA

Short circuit current
- >21.5 mA

VOLTAGE

Input signal
- 0 - 24 V dc (50 V max.)

Threshold
- Configurable in 8 levels

Input impedance
- >10 kΩ

Switching hysteresis
- 100 mV

SWITCH

Input voltage range
- 0 – 10 V dc

OUTPUTS

The outputs are open-collector type for separately powered IS devices such as LED clusters, annunciators or solenoids

Number of channels
- 2

OFF state voltage
- 30 V (max)

OFF state leakage current
- 10µA (max)

ON state voltage drop
- <1.0V @ 50 mA

ON state current
- 100 mA

Retransmission bandwidth
- 1
- 2000 Hz

CONFIGURABLE PARAMETERS

INPUTS

Channel
- Enable / Disable

Sensor type
- NAMUR prox. type (select low / high speed)
- Current pulse input
- Voltage pulse input
- Switch input

Frequency ranges
- 0.1, 0.3, 0.5, 1, 3, 5, 10, 30, 50, 100* kHz

Sample period
- 20 ms to 200 s

Quadrature
- Enable / Disable

Threshold level
- User defined values

Triggering
- Rising edge / falling edge

Filtering
- Off, 1, 5, 20, 100 kHz

Alarms
- Frequency / acceleration

Alarm limits
- High / low

Alarm deadband (hysteresis)
- User defined value

Line fault detect
- Enable / Disable

Channel status
- Active / Inactive

Counter
- Enable / Disable

Counting direction
- Count up / Count down

* *While measurements can be made in the upper half of this range, the stated accuracy applies only to frequencies up to 50kHz.*

DISCRETE OUTPUT

Function selection
- Disabled
- High / low alarm
- Acceleration alarm
- Counter preset value reached
- Quadrature output (channel 1 only)
- Scaled retransmission (channel 1 only)

Retransmission scaling (K factor channel 1 only)
- 1 – 25

CONTROL GATE INPUT

Counter (channel 1)
- Start (count) / pause

DYNAMIC DATA (READ ONLY)

PROCESS VALUES

Frequency
- 16 bit unsigned

Count
- 32 bit signed

Acceleration
- 16 bit signed

STATUS VALUES

Frequency / acceleration alarms
- High / low
- missing pulse detect

Line fault detect
- Open / short circuit

Quadrature direction
- 1 = clockwise, 2 = anti-clockwise

Counter alarms
- Preset value reached

CONTROL DATA (WRITE ONLY)

Counter preset value
- 32 bit signed
- Load preset value = 0 to disable

Counter commands
- Start / stop / reset

NOTE: *Channel 1 counter can also be controlled by control gate input: 1 = start (count), 0 = pause*

ISOLATION

Any channel to Railbus
- 60 V ac

Between input channels
- None (common 0V connection)

Between output channels
- 30 V ac

RESPONSE TIMES

Signal change to availability on Railbus
- 25 ms (max.)

POWER SUPPLIES

Railbus current (both channels @22 mA)
- 300 mA (max.)

Power dissipation (both channels @22 mA)
- 2.8 W (max.)
- No load – 2.0 W (max.)

MECHANICAL

Module Key Code
- F2

Module width
- 42 mm

Weight
- 260 g

SAFETY

Field wiring protection
- [EEx ia] IIC*

* *[EEx ia] IIB with BEI Optical Encoder*

The following figures are for Gas Groups A/B (IIC) unless otherwise stated.

24V TX supplies (Ch1 & Ch2)
- Uo = 27.4 V, Io = 93.2 mA, Po = 639 m
- C_o = 0.087 µF, L_o = 4.2 mH

Current inputs (Ch1 & Ch2)

Uo = ± 1.1 V, Io = 53 mA, Po = 15 mW

Ui = 1.1 V, Ii = 50 mA

C_o = 1000 µF, L_o = 13.1 mH

Voltage inputs (Ch1 & Ch2)

NAMUR inputs (Ch1 & Ch2)

NAMUR gate input (Ch1)
- Uo = 9.6 V, Io = 25 mA, Po = 57 mW
- Ui = 18.2 V, Pi = 333 mW
- C_o = 3.6 µF, L_o = 56.6 mH

Discrete outputs (Ch1 & Ch2)
- Ui = 30 V, Pi = 333 mW

All circuits combined within one channel
- Uo = 28.5 V, Io = 93.2 mA (or 169mA at 13.4V), Po = 639 mW,
- Co = 0.078 µF, Lo = 1.28 mH

TERMINAL ASSIGNMENTS

Terminal	Description	
1	Current input	Channel #1
2	Voltage input	
3	NAMUR input	
4	Common	
5	Power supply +ve	
6	Power supply + ve	Channel #2
7	Current input	
8	Voltage input	
9	NAMUR input	
10	Common	
11	NAMUR gate/control input	Channel #1
12	Common	
13	Output +ve	
14	Output -ve	
15	Output +ve	Channel #2
16	Output -ve	

FIELD TERMINALS

Field Wiring Type	Recommended Field Terminal
Intrinsically safe, standard	8621-FT-IS

FM ENTITY PARAMETERS

24V TX supplies (Ch1 & Ch2)
- Uo = 27.4 V, Io = 93.2 mA, Po = 639 mW
- Ca = 0.08 µF, La = 4.1 mH

24V TX supplies (Ch1 & Ch2 connected togther)
- Gas Groups C,E (IIB)
  - Uo = 27.4 V, Io = 186.4 mA, Po = 1.28 W
  - Ca = 0.67 µF, La = 4.3 mH

Current inputs (Ch1 & Ch2)
- Uo = 1.2 V, Io = 57.4 mA, Po = 17.2 mW
- Ca = 1000 µF, La = 10.6 mH

3-wire current inputs (Ch1 & Ch2)
- Gas Groups C,E (IIB)
  - Uo = 27.4 V, Io = 150.6 mA, Po = 656 mW
  - Ca = 0.67 µF, La = 6.4 mH

Voltage inputs (Ch1 & Ch2)
- Uo = 9.56 V, Io = 1.0 mA, Po = 2.39 mW
- Ca = 3.7 µF, La = 1000 mH

3-wire voltage inputs (Ch1 & Ch2)
- Uo = 27.4 V, Io = 93.2 mA, Po = 642 mW
- Ca = 0.08 µF, La = 4.0 mH

NAMUR inputs (Ch1 & Ch2)

NAMUR gate input (Ch1)
- Uo = 9.56 V, Io = 11.1 mA, Po = 26.4 mW
- Ca = 3.7 µF, La = 263 mH

Discrete outputs (Ch1 & Ch2)
- Ui = 30 V, Ii = 100 mA
- Ci = 0 µF, Li = 0 mH

2/1 I/O Modules

LED INDICATORS

POWER - Green LED

OFF	ON	FLASHING
Power failure	Power OK	Not Applicable

FAULT - Red LED

OFF	ON	FLASHING
In running state	Fault	Awaiting module training

PULSE INPUT CHANNEL - Yellow LED

OFF	ON	FLASHING
Channel inactive	Channel active and operating normally	Channel active but in alarm condition

DIGITAL OUTPUT CHANNEL - Yellow LED

OFF	ON	FLASHING
Channel inactive	Channel active and operating normally	Not applicable