Product manual
IFM
Universal f/I-f/f converter

Universal f/I-f/f converter
IFM

Table of contents

Warning

This device is designed for connection to hazardous electric voltages. Ignoring this warning can result in severe personal injury or mechanical damage.
To avoid the risk of electric shock and fire, the safety instructions of this guide must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following.
Prior to the commissioning of the device, this installation guide must be examined carefully.
Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

GENERAL

Warning

Until the device is fixed, do not connect hazardous voltages to the device. The following operations should only be carried out on a disconnected device and under ESD safe conditions:
General mounting, connection and disconnection of wires.
Troubleshooting the device.

Repair of the device and replacement of circuit breakers must be done by Red Lion Controls only.

HAZARD-OUS VOLTAGE

Warning

Do not open the front plate of the device as this will cause damage to the connector for the PGMMOD communication interfaces.
This device contains no DIP-switches or jumpers.
The device must be mounted on a DIN rail according to DIN EN 60715.

CAUTION

Symbol identification

Triangle with an exclamation mark: Warning / demand. Potentially lethal situations. Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage.

The CE mark proves the compliance of the device with the essential requirements of the directives.

The UKCA mark proves the compliance of the device with the essential requirements of the statutory requirements.

The double insulation symbol shows that the device is protected by double or reinforced insulation.

Safety instructions

Definitions

Hazardous voltages have been defined as the ranges: 75 to 1500 Volt DC, and 50 to 1000 Volt AC.
Technicians are qualified persons educated or trained to mount, operate, and also trouble-shoot technically correct and in accordance with safety regulations.
Operators, being familiar with the contents of this manual, adjust and operate the knobs or potentiometers during normal operation.

Receipt and unpacking

Unpack the device without damaging it and check whether the device type corresponds to the one ordered. The packing should always follow the device until this has been permanently mounted.

Environment

Avoid direct sun light, dust, high temperatures, mechanical vibrations and shock, and rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.
The device must be installed in pollution degree 2 or better.
The device is designed to be safe at least under an altitude up to 2 000 m.
The device is designed for indoor use.

Mounting

Only technicians, who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these, should connect the device. Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,

Red Lion Controls
www.redlion.net

Mounting and connection of the device should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location.

Stranded wire should be installed with an insulation stripping length of 5 mm or via a suitable insulated terminal such as a bootlace ferrule.

Descriptions of input / output and supply connections are shown in the block diagram and side label.

The following apply to fixed hazardous voltages-connected devices:
   The max. size of the protective fuse is 10 A and, together with a power switch, it should be easily accessible and close to the device. The power switch should be marked with a label indicating that it will switch off the voltage to the device.

Year of manufacture can be taken from the first two digits in the serial number.

UL installation requirements

Use 60/75°C copper conductors only
For use only in pollution degree 2 or better
Max. ambient temperature . . . . 60°C
Max. wire size. . . . . AWG 26-14
UL file number E324843

Calibration and adjustment

During calibration and adjustment, the measuring and connection of external voltages must be carried out according to the specifications of this manual. The technician must use tools and instruments that are safe to use.

Normal operation

Operators are only allowed to adjust and operate devices that are safely fixed in panels, etc., thus avoiding the danger of personal injury and damage. This means there is no electrical shock hazard, and the device is easily accessible.

Cleaning

When disconnected, the device may be cleaned with a cloth moistened with distilled water.

Liability

To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against Red Lion Controls that would otherwise exist according to the concluded sales agreement.

How to demount the device
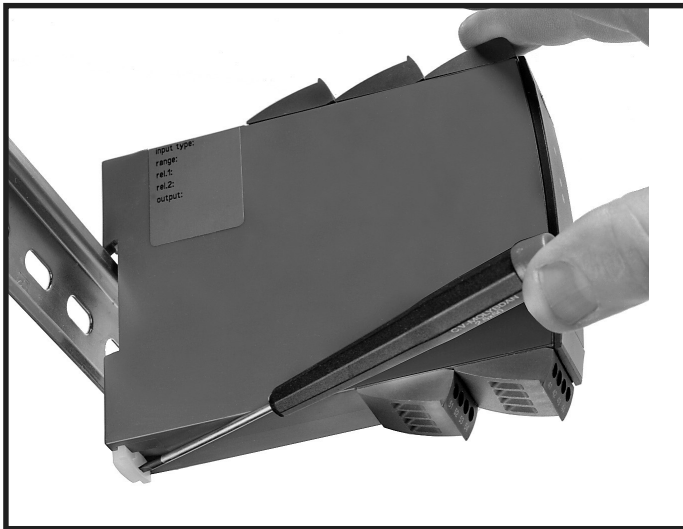
Picture 1:
The device is detached from the DIN rail by moving the bottom lock down.

Mounting / demounting the PGMMOD communication interfaces

1: Insert the tabs of the PGMMOD into the slots at the top of the device.
2: Hinge the PGMMOD down until it snaps into place.

Demounting of the PGMMOD communication interfaces
3: Push the release button on the bottom of the PGMMOD and hinge the PGMMOD out and up.
4: With the PGMMOD hinged up, remove from the slots at the top of the device.
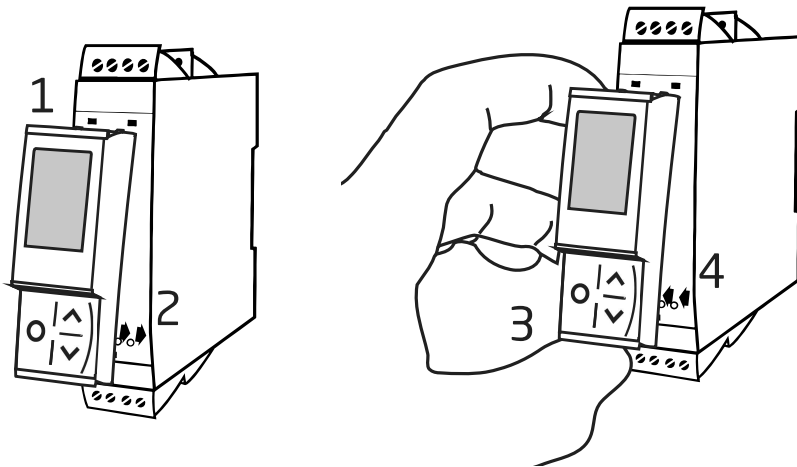
Universal f/I-f/f converter
IFM

- Front-programmable
- Input: NPN, PNP, Tacho, & TTL
- Output: Programmable bipolar mA / V or relay
- Universal power supply 21.6...253 VAC / 19.2...300 VDC

Functional highlights

- Measures frequencies up to 100 kHz.
- Active and passive current output ±23 mA / 0...23 mA.
- Buffered voltage output ±10 VDC.
- Linearization: Linear or square root function.
- 2-point process calibration.
- Programmable trigger levels -0.05...6.5 V.
- Programmable sensor supply 5...17 V.
- Advanced configurable input limits for increased safety.
- Output relay with windows, setpoint and latch functionality.
- Simulation of process value during commissioning and maintenance.
- All terminals are over-voltage protected (24 VDC), polarity protected and short-circuit protected.

Technical highlights

- Accuracy < 0.06% / span.
- Temperature coefficient 0.006% / C°.
- Response time < 30 ms.
- 2.3 kVAC, 3-port galvanic isolation.

Programming

- Configuration, monitoring and diagnostics using the PGMMOD detachable communication interfaces.
- All programming can be password-protected.
- Scrolling help text in 7 languages.

Mounting

- Units can be mounted side by side, horizontally and vertically, without air gap on a standard DIN rail – even at 60°C ambient temperature.

Applications

Input signals:

Tx	TTL	+ Supply	+ Supply		Tacho

Special trig current & voltage | TTL | PNP | NPN | Contact (NPN) | Tacho

44

43

42

41

Output signals:

IFM0001
Analog, 0/4...20 mA,
voltage and relay

IFM0001
Relays

24

23

22

21

(±) mA   (±) V   mA

2-wire
+ V supply
3.5...28 V

Relay 1

Power connection:

21.6...253 VAC
or
19.2...300 VDC

34

33

32

31
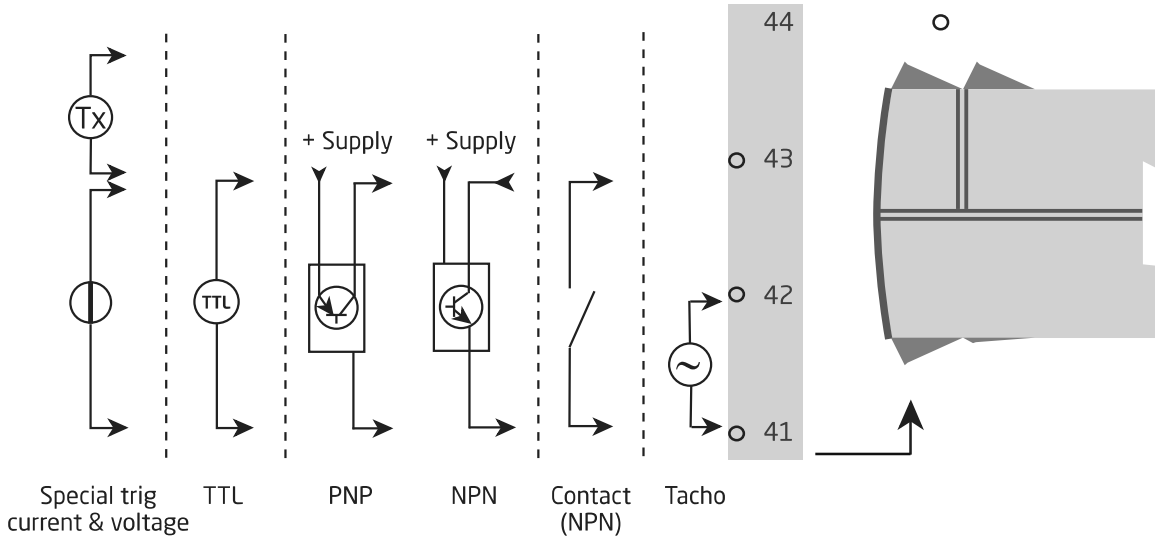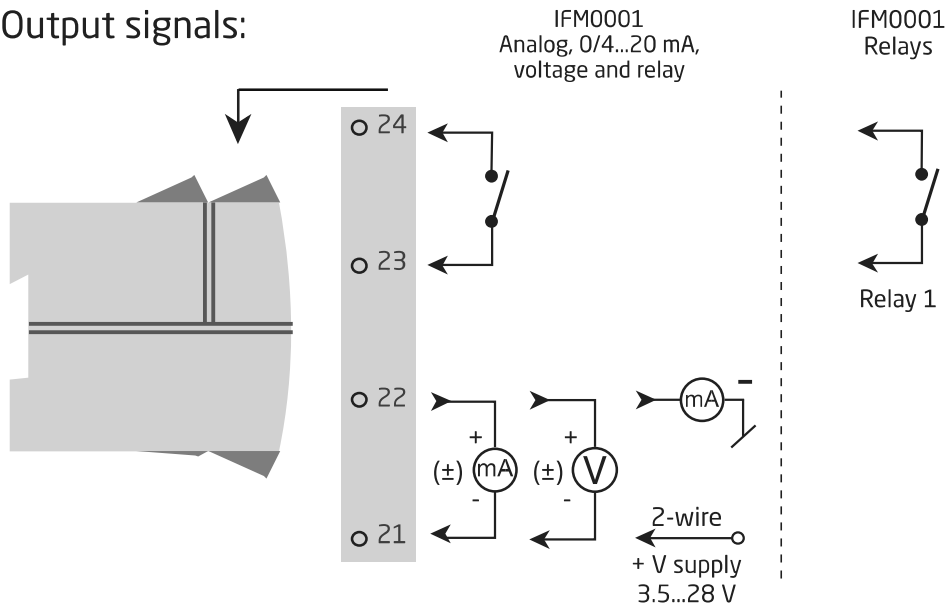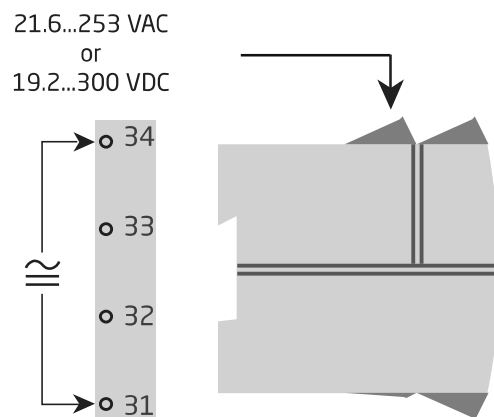
Connections

Supply

31 32 33 34

Inputs:

Special current

41 42 43 44

+ supply 5...17 V

Tx

Special voltage

41 42 43 44

-   + + supply 5...17 V

Tacho

41 42 43 44

+ supply 5...17 V

~

PNP

41 42 43 44

+ supply 5...17 V

+ supply

NPN

41 42 43 44

+ supply 5...17 V

+ supply

Contact (NPN)

41 42 43 44

TTL

41 42 43 44

+ + supply 5...17 V
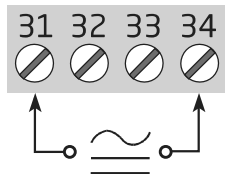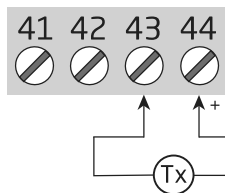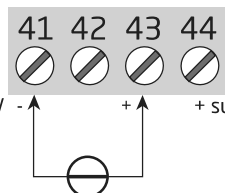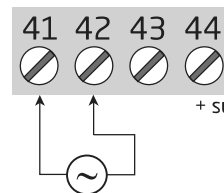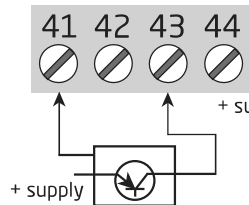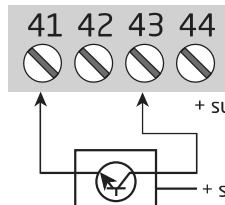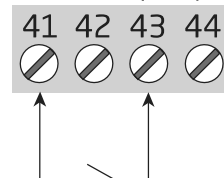
TTL

Connections

Outputs:

Current
(Active output)

21 22 23 24

- mA +

(±)

2-wire transmitter
(Passive output)

21 22 23 24

+ mA

-

Buffered voltage

21 22 23 24

- V +

(±)

Relay

21 22 23 24

R1

Block diagram

21.6...253 VAC or
19.2...300 VDC

34

31

22

21

24

23

VBuf

Rsense

R1

Yellow

D / A

Red

HW
Watchdog

CPU

Green

VReg
5...17 V

Freq.
detector
/
CPU

f_{in}

Yellow

44

43

42

41
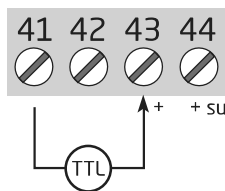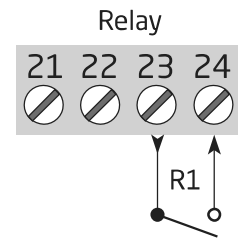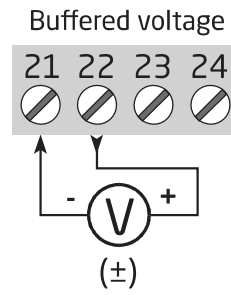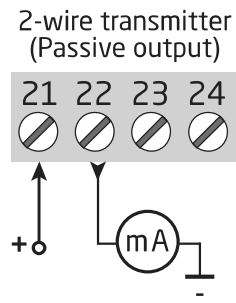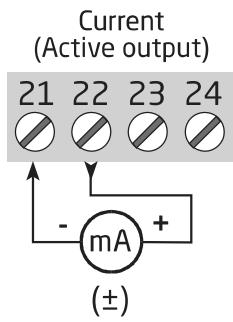
IFM
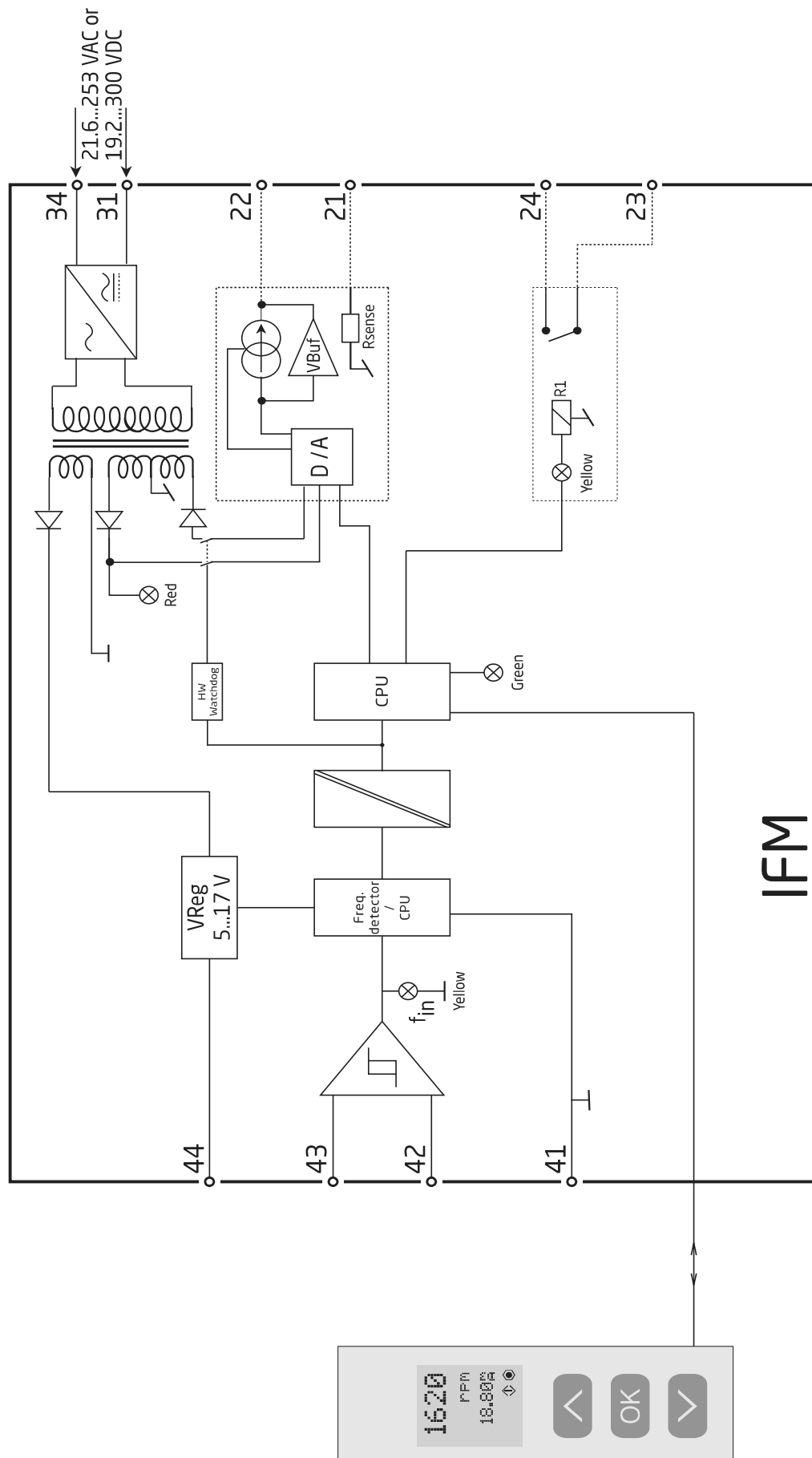
Specifications

Ordering information

Description	Part Number
1 analog output and 1 relay	IFM0001

Accessories

PGMMOD = Display / programming front

Note: The PGMMOD communication interfaces are approved and certified as an add-on component to the device. All technical characteristics are valid with the PGMMOD communication interface attached.

Electrical specifications

Environmental conditions:

Operating temperature . . . . -20°C to +60°C
Storage temperature . . . . -20°C to +85°C
Calibration temperature. . . . . 20...28°C
Relative humidity . . . . < 95% RH (non-cond.)
Protection degree IP20
Installation in pollution degree 2 & measurement / overvoltage category II.

Mechanical specifications:

Dimensions (HxWxD) . . . . 109 x 23.5 x 104 mm
Dimensions (HxWxD) w/ PGMMOD . . . . 109 x 23.5 x 116 / 131 mm
Weight approx., IFM0001 . . . . 160 g
DIN rail type. . . . . DIN EN 60715 - 35 mm
Wire size. . . . . 0.13...2.08 mm^2 / AWG 26...14 stranded wire
Screw terminal torque. . . . . 0.5 Nm
Vibration. . . . . IEC 60068-2-6
  2...13.2 Hz . . . . ±1 mm
  13.2...100 Hz . . . . ±0.7 g

Common electrical specifications:

Supply voltage, universal. . . . . 21.6...253 VAC, 50...60 Hz
                                              or 19.2...300 VDC
Protective fuse. . . . . 400 mA SB / 250 VAC
Max. required power. . . . . ≤ 2.6 W
Max. power dissipation . . . . ≤ 2.1 W
Isolation voltage - test . . . . 2.3 kVAC
Isolation voltage - working
  Input to any. . . . . 250 VAC (reinforced)
  Relay to relay, relay to analog . . . . < 115 VAC (reinforced), > 115 VAC (basic)
  NPN to analog . . . . Isolated > 50 VDC
  Push-Pull / PNP to analog . . . . Shared ground with analog output
Programming . . . . PGMMOD communication interfaces
Signal dynamics, output . . . . 18 bit
Signal / noise ratio. . . . . > 60 dB
Response time (0...90%, 100...10%) . . . . ≤ 30 ms

Accuracy, the greater of basic and absolute values:

Input			
Type	Basic accuracy	Absolute accuracy	Temperature coefficient
Frequency input	≤ 0.0002 Hz	≤ ±0.01% of input frequency	≤ ±0.0005% / °C

Output			
Type	Basic accuracy	Absolute accuracy	Temperature coefficient
Current output	8 µA	≤ ±0.05% of span	≤ ±0.005% / 0.8 µA / °C
Voltage output	2 mV	≤ ±0.05% of span	≤ ±0.005% / 200 µV / °C

EMC - immunity influence. . . . . < ±0.5% of span

of span = of selected standard range

Basic accuracy$_{Input}$ = 0.0002 Hz
Absolute accuracy$_{Input}$ = 0.001%
Calibration temperature = **20...28°C**

Example 1: Analog current output, input low 1 kHz, input high 8 kHz, output span 4...20 mA = 16 mA:

Accuracy$_{Input\_low}$ = 0.01% x 1000 Hz = 0.1 Hz
Accuracy$_{Input\_high}$ = 0.01% x 8000 Hz = 0.8 Hz
Accuracy$_{Output}$ = 0.05% x 7000 Hz = 3.5 Hz

Total accuracy$_{Low}$ = Accuracy$_{Input\_low}$ + Accuracy$_{Output}$
Total accuracy$_{Low}$ = 0.1 Hz + 3.5 Hz = 3.6 Hz

Total accuracy$_{High}$ = Accuracy$_{Input\_high}$ + Accuracy$_{Output}$
Total accuracy$_{High}$ = 0.8 Hz + 3.5 Hz = 4.3 Hz

Example accuracy calculations are based on factory calibration ambient temperature, and do not take into account other potential sources of inaccuracy, e.g. power supply effect, ambient temperature fluctuation etc. which must also be considered.

Auxiliary supplies

Sensor supply limitation (terminal 44) . . . . 20 mA, 5...17 V

Input specifications

Frequency input

Frequency range . . . . 0.001 Hz to 100 kHz
Time range, time function . . . . 10 µs to 999.9 s
Max. frequency, with input filter ON . . . . 75 Hz
Min. pulse width with input filter ON . . . . 8 ms
Min. pulse width with input filter OFF . . . . 4 µs
Response time (0...90%, 100...10%) . . . . < 30 ms

Tacho input

Trig-level LOW . . . . $\leq$ -50 mV
Trig-level HIGH . . . . $\geq$ +50 mV
Input impedance . . . . 100 kΩ || < 220 pF
Max. input voltage . . . . 80 VAC pp
Sensor supply - pin 44, programmable . . . . 5...17 V / 23 mA

NPN / PNP input

Trig-level LOW . . . . $\leq$ 4.0 V
Trig-level HIGH . . . . $\geq$ 7.0 V
Input impedance . . . . 3.48 kΩ || < 220 pF
Trigger edge . . . . NPN = Neg. edge, PNP = Pos. edge.
Sensor supply - pin 44, programmable . . . . 7.1...17 V / 23 mA
Max. input voltage . . . . 24 V

TTL input

Trig-level LOW . . . . $\leq$ 0.8 V
Trig-level HIGH . . . . $\geq$ 2.0 V
Input impedance . . . . $\geq$ 100 kΩ || < 220 pF
Sensor supply - pin 44, programmable . . . . 5...17 V / 23 mA

Special voltage input

User-programmable trig-levels. . . . . -0.05...6.50 V
*Hysteresis, min. . . . . 50 mV
Input impedance, programmable:
   High Z . . . . ≥100 kΩ || < 220 pF
   Pull up/down . . . . 3.48 kΩ || < 220 pF
Sensor supply - pin 44, programmable . . . . 5...17 V / 23 mA
                         (cannot be lower than or equal to upper trig-level)
Max. input voltage. . . . . 24 V

Special current input

User-programmable trig-levels. . . . . 0.0...10.0 mA
*Hysteresis, min. . . . . 0.2 mA
Input impedance . . . . 1 kΩ || < 220 pF
Sensor supply - pin 44, programmable . . . . 5...17 V / 23 mA
Max. input current . . . . 17 mA

* For low signal levels with input trigger level hysteresis below 100 mV / 0.1 mA it is recommended to use shielded cables with
  correct grounding, to avoid false triggering due to induced EMC.

Configurable input limits

Error detection . . . . Enable / disable
Configurable input limits, low . . . . 0 Hz...min. configured input frequency
Configurable input limits, high. . . . . Max. configured input frequency...100 kHz
Hysteresis. . . . . 0.5% of max. configured input frequency
Input limit low/high, error indication levels . . . . UP, DOWN, ZERO, NONE
                         See tables on pages 19-20

Output specifications

Current output
All standard ranges can be selected as Direct or Inverted action.

Signal range, active / passive . . . . ±23 mA / 0...23 mA
Programmable standard ranges . . . . 0...20, 4...20, S4-20, ±10 mA, ±20 mA
Load, max. . . . . ±23 mA / 600 Ω / ±13,8 VDC
External 2-wire loop supply . . . . 3.5...28 V
Response time, programmable. . . . . 0...60 s
Load stability . . . . ≤ 0.001% of span / 100 Ω
Sensor error indication . . . . 0 / 3.5 / 23 mA / none
Output limitation at outside range . . . . See tables on pages 19-20
Current limit. . . . . ≤ 28 mA

Buffered voltage output
All standard ranges can be selected as Direct or Inverted action

Signal range. . . . . ±11.5 VDC
Programmable standard ranges . . . . 0...5, 1...5, 0...10, 2...10, ±5, ±10 VDC
Load, min. . . . . > 2 kΩ
Response time, programmable. . . . . 0...60 s
Output limitation at outside range . . . . See tables on pages 19-20

Relay outputs

Relay functions . . . . Setpoint, Window, Sensor error, Latch, Power and Off
Hysteresis . . . . 0...100%
On and Off delay . . . . 0...3600 s
Power on delay . . . . 0...9999 s
NAMUR sensor error detection . . . . Break / Make / Hold
Max. voltage . . . . 250 VAC / VDC
Max. AC current . . . . 2 A
Max. AC power . . . . 500 VA
Max. DC current, resistive load:
    @ $U_{relay} \leq 30$ VDC . . . . 2 ADC
    @ $U_{relay} > 30$ VDC . . . . [$1380 \times U_{relay}^{-2} \times 1.0085^{U_{relay}}$] ADC

Graphic depiction of [$1380 \times U_{relay}^{-2} \times 1.0085^{U_{relay}}$]:
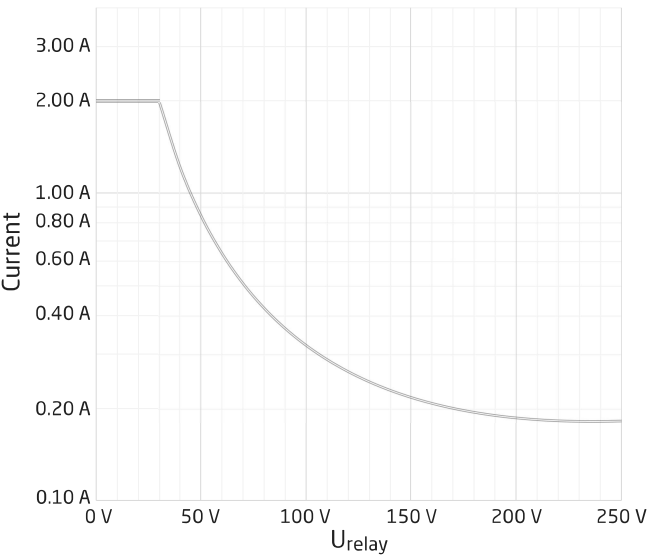
PNP output

**I_{source} max. . . . . 30 mA
V_{out} . . . . 24 VDC ± 10%
C_{out} . . . . 10 nF
R_{out} typ. . . . . 30 Ω

NPN output

I_{sink} max. . . . . 130 mA
I_{sink} max. peak . . . . 500 mA
Voltage drop 130 mA . . . . < 1.5 VDC
External voltage (terminal 24) max. . . . . 30 VDC
C_{out} . . . . 10 nF
R_{out} typ. . . . . 10 Ω

Push-Pull output

Voltage . . . . 5...24 VDC

Supported output configurations

For the IFM0001 a concurrent and independent operation of analog output and relay is possible.

Observed authority requirements

EMC. . . . . 2014/30/EU & UK SI 2016/1091
LVD . . . . 2014/35/EU & UK SI 2016/1101
RoHS . . . . 2011/65/EU & UK SI 2012/3032

Approvals

c UL us, UL 508. . . . . E324843

Programming

The PGMMOD communication interfaces provide complete module programming and access to a wide range of operational features that help you when using the device.
This chapter deals with the IFM0001 advanced features. The complete menu structure and programming options can be found in the Routing diagram section.

Configurable input error indication and input limits

Configurable input error detection

To increase system safety and integrity, you can program a high and low input error detection level. Input signals outside the low and high limits will cause the output of the device to go to the programmed error state.

The two configurable input error detection levels can be set and enabled individually, just as it is possible to individually set the output error indication for each of the two detection levels. This allows users to differentiate process faults, broken or short input wires.

Available output error states for low and high limit: UP, DOWN, ZERO and NONE.

Output error indication uses the error states defined by NAMUR NE43 for a 4...20 mA output. For all other output spans equivalent output error indications are used (see tables on pages 19-20).

When input limit is enabled and error state NONE is selected, the input error is detected and presented to you on the display with IN.ER and flashing display, but not indicated on the output signal.

Example – 4...20 mA output span and both Limit high and Limit low set to ZERO
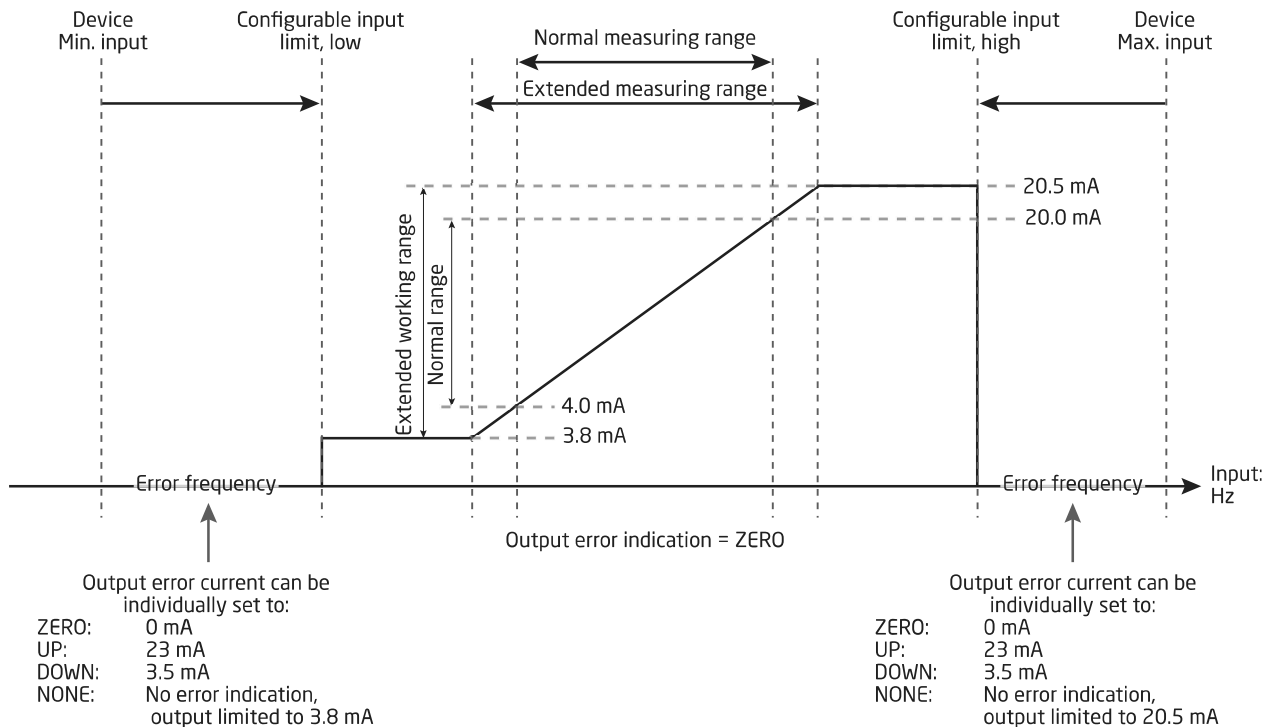
Example – Input limits disabled

Output error indication = NONE
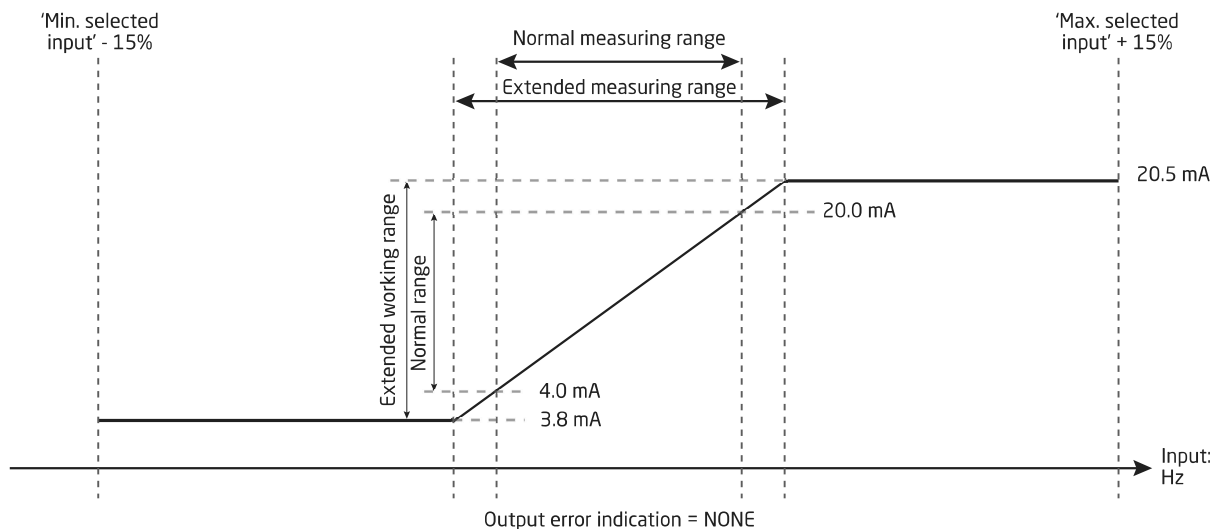
Output limits and error indications – current output

	Input limit disabled		Input limit enabled					
Output span	Output limit low	Output limit high	Output limit low	Output limit high	Output error indication, UP	Output error indication, DOWN	Output error indication, ZERO	Output error indication, NONE
4-20 mA	0 mA	23 mA	3.8 mA	20.5 mA	23 mA	3.5 mA	0 mA	No error indication
S4-20 mA	0 mA	23 mA	3.8 mA	20.5 mA	23 mA	3.5 mA	0 mA	No error indication
0-20 mA	0 mA	23 mA	0 mA	20.5 mA	23 mA	0 mA	0 mA	No error indication
±10 mA	-11.5 mA	11.5 mA	-10.25 mA	10.25 mA	11.5 mA	-11.5 mA	0 mA	No error indication
±20 mA	-23 mA	23 mA	-20.5 mA	20.5mA	23 mA	-23 mA	0 mA	No error indication

Output limits and error indications – voltage output

	Input limit disabled		Input limit enabled					
Output span	Output limit low	Output limit high	Output limit low	Output limit high	Output error indication, UP	Output error indication, DOWN	Output error indication, ZERO	Output error indication, NONE
0-5 V	0 V	5.75 V	0 V	5.125 V	5.75 V	0 V	0 V	No error indication
1-5 V	0 V	5.75 V	0.975 V	5.125 V	5.75 V	0.875 V	0 V	No error indication
0-10 V	0 V	11.5 V	0 V	10.25 V	11.5 V	0 V	0 V	No error indication
2-10 V	0 V	11.5 V	1.95 V	10.25 V	11.5 V	1.75 V	0 V	No error indication
±5 V	-5.75 V	5.75 V	-5.125 V	5.125 V	5.75 V	-5.75 V	0 V	No error indication
±10 V	-11.5 V	11.5 V	-10.25 V	10.25 V	11.5 V	-11. 5V	0 V	No error indication

Low cut-off function

Default configured for 1111 s (0.0009 Hz) or 2 s (0.5 Hz) with L.COF enabled. Drives input to 0 Hz when Low Cut-Off time is reached.

Input

Time

8 ms   8 ms   8 ms   8 ms   8 ms   8 ms

Analog
output

Output
update

Input low cut-off.
Default configured for 1111 s (0.0009 Hz) or
2 s (0.5 Hz) with L.COF enabled.

Time

1111 s or 2 s
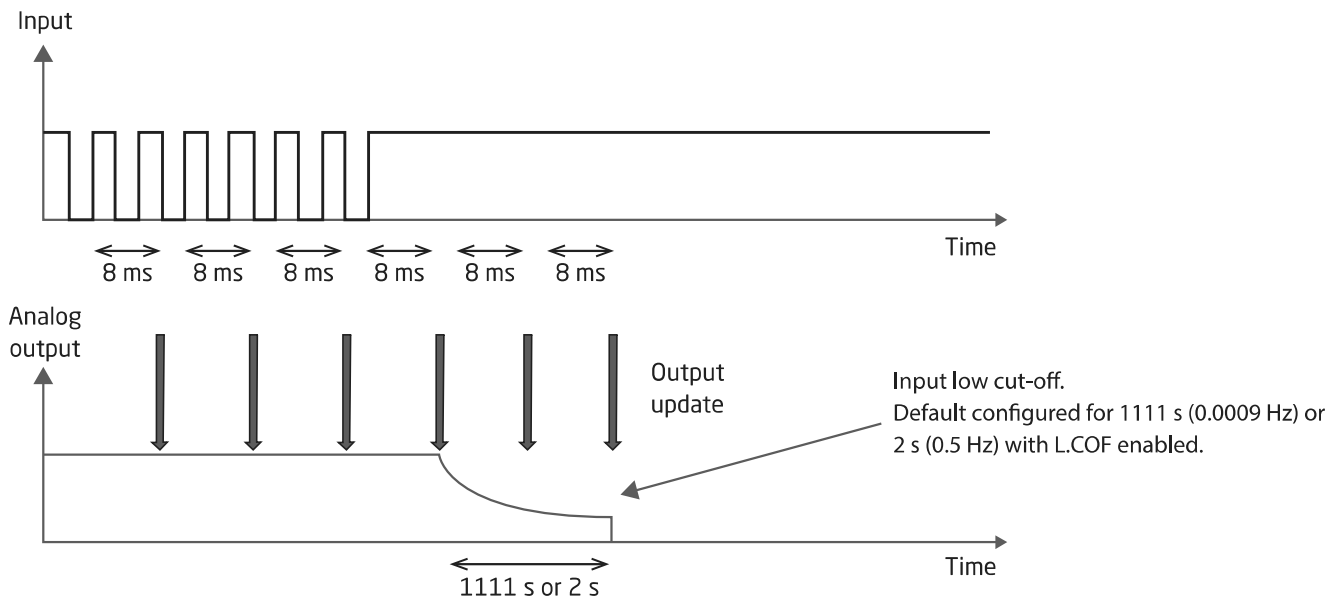
Square root function

A Square root function can be applied to the input.
Scaling of the function can be done as illustrated below:
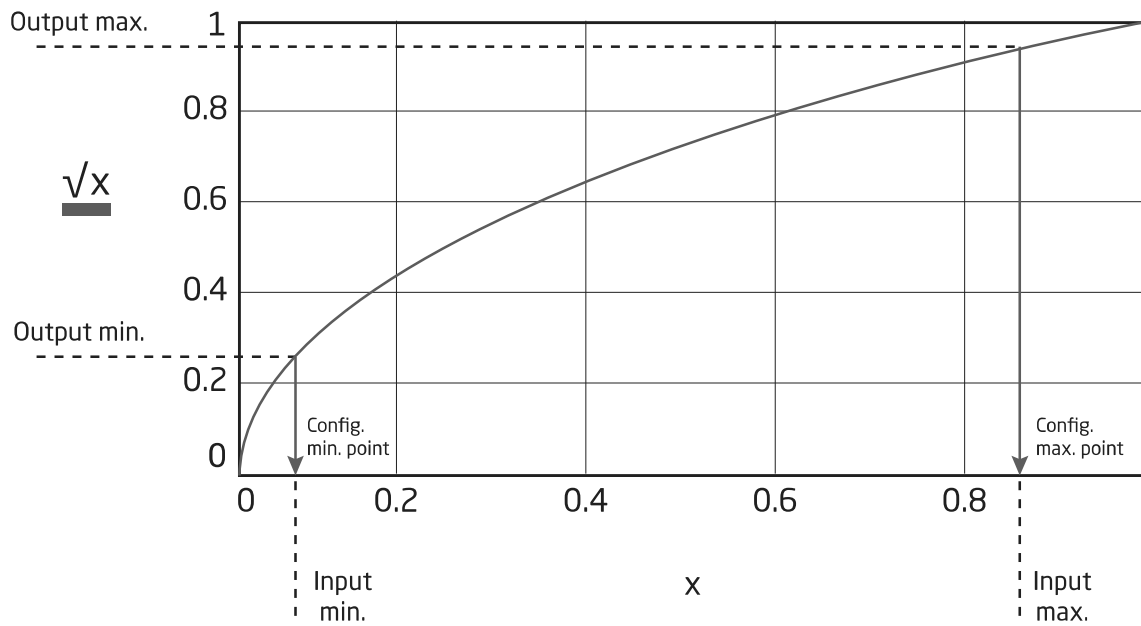
Low cut-off function:

As a part of the square root function of the IFM0001 it is possible to manually configure a low cut-off point. The feature is often used to suppress noise in the system.

The low cut off point defines a point where the input/output relationship either changes to a linear relationship or the output is truncated to zero. The two principles are illustrated below:

Linear cut-off:
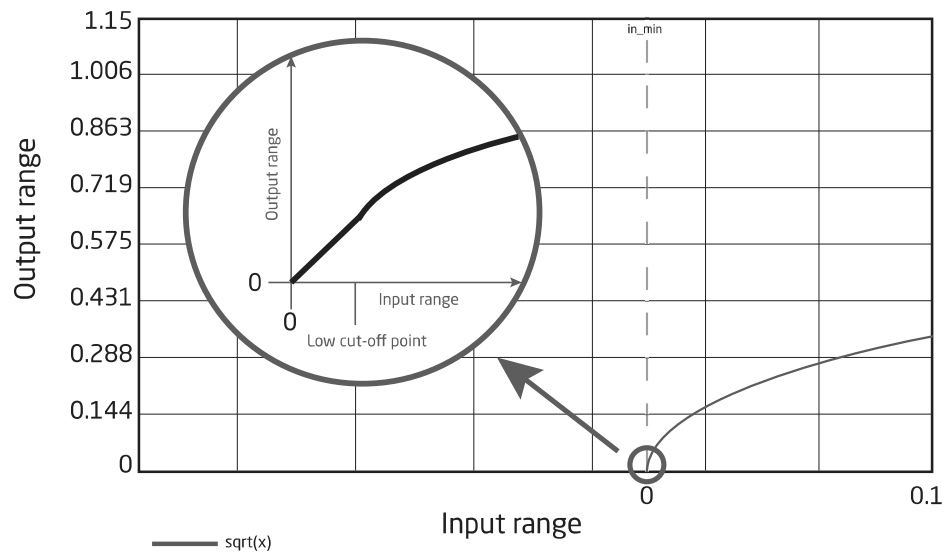
Truncation to zero:
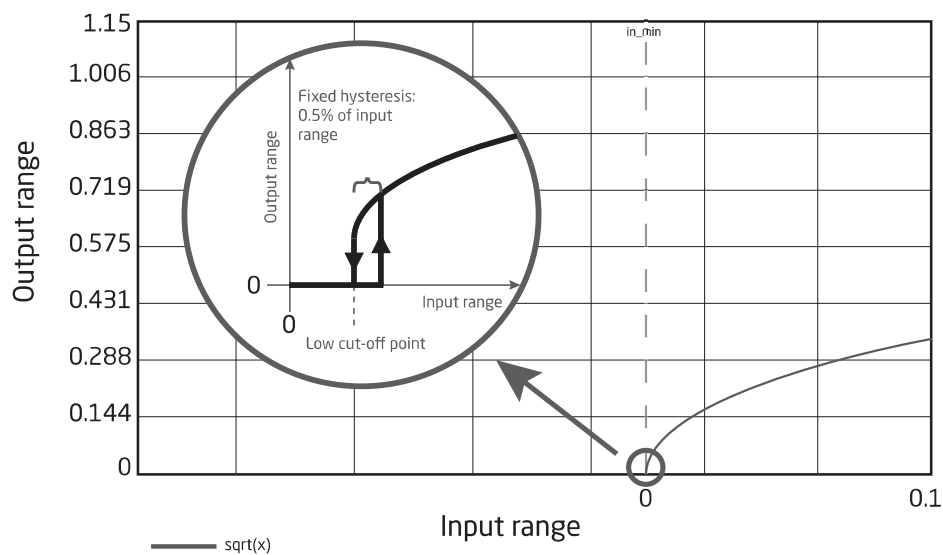
Configuration	Parameter	Specification	Condition
Low cut-off point	Linear cut-off	0.0 to 50.0% of selected input range	Independent of square root settings
	Truncation to zero	0.0 to 50.0% of selected input range Fixed hysteresis of 0.5% of the selected input range	

Over range / under range operation:

Configuration	Parameter	Specification	Condition
Normal square root action	Input low limit	'Minimum of selected input range'	'Square root point max.' > 'Square root point min.'
	Input high limit	'Maximum of selected input range' + 20%	
Inverted square root operation	Input low limit	'Minimum of selected input range' – 20%	'Square root point max.' < 'Square root point min.'
	Input high limit	'Maximum of selected input range'	

Relay functions

6 different settings of relay function can be selected.

Setpoint: The device works as a single limit switch.

Window: The relay has a window that is defined by a low and high setpoint.
On both sides of the window the relay has the same status.

Error function: The relay is activated by sensor error.

Power: The relay is activated if power is on.

Off: The relay is deactivated.

Latch: The relay is latched. Valid for Setpoint, Window and Error function (advanced settings).

Setpoint and window configuration

Common parameters:

Delay: An ON and an OFF delay can be set on both relays in the range 0...3600 s.

Hysteresis: 0.0...100.0%.

The active relay can be set as either normally open or normally closed.

The device works as a single limit switch when selecting 'setpoint' in the menu and entering the desired limit. For setpoint the relays can be set to activate on increasing or decreasing input signal.

The window function is selected by choosing 'window' in the menu and defining a high and a low setpoint. The relay can be configured as active inside the window or outside the window.

Graphic depiction of relay action setpoint
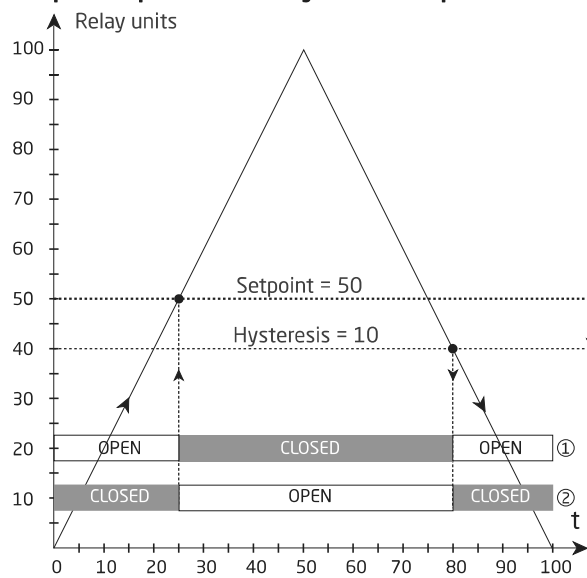
Relay action: Increasing
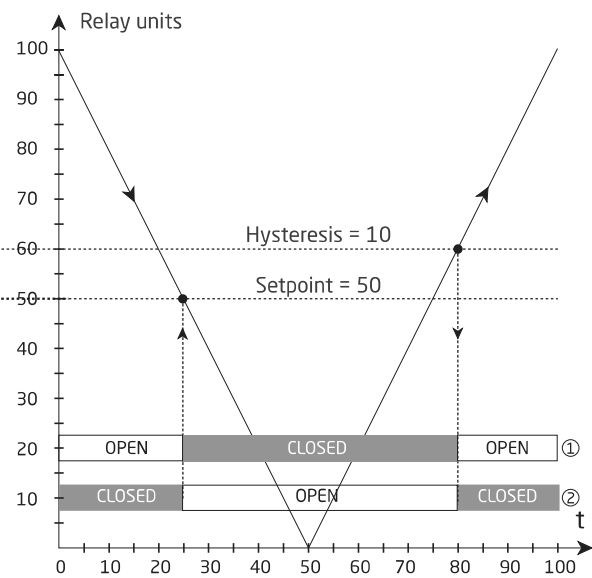
Relay action: Decreasing

① = Normal function. Relay configured for N.O.
② = Inverse function. Relay configured for N.C.

Graphic depiction of relay action window

Relay function: Active Inside Window / Active Outside Window

① = Normal function. Relay configured for N.O.
② = Inverse function. Relay configured for N.C.
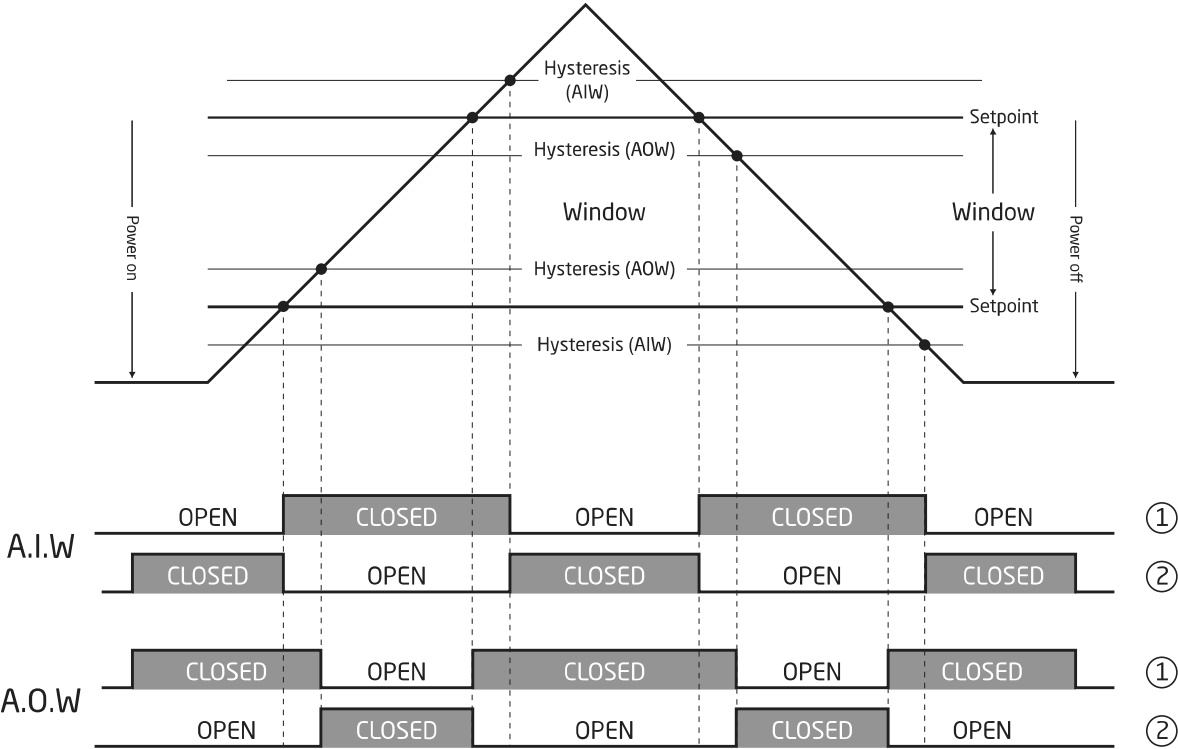
Advanced settings menu

Password protection (PASS): Programming access can be blocked by assigning a password. The password is saved in the device in order to ensure a high degree of protection against unauthorized modifications to the configuration. If the configured password is not known, please contact Red Lion support - support.redlion.net.

Memory (MEM): In the memory menu you can save the configuration of the device in the PGMMOD communication interface, and then move the PGMMOD communication interface onto another device of the same type and download the configuration in the new device.

Display setup (DISP): Here you can adjust the brightness contrast and the backlight. Setup of TAG numbers with 6 alphanumerics. Selection of functional readout in line 3 of the display - choose between readout of analog output or tag no.

Two-point process calibration (CAL): The device can be process-calibrated in 2 points to fit a given input signal. A low input signal (not necessarily 0%) is applied and the actual value is entered via the PGMMOD communication interface. Then a high signal (not necessarily 100%) is applied and the actual value is entered via the PGMMOD communication interface. If you accept to use the calibration, the device will work according to this new adjustment. If you later reject this menu point or choose another type of input signal the device will return to factory calibration. Process-calibration is cleared if you edit either of the parameters: input type, input low, input high, display low or display high. Process calibration data are not saved to the configuration repository of the PGMMOD communication interface.

Process simulation function (SIM): Simulation of process value is possible via the up and down arrows, thus controlling the output signal. The point REL.SIM allows you to activate relay/-s by means of the arrow-keys up/down. You must exit the menu by pressing ⊙K (no time-out). The simulation function exits automatically if the PGMMOD communication interface is detached.

Orientation setup (ORIEN): When the device is mounted upside down the display orientation of the the PGMMOD communication interfaces can be programmed to be rotated 180 degrees and reverse the up/down button functions.

Latch function (LATC): The latch function can be applied for a relay when combined with the setpoint, windows or error function. The latch function will hold the relay in its active/alarm state until latch is released via the PGMMOD display. If the setpoint, window or error function demands an active relay you cannot release the latch.
If the configuration is copied from one device to another by way of the PGMMOD communication interface, the latch function must be reconfigured.

Example setpoint function with latch

Input
signal

ON delay

OFF delay

Setpoint
(increasing)

Hysteresis

Time

Closed

Relay contact
(N.O.)

Relay latched

Open

Release not possible (setpoint still exceeded)

Release not possible (setpoint-hysteresis still exceeded)

Release not possible (OFF delay still exceeded)

Release possible

Fast setpoint adjustment and relay test

⌃ Increase setpoint
⌄ Decrease setpoint
ⓄⓀ Save and exit the menu
⌃ and ⌄ simultaneously = relay test

Power up

```
999.9
-199.9
```
⌃⌄

⌃-⌄   ```
75.0
RELAY 1
Txt 72
```    ⓄⓀ
*1*

```
40.0
%
10.4 mA
#1   ∧◉
```
*0*    "Monitor"    ⓄⓀ

⌃⌄

⌃ and ⌄ held:
Toggle line 3 function
O.VAL / TAG.
(Setting is volatile - use
DISP setup menu to
change and store line 3
function).

```
0000
9999
```
⌃-⌄
```
0000
PASSW.
Txt 1
```    Correct ⓄⓀ
*2*

```
NO
YES
```
⌃-⌄
```
NO
ADV.SET
Txt 2
```    No ⓄⓀ
Yes

```
x V   NPN
x mA   PNP
TACH
TTL
```
⌃-⌄
```
NAMUR
IN TYPE
Txt 3
```    x V ⓄⓀ

```
6.45
-0.05
```
⌃-⌄
```
1.00
TRIG.LO
Txt 4
```

```
6.50
0.00
```
⌃-⌄
```
2.00
TRIG.HI
Txt 5
```
*27*

```
PL.DN
PL.UP
HI.Z
```
⌃-⌄
```
HI.Z
Z.IN
Txt 6
```    ⓄⓀ

```
5.00
17.00
```
⌃-⌄
```
7.0
S.SUP
Txt 7
```    A ▷

x mA

```
9.8
0.0
```
⌃-⌄
```
5.0
TRIG.LO
Txt 4
```

```
10.0
0.2
```
⌃-⌄
```
7.0
TRIG.HI
Txt 5
```    ⓄⓀ
*27*

TACHO / TTL / NPN / PNP
ⓄⓀ

```
NO
YES
```
⌃-⌄
```
YES
ADV.SET
Txt 2
```    ⓄⓀ

Continued on the page
Routing diagram ADV.SET

---

*0* "Monitor" menu.
Line 1 shows the scaled process value - OK or error.
Line 2 shows the selected engineering unit.
Line 3 shows analog output or TAG no.
Line 4 shows status for communication and signal trending.

*1* If FastSet is disabled, the setpoints cannot be changed.
(values are read-only)

*2* Only shown if password is enabled.

*27* TRIG.HI must be set 0.05 V or 0.2 mA greater
than TRIG.LO

# Routing diagram

If no key is activated for 1 minute, the display will return to the "Monitor" menu without saving configuration changes.
⌃ Increase value / choose next parameter
⌄ Decrease value / choose previous parameter
⊙ Save the chosen value and proceed to the next menu
Hold ⊙ Back to previous menu / return to "Monitor" menu without saving.

```
                                                                    [blank]
                                                                      pH
                                                                      :
                                                                      :        1111
          Hz                                                          °F       111.1
          rpm     │   1    │ 0.000  │ 0.001  │  YES  │               °C       11.11      999.9    999.9     0.0
          S       │  1000  │ 99.99K │ 100.0k │  NO   │             (74 units)  1.111     -199.9   -199.9   60.0
         ⌃⌄           ⌃⌄       ⌃⌄       ⌃⌄      ⌃⌄                    ⌃⌄         ⌃⌄        ⌃⌄       ⌃⌄      ⌃⌄
  ⟨A⟩
  VOLT
   ⊙      Hz      │   1    │ 1.000  │ 2.000  │  NO   │  ⊙          UNIT       111.1      0.0      100.0     0.0     ⊙
        ┌IN.UNIT──┬─P.REV──┬─IN.LO──┬─IN.HI──┬─FILTER┐           ┌──%──────┬──DEC.P──┬─DISP.LO─┬─DISP.HI─┬─DISP.RP─┐
        │ Txt 8   │ Txt 83 │ Txt 9  │ Txt 10 │ Txt 11│           │ Txt 12  │ Txt 13  │ Txt 14  │ Txt 15  │ Txt 16  │
                    *38              *10       *13
                             *10
                             *27
```

Continued on
the next page

```
              Selectable UNITS:
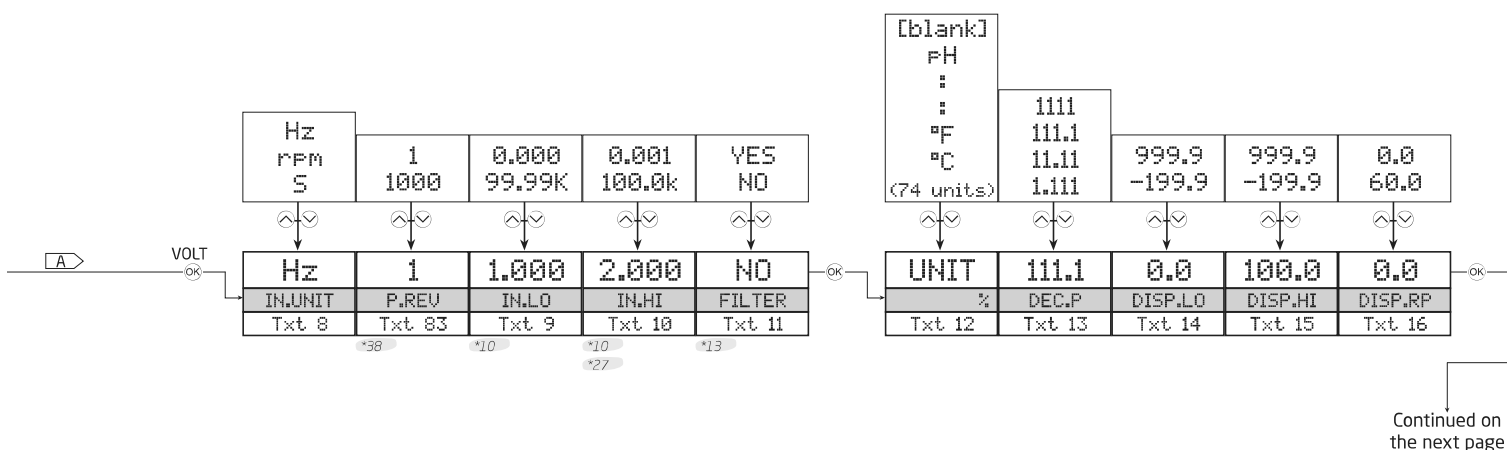
  °C     min     kHz     kJ      mV
  °F     m/s     mHz     Wh      ohm
  K      mm/s    p/m     MWh     S
  %      m/min   p/h     kWh     uS
  m      m/h     p/d     W       m3/min
  cm     in/s    t       GW      m3/h
  mm     ips     kg      MW      l/s
  um     ft/s    g       kW      l/min
  ft     in/min  N       hp      l/h
  in     ft/min  Pa      A       gal/min
  mils   in/h    MPa     kA      gal/h
  yd     ft/h    kPa     mA      t/h
  m3     m/s2    hPa     uA      mol
  l      rpm     bar     V       pH
  s      Hz      mbar    kV      blank
```

*10	Valid min. and max. input range depends on input type:

Input unit	Hz	rpm	S
Minimum value	0.000 Hz	0.000 rpm	10 µs
Maximum value	100.0 KHz	See note	999.9 s

Note: For RPM, upper limit is the lesser of 100 krpm or 60*100 krpm/P.REV

*27	TRIG.HI must be set 0.05 V or 0.2 mA greater than TRIG.LO

*38	Only shown for rpm input.

*13	Only shown if IN.HI ≤ 75 Hz (or corresponding period time / rpm value).

```
                      ┌─────────┐
                      │  -/+20  │
                      │  -/+10  │
                      │  S20-4  │
                      │  20-4   │
                      │  20-0   │                              ┌─────────┐
  ┌────────┐          │  S4-20  │                              │  SETP   │
  │  CURR  │  ┌────────┤  4-20   │              ┌────────┐      │  WIND   │
  │  VOLT  │  │  PASS  │  0-20   │              │  DISP  │      │  ERR    │
  └────────┘  │  ACTI  └─────────┘              │  PERC  │      │  POW    │
    ∧  ∨      └────────┘                        └────────┘      │  OFF    │
              ∧  ∨      ∧  ∨                      ∧  ∨          └─────────┘
                                                                  ∧  ∨
```

```
  ┌────────┐  CURR  ┌────────┬─────────┐      OK        OK      ┌────────┐  OK   ┌────────┐  SETP  ┌────────┬────────┬────────┐  OK    B
  │  CURR  │────────│  ACTI  │  4-20   │──────────────────────│  PERC  │───────│  SETP  │────────│  N.O   │ 50.0   │ DECR   │───────▷
  ├────────┤        ├────────┼─────────┤                      ├────────┤       ├────────┤        ├────────┼────────┼────────┤
  │ OUT.TY │ OK     │OUT.MOD │ O.RANGE │                      │REL.UNI │       │R1.FUNC │        │R1.CONT │R1.SETP │ACT.DIR │
  ├────────┤        ├────────┼─────────┤                      ├────────┤       ├────────┤        ├────────┼────────┼────────┤
  │ Txt 17 │        │ Txt 18 │ Txt 19  │                      │ Txt 30 │       │ Txt 31 │        │ Txt 32 │ Txt 33 │ Txt 34 │
  └────────┘        └────────┴─────────┘                      └────────┘       └────────┘        └────────┴────────┴────────┘
                                *3
```

N.O / N.C   100.0 / 0.0   INCR / DECR

```
         ┌──────────┐
         │-/+10  1-0 │
         │-/+5   2-10│
         │10-2   0-10│
         │10-0   1-5 │
         │5-1    0-5 │
         │5-0   0.2-1│
         │1-0.2  0-1 │
         └──────────┘
            ∧  ∨
  VOLT   ┌────────┐  OK
─────────│  0-10  │──────
  OK     ├────────┤
         │O.RANGE │
         ├────────┤
         │ Txt 20 │
         └────────┘
```

N.O / N.C   99.9 / 0.0   100.0 / 0.1   A.I.W / A.O.W

```
  WIND   ┌────────┬────────┬────────┬────────┐  OK
─────────│  N.O   │ 50.0   │ 60.0   │ A.I.W  │────────
  OK     ├────────┼────────┼────────┼────────┤
         │R1.CONT │SETP.LO │SETP.HI │ACT.DIR │
         ├────────┼────────┼────────┼────────┤
         │ Txt 32 │ Txt 35 │ Txt 36 │ Txt 37 │
         └────────┴────────┴────────┴────────┘
```

NOTE: For OPTO output, Relay 1
menu points (including latch) are
used, retaining Relay 1 naming.

POW /
OFF   C
OK ───▷

*3 If passive is selected, the values are limited to only
    positive span.

```
                    ┌──────┐
                    │ HOLD │
           ┌──────┐ │ CLOS │  ┌──────┐  ┌──────┐
           │100.0 │ │ OPEN │  │ 3600 │  │ 3600 │
           │  0.0 │ │ NONE │  │    0 │  │    0 │
           └──────┘ └──────┘  └──────┘  └──────┘
            ⌃  ⌄     ⌃  ⌄      ⌃  ⌄      ⌃  ⌄
           ┌──────┐ ┌──────┐  ┌──────┐  ┌──────┐
           │ 1.0  │ │ NONE │  │  0   │  │  0   │ ─○OK
  ┌─┐      ├──────┤ ├──────┤  ├──────┤  ├──────┤
─▶│B│      │R1.HYST│ │ERR.ACT│ │ON.DEL│ │OFF.DEL│
  └─┘      ├──────┤ ├──────┤  ├──────┤  ├──────┤
           │Txt 39│ │Txt 40│  │Txt 41│  │Txt 42│
           └──────┘ └──────┘  └──────┘  └──────┘
```

```
          ┌─────┐                      ┌─────┐  ┌─────┐  ┌─────┐                                    NO ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄
          │ YES │          ┌──────┐    │NONE │  │HOLD │                                                         ┌─────┐
          │ NO  │          │100.0k│    │ UP  │  │CLOS │                                                         │ YES │
          └─────┘          │0.000 │    │ZERO │  │OPEN │                                                         │ NO  │
           ⌃ ⌄             └──────┘    │DOWN │  │NONE │                                                         └─────┘
            │               ⌃ ⌄         ⌃ ⌄      ⌃ ⌄                                                             ⌃ ⌄
     YES   ┌───────┐       ┌──────┐┌──────┐┌──────┐                                       ┌──OK              ┌───────┐
──────○OK──│  NO   │──────▶│ 0.00 ││ NONE ││ NONE │──────────────────────○OK──────────────┤                 │  YES  │──○OK─
           │ ILIM.L│       │LIM.LO││ERR.ANA││ERR.R1│                                                          │ ILIM.H│
           │ Txt 43│       │Txt 45││Txt 47 ││Txt 49│                                                          │ Txt 44│
           └───────┘       └──────┘└──────┘└──────┘                                                           └───────┘
              │              *11      *18     *35
            NO ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┘

          ┌──────┐    ┌──────┐  ┌──────┐
          │100.0k│    │NONE  │  │HOLD  │
          │0.000 │    │ UP   │  │CLOS  │
          └──────┘    │ZERO  │  │OPEN  │       ┌──────┐  ┌──────┐
           ⌃ ⌄        │DOWN  │  │NONE  │       │60.0  │  │9999  │
          ┌──────┐    └──────┘  └──────┘       │0.0   │  │0     │
──────────│ 230  │   ┌──────┐┌──────┐          └──────┘  └──────┘
          │LIM.HI│   │ NONE ││ NONE │           ⌃ ⌄       ⌃ ⌄
          │Txt 46│   │ERR.ANA││ERR.R1│         ┌──────┐┌──────┐       ┌──────────┐
          └──────┘   │Txt 47 ││Txt 49│──○OK────│ 0.0  ││  0   │──○OK──│ "Monitor"│
            *12        *18     *35             │OUT.RSP││POW.DEL│      └──────────┘
                                               │Txt 50 ││Txt 51│
                                               └──────┘└──────┘
                                                  *39
```

---

*11   Range depends on selected input type + range:
     Minimum value: - Minimum valid input value (see *10) -
     Maximum value:-- Selected input range low (IN.LO) --

*12   Range depends on selected input type + range:
     Minimum value: -- Selected input range high (IN.HI) --
     Maximum value:- Maximum valid input value (see *10) -

*18   Only shown if CURR or VOLT output is selected.

*35   Not shown if R1.FUNC is set to POW or OFF.

*36   Not shown if R2.FUNC is set to POW or OFF.

*39   Not shown on if R1.FUNC is set to off.

Routing diagram, advanced settings (ADV.SET)

MEM, DISP, CAL, SIM, PASS, LANG, IFUN, LATCH ∧∨

SAVE / LOAD ∧∨

MEM — SETUP — Txt 52/1 →OK

SAVE — MEMORY — Txt 53 →OK

9 / 0 ∧∨ 9 / 0 ∧∨ 9 / A ∧∨ TAG / O.VAL ∧∨

DISP — SETUP — Txt 52/2 →OK

3 — CONTRA — Txt 54
9 — LIGHT — Txt 55
(blank) — TAGNO_ — Txt 56
O.VAL — LINE 3 — Txt 57 →OK

"Monitor"

YES / NO ∧∨ 100.0 / 0.0 ∧∨ YES / NO ∧∨ 100.0 / 0.0 ∧∨ YES / NO ∧∨

CAL — SETUP — Txt 52/3 →OK

NO — CAL.LO — Txt 58 →OK
4.0 — % — Txt 60 — *20
NO — CAL.HI — Txt 59 →OK
75.0 — % — Txt 61 — *20
YES — USE.CAL — Txt 62 →OK

NO (dashed)   NO (dashed)

YES / NO ∧∨ 100.0 / 0.0 ∧∨ ∧∨

SIM — SETUP — Txt 52/4 →OK

NO — ENA.SIM — Txt 63 →OK
50.0 — % — Txt 64 — *19 *20
REL.SIM — Txt 65 — *19

In the submenu simulation (SIM) you must press ⊗ or remove the PGMMOD communication interface to return to the "Monitor" menu.

NO (dashed)

YES / NO ∧∨ 9999 / 0000 ∧∨ YES / NO ∧∨

PASS — SETUP — Txt 52/5 →OK

NO — EN.PASS — Txt 66 →OK
0000 — NEW.PAS — Txt 67 →OK
YES — EN.FAST — Txt 68

NO (dashed)

Continued on
the next page

*19 Menu timeout is disabled while this menu is
     displayed.

*20 Selectable range as defined by DEC.P, DISP.LO and
     DISP.HI.

```
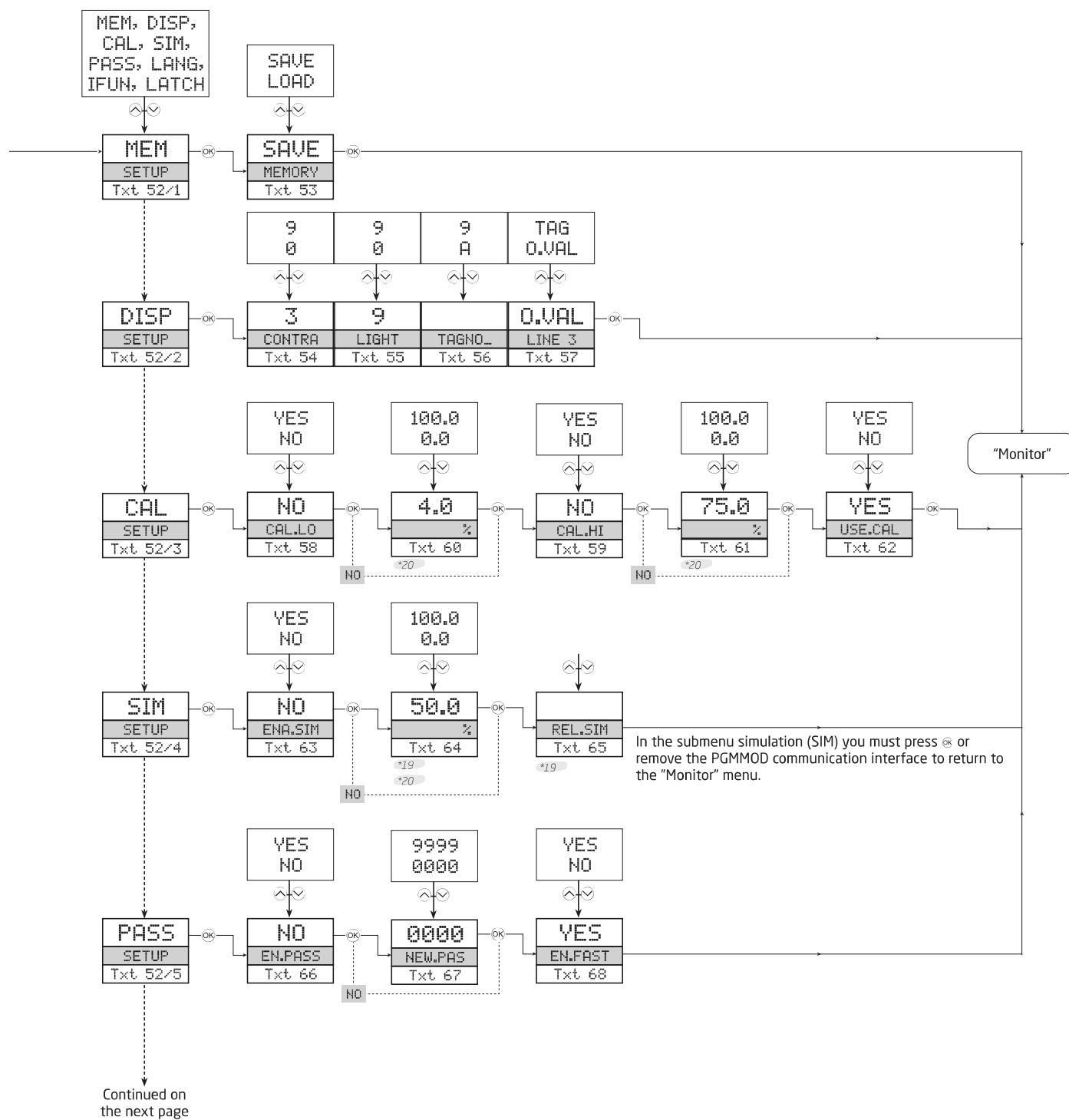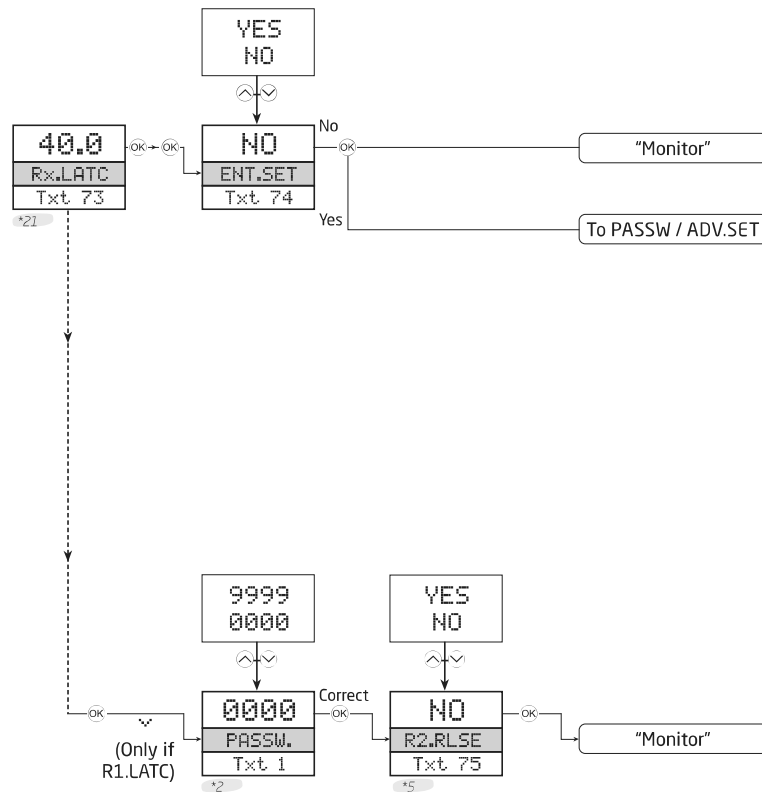                    ┌─────────────────┐
                    │ DE, DK, ES, FR, │
                    │   IT, SE, UK    │
                    └─────────────────┘
                            ∧ ∨
  ┌─────────┐        ┌─────────┐
  │  LANG   │ ─OK→   │   UK    │ ─OK→
  ├─────────┤        ├─────────┤
  │ SETUP   │        │ LANGUA  │
  ├─────────┤        ├─────────┤
  │ Txt 52/6│        │ Txt 69  │
  └─────────┘        └─────────┘
```

```
                  ┌─────────┐   ┌─────────┐ ┌─────────┐ ┌─────────┐
                  │  SQRT   │   │  0.000  │ │  0.000  │ │  ZERO   │
                  │  L.COF  │   │  1.000  │ │  1.000  │ │  LIN    │
                  │  NONE   │   │         │ │         │ │  NONE   │
                  └─────────┘   └─────────┘ └─────────┘ └─────────┘
                      ∧ ∨          ∧ ∨         ∧ ∨         ∧ ∨
  ┌─────────┐    ┌─────────┐ SQRT ┌─────────┐ ┌─────────┐ ┌─────────┐ NONE
  │  IFUN   │─OK→│  NONE   │─────→│  0.000  │ │  1.000  │ │  ZERO   │──OK→
  ├─────────┤    ├─────────┤  OK  ├─────────┤ ├─────────┤ ├─────────┤
  │ SETUP   │    │ I.FUNC  │      │ SQRT.LO │ │ SQRT.HI │ │ CUT.TYP │
  ├─────────┤    ├─────────┤      ├─────────┤ ├─────────┤ ├─────────┤
  │ Txt 52/7│    │ Txt 71  │      │ Txt 76  │ │ Txt 77  │ │ Txt 78  │
  └─────────┘    └─────────┘      └─────────┘ └─────────┘ └─────────┘
                                              *26
```

```
                                            ┌─────────┐
                                            │   0.0   │
                                            │  50.0   │
                                            └─────────┘
                                               ∧ ∨
                                    LIN     ┌─────────┐
                                    ZERO    │   5.0   │
                                      OK   →├─────────┤
                                            │ LO.CUT  │
                                            ├─────────┤
                                            │ Txt 79  │
                                            └─────────┘
```

L.COF
OK

NONE
OK

```
                  ┌─────────┐
                  │   YES   │
                  │   NO    │
                  └─────────┘
                      ∧ ∨
  ┌─────────┐    ┌─────────┐
  │  LATCH  │─OK→│   NO    │ ─OK→
  ├─────────┤    ├─────────┤
  │ SETUP   │    │ R1.LATC │
  ├─────────┤    ├─────────┤
  │ Txt 52/8│    │ Txt 70  │
  └─────────┘    └─────────┘
```

┌──────────┐
│"Monitor" │
└──────────┘

*26 *.HI must not be equal to corresponding *.LO.

Routing diagram,
manual release of latched relays

Indication of a latched relay in monitor mode

Rx.LATC = R1.LATC
or R1.LATC alternating.

```
              ┌─────────┐
              │  YES    │
              │  NO     │
              └─────────┘
                 ⌃  ⌄
                  │
┌─────────┐     ┌─────────┐   No   ┌──────────────────┐
│  40.0   │ OK  │  NO     │ ─OK──  │    "Monitor"     │
│ Rx.LATC │─OK─▸│ ENT.SET │        └──────────────────┘
│ Txt 73  │     │ Txt 74  │
└─────────┘     └─────────┘   Yes  ┌──────────────────┐
   *21                ───────────  │ To PASSW / ADV.SET│
    ┊                              └──────────────────┘
    ┊
    ┊
    ┊
    ┊
    ┊         ┌─────────┐     ┌─────────┐
    ┊         │  9999   │     │  YES    │
    ┊         │  0000   │     │  NO     │
    ┊         └─────────┘     └─────────┘
    ┊            ⌃  ⌄            ⌃  ⌄
    ┊             │               │
    ┊         ┌─────────┐ Correct┌─────────┐
    └─OK─ ⌄ ─▸│  0000   │─OK────▸│  NO     │ ─OK─ ┌──────────┐
              │ PASSW.  │        │ R2.RLSE │      │ "Monitor"│
   (Only if   │ Txt 1   │        │ Txt 75  │      └──────────┘
   R1.LATC)     *2               *5
```

---

*2	Only shown if password is enabled.

*5	"YES" can only be selected if the reason for the latched relay is no longer present. "NO" will not release the relay.

*21	Backlight flashes untill OK is pressed once.

Help text overview

[1]   Set correct password
[2]   Enter advanced setup menu?
[3]   Select PNP sensor input (or Contact to supply)
      Select NPN sensor input (or Contact to ground)
      Select TTL sensor input
      Select Tacho sensor input
      Select custom current trigger input
      Select custom voltage trigger input
      Set low trigger level for input signal
      Set high trigger level for input signal
[4]   Set input high impedance (high resistance)
[5]   Enable internal pull-up on input
[6]   Enable internal pull-down on input
      Set sensor supply voltage
      Set up input for period time measurement
[7]   Set up input for rpm measurement
[8]   Set up input for frequency measurement
      Set input range, low
      Set input range, high
[9]   Enable input filter (50/60 Hz low-pass / BW-limiter)
[10] Select display unit
[11] Select decimal point position
[12] Set display range, low
[13] Set display range, high
[14] Set display response time [seconds]
[16] Set up output as current output
[17] Set up output as voltage output
      Select active output mode
      Select passive output mode
[18] Select 20..-20 mA output range
      Select 10..-10 mA output range
[19] Select 20..4 mA output range with safety readback
      Select 20..4 mA output range
      Select 20..0 mA output range
      Select -20..20 mA output range
      Select -10..10 mA output range
      Select 4..20 mA output range with safety readback
      Select 4..20 mA output range
      Select 0..20 mA output range
      Select 10..-10 V output range
      Select 5..-5 V output range
[20] Select 10..2 V output range
      Select 10..0 V output range
      Select 5..1 V output range
      Select 5..0 V output range
      Select -10..10 V output range
      Select -5..5 V output range
      Select 2..10 V output range
      Select 0..10 V output range
      Select 1..5 V output range
      Select 0..5 V output range

[30] Set up relay in % of input range
      Set up relay in display units
[31] Select OFF function - relay is permanently off
      Select POWER function - relay indicates power status OK
      Select ERROR function - relay indicates sensor error only
      Select WINDOW function - relay is controlled by 2 setpoints
      Select SETPOINT function - relay is controlled by 1 setpoint
[32] Select Normally Closed contact
      Select Normally Open contact
[33] Set relay setpoint
[34] Activate relay on decreasing signal
      Activate relay on increasing signal
[35] Set relay window setpoint, low
[36] Set relay window setpoint, high
[37] Select relay to be Active Outside Window
      Select relay to be Active Inside Window
[38] - NOT USED -
[39] Set relay hysteresis
[41] Set relay ON delay [seconds]
[42] Set relay OFF delay [seconds]
[43] Enable configurable input limit, low
[44] Enable configurable input limit, high
[45] Set configurable input limit, low
[46] Set configurable input limit, high
[47] Select downscale at limit error
      Select zero output at limit error
      Select upscale at limit error
      Select no error action - output undefined - at limit error

[49] Select no error action - undefined relay state - at limit error
Open relay contact at limit error
Close relay contact at limit error
Hold relay status at limit error
[50] Set output response time [seconds]
[51] Set relay power-on delay [seconds]
[52] Enter Relay Latch setup
Select Analog Input Function
Enter Language setup
Enter Password setup
Enter Simulation mode
Perform Process calibration
Enter Display setup
Perform Memory operations
[53] Load saved configuration into module
Save configuration in display front
[54] Adjust LCD contrast
[55] Adjust LCD backlight
[56] Write a 6-character device TAG
[57] Output value is shown in display line 3
Device TAG is shown in display line 3
[58] Calibrate Input low to process value?
[59] Calibrate Input high to process value?
[60] Set value for low calibration point
[61] Set value for high calibration point
[62] Use process calibration values?
[63] Enable input simulation?
[64] Set the input simulation value
[65] Relay simulation - use ^ and v to toggle relay 1
[66] Enable password protection?
[67] Set new password
[68] Enable Fastset functionality?
[69] Select language
[70] Enable Relay Latch function?
[71] Select no input function
Select 0.5 Hz low cut off on input. (No effect on period time input)
Select Square Root Input Function
[72] Relay setpoint - press OK to save
Relay setpoint - read only
[73] Relay is latched - press OK to acknowledge
Relay 1 is latched - press v to release
[74] Enter setup menu? (Latched relays may release!)
[75] Release relay? (if conditions allow)
[76] Select low value of square root
[77] Select high value of square root
[78] Disable low cut-off
Set low cut-off type to linear
Set low cut-off type to zero
[79] Select low cut-off point in % of input range
[83] Set input pulses per revolution

Operation

The device provides multiple features for easy user operation, and to perform efficient troubleshooting.
Monitoring the operational status is easy from either the front LEDs or the PGMMOD communication interface.

Status indicators without PGMMOD communication interface

Power	Red / green LED indicates system status
f in	Yellow LED indicates an active input
Dig. out 1	Yellow LED indicates that relay 1 is energized

Power green flashing LED 13 Hz indicates normal operation.
Power green flashing LED 1 Hz indicates configurable input limit error.
Power steady green LED indicates internal error.
Power steady red LED indicates fatal error.

Status, error detection and signal 'out-of-range' with PGMMOD communication interface

SCROLLING ERROR MESSAGE	INDICATION Text	CONDITION	ACTION
Process and application errors			
Input error	IN.ER - flashing display	Input out of configured input limits	Check input signal value and configured input limits
Input underrange	IN.LO	Input below low cut-off	Check input signal source
Input overrange	IN.HI	Input above valid measurement range	Check input signal source
Display out of range	-1999 or 9999	Display saturation	Check configuration and input values
Analog output error	AO.ER	Error in analog output current (S4-20 mA output only)	Check wiring of analog output and recycle power *
Sensor supply overloaded	SE.OL	Sensor supply overload condition detected	Check sensor supply specifications
Sensor short circuit	SE.SH	Sensor short circuit condition	Check sensor for short circuit
Sensor wire break	SE.BR	Sensor open loop / broken wire condition	Check sensor for open loop / broken wire
Device errors			
No communication between device and the PGMMOD communication interface	NO.CO	No communication (PGMMOD <-> device)	Reattach the PGMMOD communication interface to the product. If attached, disconnect and reattach
Configuration error	CO.ER	Invalid configuration downloaded to module	Step through menu to create valid configuration **
Invalid configuration type or version	TY.ER	Configuration read from the PGMMOD has invalid type or rev. no.	Save correct device type and revision configuration to the PGMMOD communication interface **
Analog output supply error	AO.SU	Analog output supply error	Verify output configuration and output connection *
RAM error	RA.ER	Internal RAM error	Contact Red Lion *
A/D converter error	AD.ER	Internal A/D converter error	Contact Red Lion *
Internal flash error	IF.ER	Internal flash error	Contact Red Lion *
Frequency input error	FI.ER	Internal frequency circuit error	Contact Red Lion *
EEPROM Error	EE.ER	Internal EEPROM error	Contact Red Lion *
Storing of configuration failed - previous configuration used	CO. WARN	Writing configuration to internal device memory failed.	Device configuration reverts to last known valid configuration. Cycle through menu to retry writing new configuration.

!	All error indications in the display flash once per second. The help text explains the error. If the error is an input loop error, the display backlight flashes as well - this is acknowledged (stopped) by pushing the ⊙Ⓚ button.
*	Error is acknowledged by either stepping through the basic setup, or by resetting the device power. Some types of errors can only be acknowledged by resetting the device power.
**	Error is acknowledged by stepping through the basic setup.

Red Lion Controls Technical Support

If for any reason you have trouble operating, connecting, or simply have questions concerning your new product, contact Red Lion's technical support.

Support: support.redlion.net   Inside US: +1 (877) 432-9908
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