

Product Manual

PGMMODC1

Communication enabler



Model No. PGMMODC1
Drawing No. LP1097
Version No. 101
Revision Date 19/07



Communication enabler PGMMODC1

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Warning



GENERAL

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.



**HAZARD-
OUS
VOLTAGE**

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 Modbus cable.

Troubleshooting the device.



CAUTION

Warning

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

Symbol identification



Triangle with an exclamation mark: 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 double insulation symbol shows that the device is protected by double or reinforced insulation.

Safety instructions

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

The device is manufactured for indoor use. 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.

The device may be used in Overvoltage Category II, Pollution Degree 2 at an altitude up to 2000 m.

Mounting

Only qualified technicians who are familiar with the technical terms, warnings, and instructions in this installation guide and who are able to follow these should connect the device. Only devices which are undamaged and free of moist and dust may be installed. The device may be installed and supplied by Red Lion IAMS and AFCM series only.

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

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.

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.

Special Condition of Use:

- 1) In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70) or Canadian Electrical Code (C22.1)
- 2) In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70) or Canadian Electrical Code (C22.1).

The equipment shall be installed in an enclosure with a minimum ingress protection rating of IP54 unless the apparatus is intended to be afforded an equivalent degree of protection by location.

Conditions particulières d'utilisation :

- 1) Dans les installations de classe I, division 2, l'équipement visé doit être installé dans un boîtier protégé par un outil pouvant accepter une ou plusieurs des méthodes de câblage de classe I, division 2 spécifiées dans le Code national de l'électricité (ANSI/NFPA 70) ou le Code électrique canadien (C22.1).
- 2) Dans les installations de classe I, zone 2, l'équipement visé doit être monté à l'intérieur d'un boîtier protégé par un outil pouvant accepter une ou plusieurs des méthodes de câblage de classe I, zone 2 spécifiées dans le Code national de l'électricité (ANSI/NFPA 70) ou le Code électrique canadien (C22.1).

L'équipement doit être installé dans un boîtier dont l'indice de protection est d'au moins IP54, à moins que l'appareil ne soit destiné à recevoir un degré de protection équivalent selon l'emplacement.

Communication enabler PGMMODC1

- Programming display for IAMS and AFCM devices
- Modbus RTU protocol interface over RS-485
- Monitor process value from the built-in display
- High 2.5 kV isolation to host unit
- Shielded RJ45 Modbus connector on top

Applications

- The PGMMODC1 detachable display adds Modbus RTU RS-485 serial communications to all current and future IAMS/AFCM units.
- The unit converts a wide array of sensors and analog device signals measured by the device, like uni- and bipolar mA and voltage signals, potentiometer, Lin. R, RTD and TC, to a Modbus communication line signal.
- When mounted on an IAMS/AFCM device any signal coming from or going to I.S. classified area, like AI, AO, DI and DO signals, can be converted to a Modbus network.
- All individual unit operating parameters can easily and quickly be configured by using the Modbus communication or by using the front display menu.
- The easily readable PGMMODC1 display can be used to read the process signal, simulate the output signal, indicate sensor errors and internal module errors.

Technical characteristics

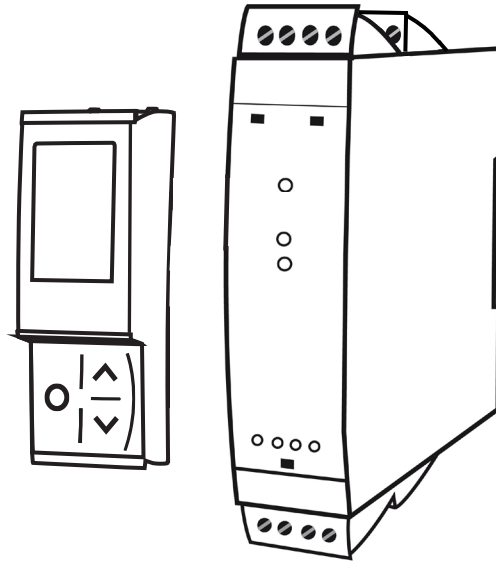
- PGMMODC1 has full PGM functionality for unit programming, process signal monitoring and diagnostics handling.
- Modbus RTU protocol is supported using a serial RS-485 communication wiring.
- Multidrop half-duplex connection via shielded RJ45 connector.
- High safe galvanic isolation of 2.5 kVAC between the serial wiring and the connected system IAMS/AFCM units.
- Modbus parameters such as address, baud rate, stop bit(s), and parity bit are configured from the PGMMODC1 display, which also stores parameters.

Mounting / installation / programming

- Mounting in Zone 2 / Div 2.
- The PGMMODC1 can be moved from one device to another. The individual system IAMS/AFCM unit configuration of the first transmitter can be saved and downloaded to subsequent transmitters.
- Programmed parameters can be protected by a user-defined password.
- When mounted on devices that are installed upside down, a menu item allows the display on the PGMMODC1 to be rotated 180° and the up/down buttons to switch function.

Mounting on a IAMS/AFCM device

PGMMODC1 is a detachable display that can be mounted on all IAMS/AFCM fronts for programming and signal monitoring.



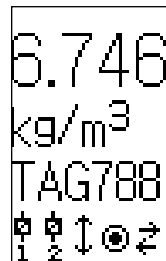
PGMMODC1 contains a four line LCD dot display

Line 1 can e.g. show the scaled process value.

Line 2 can e.g. show the selected engineering unit.

Line 3 can e.g. show the analog output or TAG no.

Line 4 shows status for communication and e.g. signal trending.

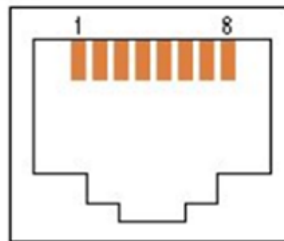


RJ45 Modbus Connector

Pin 5: RS485 A line

Pin 4: RS485 B line

Pin 8: RS485 GND and shield



Electrical specifications

Environmental conditions:

Specifications range	-20°C to +60°C
Storage temperature	-20°C to +85°C
Humidity.	< 95% RH (non-cond.)
Protection degree	IP20
Installation in pollution degree 2 / overvoltage category II.	

Mechanical specifications:

Dimensions (HxWxD)	73.2 x 23.3 x 26.5 mm
Dimensions (HxWxD) w/ IAMS/AFCM unit	109 x 23.5 x 131 mm
Weight approx.	100 g
Connection	RJ45 - shielded

Common specifications:

Power consumption	≤ 0.15 W
Isolation voltage - test / working	2.5 kVAC / 250 VAC reinforced isolation
Signal / noise ratio	> 60 dB
Update rate / response time	> 50 Hz / < 20 ms
Signal type	RS-485 half duplex
Serial protocol	Modbus RTU
Modbus mode.	RTU - slave
Devices on an RS485 line	Up to 32 (without a repeater)
Data rates, baud	2400, 4800, 9600, 19200, 38400, 57600, 115200
Automatic baudrate detection	Yes - can be configured ON or OFF
Parity.	Even, Odd, None
Stop bit(s)	1 or 2
Digital addressing	1...247
Response delay.	0...1000 ms

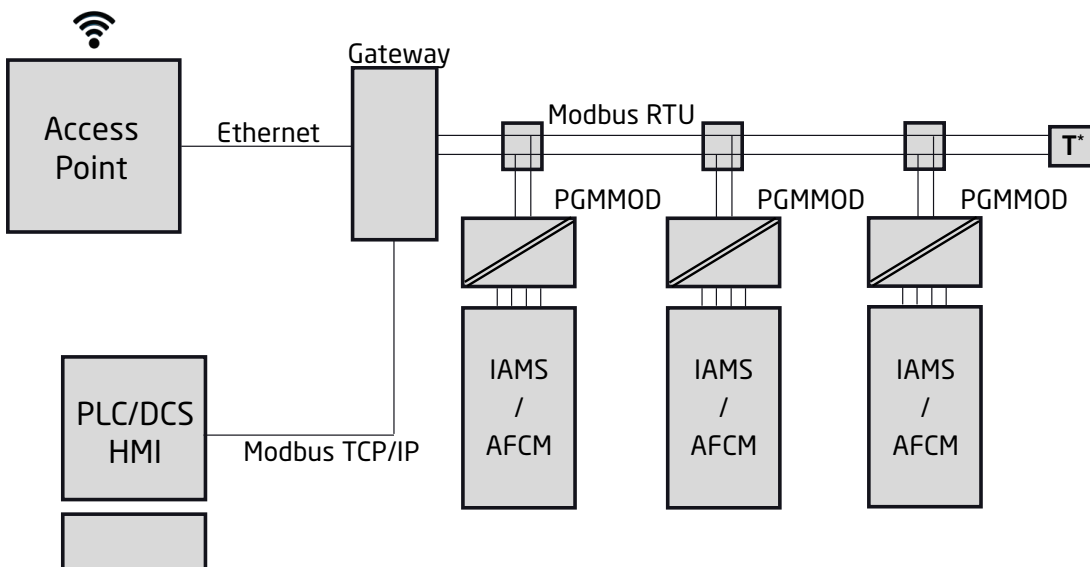
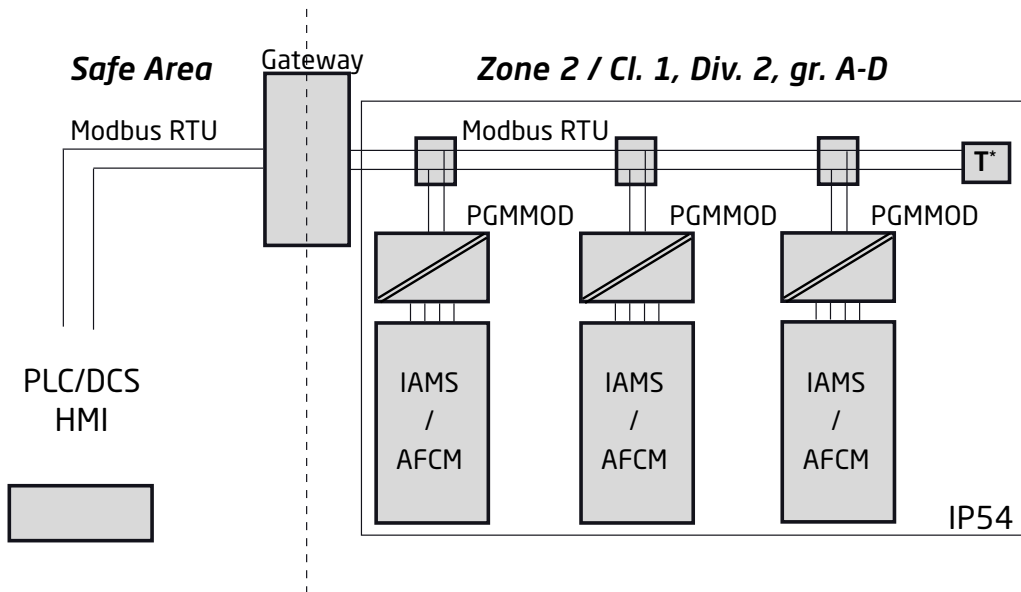
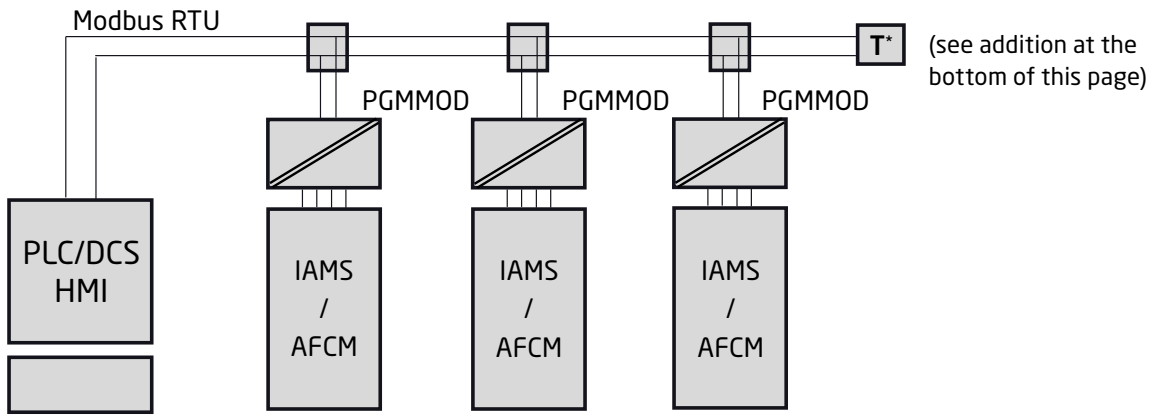
Approvals:

EMC 2004/108/EC.	EN 61326-1
LVD 2006/95/EC.	EN 61010-1
UL, Standard for Safety	UL 61010-1
UL Listed	E179259

Ex:

FM	FM19US0016X CL I DIV2 GP A- D T5 CL I Zn2 Groups IIC T5 CL I Zn2 AEx nA IIC T5
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PGMMODC1 installation examples



* Termination Resistors are not required when talking to other Red Lion devices. However, a 120 Ohm resistor may be required with other master devices.

Modbus basics

Modbus is a “master-slave” system..., where the “master” communicates with one or multiple “slaves”.

The master typically is a PLC (Programmable Logic Controller), DCS (Distributed Control System), HMI (Human Machine Interface), or RTU (Remote Terminal Unit).

The three most common Modbus versions used are: MODBUS ASCII, MODBUS RTU and MODBUS/TCP.

In Modbus RTU, data is coded in binary, and requires only one communication byte per data byte. This is ideal for use over multi-drop RS485 networks, at speeds up to 115,200 bps.

The most common speeds are 9,600 bps and 19,200 bps.

Modbus RTU is the most widely used industrial protocol and is supported by the PGMMODC1.

Modbus RTU:

To communicate with a slave device, the master sends a message containing:

Device Address - Function Code - Data - Error Check

The Device Address is a number from 0 to 247.

Messages sent to address 0 (broadcast messages) will be accepted by all slaves, but numbers 1-247 are addresses of specific devices.

With the exception of broadcast messages, a slave device always responds to a Modbus message so the master knows the message was received.

PGMMODC1 Supported Modbus Function Codes:

Command	Function code
Read Holding Registers	03
Read Input Registers	04
Write Single Register	06
Diagnostics	08
Write Multiple Registers	16

The Function Code defines the command that the slave device is to execute, such as read data, accept data, report status. Some function codes have subfunction codes.

The Data defines addresses in the device’s memory map for read functions, contains data values to be written into the device’s memory, or contains other information needed to carry out the function requested.

The Error Check is a 16-bit numeric value representing the Cyclic Redundancy Check (CRC).

Maximum number of registers which can be read or written at once:

For a read command, the limit is 8 registers at a baud rate up to 38,400 bps, 16 registers @ 57,800 bps and 32 registers @ 115,200 bps.

For a write command, the limit is 123 registers at baud rates up to 115,200 bps.

PGMMODC1 modbus parameter settings

Automatic Baudrate Detection:

Can be configured YES or **NO**

Supported baudrates:

2400, 4800, 9600, **19.2k**, 38.4k, 57.6k, 115.2k bps

Parity Mode:

Even, Odd or None parity

Stop Bits:

1 or 2 stop bits

Response delay:

0...1000 ms (**0 ms = default**)

Modbus slave addressing range:

1 - 247 (**247 = default address**)

Modbus Parameter Storage:

Saved in non-volatile memory in the PGMMODC1 device

(Factory Default Values are marked in **bold**)

AFCM Configuration Parameter List

Category	Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values
GENERAL	DEVICE NUMBER	0	0	1	RO	UNSIGNED INTEGER	Defines the actual device type	AFCM = 16930 (0xAFCM)
GENERAL	DEVICE VERSION	1	1	1	RO	UNSIGNED INTEGER	Product version	0
GENERAL	PASSWORD	2	2	1	R/W	UNSIGNED INTEGER	Password for entering configuration menu	Range: 0...9999
INPUT	INPUT TYPE	3	3	1	R/W	UNSIGNED INTEGER	Selected input type (Voltage, Current, Resistance, Potentiometer, Temperature)	TEMP = 0 POTM = 1 LINR = 2 CURR = 3 VOLT = 4
INPUT	INPUT VOLTAGE RANGE	4	4	1	R/W	UNSIGNED INTEGER	Fixed input range for voltage measurements	0...1 V = 0 0.2...1 V = 1 0...2.5 V = 2 0.5...2.5 V = 3 0...5 V = 4 1...5 V = 5 0...10 V = 6 2...10 V = 7
INPUT	INPUT CURRENT RANGE	5	5	1	R/W	UNSIGNED INTEGER	Fixed input range for current measurements	0...20 mA = 0 4...20 mA = 1
INPUT	CONNECTION TYPE	6	6	1	R/W	UNSIGNED INTEGER	Sensor connection type for RTD / resistance measurements	2-wire = 0 3-wire = 1 4-wire = 2
INPUT	LIN RES LOW	7	7	1	R/W	UNSIGNED INTEGER	Input range low for Linear resistance measurements	Range: 0...9998
INPUT	LIN RES HIGH	8	8	1	R/W	UNSIGNED INTEGER	Input range high for Linear resistance measurements.	Range: 1...9999
INPUT	TEMP UNIT	9	9	1	R/W	UNSIGNED INTEGER	Temperature units	°C = 0 °F = 1
INPUT	TEMP SENSOR TYPE	10	10	1	R/W	UNSIGNED INTEGER	Temperature sensor type	TC = 0 Ni = 1 Pt = 2
INPUT	PT TYPE	11	11	1	R/W	UNSIGNED INTEGER	Pt value (Pt10, Pt20, Pt50...)	Pt10 = 0 Pt20 = 1 Pt50 = 2 Pt100 = 3 Pt200 = 4 Pt250 = 5 Pt300 = 6 Pt400 = 7 Pt500 = 8 Pt1000 = 9
INPUT	NI TYPE	12	12	1	R/W	UNSIGNED INTEGER	Ni value (Ni50, Ni100...)	Ni50 = 0 Ni100 = 1 Ni120 = 2 Ni1000 = 3
INPUT	TC TYPE	13	13	1	R/W	UNSIGNED INTEGER	Thermocouple type (TCB, TCK...)	TC type B = 0 TC type E = 1 TC type J = 2 TC type K = 3 TC type L = 4 TC type N = 5 TC type R = 6 TC type S = 7 TC type T = 8 TC type U = 9 TC type W3 = 10 TC type W5 = 11 TC type Lr = 12
DISPLAY	DISPLAY UNIT	14	14	1	R/W	UNSIGNED INTEGER	Units shown as display units for non-temperature input types	acc. to table 1
DISPLAY	DECIMAL POINT	15	15	1	R/W	UNSIGNED INTEGER	Decimal point place for display reading of non-temperature input types	XXXX = 0 X.XXX = 1 XX.XX = 2 XXX.X = 3
DISPLAY	DISPLAY LOW	16	16	1	R/W	INTEGER	Low display range for display reading of non-temperature input types.	Range: -1999...9999
DISPLAY	DISPLAY HIGH	17	17	1	R/W	INTEGER	High display range for display reading of non-temperature input types	Range: -1999...9999

OUTPUT	OUTPUT TYPE	18	18	1	R/W	UNSIGNED INTEGER	Output type: Programmable pulse is available for: Frequency < 500 Hz Pulses < 30,000 p/m < 1,800,000 p/hour < 43,200,000 p/day	DC 50% = 0 Prog Pulse = 1
OUTPUT	OUTPUT UNIT	19	19	1	R/W	UNSIGNED INTEGER	Output unit	Hz = 0 p/min = 1 p/hour = 2 p/day = 3
OUTPUT	FREQUENCY LOW / PULSE LOW	20	20	2	R/W	UNSIGNED INTEGER	Frequency output low value in mHz or 1/1000nds of pulses per min./hour/day	Range with frequency selected: 0...25000000 Range with p/min. selected: 60...30000000 Range with p/hour selected: 3600...30000000 Range with p/day selected:86400...30000000
OUTPUT	FREQUENCY HIGH / PULSE HIGH	21	22	2	R/W	UNSIGNED INTEGER	Frequency output high value in mHz or 1/1000nds of pulses per min./hour/day	Range with frequency selected: 0...25000000 Range with p/min. selected: 60...30000000 Range with p/hour selected: 3600...30000000 Range with p/day selected:86400...30000000
OUTPUT	CUTOFF FREQUENCY / PULSE	22	24	2	R/W	UNSIGNED INTEGER	Cutoff frequency in mHz or 1/1000nds of pulses per min./hour/day	Range with frequency selected: 0...25000000 Range with p/min. selected: 60...30000000 Range with p/hour selected: 3600...30000000 Range with p/day selected:86400...30000000
OUTPUT	PULSE TIME	23	26	1	R/W	UNSIGNED INTEGER	Pulse length in ms, must be set less than 0.9 x (1 / Fmax)	Range: 1...1000
OUTPUT	INDICATE ERROR	24	27	1	R/W	UNSIGNED INTEGER	Use a specific frequency to indicate errors	NO = 0 YES = 1
OUTPUT	ERROR FREQUENCY	25	28	2	R/W	UNSIGNED INTEGER	Frequency to indicate an error in mHz or 1/1000nds of pulses per min./hour/day	Range with frequency selected: 0...26250000 Range with pulse selected: 0...31500000
OUTPUT	RESPONSE TIME	26	30	1	R/W	UNSIGNED INTEGER	Response time in 1/10 s	Range for non-temperature inputs: 4...600 (0.4...60 s) Range for temperature inputs: 10...600 (1...60 s)
OUTPUT	OUTPUT LOW	27	31	2	R/W	INTEGER	Specific output value low. Dependant of selected input. For temperature types value is 1/10°.	Range equals the measurement range for the selected sensor type and must be lower than OUTPUT HIGH
OUTPUT	OUTPUT HIGH	28	33	2	R/W	INTEGER	Specific output value high. Dependant of selected input. For temperature types value is 1/10°.	Range equals the measurement range for the selected sensor type and must be higher than OUTPUT LOW
DISPLAY	DISPLAY CONTRAST	29	35	1	R/W	UNSIGNED INTEGER	Contrast in the LCD display	Range: 0...9
DISPLAY	DISPLAY BACKLIGHT	30	36	1	R/W	UNSIGNED INTEGER	Backlight intensity in LCD	Range: 0...9
DISPLAY	TAG TEXT	31	37	3	R/W	ASCII CHAR	Tag of the device (6 characters)	Range: ASCII values from 32 to 90 (' ' to 'Z').
DISPLAY	LINE 3 FUNCTION	32	40	1	R/W	UNSIGNED INTEGER	Information shown in line 3 of display in monitor mode (normal mode). Choose between the output frequency value or the configured tag.	Output value = 0 TAG = 1
INPUT	USE CALIB	33	41	1	R/W	UNSIGNED INTEGER	Use the applied calibration values	NO = 0 YES = 1
GENERAL	ENABLE PASSWORD	34	42	1	R/W	UNSIGNED INTEGER	Password protect entry to configuration menu	NO = 0 YES = 1
INPUT	CALIB RANGE LOW	35	43	2	R/W	FLOAT	Actual process value for low calibration point in either display values or 1/10 °C	For non-temperature input types range is DISPLAY LOW...DISPLAY HIGH For temperature input types the range equals the measurement range for the selected sensor type
INPUT	CALIB RANGE HIGH	36	45	2	R/W	FLOAT	Actual process value for high calibration point in either display values or 1/10 °C	As CALIB RANGE LOW
INPUT	CALIB POINT LOW	37	47	2	R/W	FLOAT	Measured process value for low calibration point in either display values or 1/10 °C. (Must be copied from PROCESS DATA)	As CALIB RANGE LOW
INPUT	CALIB POINT HIGH	38	49	2	R/W	FLOAT	Measured process value for high calibration point in either display values or 1/10 °C (Must be copied from PROCESS DATA)	As CALIB RANGE LOW

GENERAL	HELP TEXT LANGUAGE	39	53	1	R/W	UNSIGNED INTEGER	Language for the help texts shown in display	UK = 0 DK = 1 DE = 2 FR = 3 SE = 4 IT = 5 ES = 6
GENERAL	CHECKSUM	100	100	1	RO	UNSIGNED INTEGER	CRC16 checksum of the configuration	Range 0...65536
GENERAL	Configuration counter	101	101	1	RO	UNSIGNED INTEGER	This counter will count the number of times the configuration has been changed. The counter is reset on power-up	Range 0...65536

Table 1: Display units

0	°C	10	mils	20	in/s	30	kHz	40	MPa	50	GW	60	mV	70	gal/h
1	°F	11	yd	21	ips	31	Hz	41	kPa	51	MW	61	Ω	71	t/h
2	K	12	m ³	22	ft/s	32	p/min	42	hPa	52	kW	62	S	72	mol
3	%	13	L	23	in/min	33	p/h	43	bar	53	hp	63	μS	73	pH
4	m	14	s	24	ft/min	34	p/day	44	mbar	54	A	64	m ³ /min	74	[blank]
5	cm	15	min	25	in/h	35	t	45	kJ	55	kA	65	m ³ /h		
6	mm	16	m/s	26	ft/h	36	kg	46	Wh	56	mA	66	l/s		
7	μm	17	mm/s	27	m/s ²	37	g	47	MWh	57	μA	67	l/min		
8	Ft	18	m/min	28	mm/s ²	38	N	48	kWh	58	V	68	l/h		
9	in	19	m/h	29	rpm	39	Pa	49	W	59	kV	69	gal/min		

AFCM Input Types and Ranges

Input type	Min. value	Max. value	Standard
mA	0 mA	20 mA	-
V	0 V	10 V	-
Pt10...Pt1000	-200°C	+850°C	IEC 60751
Ni50...Ni1000	-200°C	+250°C	DIN 43760
Lin. R	0 Ω	10000 Ω	-
Potentiometer	10 Ω	100 kΩ	-
TC B	0°C	+1820°C	IEC 60584-1
TC E	-100°C	+1000°C	IEC 60584-1
TC J	-100°C	+1200°C	IEC 60584-1
TC K	-180°C	+1372°C	IEC 60584-1
TC L	-200°C	+900°C	DIN 43710
TC N	-180°C	+1300°C	IEC 60584-1
TC R	-50°C	+1760°C	IEC 60584-1
TC S	-50°C	+1760°C	IEC 60584-1
TC T	-200°C	+400°C	IEC 60584-1
TC U	-200°C	+600°C	DIN 43710
TC W3	0°C	+2300°C	ASTM E988-90
TC W5	0°C	+2300°C	ASTM E988-90
TC LR	-200°C	+800°C	GOST 3044-84

AFCM Process Parameter List

Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values
DISPLAY VALUE	0	1000	2	RO	INTEGER	The measured value in 1/10 of °C/°F for temperature Input types, or the scaled display value for non-temperature input types (INTEGER version of PRIMARY VALUE)	Range for non-temperature input types: DISPLAY LOW...DISPLAY HIGH Range for temperature input types: equals the measurement range for the selected sensor type
PERCENT PV	1	1002	1	RO	INTEGER	The relative input value as 1/100 of % calculated from PRIMARY VALUE. For temperature input types 0...100% corresponds the selected temperature range (OUTPUT LOW...OUTPUT HIGH) For non-temperature input types 0...100% corresponds the selected fixed range (e.g. 4...20 mA)	Range: 0...9999 (e.g. 7898 = 78.98%)
MEASURE STATUS	2	1003	1	RO	INTEGER	The actual measurement status	OUTPUT UNDERRANGE: bit 0=1 OUTPUT OVERRANGE: bit 1= 1 OUTPUT LOW LIMITED: bit 2= 1 OUTPUT HIGH LIMITED: bit 3= 1 INPUT UNDERRANGE: bit 4= 1 INPUT OVERRANGE: bit 5= 1 SENSOR SHORTED: bit 6= 1 SENSOR BROKEN: bit 7= 1
ERROR STATUS	3	1004	1	RO	INTEGER	The actual error status (Device errors)	AD COMM. ERROR bit 0= 1 CJC ERROR bit 1= 1 RAM ERROR bit 2= 1 EEP ERROR bit 3= 1 FLASH ERROR bit 4= 1 NOT CALIBRATED bit 5= 1 BAD OUTPUT bit 6= 1 NO OUTPUT bit 7= 1 OUTPUT SUPPLY ERROR bit 8= 1 INPUT SUPPLY ERROR bit 9= 1
PRIMARY RAW VALUE	5	1005	2	RO	FLOAT	The measured value in 1/10 of °C/°F for temperature Input types, or the scaled display value for non-temperature input types, NOT PROCESS CALIBRATED.	Range for non-temperature input types: DISPLAY LOW...DISPLAY HIGH Range for temperature input types equals the measurement range for the selected sensor type
PRIMARY VALUE	6	1007	2	R/W	FLOAT	The measured value in 1/10 of °C/°F for temperature Input types, or the scaled display value for non-temperature input types	Range for non-temperature input types: DISPLAY LOW...DISPLAY HIGH Range for temperature input types equals the measurement range for the selected sensor type
RELATIVE PV	7	1009	2	RO	FLOAT	The relative input value calculated from PRIMARY VALUE. For temperature input types relative to selected temperature range (OUTPUT LOW...OUTPUT HIGH) For non-temperature input types relative to selected fixed range (e.g. 4...20 mA)	Range: 0.0...1.0
OUTPUT FREQUENCY	8	1011	2	R/W	FLOAT	Calculated output value in mHz or 1/1000nds of pulses per min./hour/day	Range with frequency selected: 0...25000000 (0...25000 Hz) Range with pulse selected: 0...30000000
MEASURE CONTROL	9	1013	1	R/W	INTEGER	Measurement control. By disabling update of certain READ/WRITE parameters PRIMARY VALUE, OUTPUT VALUE or RELAY STATUS, these can be simulated by writing values. All bits are cleared when TIMEOUT COUNTER reaches 0	RESTART SCAN bit 0 = 1 RESTART WITH NEW CONFIGURATION bit 1 = 1 DISABLE PRIMARY VALUE UPDATE bit 2 = 1 DISABLE OUTPUT VALUE UPDATE bit 3 = 1 NOT USED bit 4 = 1 DISABLE CONFIGURATION CHECK bit 5 = 1 GET NEW CONFIGURATION bit 6 = 1
TIMEOUT COUNTER	10	1014	1	R/W	INTEGER	Time out counter, decrements every 0.075 second. When reaching 0 (if not refreshed) all bits in MEASURE CONTROL will be cleared.	Range: 0...255
INTERNAL TEMPERATURE	11	1015	1	RO	INTEGER	Internal measured or connector temperature in 1/10 of °C/°F	Range: -200...800 (-20.0...80.0 °C) or -40...1760 (-4.0...176.0 °F)

PGMMODC1 modbus Configuration Parameter List

Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values
ENABLE MODBUS	1	3000	1	R/W	INTEGER	Enable Modbus communication. If disabled, PGMMODC1 ignores all frames sent from the Modbus master and the only way to re-enable Modbus communication is by using the PGMMODC1 menu.	NO = 0 YES = 1
BAUDRATE	2	3001	1	R/W	INTEGER	The baud value used for Modbus communication	2400 BAUD = 0 4800 BAUD = 1 9600 BAUD = 2 19200 BAUD = 3 38400 BAUD = 4 57600 BAUD = 5 115200 BAUD = 6
ENABLE AUTOBAUD	3	3002	1	R/W	INTEGER	Enable automatic baudrate detection. If enabled, PGMMODC1 determines the baudrate automatically by listening to frames sent on the Modbus line.	NO = 0 YES = 1
PARITY	4	3003	1	R/W	INTEGER	Configures parity check on Modbus frames	NONE = 0 EVEN PARITY = 1 ODD PARITY = 2
STOPBITS	5	3004	1	R/W	INTEGER	Configures the number of stopbits in Modbus frames	ONE STOPBIT = 1 TWO STOPBITS = 2
ADDRESS	6	3005	1	R/W	INTEGER	Configures the Modbus address of the PGMMODC1 (Address 0 is broadcast address)	Range: 1...247
RESPONSE DELAY	7	3006	1	R/W	INTEGER	Configures minimum delay for Modbus response in ms	Range: 0...1000

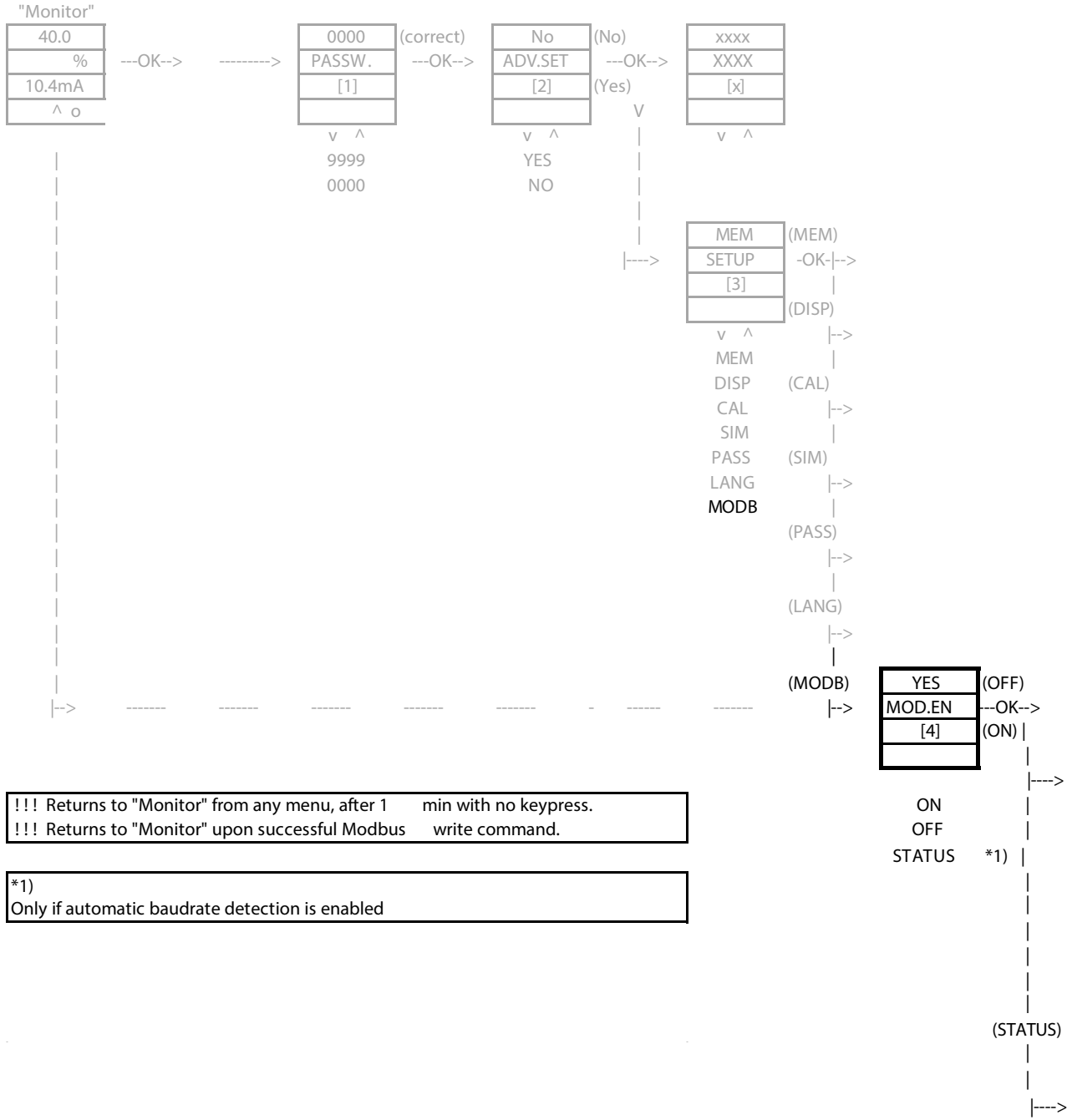
PGMMODC1 Additional Parameter List

Parameter Name:	Nr.	Register Address:	Register Size:	Read/Write:	Type:	Description:	Values
ROTATE DEVICE	1	3100	1	R/W	INTEGER	Enables the display and key buttons to be used normally when the host device is mounted upside down	NO = 0 YES = 1

PGMMODC1 Modbus Status Parameter List

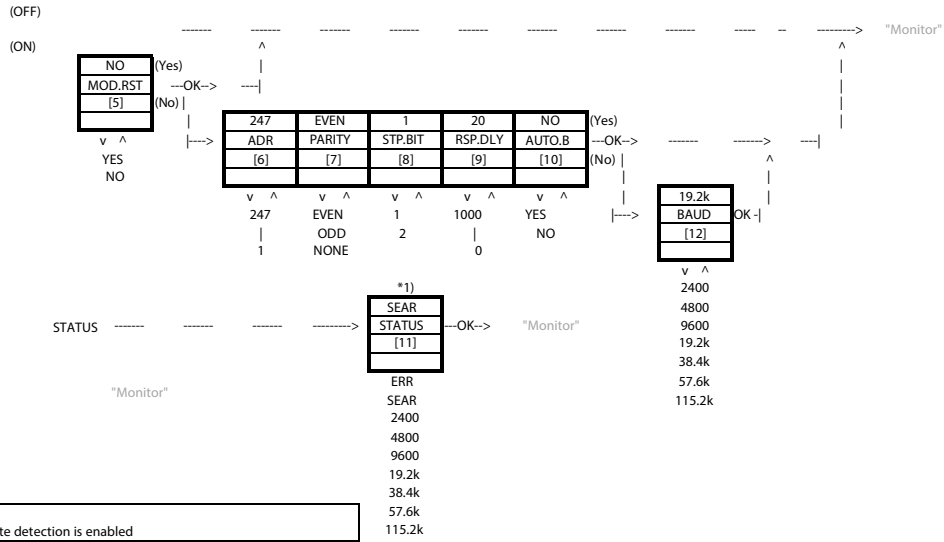
Parameter Name	No.	Register Address	Register Size	Read/Write	Type	Description	Values
AUTOBAUD STATUS	1	4000	1	RO	INTEGER	Actual state of automatic baudrate detection	2400 BAUD = 0 4800 BAUD = 1 9600 BAUD = 2 19200 BAUD = 3 38400 BAUD = 4 57600 BAUD = 5 115200 BAUD = 6 SEARCHING = 7 ERROR = 8
IDENTIFY DEVICE	2	4001	1	R/W	INTEGER	Enables the device to flash the LCD background with appr. 4 Hz. Value will automatically return to NO if not written within 10 seconds!	NO = 0 YES = 1
MAXIMUM READ REGISTERS	3	4002	1	RO	INTEGER	Maximum allowed number of registers that can be read in one command, with the given/detected baudrate	Range: 8...32

PGMMODC1 Modbus settings - routing diagram



SCROLLING HELP TEXTS:

- [1] Set correct password
- [2] Enter advanced setup menu?
- [3] Enter Language setup
- Enter Password setup
- Enter Simulation mode
- Perform Process calibration
- Enter Display setup
- Perform Memory operations
- Enter Modbus setup**
- Enter Rotation setup
- [4] Enable modbus communication
- Disable Modbus communication
- See automatic baudrate detection status
- [5] Reset Modbus to default?
- [6] Select Modbus slave address
- [7] Select parity for Modbus
- [8] Select number of stop bits
- [9] Select response delay in ms
- [10] Enable automatic baudrate detection
- [11] Modbus baudrate not detected
- Searching for Modbus baudrate
- Modbus baudrate detected
- [12] Select baudrate in bps



Default settings:

- Baud rate: 19.2 kbps
- Parity mode: Even
- Stop bit: 1
- Address: 247
- Reponse delay: 0 ms

Ordering information

DESCRIPTION	PART NUMBER
Communication/Programming Module Interface	PGMMODC1