



# INSTRUCTION MANUAL

## SIL 2 Quadruple Repeater Power Supply DIN-Rail and Termination Board Model D5212Q



## Characteristics

### General Description:

The quadruple channel Repeater Power Supply D5212Q provides a fully floating DC supply for energizing conventional 2-wire 0/4-20 mA transmitters located in Hazardous Area, and repeats the current in Safe Area to drive a load in applications requiring SIL 2 level (according to IEC 61508:2010) in safety related systems for high risk industries.

### Function:

4 channels I.S. analog input for 2-wire loop powered transmitters (or separately powered inputs, only for channels 1 and 2), providing isolation between input, output and supply, and current source output signals. The module is fully configurable to achieve any desired input/output combination: any number of outputs can be independently linked to each input. Output function can be configured as: adder, subtractor, low/high selector. An optically coupled open-drain alarm output with user-settable trip point is also provided. Modbus RTU RS-485 output is available on Bus connector to interface digital device.

### Configurability:

Totally software configurable (no jumpers or switches), by PC via USB with PPC5092 adapter and related configurator software or by RS485 Modbus output, in order to choose: input signal range, linear or reverse output signal, alarm trip point, low, high, window or fault repeater alarm mode, hysteresis, delay time.

Mounting on standard DIN-Rail, with or without Power Bus, or on customized Termination Boards, in Safe Area or in Zone 2.

## Technical Data

### Supply:

24 Vdc nom (21.5 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  Vpp, 2 A time lag fuse internally protected.

**Current consumption @ 24 V:** 200 mA max. with 20 mA input/output for 4 channels.

**Power dissipation:** 2.75 W max. with 24 V supply voltage and 20 mA input/output for 4 channels.

### Isolation (Test Voltage):

I.S. In/Out 1.5 KV; I.S. In/Supply 1.5 KV; Out/Supply 500 V; I.S. In/Alarm 1.5 KV; Supply/Alarm 500 V; Out/Alarm 500 V.

### Input:

0/4 to 20 mA (2 wire Tx current limited at  $\approx 25$  mA) and separately powered inputs (only for channels 1 and 2).

#### Transmitter line voltage:

14.5 V typical at 20 mA with max. 20 mVrms ripple, 14.0 V minimum.

**Integration time:** 500 ms.

**Resolution / Visualization:** 1  $\mu$ A.

**Fault:** Out-of-range (burnout) fault detection can be enabled or disabled. Any analog output can be programmed to detect fault condition forcing downscale or highscale. Alarm can be programmed to detect fault condition. Fault conditions are also signalled via Power Bus or Termination Board and by a red LED on the front panel (one for each channel).

**Out-of-range:** low and high separated trip point values are fully programmable.

### Output:

0/4 to 20 mA, on max. 300  $\Omega$  load source mode, current limited at about 25 mA.

**Response time:** 100 ms max. (10 to 90 % step change).

**Output ripple:**  $\leq 20$  mVrms on 250  $\Omega$ .

**Modbus Output:** for parameter configuration and burnout / fault indication. Modbus RTU protocol up to 57.6 Kbit/s with RS-485 connection on Power Bus connector.

### Alarm:

**Trip point range:** within rated limits of the input sensors.

**Output:** voltage free SPST photoMOS: 100 mA, 60 Vdc ( $\leq 1$  V voltage drop).

### Performance:

Ref. Conditions 24 V supply, 250  $\Omega$  loads, 23  $\pm 1$  °C ambient temperature.

**Calibration accuracy:**  $\leq \pm 0.05$  % of full scale on inputs and outputs.

**Linearity error:**  $\leq \pm 0.05$  % of full scale on inputs and outputs.

**Supply voltage influence:**  $\leq \pm 0.02$  % of full scale for a min to max supply change.

**Load influence:**  $\leq \pm 0.02$  % of full scale for a 0 to 100 % load resistance change.

**Temperature influence:**  $\leq \pm 0.01$  % of input full scale and  $\leq \pm 0.005$  % of output full scale for a 1 °C change.

### Compatibility:

CE mark compliant, conforms to Directives:

2014/34/EU ATEX, 2014/30/EU EMC, 2014/35/EU LVD, 2011/65/EU RoHS.

### Environmental conditions:

**Operating:** temperature limits -40 to + 70 °C, relative humidity 95 %, up to 55 °C.

**Storage:** temperature limits -45 to + 80 °C.

**Max altitude:** 2000 m a.s.l.

### Safety Description:



**ATEX:** II 3(1)G Ex ec [ia Ga] IIC T4 Gc, II (1)D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I; **IECEx:** Ex ec [ia Ga] IIC T4 Gc, [Ex ia Da] IIIC, [Ex ia Ma] I,

**UL:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, AEx nA [ia Ga] IIC T4 Gc

**C-UL:** NI / I / 2 / ABCD / T4, AIS / I, II, III / 1 / ABCDEFG, Ex nA [ia Ga] IIC T4 Gc X

**EAC-EX:** 2Ex nA [ia Ga] IIC T4 Gc X, [Ex ia Da] IIIC, [Ex ia Ma] I

**CCC:** Ex ec [ia Ga] IIC T4 Gc; [Ex ia Ga] IIC; [Ex ia Da] IIIC

associated apparatus and non-sparking electrical equipment.

Uo/Voc = 24.1 V, Io/Isc = 86 mA, Po/Po = 516 mW at terminals 13-14, 15-16, 17-18, 19-20.

Uo/Voc = 1.1 V, Io/Isc = 56 mA, Po/Po = 16 mW at terminals 21-22, 23-24.

Ui/Vmax = 30 V at terminals 21-22, 23-24.

Ii/Imax = 128 mA at terminals 21-22, 23-24.

Ci = 2.1 nF, Li = 0 nH at terminals 21-22, 23-24.

Um = 250 Vrms, -40 °C  $\leq$  Ta  $\leq$  70 °C.

### Approvals:

DEMKO 18 ATEX 2017X conforms to EN60079-0, EN60079-7, EN60079-11; IECEx ULD 18.0013X conforms to IEC60079-0, IEC60079-7, IEC60079-11.

UL & C-UL E222308 conforms to UL913, UL 60079-0, UL60079-11, UL60079-15,

UL 121201 for UL and CSA C22.2 60079-0, CSA C22.2 60079-11, CSA C22.2 60079-15 CSA C22.2 No. 213 for C-UL.

RU C-IT.EX01.B.00018/19 conforms to GOST 31610.0, GOST 31610.11, GOST 31610.15.

CCC 2020322316000978 conforms to GB/T 3836.1, GB/T 3836.3, GB/T 3834.4

DNV No. TAA00001U0 and KR No.MIL20769-EL002 for maritime applications.

SIL 2 conforms to IEC61508:2010 Ed.2.

### Mounting:

EN/IEC60715 TH 35 DIN-Rail, with or without Power Bus or on customized Termination Board.

**Weight:** about 120 g.

**Connection:** by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm<sup>2</sup>.

**Location:** Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4 or Class I, Division 2, Group A,B,C,D, T4 or Class I, Zone 2, Group IIC, T4 installation.

**Protection class:** IP 20.

**Dimensions:** Width 22.5 mm, Depth 123 mm, Height 120 mm.

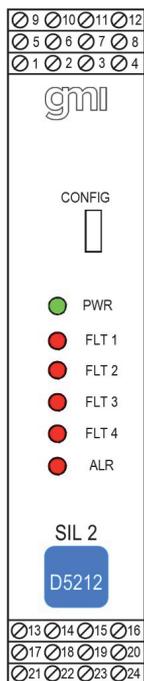
## Ordering Information

Model:	D5212	
4 channels		Q

Power Bus and DIN-Rail accessories:  
 Connector JDFT050      Cover and fix MCHP196  
 Terminal block male MOR017      Terminal block female MOR022

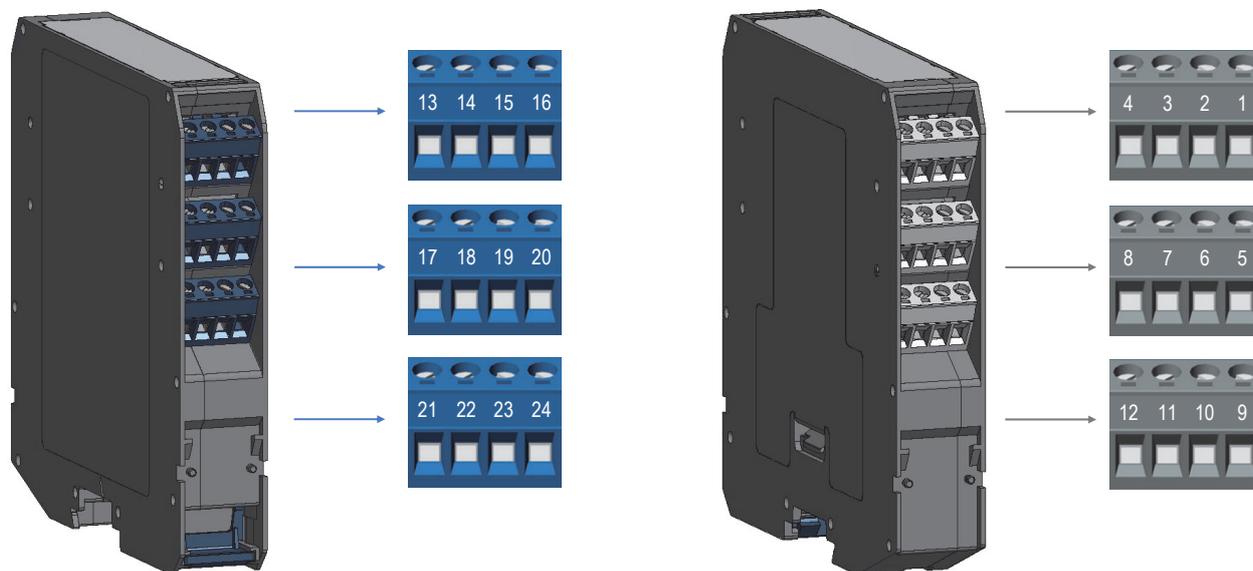
Operating parameters are programmable from PC by the GM Pocket Portable Adapter PPC5092 via USB serial line and SWC5090 Configurator software.

## Front Panel and Features



- Input from Zone 0 (Zone 20) / Division 1, installation in Zone 2 / Division 2.
- Quadruple channels for 2 wires Transmitters or externally powered transmitters.
- 0/4-20 mA Input, Output Signals.
- Input and Output short circuit proof.
- Source current Outputs.
- Modbus RTU RS-485 Output.
- Fully programmable operating parameters.
- High Accuracy,  $\mu$ P controlled A/D converter.
- Three port isolation, Input / Output / Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4, EN61326-1, EN61326-3-1 for safety system.
- ATEX, IECEx, UL & C-UL, EAC Ex, CCC Certifications
- Type Approval Certificate DNV and KR for maritime applications.
- High Density, four channels per unit.
- Out of range (Burnout) fault detection
- Open-drain alarm output with user-settable trip point
- Simplified installation using standard DIN-Rail and plug-in terminal blocks or customized Termination Boards.
- 250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

## Terminal block connections



### HAZARDOUS AREA

13	+ Input for 2 Wire Transmitters Ch 1
14	- Input for 2 Wire Transmitters Ch 1
15	+ Input for 2 Wire Transmitters Ch 2
16	- Input for 2 Wire Transmitters Ch 2
17	+ Input for 2 Wire Transmitters Ch 3
18	- Input for 2 Wire Transmitters Ch 3
19	+ Input for 2 Wire Transmitters Ch 4
20	- Input for 2 Wire Transmitters Ch 4
21	+ Input for External Powered Transmitters Ch 1
22	- Input for External Powered Transmitters Ch 1
23	+ Input for External Powered Transmitters Ch 2
24	- Input for External Powered Transmitters Ch 2

### SAFE AREA

1	+ Output Ch 1
2	- Output Ch 1
3	+ Output Ch 2
4	- Output Ch 2
5	+ Output Ch 3
6	- Output Ch 3
7	+ Output Ch 4
8	- Output Ch 4
9	+ Power Supply 24 Vdc
10	- Power Supply 24 Vdc
11	Alarm out
12	Alarm out

## Parameters Table

In the system safety analysis, always check the Hazardous Area/Hazardous Locations devices to conform with the related system documentation, if the device is Intrinsically Safe check its suitability for the Hazardous Area/Hazardous Locations and group encountered and that its maximum allowable voltage, current, power ( $U_i/V_{max}$ ,  $I_i/I_{max}$ ,  $P_i/P_i$ ) are not exceeded by the safety parameters ( $U_0/V_{oc}$ ,  $I_0/I_{sc}$ ,  $P_0/P_0$ ) of the D5212Q Associated Apparatus connected to it. Also consider the maximum operating temperature of the field device, check that added connecting cable and field device capacitance and inductance do not exceed the limits ( $C_0/C_a$ ,  $L_0/L_a$ ,  $L_0/R_0$ ) given in the Associated Apparatus parameters for the effective group. See parameters indicated in the table below:

D5212Q Terminals	D5212Q Associated Apparatus Parameters		Must be	Hazardous Area/ Hazardous Locations Device Parameters		
13-14, 15-16 17-18, 19-20	$U_0 / V_{oc} = 24.1 \text{ V}$		$\leq$	$U_i / V_{max}$		
21-22, 23-24	$U_0 / V_{oc} = 1.1 \text{ V}$					
13-14, 15-16 17-18, 19-20	$I_0 / I_{sc} = 86 \text{ mA}$		$\leq$	$I_i / I_{max}$		
21-22, 23-24	$I_0 / I_{sc} = 56 \text{ mA}$					
13-14, 15-16 17-18, 19-20	$P_0 / P_0 = 516 \text{ mW}$		$\leq$	$P_i / P_i$		
21-22, 23-24	$P_0 / P_0 = 16 \text{ mW}$					
D5212Q Terminals	D5212Q Associated Apparatus Parameters Cenelec (US)		Must be	Hazardous Area/ Hazardous Locations Device + Cable Parameters		
13-14, 15-16 17-18, 19-20	IIC	$C_0 / C_a = 0.121 \mu\text{F}$	$\geq$	$C_i / C_i \text{ device} + C \text{ cable}$		
	IIB	$C_0 / C_a = 0.917 \mu\text{F}$				
	IIA	$C_0 / C_a = 3.307 \mu\text{F}$				
	I	$C_0 / C_a = 5.197 \mu\text{F}$				
IIIC	$C_0 / C_a = 0.917 \mu\text{F}$					
21-22, 23-24	IIC	$C_0 / C_a = 99 \mu\text{F}$				
	IIB	$C_0 / C_a = 999 \mu\text{F}$				
	IIA	$C_0 / C_a = 999 \mu\text{F}$				
	I	$C_0 / C_a = 999 \mu\text{F}$				
	IIIC	$C_0 / C_a = 999 \mu\text{F}$				
13-14, 15-16 17-18, 19-20	IIC	$L_0 / L_a = 4.85 \text{ mH}$			$\geq$	$L_i / L_i \text{ device} + L \text{ cable}$
	IIB	$L_0 / L_a = 19.43 \text{ mH}$				
	IIA	$L_0 / L_a = 38.86 \text{ mH}$				
	I	$L_0 / L_a = 63.76 \text{ mH}$				
	IIIC	$L_0 / L_a = 19.43 \text{ mH}$				
21-22, 23-24	IIC	$L_0 / L_a = 11.63 \text{ mH}$				
	IIB	$L_0 / L_a = 46.54 \text{ mH}$				
	IIA	$L_0 / L_a = 93.09 \text{ mH}$				
	I	$L_0 / L_a = 152.73 \text{ mH}$				
	IIIC	$L_0 / L_a = 46.54 \text{ mH}$				
13-14, 15-16 17-18, 19-20	IIC	$L_0 / R_0 = 68.9 \mu\text{H}/\Omega$	$\geq$	$L_i / R_i \text{ device and } L \text{ cable} / R \text{ cable}$		
	IIB	$L_0 / R_0 = 275.9 \mu\text{H}/\Omega$				
	IIA	$L_0 / R_0 = 551.9 \mu\text{H}/\Omega$				
	I	$L_0 / R_0 = 905.6 \mu\text{H}/\Omega$				
	IIIC	$L_0 / R_0 = 275.9 \mu\text{H}/\Omega$				
21-22, 23-24	IIC	$L_0 / R_0 = 2339 \mu\text{H}/\Omega$				
	IIB	$L_0 / R_0 = 9356.1 \mu\text{H}/\Omega$				
	IIA	$L_0 / R_0 = 18712.2 \mu\text{H}/\Omega$				
	I	$L_0 / R_0 = 30699.7 \mu\text{H}/\Omega$				
	IIIC	$L_0 / R_0 = 9356.1 \mu\text{H}/\Omega$				

When used with separate powered intrinsically safe devices, check that maximum allowable voltage, current ( $U_i/V_{max}$ ,  $I_i/I_{max}$ ) of the D5212Q Associated Apparatus are not exceeded by the safety parameters ( $U_0/V_{oc}$ ,  $I_0/I_{sc}$ ) of the Intrinsically Safe device, indicated in the table below:

D5212Q Terminals	D5212Q Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
21-22, 23-24	$U_i / V_{max} = 30 \text{ V}$	$\geq$	$U_0 / V_{oc}$
21-22, 23-24	$I_i / I_{max} = 128 \text{ mA}$	$\geq$	$I_0 / I_{sc}$
21-22, 23-24	$C_i = 2.1 \text{ nF}$ , $L_i = 0 \text{ nH}$		

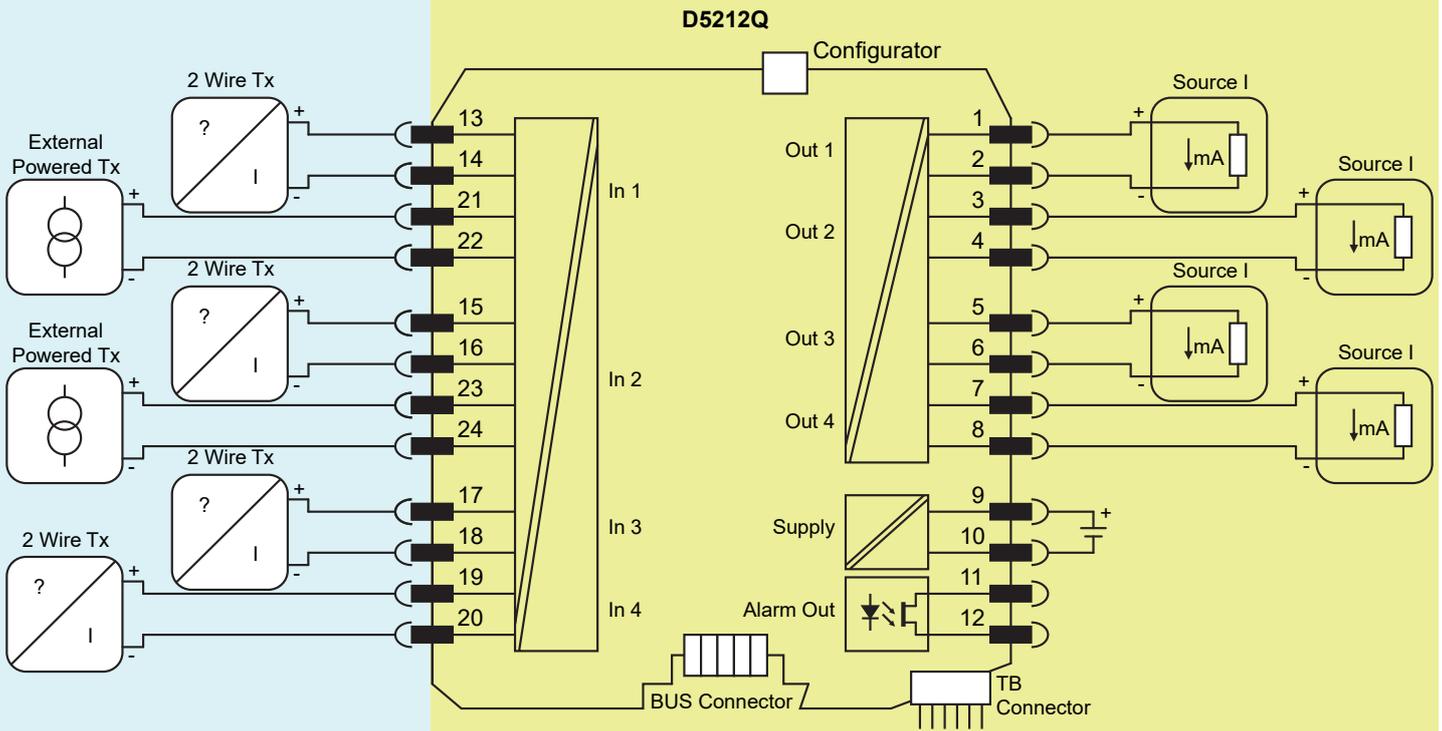
For installations in which both the  $C_i$  and  $L_i$  of the Intrinsically Safe apparatus exceed 1 % of the  $C_0$  and  $L_0$  parameters of the Associated Apparatus (excluding the cable), then 50 % of  $C_0$  and  $L_0$  parameters are applicable and shall not be exceeded (50 % of the  $C_0$  and  $L_0$  become the limits which must include the cable such that  $C_i \text{ device} + C \text{ cable} \leq 50 \% \text{ of } C_0$  and  $L_i \text{ device} + L \text{ cable} \leq 50 \% \text{ of } L_0$ ). The reduced capacitance of the external circuit (including cable) shall not be greater than 1  $\mu\text{F}$  for Groups I, IIA, IIB and 600 nF for Group IIC.

If the cable parameters are unknown, the following values may be used: Capacitance 200pF per meter (60pF per foot), Inductance 1 $\mu\text{H}$  per meter (0.20 $\mu\text{H}$  per foot).

## Function Diagram

HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,  
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,  
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,  
CLASS I, ZONE 0, GROUP IIC

SAFE AREA, ZONE 2 GROUP IIC T4,  
NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2,  
GROUPS A, B, C, D T-Code T4, CLASS I, ZONE 2, GROUP IIC T4



## Warning

D5212 series is isolated Intrinsically Safe Associated Apparatus installed into standard EN/IEC60715 TH 35 DIN-Rail located in Safe Area or Zone 2, Group IIC, Temperature T4 Hazardous Area (according to EN/IEC60079-15) within the specified operating temperature limits  $T_{amb} -40$  to  $+70$  °C, and connected to equipment with a maximum limit for power supply  $U_m$  of 250 Vrms or Vdc.

Not to be connected to control equipment that uses or generates more than 250 Vrms or Vdc with respect to earth ground.

D5212 series must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/international installation standards (e.g. EN/IEC60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines)), following the established installation rules, particular care shall be given to segregation and clear identification of I.S. conductors from non I.S. ones.

De-energize power source (turn off power supply voltage) before plug or unplug the terminal blocks when installed in Hazardous Area unless area is known to be nonhazardous.

**Warning: substitution of components may impair Intrinsic Safety and suitability for Zone 2.**

**Explosion Hazard: to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing unless area is known to be nonhazardous.**

Failure to properly installation or use of the equipment may risk to damage the unit or severe personal injury.

The unit cannot be repaired by the end user and must be returned to the manufacturer or his authorized representative. Any unauthorized modification must be avoided.

## Operation

The quadruple channel Repeater Power Supply D5212Q provides a fully floating DC supply for energizing conventional 2-wire 0/4-20 mA transmitters located in Hazardous Area, and repeats the current in Safe Area to drive a load in applications requiring SIL 2 (according to IEC 61508:2010) in safety related systems for high risk industries.

4 channels I.S. analog input for 2-wire loop powered transmitters (or separately powered inputs, only for channels 1 and 2), providing isolation between input, output and supply, and current source output signals. The module is fully configurable to achieve any desired input/output combination: any number of outputs can be independently linked to each input.

Output function can be configured as: adder, subtractor, low/high selector. An optically coupled open-drain alarm output with user-settable trip point is also provided.

Modbus RTU RS-485 output is available on Bus connector to interface digital device.

Presence of supply power is displayed by a "POWER ON" green signaling LED; fault for each channel and alarm conditions are signaled by related red front panel LED.

## Installation

D5212 series is a quadruple repeater power supply housed in a plastic enclosure suitable for installation on EN/IEC60715 TH 35 DIN-Rail, with or without Power Bus or on customized Termination Board. D5212 series can be mounted with any orientation over the entire ambient temperature range.

Electrical connections are accommodated by polarized plug-in removable screw terminal blocks which can be plugged in/out into a powered unit without suffering or causing any damage **(for Zone 2 installations check the area to be nonhazardous before servicing)**. Connect only one individual conductor per each clamping point, use conductors up to 2.5 mm<sup>2</sup> (13 AWG) and a torque value of 0.5-0.6 Nm.

The wiring cables have to be proportionate in base to the current and the length of the cable.

On the section "Function Diagram" and enclosure side a block diagram identifies all connections.

Identify the function and location of each connection terminal using the wiring diagram on the corresponding section, as an example:

Connect 24 Vdc power supply positive at terminal "9" and negative at terminal "10".

Connect positive output of analog channel 1 (mA source mode) at terminal "1" and negative output (common to all channels) at "2" (channel 1).

For other channels connect terminals "3" and "4" for channel 2, terminals "5" and "6" for channel 3, "7" and "8" for channel 4.

Connect alarm output at terminals "11" and "12".

In case of a 2 wire input transmitter, connect the wires at terminal "13" for positive and "14" for negative (channel 1), or "15" for positive and "16" for negative (channel 2), or "17" for positive and "18" for negative (channel 3), or "19" for positive and "20" for negative (channel 4). Note that positive terminals of all channels are in common.

For separately powered transmitters, connect input signal at terminal "21" for positive and "22" for negative (channel 1), or "23" for positive and "24" for negative (channel 2). Note that negative terminals of all channels are in common.

Intrinsically Safe conductors must be identified and segregated from non I.S. and wired in accordance to the relevant national/international installation standards (e.g. EN/IEC60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines)), make sure that conductors are well isolated from each other and do not produce any unintentional connection. Isolation in accordance with EN/IEC 60079-11 clause 6.3.13 is not provided between separate intrinsically safe circuits. Isolation in accordance with EN/IEC 60079-11 clause 6.3.13 is provided between non-intrinsically safe circuits and intrinsically safe circuits.

Connect alarm transistors checking the load rating to be within the maximum rating (100 mA at 60 V ( $\leq 1.0$  V voltage drop)).

The enclosure provides, according to EN60529, an IP20 minimum degree of protection (or similar to NEMA Standard 250 type 1). The equipment shall only be used in an area of at least pollution degree 2, as defined in EN/IEC 60664-1. When installed in Zone 2, the unit shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with EN/IEC 60079-0. When installed in a Class I, Zone 2 Hazardous Location, the unit shall be mounted in a supplemental AEx or Ex enclosure that provides a degree of protection not less than IP54 in accordance with UL/CSA 60079-0. When installed in a Class I, Division 2 Hazardous Location, the unit shall be mounted in a supplemental enclosure that provides a degree of protection not less than IP54. The enclosure must have a door or cover accessible only by the use of a tool. The end user is responsible to ensure that the operating temperature of the module is not exceeded in the end use application.

Units must be protected against dirt, dust, extreme mechanical (e.g. vibration, impact and shock) and thermal stress, and casual contacts. If enclosure needs to be cleaned use only a cloth lightly moistened by a mixture of detergent in water.

**Electrostatic Hazard: to avoid electrostatic hazard, the enclosure of D5212 series must be cleaned only with a damp or antistatic cloth.**

Any penetration of cleaning liquid must be avoided to prevent damage to the unit. Any unauthorized card modification must be avoided.

D5212 series must be connected to SELV or PELV supplies.

All circuits connected to D5212 series must comply with the overvoltage category II (or better) according to EN/IEC60664-1.

## Start-up

Before powering the unit check that all wires are properly connected, particularly supply conductors and their polarity, input and output wires, also check that Intrinsically Safe conductors and cable trays are segregated (no direct contacts with other non I.S. conductors) and identified either by color coding, preferably blue, or by marking.

Check conductors for exposed wires that could touch each other causing dangerous unwanted shorts.

Turn on power, the "power on" green led must be lit, for 2 wire transmitter connection the supply voltage on each channel must be  $\geq 14$  V, output signal should be corresponding to the input from the transmitter, alarm LED should reflect the input variable condition with respect to trip points setting.

If possible change the transmitter output and check the corresponding Safe Area output.

## Configuration parameters:

The SWC5090 is able to continuously scan the module and display the real-time values on screen. Note that while the module is being monitored, configuration screens are disabled.

The display shows all the monitored parameters:

- Input: represents the value read from field.
- Output: represents the theoretical output value.
- Alarm status: is represented by a led, which is red when activated.
- Faults: is represented by a led, which is red when activated
- Graph: shows only the variable chosen from the monitored values box.

### INPUT:

#### Out of range:

- Low threshold: input value below which the fault is triggered
- High threshold: input value above which the fault is triggered

#### Tag:

- 16 alphanumerical characters

### OUTPUT:

#### Type:

- 0-20 mA Source
  - 4-20 mA Source
  - Custom Source
- all output parameters are fully customizable

**Downscale:** analog output downscale in normal working condition (range 0 to 24 mA)

**Upscale:** analog output upscale in normal working condition (range 0 to 24 mA)

**Under range:** analog output value in under range condition (range 0 to 24 mA)

**Over range:** analog output value in over range condition (range 0 to 24 mA)

**Fault output value:** analog output value in case of fault condition (range 0 to 24 mA)

**Fault in case of:** analog output is forced to "Fault Output Value" when input is out of configured range

**Advanced settings:** When the advanced settings button is clicked, the following settings box is shown.

**Output 1**

**Input A selector**

Input 1  Input 2  Input 3  Input 4

**Output operations :**

None  Sum

Maximum  Minimum

**Input B selector :**

Input 1  Input 2  Input 3  Input 4

#### Input A selector:

- Input 1: output represent Input1
- Input 2: output represent Input2
- Input 3: output represent Input3
- Input 4: output represent Input4

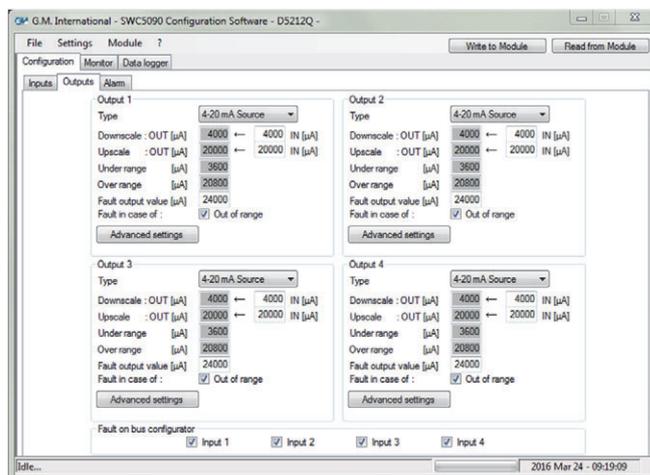
#### Output operations:

- None: output operations are disabled.
- Subtraction: analog output represents the subtraction of the two selected input channels.
- Sum: analog output represents the sum of the two selected input channels.
- Maximum: analog output represents the higher of the two selected input ch.
- Minimum: analog output represents the lower of the two selected input channels.

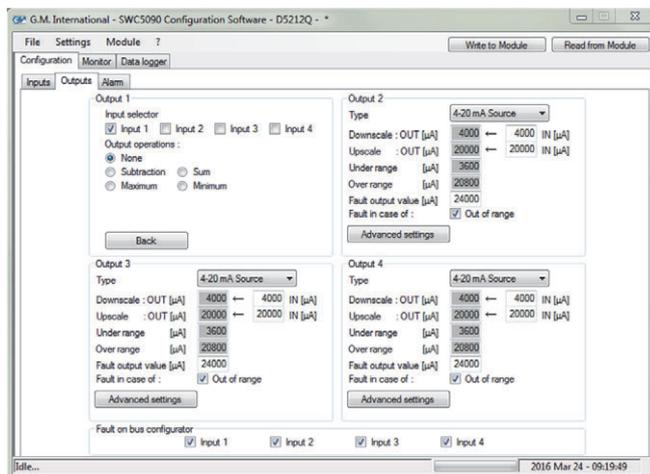
#### Input B selector: (it is shown when the output operations selected is not None)

- Input 1: represents the second operand used for the output operation.
- Input 2: represents the second operand used for the output operation.
- Input 3: represents the second operand used for the output operation.
- Input 4: represents the second operand used for the output operation.

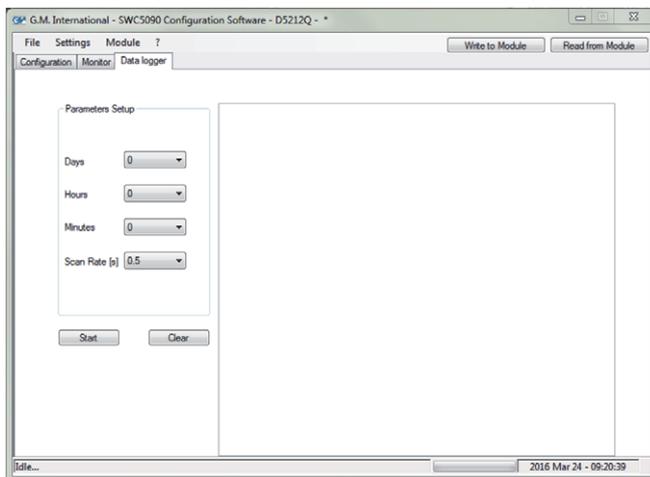
## Screenshots:



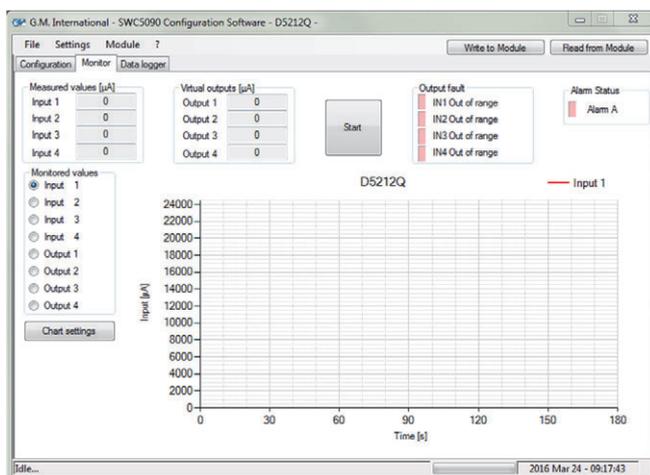
Output Configuration



Output Advanced



Data logger Configuration



Monitor

## Configuration parameters:

### ALARM:

#### Type:

- None: alarm is disabled
- Low: alarm is triggered when input descends below "Low Set"
- High: alarm is triggered when input ascends above "High Set"
- Window: alarm is triggered below "Low Set" and above "High Set"

#### Alarm lock:

alarm is inhibited until source ascends above or descends below the configuration parameters, and then, it behaves as standard configuration.

#### Input A selector:

- Input 1: alarm is triggered on Input1
- Input 2: alarm is triggered on Input2
- Input 3: alarm is triggered on Input3
- Input 4: alarm is triggered on Input4

#### Output operations:

- None: output operations are disabled.
- Subtraction: analog output represents the subtraction of the two selected input ch.
- Sum: analog output represents the sum of the two selected input channels.
- Maximum: analog output represents the higher of the two selected input channels
- Minimum: analog output represents the lower of the two selected input channels

#### Input B selector: (it is shown when the output operations selected is not None)

- Input 1: represents the second operand used for the output operation
- Input 2: represents the second operand used for the output operation
- Input 3: represents the second operand used for the output operation
- Input 4: represents the second operand used for the output operation

#### NO contact position in alarm:

- Open: alarm output is closed under regular working conditions, and it opens in case of alarm
- Closed: alarm output is open under regular working conditions, and it closes in case of alarm

#### Low Set:

input value below which the alarm is triggered (in Low, Window)

#### Low Hysteresis:

hysteresis on the low set value

#### High Set:

Input value above which the alarm is triggered

#### High Hysteresis:

hysteresis on the high set value

#### On Delay:

time for which the input has to be in alarm condition before the alarm output is triggered, configurable from 0 to 1000 seconds in steps of 100 ms

#### Off Delay:

time for which the input has to be in normal condition before the alarm output is deactivated, configurable from 0 to 1000 seconds in steps of 100 ms.

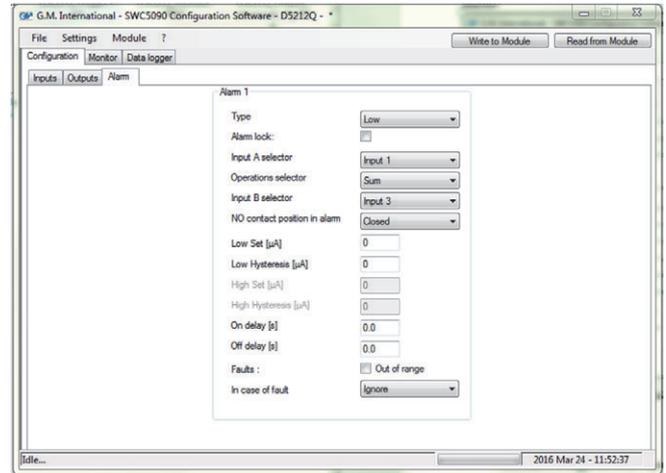
### FAULT:

alarm is triggered when input is out of configured range

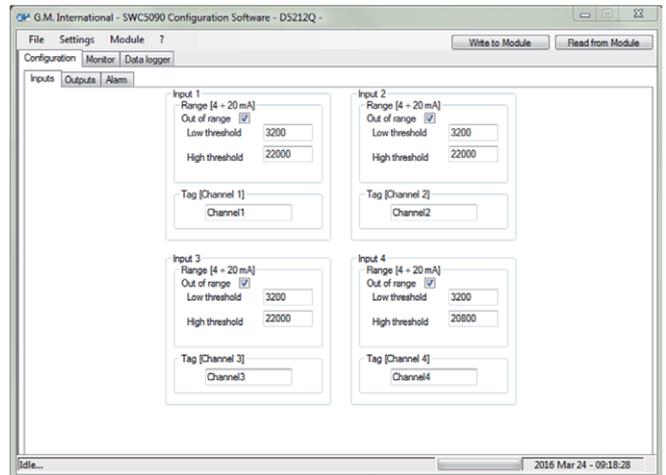
#### In case of fault:

- Ignore: alarm is not affected
- Lock status: remains in the same status as it was before fault occurred
- Alarm active: alarm is triggered
- Alarm inactive: alarm is deactivated

## Screenshots:



Alarm Configuration



Input Configuration

Param.	Description	Notes	Type <sup>(1)</sup>
0	G.M. Factory Code	Identification Data	R
1	Instrument Code		
2	Option Code		
3	Hardware Release		
4	Software Release		
5 to 15	Reserved		
16	Modbus Address	Communication Data	R/W
17	Modbus Baudrate		
18	Modbus Format		
64	Input1 measured value(Low 16 bits) <sup>(1)</sup>	Input (Field) Data	R
65	Input1 measured value(High 16 bits) <sup>(1)</sup>		
66	Input2 measured value(Low 16 bits) <sup>(1)</sup>		
67	Input2 measured value(High 16 bits) <sup>(1)</sup>		
68	Input3 measured value(Low 16 bits) <sup>(1)</sup>		
69	Input3 measured value(High 16 bits) <sup>(1)</sup>		
70	Input4 measured value(Low 16 bits) <sup>(1)</sup>		
71	Input4 measured value(High 16 bits) <sup>(1)</sup>		
72	Input1 fault <sup>(2)</sup>		
73	Input2 fault <sup>(2)</sup>		
74	Input3 fault <sup>(2)</sup>		
75	Input4 fault <sup>(2)</sup>		
102	Input1 Downscale (Low 16 bits) <sup>(1)</sup>		
103	Input1 Downscale (High 16 bits) <sup>(1)</sup>		
104	Input1 Upscale (Low 16 bits) <sup>(1)</sup>		
105	Input1 Upscale (High 16 bits) <sup>(1)</sup>		
106	Input1 Fault Switch <sup>(3)</sup>		
107	Input1 Low Range Fault (Low 16 bits) <sup>(1)</sup>		
108	Input1 Low Range Fault (High 16 bits) <sup>(1)</sup>		
109	Input1 High Range Fault (Low 16 bits) <sup>(1)</sup>		
110	Input1 High Range Fault (High 16 bits) <sup>(1)</sup>		
111	Input2 Downscale (Low 16 bits) <sup>(1)</sup>		
112	Input2 Downscale (High 16 bits) <sup>(1)</sup>		
113	Input2 Upscale (Low 16 bits) <sup>(1)</sup>		
114	Input2 Upscale (High 16 bits) <sup>(1)</sup>		
115	Input2 Fault Switch <sup>(3)</sup>		
116	Input2 Low Range Fault (Low 16 bits) <sup>(1)</sup>		
117	Input2 Low Range Fault (High 16 bits) <sup>(1)</sup>		
118	Input2 High Range Fault (Low 16 bits) <sup>(1)</sup>		
119	Input2 High Range Fault (High 16 bits) <sup>(1)</sup>		
120	Input3 Downscale (Low 16 bits) <sup>(1)</sup>		
121	Input3 Downscale (High 16 bits) <sup>(1)</sup>		
122	Input3 Upscale (Low 16 bits) <sup>(1)</sup>		
123	Input3 Upscale (High 16 bits) <sup>(1)</sup>		
124	Input3 Fault Switch <sup>(3)</sup>		
125	Input3 Low Range Fault (Low 16 bits) <sup>(1)</sup>		
126	Input3 Low Range Fault (High 16 bits) <sup>(1)</sup>		
127	Input3 High Range Fault (Low 16 bits) <sup>(1)</sup>		
128	Input3 High Range Fault (High 16 bits) <sup>(1)</sup>		
129	Input4 Downscale (Low 16 bits) <sup>(1)</sup>		
130	Input4 Downscale (High 16 bits) <sup>(1)</sup>		
131	Input4 Upscale (Low 16 bits) <sup>(1)</sup>		
132	Input4 Upscale (High 16 bits) <sup>(1)</sup>		
133	Input4 Fault Switch <sup>(3)</sup>		
134	Input4 Low Range Fault (Low 16 bits) <sup>(1)</sup>		
135	Input4 Low Range Fault (High 16 bits) <sup>(1)</sup>		
136	Input4 High Range Fault (Low 16 bits) <sup>(1)</sup>		
137	Input4 High Range Fault (High 16 bits) <sup>(1)</sup>		
160	Output1 Downscale (Low 16 bits) <sup>(1)</sup>	Output Configuration	R/W
161	Output1 Downscale (High 16 bits) <sup>(1)</sup>		
162	Output1 Upscale (Low 16 bits) <sup>(1)</sup>		
163	Output1 Upscale (High 16 bits) <sup>(1)</sup>		
164	Output1 Under Range (Low 16 bits) <sup>(1)</sup>		
165	Output1 Under Range (High 16 bits) <sup>(1)</sup>		
166	Output1 Over Range (Low 16 bits) <sup>(1)</sup>		
167	Output1 Over Range (High 16 bits) <sup>(1)</sup>		
168	Output1 Fault Current (Low 16 bits) <sup>(1)</sup>		
169	Output1 Fault Current (High 16 bits) <sup>(1)</sup>		
170	Output1 Fault Mask <sup>(3)</sup>		
172	Output1 InputA Selector <sup>(4)</sup>		
173	Output1 InputB Selector <sup>(4)</sup>		
174	Output1 Operation <sup>(5)</sup>		
175	Output2 Downscale (Low 16 bits) <sup>(1)</sup>		
176	Output2 Downscale (High 16 bits) <sup>(1)</sup>		
177	Output2 Upscale (Low 16 bits) <sup>(1)</sup>		
178	Output2 Upscale (High 16 bits) <sup>(1)</sup>		
179	Output2 Under Range (Low 16 bits) <sup>(1)</sup>		
180	Output2 Under Range (High 16 bits) <sup>(1)</sup>		
181	Output2 Over Range (Low 16 bits) <sup>(1)</sup>		
182	Output2 Over Range (High 16 bits) <sup>(1)</sup>		
183	Output2 Fault Current (Low 16 bits) <sup>(1)</sup>		
184	Output2 Fault Current (High 16 bits) <sup>(1)</sup>		
185	Output2 Fault Mask <sup>(3)</sup>		
187	Output2 InputA Selector <sup>(4)</sup>		
188	Output2 InputB Selector <sup>(4)</sup>		
189	Output2 Operation <sup>(5)</sup>		
190	Output3 Downscale (Low 16 bits) <sup>(1)</sup>		
191	Output3 Downscale (High 16 bits) <sup>(1)</sup>		
192	Output3 Upscale (Low 16 bits) <sup>(1)</sup>		
193	Output3 Upscale (High 16 bits) <sup>(1)</sup>		

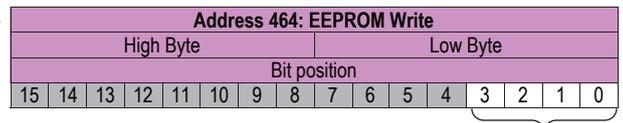
Supported ModBus Baudrates	
Index	Baudrate
0	4800
1	9600
2	19200
3	38400
4	57600

Address 18: Supported Modbus Formats															
High Byte								Low Byte							
Bit position															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Endianness 32 bit Data (0 = Little; 1 = Big)   
 Termination resistance (1 = enabled)

Supported Modbus Parity:  
 0 8 data bit, no parity, 1 stop bit  
 1 8 data bit, even parity, 1 stop bit  
 2 8 data bit, odd parity, 1 stop bit

Param.	Description	Notes	Type <sup>(11)</sup>
194	Output3 Under Range (Low 16 bits) <sup>(1)</sup>	Output Configuration	R/W
195	Output3 Under Range (High 16 bits) <sup>(1)</sup>		
196	Output3 Over Range (Low 16 bits) <sup>(1)</sup>		
197	Output3 Over Range (High 16 bits) <sup>(1)</sup>		
198	Output3 Fault Current (Low 16 bits) <sup>(1)</sup>		
199	Output3 Fault Current (High 16 bits) <sup>(1)</sup>		
200	Output3 Fault Mask <sup>(3)</sup>		
202	Output3 InputA Selector <sup>(4)</sup>		
203	Output3 InputB Selector <sup>(4)</sup>		
204	Output3 Operation <sup>(5)</sup>		
205	Output4 Downscale (Low 16 bits) <sup>(1)</sup>		
206	Output4 Downscale (High 16 bits) <sup>(1)</sup>		
207	Output4 Upscale (Low 16 bits) <sup>(1)</sup>		
208	Output4 Upscale (High 16 bits) <sup>(1)</sup>		
209	Output4 Under Range (Low 16 bits) <sup>(1)</sup>		
210	Output4 Under Range (High 16 bits) <sup>(1)</sup>		
211	Output4 Over Range (Low 16 bits) <sup>(1)</sup>		
212	Output4 Over Range (High 16 bits) <sup>(1)</sup>		
213	Output4 Fault Current (Low 16 bits) <sup>(1)</sup>		
214	Output4 Fault Current (High 16 bits) <sup>(1)</sup>		
215	Output4 Fault Mask <sup>(3)</sup>		
217	Output4 InputA Selector <sup>(4)</sup>		
218	Output4 InputB Selector <sup>(4)</sup>		
219	Output4 Operation <sup>(5)</sup>		
220	Fault Bus Configuration <sup>(4)</sup>	Fault Config.	R/W
240	Alarm Configuration <sup>(6)</sup>	Alarm Control	R/W
242	Alarm Startup Lock <sup>(7)</sup>		
243	Alarm Fault Configuration <sup>(8)</sup>		
244	Alarm Fault Mask <sup>(3)</sup>		
245	Contact Position in Case of Alarm <sup>(9)</sup>		
246	Delay to Alarm Issue <sup>(10)</sup>		
247	Delay to Alarm Removal <sup>(10)</sup>		
248	Alarm Low Threshold (Low 16 bits) <sup>(1)</sup>		
249	Alarm Low Threshold (High 16 bits) <sup>(1)</sup>		
250	Alarm Low Threshold Hysteresis (Low 16 bits) <sup>(1)</sup>		
251	Alarm Low Threshold Hysteresis (High 16 bits) <sup>(1)</sup>		
252	Alarm High Threshold (Low 16 bits) <sup>(1)</sup>		
253	Alarm High Threshold (High 16 bits) <sup>(1)</sup>		
254	Alarm High Threshold Hysteresis (Low 16 bits) <sup>(1)</sup>		
255	Alarm High Threshold Hysteresis (High 16 bits) <sup>(1)</sup>		
256	Alarm InputA Selector <sup>(4)</sup>		
257	Alarm InputB Selector <sup>(4)</sup>		
258	Alarm Operation Selector <sup>(5)</sup>		
464	EEPROM Write	Command	W
548	Output 1 virtual value (Low 16 bits) <sup>(1)</sup>	Output Data	R
549	Output 1 virtual value (High 16 bits) <sup>(1)</sup>	Output Data	R
553	Output 2 virtual value (Low 16 bits) <sup>(1)</sup>	Output Data	R
554	Output 2 virtual value (High 16 bits) <sup>(1)</sup>	Output Data	R
558	Output 3 virtual value (Low 16 bits) <sup>(1)</sup>	Output Data	R
559	Output 3 virtual value (High 16 bits) <sup>(1)</sup>	Output Data	R
563	Output 4 virtual value (Low 16 bits) <sup>(1)</sup>	Output Data	R
564	Output 4 virtual value (High 16 bits) <sup>(1)</sup>	Output Data	R
567	Alarm status <sup>(7)</sup>	Alarm Data	R
600	Ch. 1 chars 0, 1	Tags	R/W
601	Ch. 1 chars 2, 3	Tags	R/W
602	Ch. 1 chars 4, 5	Tags	R/W
603	Ch. 1 chars 6, 7	Tags	R/W
604	Ch. 1 chars 8, 9	Tags	R/W
605	Ch. 1 chars 10, 11	Tags	R/W
606	Ch. 1 chars 12, 13	Tags	R/W
607	Ch. 1 chars 14, 15	Tags	R/W
608	Ch. 2 chars 0, 1	Tags	R/W
609	Ch. 2 chars 2, 3	Tags	R/W
610	Ch. 2 chars 4, 5	Tags	R/W
611	Ch. 2 chars 6, 7	Tags	R/W
612	Ch. 2 chars 8, 9	Tags	R/W
613	Ch. 2 chars 10, 11	Tags	R/W
614	Ch. 2 chars 12, 13	Tags	R/W
615	Ch. 2 chars 14, 15	Tags	R/W
616	Ch. 3 chars 0, 1	Tags	R/W
617	Ch. 3 chars 2, 3	Tags	R/W
618	Ch. 3 chars 4, 5	Tags	R/W
619	Ch. 3 chars 6, 7	Tags	R/W
620	Ch. 3 chars 8, 9	Tags	R/W
621	Ch. 3 chars 10, 11	Tags	R/W
622	Ch. 3 chars 12, 13	Tags	R/W
623	Ch. 3 chars 14, 15	Tags	R/W
624	Ch. 4 chars 0, 1	Tags	R/W
625	Ch. 4 chars 2, 3	Tags	R/W
626	Ch. 4 chars 4, 5	Tags	R/W
627	Ch. 4 chars 6, 7	Tags	R/W
628	Ch. 4 chars 8, 9	Tags	R/W
629	Ch. 4 chars 10, 11	Tags	R/W
630	Ch. 4 chars 12, 13	Tags	R/W
631	Ch. 4 chars 14, 15	Tags	R/W



- 1 Save Input/Output Configuration
- 2 Save Modbus configuration
- 8 Save Tags

- Notes:**
- (1) Expressed in 100 nA
  - (2) 0 = No fault,  
1 = Input out of range
  - (3) 0 = Ignore input fault,  
1 = Report input out of range
  - (4) 0 = Input1,  
1 = Input2,  
2 = Input3,  
3 = Input4
  - (5) 0 = None,  
1 = Sum,  
2 = Subtraction,  
3 = Maximum,  
4 = Minimum
  - (6) 0 = None,  
1 = Low,  
2 = High,  
3 = Window,  
4 = Fault repeater
  - (7) 0 = Inactive,  
1 = Active
  - (8) 0 = Ignore,  
1 = Lock status,  
2 = Alarm active,  
3 = Alarm inactive
  - (9) 0 = Open,  
1 = Closed
  - (10) Expressed in tenths of seconds
  - (11) Parameter type:  
R = read only,  
W = write only,  
R/W = read and write