PROGRAMMABLE f/I - f/f CONVERTER

- Pulse conditioning
- Frequency generator
- Concurrent f/I and f/f function
- Analogue current and voltage output
- PNP / NPN output, optional relays
- Programmable by PC and Loop Link

Supply voltage:	24 VDC

INPUT RANGE:

Frequency:	0...20000 Hz
Sensor types:	NAMUR, tacho, NPN, PNP, TTL, S0

OUTPUT RANGE:

Current and voltage output:	0...20 mA / 0...10 V
Relay outputs:	0...20 Hz
NPN and PNP output as f/f:	0...1000 Hz
NPN and PNP output as generator:	0...20000 Hz

In general:
By way of a standard PC and the Loop Link programming kit, the PRecon 5225 f/I - f/f Converter is configured acc. to the requested function.
Alternatively, the 5225 may be delivered fully-configured acc. to your specifications, see the Options Index on the next page.
Typical pulse sources are flow meters, tacho generators, mechanical switches, or inductive proximity sensors.

Applications:
The f/I function performs frequency to current and voltage conversion.
The output can be programmed to show period meaning that the input frequency can be converted to a linear time signal.
The digital outputs are used as e.g. a frequency watch for speed control or as a window comparator having one status between 2 limits and the opposite status outside these limits.

The f/f function can be used for pulse division or multiplication and as a buffer collecting fast pulse trains. The input pulses are calculated, counted in a buffer, and sent to the output as a pulse train with the programmed pulse width.

The concurrent f/I and f/f functions enable a scaled digital output signal in conjunction with the analogue output.

The frequency generator function is used as e.g. a time base or clock generator.

Technical characteristics:
Input:
Programmable input for standard pulse generator connection.
Normally, the auxiliary supply and trigger level follow the sensor type, but these can be programmed acc. to other values.
At contact input, the 50 Hz filter should be applied.
The PRecon 5225 is protected against polarity reversal on input and supply.

Analogue output:
The analogue current and voltage output can be scaled acc. to your choice in relation to the digital input. Max. zero offset is 50% of selected measurement range. Programmable response time.
Short-circuit-protected output.
When both current and voltage signals are used simultaneously, the mA loop to ground passes through the internal shunt.

Standard voltage output (pin 12) is obtained by leading the current signal (pin 13) through an internal shunt resistor (pin 12). At current signals in the ranges 0...1 VDC, a 50 Ω shunt (JP1) is applied; in the ranges 0...10 VDC, a 500 Ω shunt (JP2) is applied.

Digital output(s):
Both NPN / PNP and relay outputs can be set up with delayed on and off. The action on the outputs can be inverted, and the hysteresis can be set acc. to your specifications.
At power-up, shifts on the outputs can be delayed for up to 999 s.

NPN and PNP outputs for external relay, electromechanical counter, PLC input, or equivalent load.
The outputs are current-limited by way of PTC resistors.
Active output is established by connecting the NPN to the PNP output (jumper pins 22-23).

Relay outputs:
The PRecon 5225 can be delivered with 2 relay outputs that are programmed individually.

Status indication:
The 5225 is equipped with 4 front LEDs.
f in:	Indicates an active input (non-active at NPN input).
Dig. out. 1:	Indicates active NPN or relay 1 output.
Dig. out. 2:	Indicates active relay 2 output.
Error:	Indicates sensor error at NAMUR input.

Electrical specifications:

Specifications range:
-20°C to +60°C

Common specifications:

Supply voltage	19.2...28.8 VDC
Internal consumption	1.7 W
Max. consumption	3.5 W
Power-up delay (digital outputs)	0...999 s
Warm-up time	30 s
Communications interface	Loop Link
Signal / noise ratio	min. 60 dB
Response time, analogue	< 60 ms + period
Response time, digital output	< 50 ms + period
Response time, concurrent f/I and f/f	< 80 ms + period
Calibration temperature	20...28°C
Temperature coefficient	< ±0.01% of span / °C
Linearity error	< ±0.1% of span
Effect of supply voltage change	< 0.002% of span / %V

Auxiliary voltages:

Namur supply	8.3 VDC ±0.5 VDC / 8 mA
S0 supply	17 VDC / 20 mA
NPN / PNP supply	17 VDC / 20 mA
Special supply (programmable)	5...17 VDC / 20 mA

EMC immunity influence	< ±0.5%

Max. wire size	1 x 2.5 mm² stranded wire
Screw terminal torque	0.5 Nm
Humidity	< 95% RH (non-cond.)
Dimensions (HxWxD)	109 x 23.5 x 130 mm
DIN rail type	DIN 46277
Protection degree	IP20
Weight	190 g

Input:
General:

Measurement range	0...20 kHz
Min. measurement range	0.001 Hz
Max. offset	90% of selected max. frequency
Low cut off	0.001 Hz
Min. pulse width (without filter)	25 µs
Min. period (without filter)	50 µs
Max. frequency (without filter)	20 kHz
Min. pulse width (with filter)	10 ms
Min. period (with filter)	20 ms
Max. frequency (with filter)	50 Hz
Programmable trig-level	0.025...6.5 V (nom.)
Trig-level LOW	> 50% of trig high -50 mV

Namur input acc. to DIN 19234:

Trig-level LOW	≤ 1.2 mA
Trig-level HIGH	≥ 2.1 mA
Input impedance	1000 Ω

Sensor error detection (only for Namur):

Breakage	≤ 0.1 mA
Short-circuit	≥ 7.0 mA
Response time	≤ 400 ms

Tacho input:

Trig-level LOW	≤ -50 mV
Trig-level HIGH	≥ 50 mV
Input impedance	≥ 100 kΩ
Max. input voltage	80 VAC pp

NPN / PNP input:

Trig-level LOW	≤ 4.0 V
Trig-level HIGH	≥ 7.0 V
Input impedance, standard	3.48 kΩ
Input impedance, special version	13.3 kΩ / NPN

TTL input:

Trig-level LOW	≤ 0.8 VDC
Trig-level HIGH	≥ 2.0 VDC
Input impedance	≥ 100 kΩ

S0 input acc. to DIN 43 864:

Trig-level LOW	≤ 2.2 mA
Trig-level HIGH	≥ 9.0 mA
Input impedance	800 Ω

Analogue output:
Current output:

Signal range	0...20 mA
Min. signal range	5 mA
Max. offset	50% of select. max. value
Signal dynamics	16 bit
Updating time	20 ms
Updating time for concurrent f/I and f/f	40 ms
Load (max.)	20 mA / 600 Ω / 12 VDC
Load stability	< ±0.01% of span / 100 Ω
Current limit	≤ 23 mA

Voltage output through internal shunt:

Signal range	0...10 VDC
Min. signal span	250 mV
Max. offset	50% of select. max. value
Load (min.)	500 kΩ

Digital outputs (NPN / PNP):

$I_{max.}$ source	30 mA
$I_{max.}$ sink	130 mA
$V_{max.}$	28.5 VDC

f/f converter output:

Signal range	0...1000 Hz
Multiplicator / Divisor	1.0000...1000000
Min. pulse width	500 µs
Max. pulse width	999 ms
Max. duty cycle	50%

Frequency generator:

Min. period	50 µs
Max. frequency	20 kHz
Duty cycle	50%

Relay output:

Isolation, test / operation	3.75 kVAC / 250 VAC
Frequency max.	20 Hz
$V_{max.}$	250 VRMS
$I_{max.}$	2 A / AC
Max. AC power	500 VA
Max. load at 24 VDC	1 A

GOST R approval:

VNIIM, Cert. no.	See homepage

Observed authority requirements: Standard:

EMC 2004/108/EC	EN 61326-1
LVD 73/23/EEC	EN 61010-1
PELV/SELV	IEC 364-4-41 and EN 60742

Of span = Of the presently selected range

Options index 5225:

*1: f/I converter	***2: f/f converter**	***3: f/I and f/f converter**	***4: Frequency generator**

Digital input:

*1,3 Unit: Frequency / Period
0% _____ Hz/s   100% _____ Hz/s

*1,2,3 Input type: Tacho / TTL / NPN / PNP / S0 / NAMUR
Special Current / Special Voltage
Trig level high _____ mA/V   Trig level low _____ mA/V   Spec. sensor supply _____ V

*1,2,3 Input filter:
Disable / 50 Hz Lowpass

Analogue output:

*1,3 Unit: Current / Voltage
0...20 mA, 4...20 mA, 20...0 mA, 20...4 mA / 0...10 V, 0...1 V, 10...0 V, 1...0 V
Fixed output _____ mA/V / Specify 0% _____ mA/V   100% _____ mA/V

*1,3 Response time:
_____ s

*1,3 Sensor error (NAMUR):
Off / Hold / Specify error value _____ mA

Digital output 1:

*1   Output 1:   Off / Activate for incr. freq. / Activate for decr. freq.
Setpoint _____ Hz/s   Hysteresis _____ Hz/s
/Window
High limit _____ Hz/s   Low limit _____ Hz/s

*4 Frequency:
_____ Hz

*1   Output 1 delay: Delay on / Delay off   Power on delay
_____ s   /   _____ s   _____ s

*1,2,3   Output 1 action:
NPN or relay N.C. / PNP or relay N.O.

*2,3   Output 1 function: Multiply: P1*InA / Divide: InA/P1
P1: _____   Pulse time _____ s

*1,2,3   Sensor error action:
Off / Close / Open / Hold

Digital output 2:

*1,3   Output 2:   Off / Activate for incr. freq. / Activate for decr. freq.)
Setpoint _____ Hz/s   Hysteresis _____ Hz/s

*3   Output 2 window: /Window
High limit _____ Hz/s   Low limit _____ Hz/s

*1,3   Output 2 action:
NPN or relay N.C. / PNP or relay N.O.

*1,3   Output 2 delay: Delay on / Delay off   Power on delay
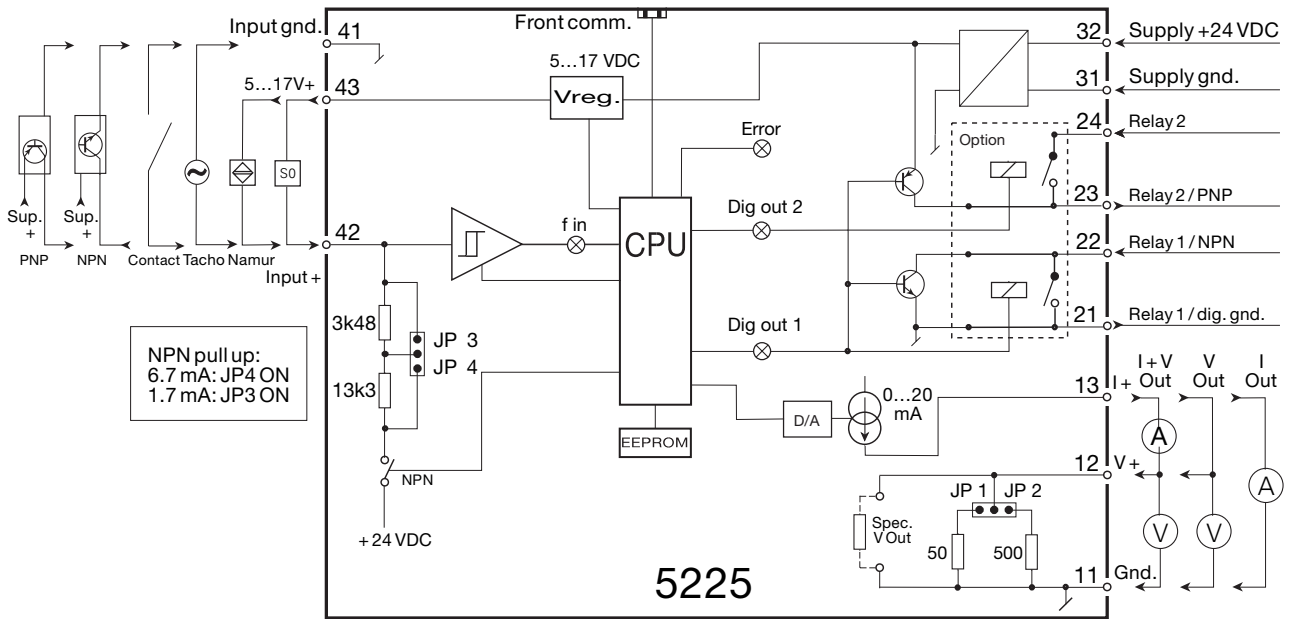_____ s   /   _____ s   _____ s

*1,2,3   Sensor error action:
Off / Close / Open / Hold
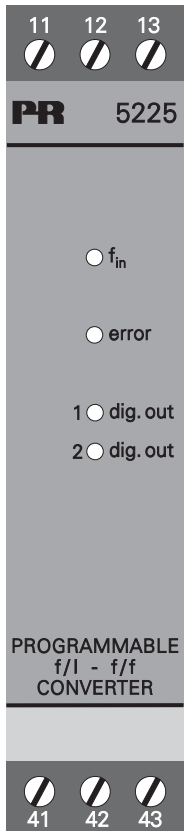
*1,2,3 Error LED:
Disable / Sensor error (NAMUR)

Order: 5225

Type	Version	Output	
5225	Standard : A	Analogue + NPN / PNP	: 1
		Analogue + Relay output	: 2

Block diagram:

Input gnd. 41

Front comm.

5...17 VDC

Vreg.

32 Supply +24 VDC

31 Supply gnd.

5...17V+ 43

Error

Option

24 Relay 2

23 Relay 2 / PNP

Sup.
+
PNP

Sup.
+
NPN

Contact Tacho Namur

S0

Input +

42

f in

CPU

Dig out 2

22 Relay 1 / NPN

21 Relay 1 / dig. gnd.

3k48

JP 3
JP 4

NPN pull up:
6.7 mA: JP4 ON
1.7 mA: JP3 ON

13k3

Dig out 1

EEPROM

D/A

0...20 mA

13 I+

I+V Out
V Out
I Out

A

NPN

12 V+

+ 24 VDC

JP 1   JP 2

Spec. V Out

50   500

A

V   V

5225

11 Gnd.

Front layout:

11	12	13

PR 5225

○ f in

○ error

1 ○ dig. out

2 ○ dig. out

PROGRAMMABLE
f/I - f/f
CONVERTER

41	42	43

5225 connection to Loop Link:

Supply

11 12 13

Comm.

5225

COM ⊗

Loop Link

41 42 43