REDLION®

IAMS

Models No. 0002
0022 / 0020

Drawing No. LP1109
Version No. 104
Revision Date 23/07

$\square$ C $\overset{\text{UL}}{\circledR}$ US **FM** APPROVED
LISTED
E324843

IAMS 0002 / 0022 / 0020

CONTENTS

WARNING

The IAMS devices are 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 manual 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 manual must be examined carefully.

Only qualified personnel (technicians) should install these devices. 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 devices are fixed, do not connect hazardous voltages to the devices.

The following operations should only be carried out on a disconnected devices and under ESD safe conditions:

General mounting, connection and disconnection of wires.
Troubleshooting the device.

Repair of the device must be done by Red Lion Controls only.

HAZARDOUS VOLTAGE

WARNING

To keep the safety distances, the relay contacts on the devices must not be connected to both hazardous and non-hazardous voltages at the same time.

The IAMS devices must be mounted on a DIN rail according to DIN 46277.

INSTAL-LATION

WARNING

Do not open the front plate of the devices as this will cause damage to the connector for the display / programming module PGMMOD05. This devices contains no DIP-switches or jumpers.

SYMBOL IDENTIFICATION

⚠️ **Triangle with an exclamation mark:** Warning / demand.
Potentially lethal situations.

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

▣ **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 troubleshoot 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. The packing should always follow the device until this has been permanently mounted.
Check at the receipt of the module whether the type corresponds to the one ordered.

ENVIRONMENT

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation.
All devices fall under Installation Category II, Pollution Degree 1, and Insulation Class II.

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

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 that 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 DISMANTLE THE IAMS 0002 / 0022 / 0020

First, remember to demount the connectors with hazardous voltages.
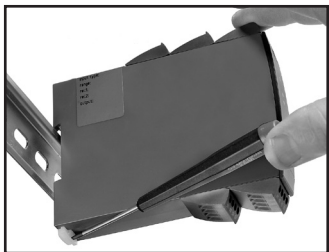
Picture 1:
Detach the device from the DIN rail by lifting the bottom lock.

When front LED lights red / display shows AO.ER

IAMS0002 and IAMS0022 are designed as SIL 2 devices with a high safety level. Therefore, a continuous measurement of the outgoing current is carried out on a 4...20 mA and 20...4 mA output signal. If the current output signal is different from the internal calculated output value or the current output is 0 (due to e.g. an open circuit breakage), an error mode switches on the red front LED. This function is not a default option but must be actively selected via the programming menu (S4-20 & S20-4).
The error mode can only be reset by switching off and then switching on the supply voltage to the device.

IAMS 0002 / 0022 / 0020

- *Input for RTD, TC, Ohm, potentiometer, mA and V*
- *2-wire supply > 16 V*
- *2 adjustable alarm limits*
- *FM-approved for installation in Div. 2*
- *Output for current , voltage and 2 relays*
- *Universal AC or DC supply*

Advanced features

- Programmable by way of detachable display front (PGMMOD 05/C1), process calibration, signal simulation, password protection, error diagnostics and selection of help text available in several languages.

Application

- Linearised, electronic temperature measurement with RTD or TC sensor.
- Conversion of linear resistance variation to a standard analogue current / voltage signal, i.e. from solenoids and butterfly valves or linear movements with attached potentiometer.
- Power supply and signal isolator for 2-wire transmitters.
- Process control with 2 pairs of potential-free relay contacts and analogue output.
- Process control with 2 pairs of potential-free relay contacts which can be configured to suit any application.
- Process control with standard analogue output.
- Galvanic separation of analogue signals and measurement of floating signals.
- The IAMS0002 and IAMS0022 have been designed according to strict safety requirements and is thus suitable for application in SIL 2 installations.
- Trip amplifier with window function allowing the relay to change state within a high and a low setpoint on the input span.
- Relay latch function, where the relay is activated and can only be reset manually.
- Sophisticated sensor error surveillance, where one relay holds the state immediately prior to the sensor error, thus allowing the process to continue. The other relay can be set for sensor error alarm so that the defect sensor can be replaced immediately.

Technical characteristics

- When the devices are used in combination with a programming front (PGMMOD 05/C1), all operational parameters can be modified to suit any application. As the devices are designed with electronic hardware switches, it is not necessary to open the device for setting of DIP-switches.
- A green / red front LED indicates normal operation and malfunction. A yellow LED is ON for each active output relay.
- Continuous check of vital stored data for safety reasons.
- 3-port 2.3 kVAC galvanic isolation.
- 4-port 2.3 kVAC galvanic isolation. (IAMS0022)

PGM DISPLAY / PROGRAMMER FRONT

Functionality

The simple and easily understandable menu structure and the explanatory help texts guide you effortlessly and automatically through the configuration steps, thus making the product very easy to use. Functions and configuration options are described in the section "Configuration / operating the function keys".

Application

- Communications interface for modification of operational parameters in the IAMS devices.
- Can be moved from one device to another and download the configuration of the first transmitter to subsequent transmitters.
- Fixed display for readout of process data and status.

Technical characteristics

- LCD display with 4 lines; Line 1 (H=5.57 mm) shows input signal, line 2 (H=3.33 mm) shows units, line 3 (H=3.33 mm) shows analogue output or tag no. and line 4 shows communication and relay status.
- Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure a high degree of protection against unauthorised modifications to the configuration.

Mounting / installation

- Click PGM onto the front of the device.

MOUNTING / DEMOUNTING THE PGMMOD

1: Insert the tabs of PGMMOD into the holes at the top of the device.
2: Swing PGMMOD into place.

Demounting of PGMMOD
3: Push the release button on the bottom of PGMMOD and swing PGMMOD up.
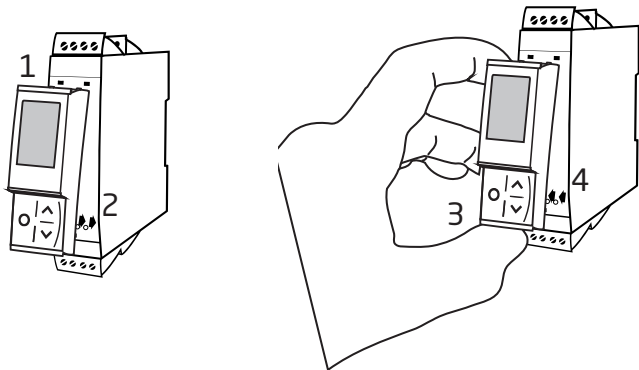
APPLICATIONS

Input signals:
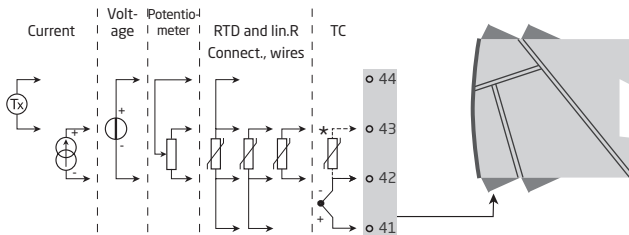
See the connection drawing on page 20.

Output signals:

Analogue, 0/4...20 mA and voltage

Supply:

21.6...253 VAC
or
19.2...300 VDC
Polarity is reversible.
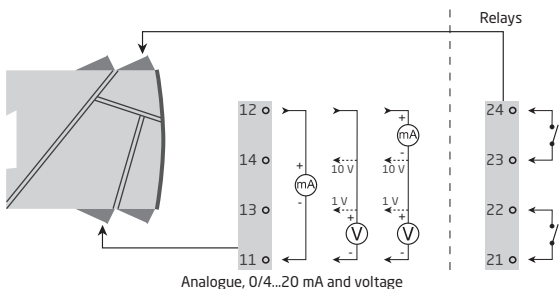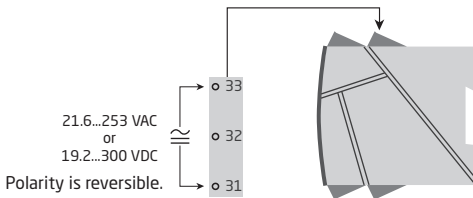
Electrical specifications

Environmental conditions

Specifications range	-20°C to +60°C
Calibration temperature	20...28°C
Relative humidity	< 95% RH (non-cond.)
Protection degree	IP20

Mechanical specifications

Dimensions (HxBxD)	109 x 23.5 x 104 mm
Dimensions, with PGMMOD (HxBxD)	109 x 23.5 x 131 mm
Weights	
IAMS0002	145 g (5.1 oz)
IAMS0020	159 g (5.6 oz)
IAMS0022	170 g (6.0 oz)
Max. wire size	1 x 2.5 mm^2 stranded wire
Screw terminal torque	0.5 Nm
Vibration	IEC 60068-2-6 : 2007 (IAMS0002)
	IEC 60068-2-6 (IAMS0022/IAMS0020)
2...13.2 Hz	±1 mm
13.2...100 Hz	±0.7 g

Common specifications

Supply voltage, universal	21.6...253 VAC, 50...60 Hz or
	19.2...300 VDC
Max. consumption	$\leq$ 2.0 W
Fuse	400 mA SB / 250 VAC
Isolation voltage, test / operation	2.3 kVAC / 250 VAC
Communications interface	Communication enabler PGMMODC1
Signal / noise ratio	Min. 60 dB (0...100 kHz)
Response time (0...90%, 100...10%):	
Temperature input	$\leq$ 1 s
mA / V input	$\leq$ 400 ms

Accuracy, the greater of the general and basic values:

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤ ±0.1% of span	≤ ±0.01% of span / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
mA	$\leq \pm 4$ µA	$\leq \pm 0.4$ µA / °C
Volt	$\leq \pm 20$ µV	$\leq \pm 2$ µV / °C
Pt100	$\leq \pm 0.2$°C	$\leq \pm 0.01$°C / °C
Linear resistance	$\leq \pm 0.1 \, \Omega$	$\leq \pm 0.01 \, \Omega$ / °C
Potentiometer	$\leq \pm 0.1 \, \Omega$	$\leq \pm 0.01 \, \Omega$ / °C
TC type: E, J, K, L, N, T, U	$\leq \pm 1$°C	$\leq \pm 0.05$°C / °C
TC type: R, S, W3, W5, LR	$\leq \pm 2$°C	$\leq \pm 0.2$°C / °C
TC type: B 85...200°C	$\leq \pm 4$°C	$\leq \pm 0.4$°C / °C
TC type: B 200...1820°C	$\leq \pm 2$°C	$\leq \pm 0.2$°C / °C

EMC immunity influence... < ± 0.5% of span
Extended EMC immunity:
NAMUR NE 21, A criterion, burst .... < ± 1% of span

Auxiliary supplies:
2-wire supply (terminal 44...43)........................ 25...16 VDC / 0...20 mA

RTD, linear resistance and potentiometer input

Input for RTD types:
   Pt10, Pt20, Pt50, Pt100, Pt200, Pt250, Pt300, Pt400, Pt500, Pt1000
   Ni50, Ni100, Ni120, Ni1000, Cu10, Cu20, Cu50, Cu100

Input type	Min. value	Max. value	Standard
Pt10...Pt1000	-200°C	+850°C	IEC 60751
Ni50...Ni1000	-60°C	+250°C	DIN 43760
Cu10...Cu100	-200°C	+260°C	$\alpha = 0,00427$
Lin. R	$0 \, \Omega$	$10000 \, \Omega$	-
Potentiometer	$10 \, \Omega$	$100 \, k\Omega$	-

Cable resistance per wire (max.), RTD............. $50 \, \Omega$
Sensor current, RTD... Nom. 0.2 mA
Effect of sensor cable resistance
(3- / 4-wire), RTD... < $0.002 \, \Omega / \Omega$
Sensor error detection, RTD................................ Yes
Short circuit detection, RTD .... < $15 \, \Omega$

TC input

Type	Min. value	Max. value	Standard
B	0°C	+1820°C	IEC 60584-1
E	-100°C	+1000°C	IEC 60584-1
J	-100°C	+1200°C	IEC 60584-1
K	-180°C	+1372°C	IEC 60584-1
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 60584-1
R	-50°C	+1760°C	IEC 60584-1
S	-50°C	+1760°C	IEC 60584-1
T	-200°C	+400°C	IEC 60584-1
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
LR	-200°C	+800°C	GOST 3044-84

Cold junction compensation (CJC)
  via internal CJC sensor .... ±(2.0°C + 0.4°C * Δt)
  Δt = internal temperature - ambient temperature
Sensor error detection, all TC types................. Yes
Sensor error current:
  when detecting... Nom. 2 µA
  else .... 0 µA

Current input

Measurement range... 0...20 mA
Programmable measurement ranges.............. 0...20 and 4...20 mA
Input resistance.. Nom. 20 Ω + PTC 50 Ω
Sensor error detection:
  Loop break 4...20 mA....................................... Yes

Voltage input

Measurement range... 0...12 VDC
Programmable measurement ranges.............. 0...1 / 0.2...1 / 0...5 / 1...5 /
                                             0...10 and 2...10 VDC
Input resistance.. Nom. 10 MΩ

Current output

Signal range (span)	0...20 mA
Programmable signal ranges	0...20 / 4...20 / 20...0 / 20...4 mA
Load (max.)	20 mA / 800 Ω / 16 VDC
Load stability	≤ 0.01% of span / 100 Ω
Sensor error detection	0 / 3.5 / 23 mA / none
NAMUR NE 43 Upscale / Downscale	23 mA / 3.5 mA
Output limitation:	
on 4...20 and 20...4 mA signals	3.8...20.5 mA
on 0...20 and 20...0 mA signals	0...20.5 mA
Current limit	≤ 28 mA

Voltage output

Signal range	0...10 VDC
Programmable signal ranges	0...1 / 0.2...1 / 0...10 / 0...5 / 1...5 / 2...10 / 1...0 / 1...0.2 / 5...0 / 5...1 / 10...0 and 10...2 V
Load (min.)	500 kΩ

Ex / I.S. approval

FM, applicable in	Class I, Div. 2, Group A, B, C, D
	Class I, Div. 2, Group IIC
	Zone 2
Max. ambient temperature for T5	60°C

Relay outputs

Relay functions	Setpoint, Window, Sensor error, Latch, Power and Off
Hysteresis	0...100%
On and Off delay	0...3600 s
Sensor error detection	Break / Make / Hold
Max. voltage	250 VRMS
Max. current	2 A / AC or 1 A / DC
Max. AC power	500 VA

Observed authority requirements	**Standard**
EMC 2004/108/EC	EN 61326-1 (IAMS0002)
EMC 2014/30/EU	EN 61326-1 (IAMS 0022 / 0020)
LVD 2006/95/EC	EN 61010-1 (IAMS0002)
LVD 2014/35/EU	EN 61010-1 (IAMS 0022 / 0020)
FM	3600, 3611, 3810 and ISA 82.02.01
UL, Standard for Safety	UL 508

of span = of the currently selected measurement range

Visualisation in the PGM of sensor error detection and input signal outside range

Sensor error check:	
Configuration	Sensor error detection:
R1, ERR.ACT=NONE - R2, ERR.ACT=NONE, OUT.ERR=NONE.	OFF
Else:	ON

Outside range readout (IN.LO, IN.HI): If the valid range of the A/D converter or the polynomial is exceeded			
Input	Range	Readout	Limit
VOLT	0...1 V / 0.2...1 V	IN.LO	< -25 mV
		IN.HI	> 1.2 V
	0...10 V / 2...10 V	IN.LO	< -25 mV
		IN.HI	> 12 V
CURR	0...20 mA / 4...20 mA	IN.LO	< -1.05 mA
		IN.HI	> 25.05 mA
LIN.R	0...800 Ω	IN.LO	< 0 Ω
		IN.HI	> 1075 Ω
	0...10 kΩ	IN.LO	< 0 Ω
		IN.HI	< 110 kΩ
POTM	-	IN.LO	< -0.5 %
		IN.HI	> 100.5 %
TEMP	TC / RTD	IN.LO	< temperature range -2℃
		IN.HI	> temperature range +2℃

Display readout below min.- / above max. (-1999, 9999):			
Input	Range	Readout	Limit
All	All	-1999	Display readout <-1999
		9999	Display readout >9999

Sensor error detection limits

Sensor error detection (SE.BR, SE.SH):			
Input	Range	Readout	Limit
CURR	Loop break (4...20 mA)	SE.BR	<= 3.6 mA; > = 21 mA
POTM	All, SE.BR on all 3-wire	SE.BR	> ca. 126 kΩ
LIN.R	0...800 Ω	SE.BR	> ca. 875 Ω
	0...10 kΩ	SE.BR	> ca. 11 kΩ
TEMP	TC	SE.BR	> ca. 750 kΩ / (1.25 V)
	RTD, 2-, 3-, and 4-wire	SE.BR	> ca. 15 kΩ
	No SE.SH for Cuxx, Pt10, Pt20 and Pt50	SE.SH	< ca. 15 Ω

Error indications

Readout at hardware error		
Error search	Readout	Error cause
Test of internal CJC sensor	CJ.ER	CJC sensor defect or temperature outside range
Checksum test of the configuration in FLASH	FL.ER	Error in FLASH
Check measurement of analogue output current*	AO.ER	1) No load on the current output (only S4...20/S20...4 mA)
Communications test PGM / device	NO.CO	Connection error
Check that input signal matches input configuration	IN.ER	1) Error levels on input
Check that saved configuration in PGM matches device	TY.ER	Configuration is not IAMS 0002 / 0022 / 0020

Error indications in the display flash once per second. The help text explains the error.
* Does not apply to IAMS0020.
1) The error is reset by switching off and then switching on the supply voltage to the device.

CONNECTIONS

Supply:

41 32 33

Inputs:

RTD, 2-wire

41 42 43 44

RTD, 3- / 4-wire

41 42 43 44

TC, internal CJC sensor

41 42 43 44

Resistance, 2-wire

41 42 43 44

Resistance, 3- / 4-wire

41 42 43 44

Potentiometer

41 42 43 44

2-wire transmitter

41 42 43 44

Current

41 42 43 44

Voltage

41 42 43 44

Outputs:

Current

11 12 13 14

Voltage, 1 V

11 12 13 14

Voltage, 10 V

11 12 13 14

Relays

21 22 23 24
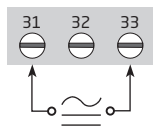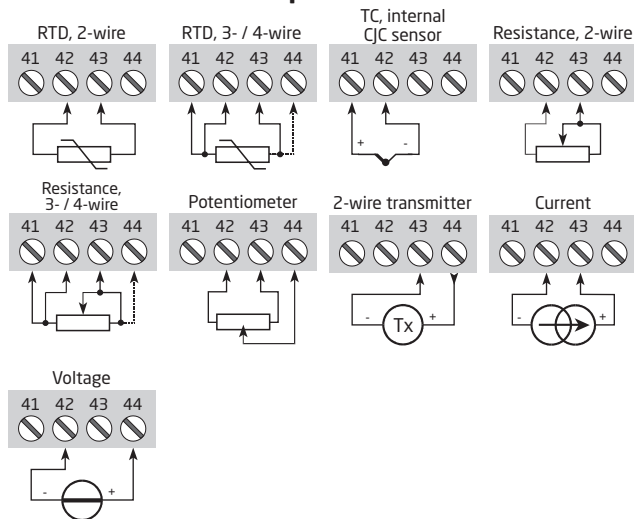
BLOCK DIAGRAM
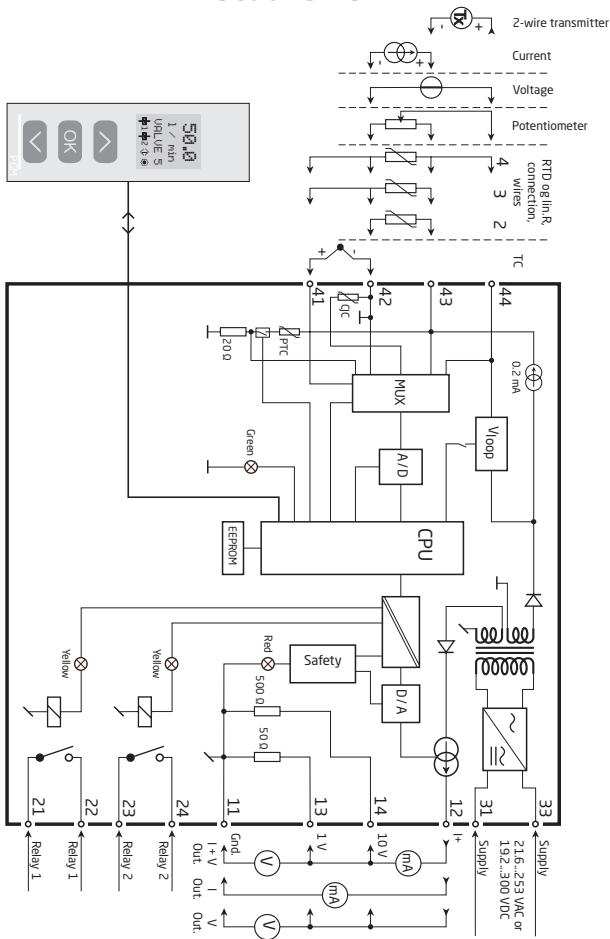
CONFIGURATION / OPERATING THE FUNCTION KEYS

Documentation for routing diagram.

In general:

When configuring the IAMS devices, you will be guided through all parameters and you can choose the settings which fit the application. For each menu there is a scrolling help text which is automatically shown in line 3 on the display.

Configuration is carried out by using the 3 function keys:

- $\wedge$ will increase the numerical value or choose the next parameter
- $\vee$ will decrease the numerical value or choose the previous parameter
- $\circledcirc$ will accept the chosen value and proceed to the next menu

When configuration is completed, the display will return to the default state 1.0. See the reference diagram on page 28.

Pressing and holding $\circledcirc$ will return to the previous menu or return to the default state (1.0) without saving the changed values or parameters.

If no key is activated for 1 minute, the display will return to the default state (1.0) without saving the changed values or parameters.

Further explanations:

Fast setpoint adjustment and relay test: These menus allow you to make a quick setpoint change and relay test when the FastSet menu is activated. This function can only be activated when the relays are set for setpoint function and are controlled by a setpoint.

Pressing $\wedge$ and $\vee$ simultaneously will activate a relay test and change the state of the relay.
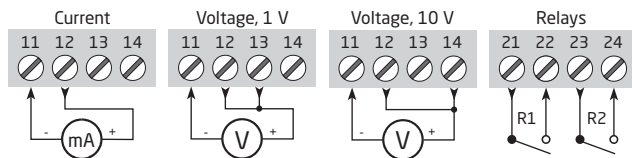
Pressing $\circledcirc$ will save the setpoint change.

Holding down $\circledcirc$ for more than 1 second will return the unit to the default state without saving the setpoint change.

Password protection: Programming access can be blocked by assigning a password. The password is saved in the transmitter in order to ensure a high degree of protection against unauthorised modifications to the configuration. Default password 2008 allows acces to all configuration menus.

Signal and sensor error info via display front PGMMOD05

Sensor error (see limits in the table) is displayed as SE.BR (sensor break) or SE.SH (sensor short). Signals outside the selected range (not sensor error, see table for limits) are displayed as IN.LO indicating low input signal or IN.HI indicating high input signal. The error indication is displayed in line 3 as text and at the same time the backlight flashes. Line 4 of the display is a status line which displays status of relay 1 and relay 2, COM (flashing bullet) indicating correct functioning of PGMMOD05 and arrow up/down which indicates tendency readout of the input signal. If the figure 1 or figure 2 flashes, the unit has detected that the setpoint has been exceeded and that the relay is in "delay" mode. When the delay time has passed and the relay makes/breaks, the relay sign either displays or disappears.

Signal and sensor error indication without display front

Status of the unit can also be read from the red/green LED in the front of the device.

Green flashing LED 13 Hz indicates normal operation.

Green flashing LED 1 Hz indicates sensor error.

Steady green LED indicates internal error.

Steady red LED indicates fatal error.

Relay functions

6 different settings of relay function can be selected.

Setpoint:	The unit works as a single limit switch
Window:	The relay has a window that is defined by a low and a 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 as long as the power is on.
Off:	The relay is deactivated.
Latch:	The relay is latched. Only valid for setpoint and window function.

I**ncreasing/decreasing:** The relays can be set to activate at increasing or decreasing input signal.

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

Hysteresis: 0.0...100.0%.

Latch

When the setpoint is exceeded the relay outputs enter an alarm state. The latch function of the IAMS0022 and IAMS0020 will hold the relays in this state until the function is deactivated manually. The latch function can be applied when the relay function setpoint or window is selected.

The latch function can be selected separately for each relay output. If the configuration is copied from one device to another by way of the PGMMOD05, the latch function must be reconfigured.

The latch function activates and holds the relays when the input signal rises above or falls below the selected setpoints and the relay action has been selected as increasing or decreasing.

The window function is selected by choosing "window" in the menu and defining a high and a low setpoint.

It can be selected for each relay contact whether the contact is open or closed inside the window. This selection is made in the menu R1.cont and R2.cont.

The setpoint function is selected by choosing "setpoint" in the menu and entering the desired limit. The device then works as a single limit switch.

An activated relay means that the contact is closed if the contact function "normally open" is selected, and the contact is open if the contact function "normally closed" is selected.

The delay time for activation and deactivation can be set independently of each other in the menus ON.DEL and OFF DEL respectively.

If the relay function "Error" is active, the relay will latch when a sensor error occurs and will not be deactivated automatically when the sensor error is rectified.

The relay can only be deactivated by an operator and only when the normal conditions for deactivation are met. If the input signal still has a value that will activate the relay, the relay will latch again.

See the graphic depiction of the setpoint and window functions on pages 36, 37 and 38.

Manual deactivation of the latch function

If the relay outputs are activated and thereby latched, it will be indicated in the display. The backlight flashes and the scrolling help text tells you how to deactivate the output. Manual deactivation is carried out by way of the front buttons on the PGMMOD05. Use ⌃ and ⌄ to navigate in the menu and ⊛ to validate your selection. If the password protection has been activated, the password must be entered in order to access the deactivation menu. See the menu structure on page 33.

Advanced functions

The unit gives access to a number of advanced functions which can be reached by answering "Yes" to the point "adv.set".

Display setup: Here you can adjust the brightness contrast and the backlight. Setup of TAG number with 6 alphanumerics. Selection of functional readout in line 3 of the display - choose between readout of analogue output or TAG number.

Two-point process calibration: The unit 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 PGMMOD05. Then a high signal (not necessarily 100%) is applied and the actual value is entered via PGMMOD05. If you accept to use the calibration, the unit will work according to this new adjustment. If you later reject this menu point or choose another type of input signal the unit will return to factory calibration.

Process simulation function: If you say "yes" to the point "EN.SIM" it is possible to simulate an input signal by means of the arrow keys and thus control the output signal up or down. When you finalise the point with ⊛, the unit returns to normal mode. The point REL.SIM allows you to activate relay 1 and relay 2 by means of the arrow-keys up/down. You must exit the menu by pressing ⊛ (no time-out).

Password: Here you can choose a password between 0000 and 9999 in order to protect the unit against unauthorised modifications to the configuration. The unit is delivered default without password. If you have locked the device with a password by mistake, you can always open the menu by using the master password 2008.

Language: In the menu "lang.setup" you can choose between 7 different language versions of help texts that will appear in the menu. You can choose between UK, DE, FR, IT, ES, SE and DK.

Auto diagnosis

The unit performs an advanced auto diagnosis of the internal circuits.

The following possible errors can by display in the front unit PGMMOD05.

CJ.ER - CJC sensor defect or CJC temperature outside range
FL.ER - Flash error
AO.ER - No load on the current output (only for S4...20 mA/S20...4 mA)
NO.CO - Connection error
IN.ER - Error levels on input
TY.ER - Configuration in PGMMOD05 does not match this product type

Selection of units

After choosing the input signal type you can choose the process units which will be displayed in text line 2 (see table). By selection of temperature input the process value is always displayed in Celsius or Fahrenheit. This is selected in the menu point after selection of temperature input.

Safety readback

When the device is delivered with default configuration, the SIL function is disabled. The safety readback function (loop surveillance) can be selected in the menu O.RANGE, thus enabling the device to run in SIL mode. In order to enable the SIL functionality, the menu item S4...20 mA must be selected. Please note, however, that when safety readback is enabled, a sensor error will be indicated as an error on the analogue output signal.

Memory

In the memory menu you can save the configuration of the device in the PGMMOD05, and then move the PGMMOD05 onto another device of the same type and download the configuration in the new device.

Power up

Fast setpoint adjustment and relay test
⊙ Increase setpoint
⊙ Decrease setpoint
⊗ Save and exit the menu
⊙ and ⊙ simultaneously = change relay state

1.2

50.0 — OK
RELAY1
Txt 57

75.0 — OK
RELAY2
Txt 57

50.0 — OK
%
12.0

1.0

1.0 = Default state Line 1 shows input signal. Line 2 shows UNIT. By pressing ⊙ and ⊙ simultaneously line 3 alternates between A.Out and TAG. Line 4 shows relay and communication status.

1.1 = Only if password-protected.

1.2 = Only if FastSet is activated and the relay function is setpoint.

1.3 = Not valid for these input signals: 0...20 mA and voltage.

1.4 = Only if input signal is temperature.

1.5 = The relay can only be deactivated by an operator and only if the normal conditions for deactivation are met. If the input signal still has a value that will activate the relay, the relay will latch again.

0000
9999
0000 — OK
PASSW.
Txt 1

1.1

NO
YES
NO — OK
ADV.SET
Txt 2

VOLT
CURR
POTM
LIN.R
TEMP
VOLT — OK
IN TYPE
Txt 3

2-10
0-10
1-5
0-5
0.2-1
0-1
2-10 — OK
V.RANGE
Txt 4

°C
mA
rPm
(69 units)
(see pg 29 for units list)
UNIT — OK
%
Txt 11

1111
111.1
11.11
1.111
111.1 — OK
DEC.P
Txt 12

999.9
-199.9
0.0 —
DISP.LO
Txt 13

CURR — OK
IN TYPE
Txt 3

0-20 4-20
4-20 — OK
I.RANGE
Txt 5

POTM — OK
IN TYPE
Txt 3

LIN.R — OK
IN TYPE
Txt 3

2W 3W 4W
3W — OK
CONNEC.
Txt 6

0...9999
0 — OK
R 0%
Txt 7

0...9999
2500 — OK
R 100%
Txt 8

TEMP — OK
IN TYPE
Txt 3

Cu Pt Ni TC

Pt
SENSOR
Txt 10

10...1000
100 — OK
Pt TYPE
Txt 16

2W 3W 4W
3W —
CONNEC.
Txt 6

50...1000
Ni — OK
SENSOR
Txt 10

100 — OK
Ni TYPE
Txt 17

2W 3W 4W
3W —
CONNEC.
Txt 6

TC.B TC.E TC.J TC.K TC.L
TC.N TC.R TC.S TC.T TC.U
TC.W3 TC.W5 TC.Lr
TC — OK
SENSOR
Txt 10

TC.K — OK
TC.TYPE
Txt 18

INT —
CJC
Txt 63

10...100
Cu — OK
SENSOR
Txt 10

10 — OK
Cu TYPE
Txt 69

2W 3W 4W
3W —
CONNEC.
Txt 6

Continued on the page Routing diagram ADV.SET

YES — OK
ADV.SET
Txt 2

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ROUTING DIAGRAM

If no key is activated for 1 minute, the display will return to the default
state 1.0 without saving configuration changes.

⊙ Increase value / choose next parameter

⊙ Decrease value / choose previous parameter

⊙ Accept the chosen value and proceed to the next menu

Hold ⊙ Back to previous menu / return to menu 1.0 without saving

　　Availability of output parameters are model number dependent.
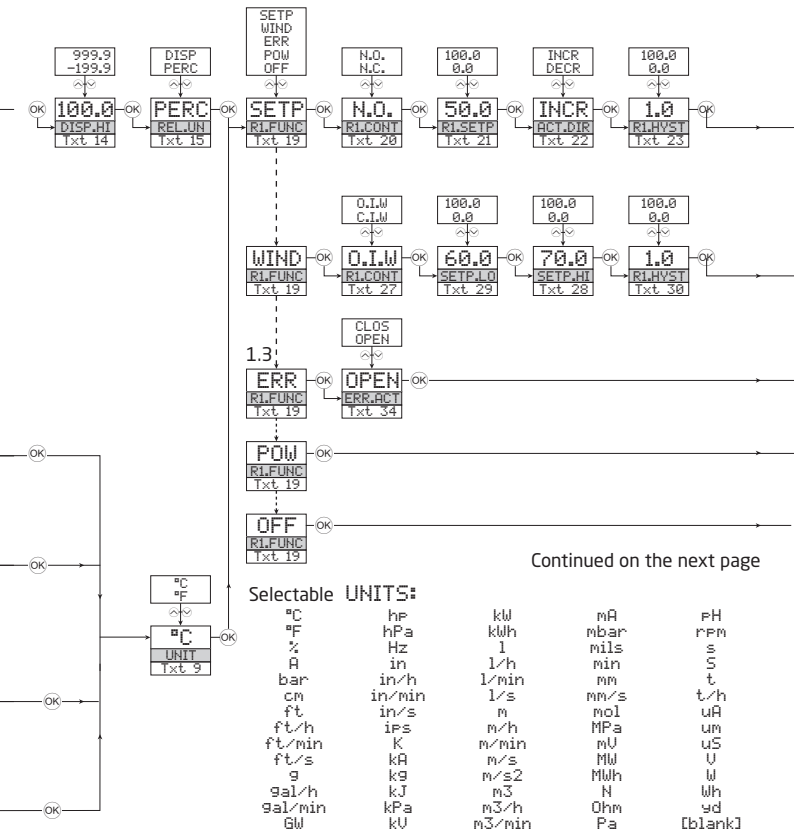
Selectable UNITS:

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

Top row:

HOLD / CLOS / OPEN / NONE
NONE — ERR.ACT — Txt 24
1.3

3600 / 0000
0 — ON.DEL — Txt 25

3600 / 0000
0 — OFF.DEL — Txt 26

SETP / WIND / ERR / POW / OFF
SETP — R2.FUNC — Txt 19

N.O. / N.C.
N.O. — R2.CONT — Txt 20

100.0 / 0.0
50.0 — R2.SETP — Txt 21

INCR / DECR
INCR — ACT.DIR — Txt 22

100.0 / 0.0
1.0 — R2.HYST — Txt 23

Second row:

HOLD / CLOS / OPEN / NONE
NONE — ERR.ACT — Txt 31
1.3

3600 / 0000
0 — ON.DEL — Txt 32

3600 / 0000
0 — OFF.DEL — Txt 33

WIND — R2.FUNC — Txt 19

O.I.W / C.I.W
O.I.W — R2.CONT — Txt 27

100.0 / 0.0
60.0 — SETP.LO — Txt 29

100.0 / 0.0
70.0 — SETP.HI — Txt 28

100.0 / 0.0
1.0 — R2.HYST — Txt 30

1.3
ERR — R2.FUNC — Txt 19

CLOS / OPEN
OPEN — ERR.ACT — Txt 34

POW — R2.FUNC — Txt 19

OFF

Flowchart boxes (top row, left to right):

- HOLD / CLOS / OPEN / NONE ▲▼ — **NONE** — ERR.ACT — Txt 24 — 1.3
- 3600 / 0000 ▲▼ — **0** — ON.DEL — Txt 25
- 3600 / 0000 ▲▼ — **0** — OFF.DEL — Txt 26
- VOLT / CURR ▲▼ — **CURR** — ANA.OUT — Txt 36
- S20-4 / 20-4 / 20-0 / S4-20 / 4-20 / 0-20 ▲▼ — **4-20** — O.RANGE — Txt 37
- 23mA / 0/3.5mA / NONE ▲▼ — **23mA** — OUT.ERR — Txt 38 — 1.3
- 850 / -200 ▲▼ — **0.0** — OUT.LO — Txt 41 — 1.4
- 850 / -200 ▲▼ — **150.0** — OUT.HI — Txt 42 — 1.4

Second row (left):

- HOLD / CLOS / OPEN / NONE ▲▼ — **NONE** — ERR.ACT — Txt 31 — 1.3
- 3600 / 0000 ▲▼ — **0** — ON.DEL — Txt 32
- 3600 / 0000 ▲▼ — **0** — OFF.DEL — Txt 33

Lower middle:

- 10-2 / 10-0 / 5-1 / 5-0 / 1-0.2 / 1-0 / 2-10 / 0-10 / 1-5 / 0-5 / 0.2-1 / 0-1 ▲▼
- **VOLT** — ANA.OUT — Txt 36 → **0-10** — O.RANGE — Txt 39

To default state 1.0 —OK→

ROUTING DIAGRAM

Advanced settings (ADV.SET)
2.0 In the submenu simulation (SIM) you must press ⊙ to return to the default state 1.0.

MEM
DISP
CAL
SIM
PASS
LANG
∧∨

MEM / SETUP / Txt 43 —ok→ SAVE / LOAD / ∧∨ → **SAVE** / MEMORY / Txt 44 —ok→

DISP / SETUP / Txt 43 —ok→ 9 / 0 / ∧∨ → **3** / CONTRA / Txt 45 —ok→ 9 / 0 / ∧∨ → **9** / LIGHT / Txt 46 —ok→ 9 / A / ∧∨ → VALVE 5 / Txt 47 —ok→
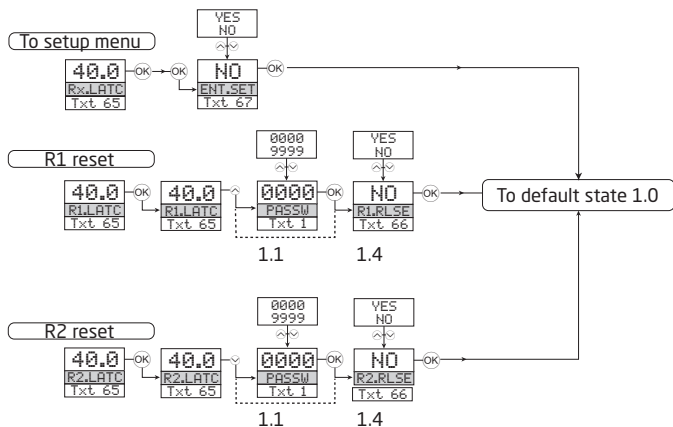
CAL / SETUP / Txt 43 —ok→ YES / NO / ∧∨ → **YES** / CAL.LO / Txt 49 —ok→ 100.0 / 0.0 / ∧∨ → **2.0** / % / Txt 61 ┈NO┈→ **YES** / CAL.HI / Txt 50 —ok→ 100.0 / 0.0 / ∧∨ → **90.0** / % / Txt 62 ┈NO┈→ YES / NO / ∧∨ → **YES** / USE.CAL / Txt 60 —ok→

To default state 1.0

SIM / SETUP / Txt 43 —ok→ YES / NO / ∧∨ → **YES** / EN.SIM / Txt 51 —ok→ 100.0 / 0.0 / ∧∨ → **25.0** / % / Txt 52 ┈NO┈→ REL.SIM / Txt 53 —ok→

2.0

PASS / SETUP / Txt 43 —ok→ YES / NO / ∧∨ → **YES** / EN.PASS / Txt 54 —ok→ 9999 / 0000 / ∧∨ → **0000** / NEW.PAS / Txt 55 ┈NO┈→ YES / NO / ∧∨ → **YES** / EN.FAST / Txt 56 —ok→

LANG / SETUP / Txt 43 —ok→ DE, DK, ES, FR, IT, SE, UK / ∧∨ → **UK** / LANGUA / Txt 59 —ok→

LATC / SETUP / Txt 43 —ok→ YES / NO / ∧∨ → **NO** / R1.LATC / Txt 64 —ok→ YES / NO / ∧∨ → **NO** / R2.LATC / Txt 64 —ok→

ROUTING DIAGRAM
Manual deactivation of the latch function
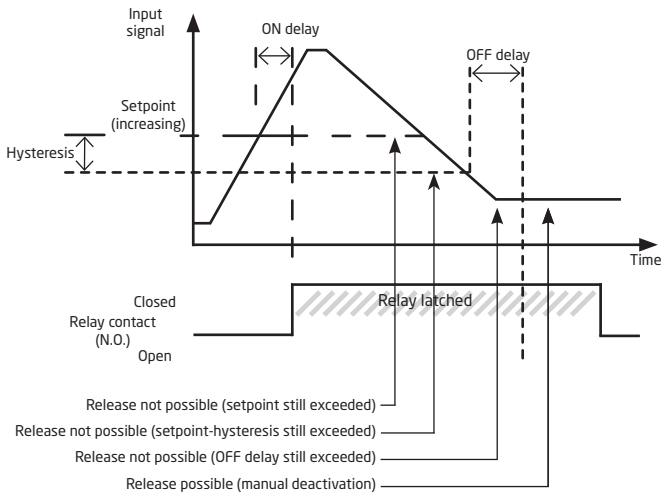
SCROLLING HELP TEXT IN DISPLAY LINE 3

[01] Set correct password

[02] Select setup module or NO to store and exit
[03] Select temperature input
      Select potentiometer input
      Select linear resistance input
      Select current input
      Select voltage input
[04] Select 0.0-1 V input range
      Select 0.2-1 V input range
      Select 0-5 V input range
      Select 1-5 V input range
      Select 0-10 V input range
      Select 2-10 V input range
[05] Select 0-20 mA input range
      Select 4-20 mA input range
[06] Select 2-wire sensor connection
      Select 3-wire sensor connection
      Select 4-wire sensor connection
[07] Set resistance value low
[08] Set resistance value high
[09] Select Celsius as temperature unit
      Select Fahrenheit as temperature unit
[10] Select TC sensor type
      Select Ni sensor type
      Select Pt sensor type
[11] Select display unit
[12] Select decimal point position
[13] Set display range low
[14] Set display range high
[15] Set relays in % of input range
      Set relays in display units
[16] Select Pt10 as sensor type
      Select Pt20 as sensor type
      Select Pt50 as sensor type
      Select Pt100 as sensor type
      Select Pt200 as sensor type
      Select Pt250 as sensor type
      Select Pt300 as sensor type
      Select Pt400 as sensor type
      Select Pt500 as sensor type
      Select Pt1000 as sensor type
[17] Select Ni50 as sensor type
      Select Ni100 as sensor type
      Select Ni120 as sensor type
      Select Ni1000 as sensor type
[18] Select TC-B as sensor type
      Select TC-E as sensor type
      Select TC-J as sensor type
      Select TC-K as sensor type
      Select TC-L as sensor type
      Select TC-N as sensor type
      Select TC-R as sensor type
      Select TC-S as sensor type
      Select TC-T as sensor type
      Select TC-U as sensor type
      Select TC-W3 as sensor type
      Select TC-W5 as sensor type

      Select TC-Lr as sensor type

[19] 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
[20] Select Normally Closed contact
      Select Normally Open contact
[21] Set relay setpoint
[22] Activate relay on decreasing signal
      Activate relay on increasing signal
[23] Set relay hysteresis
[24] No error action - undefined status at error
      Open relay contact at error
      Close relay contact at error
      Hold relay status at error
[25] Set relay ON delay in seconds
[26] Set relay OFF delay in seconds
[27] Relay contact is Open Inside Window
      Relay contact is Closed Inside Window
[28] Set relay window setpoint low
[29] Set relay window setpoint high
[30] Set relay window hysteresis
[34] Open relay contact at error
      Close relay contact at error
[36] Select current as analogue output type
      Select voltage as analogue output type
[37] Select 0-20 mA output range
      Select 4-20 mA output range
      Select S4-20 mA with safety readback
      Select 20-0 mA output range
      Select 20-4 mA output range
      Select S20-4 mA with safety readback
[38] Select no error action - output undefined at error
      Select downscale at error
      Select NAMUR NE43 downscale at error
      Select NAMUR NE43 upscale at error
[39] Select 0.0-1 V output range
      Select 0.2-1 V output range
      Select 0-5 V output range
      Select 1-5 V output range
      Select 0-10 V output range
      Select 2-10 V output range
      Select 1-0.0 V output range
      Select 1-0.2 V output range
      Select 5-0 V output range
      Select 5-1 V output range
      Select 10-0 V output range
      Select 10-2 V output range
[41] Set temperature for analogue output low
[42] Set temperature for analogue output high
[43] Enter Language setup
      Enter Password setup
      Enter simulation mode
      Perform process calibration
      Enter display setup
      Perform memory operations

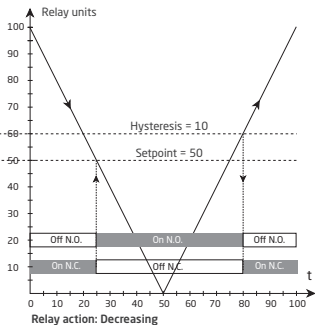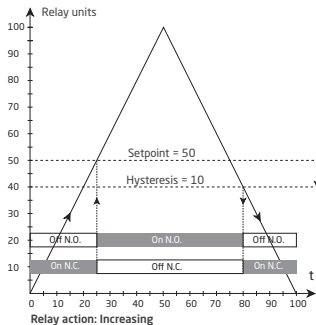|	
[44]	Load saved setup into device
	Save setup in display front
[45]	Adjust LCD contrast
[46]	Adjust LCD backlight
[47]	Write a 6-character device TAG
[48]	Analogue output value is shown in display line 3
	Device TAG is shown in display line 3
[49]	Calibrate Input low to process value?
[50]	Calibrate Input high to process value?
[51]	Enable simulation mode?
[52]	Set the input simulation value
[53]	Relay simulation - use ^ and v to toggle relay
	1 and 2
[54]	Enable password protection?
[55]	Set new password
[56]	Enable Fastset functionality?
[57]	Relay setpoint - press OK to save
[58]	Relay setpoint - Read only
[59]	Select language
[60]	Use process calibration values?
[61]	Set value for low calibration point
[62]	Set value for high calibration point

Graphic depiction of latch function setpoint

Input signal

ON delay

OFF delay

Setpoint (increasing)

Hysteresis

Time

Closed

Relay contact (N.O.)

Open

Relay latched

Release not possible (setpoint still exceeded)

Release not possible (setpoint-hysteresis still exceeded)

Release not possible (OFF delay still exceeded)

Release possible (manual deactivation)

Graphic depiction of latch function window
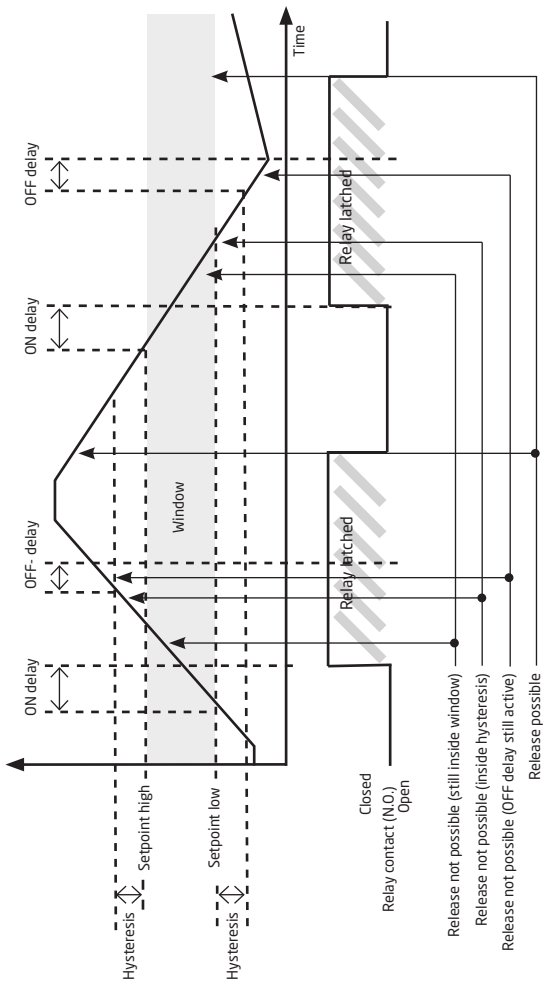
Graphic depiction of relay action setpoint

Relay units

Setpoint = 50
Hysteresis = 10

| Off N.O. | On N.O. | Off N.O. |
| On C. | Off N.C. | On C. |

Relay action: Increasing

Relay units

Hysteresis = 10
Setpoint = 50

| Off N.O. | On N.O. | Off N.O. |
| On C. | Off N.C. | On C. |

Relay action: Decreasing

Graphic depiction of relay action window

Relay units

Hysteresis = 5
Setpoint High = 60

Setpoint Low = 40
Hysteresis = 5

| Off | ⊘ | Off | ⊘ | Off |
| On | ⊘ | On | ⊘ | On |
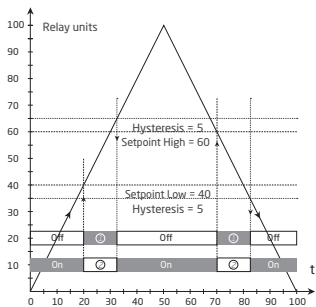
Relay function: Window (shown for increasing signal)
Contact: Closed inside window = ⊘
Contact: Open inside window = ⊘

Relay units

Hysteresis = 5
Setpoint High = 60

Setpoint Low = 40
Hysteresis = 5

| Off | ⊘ | Off | ⊘ | Off |
| On | ⊘ | On | ⊘ | On |
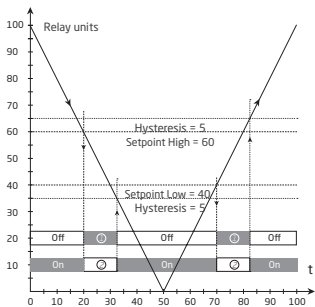
Relay function: Window (shown for decreasing signal)
Contact: Closed inside window = ⊘
Contact: Open inside window = ⊘

Ordering information

DESCRIPTION	PART NUMBER
Universal transmitter with analog output	IAMS0002
Universal transmitter with analog output / 2 relays	IAMS0022
Universal trip amplifier / 2 relays	IAMS0020
Display / programming module	PGMMOD05
Display/Comms Module - Modbus RTU protocol interface over RS-485	PGMMODC1