

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 (according to IEC 61511) 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.

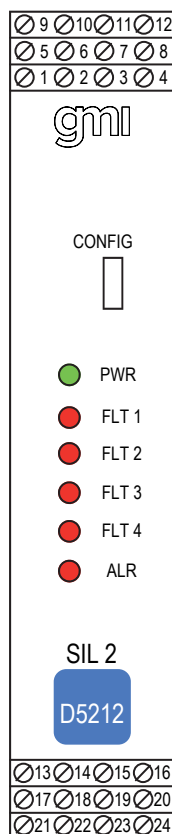
Modbus RTU RS-485 output is available on Bus connector to interface digital device.

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.

Front Panel and Features:



- SIL 2 according to IEC 61511 for Tproof = 3 / 10 years ($\leq 10\%$ / $> 10\%$ of total SIF), PFDavg (1 year) 2.73 E-04, SFF 81.26%
- Input from Zone 0 (Zone 20), installation in Zone 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, μP 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, TÜV Certifications (pending).
- 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.

Ordering Information:

Model: D5212Q

Operating parameters are programmable by PC via USB with PPC5092 Adapter and related configurator software.

Power Bus and DIN-Rail accessories:

Connector JDFT050

Cover and fix MCHP196

Terminal block male MOR017

Terminal block female MOR022

Technical Data:

Supply:

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

Current consumption @ 24 V: 190 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 $\approx 25 \text{ mA}$) 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 μA .

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 Ω load source mode, current limited at about 25 mA.

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

Output ripple: $\leq 20 \text{ mVrms}$ on 250 Ω .

Modbus Output: for parameter configuration and burnout / fault indication. Modbus RTU protocol up to 115.2 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 ($\leq 1 \text{ V}$ voltage drop).

Performance:

Ref. Conditions 24 V supply, 250 Ω loads, $23 \pm 1 \text{ }^\circ\text{C}$ 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 $1 \text{ }^\circ\text{C}$ 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 $+70 \text{ }^\circ\text{C}$, relative humidity 95 %, up to $55 \text{ }^\circ\text{C}$.

Storage: temperature limits -45 to $+80 \text{ }^\circ\text{C}$.

Safety Description:



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

IECEx: Ex nA [ia Ga] IIC T4 Gc, [Ex ia Da] IIIC, [Ex ia Ma] I,

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, $-40 \text{ }^\circ\text{C} \leq \text{Ta} \leq 70 \text{ }^\circ\text{C}$.

Approvals:

ATEX conforms to EN60079-0, EN60079-11, EN60079-15 (Pending).

IECEx conforms to IEC60079-0, IEC60079-11, IEC60079-15 (Pending).

SIL 2 conforms to IEC61511 (Pending).

DNV No. A-13625 and KR No. MIL20769-EL002 Certificates for maritime applications.

Mounting:

T35 DIN-Rail according to EN50022, 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 mm².

Location: Safe Area or Zone 2, Group IIC T4 installation.

Protection class: IP 20.

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

Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (μF)	Lo/La (mH)	Lo/Ro (μH/Ω)
Terminals 13-14, 15-16	IIC	0.121	4.85	68.9
17-18, 19-20	IIB	0.917	19.43	275.9
Uo/Voc = 24.1 V	IIA	3.307	38.86	551.9
Io/Isc = 86 mA	I	5.197	63.76	905.6
Po/Po = 516 mW	IIIC	0.917	19.43	275.9
Terminals 21-22, 23-24	IIC	99	11.63	2339
Uo/Voc = 1.1 V	IIB	999	46.54	9356.1
Io/Isc = 56 mA	IIA	999	93.09	18712.2
Po/Po = 16 mW	I	999	152.73	30699.7
Ui/Vmax= 30 V	IIIC	999	46.54	9356.1
li/lmax=128 mA				
Ci = 2.1 nF, Li = 0 nH				

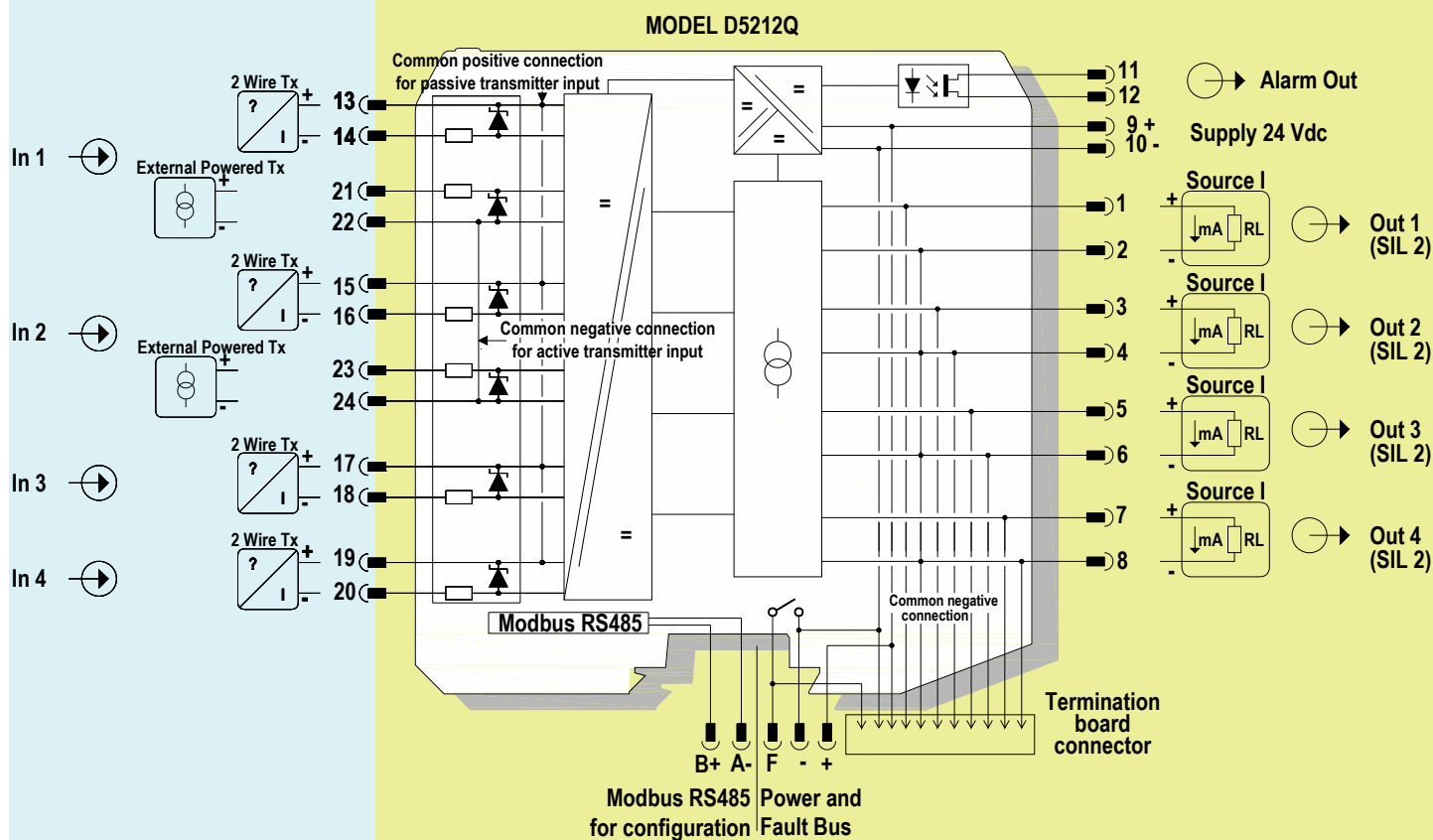
Image:



Function Diagram:

HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC

SAFE AREA, ZONE 2 GROUP IIC T4



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 ☒ Subtraction ☐ Sum

☐ Maximum ☐ Minimum

Input B selector :

☐ Input 1 ☒ Input 2 ☐ Input 3 ☐ Input 4

Back

Input A selector:

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

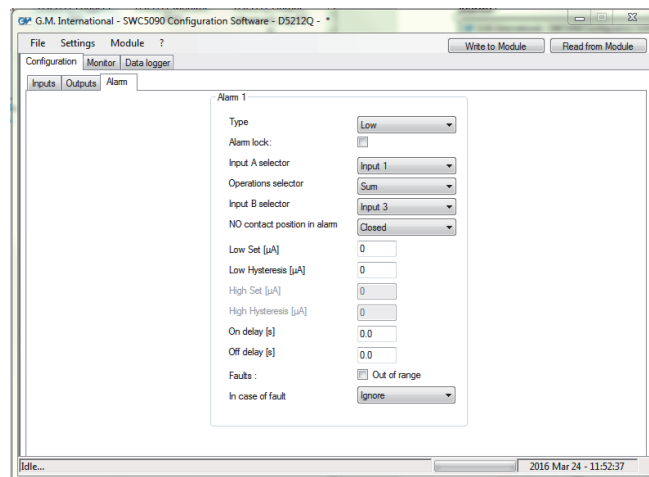
Output operations:

- ☐ 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.

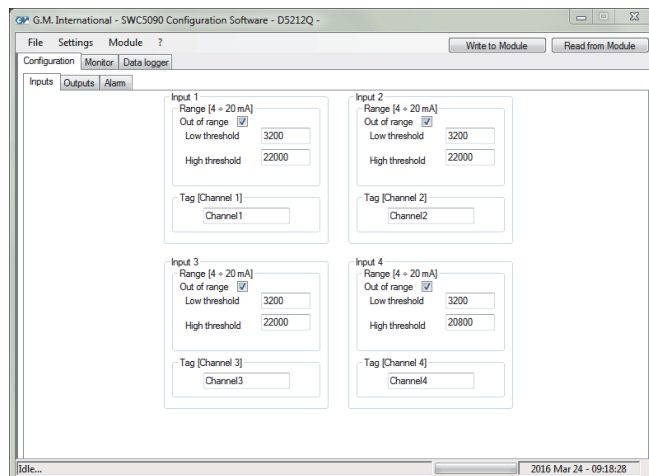
Input B selector: (it is shown when the output operations selected is not None)

- ☐ 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.

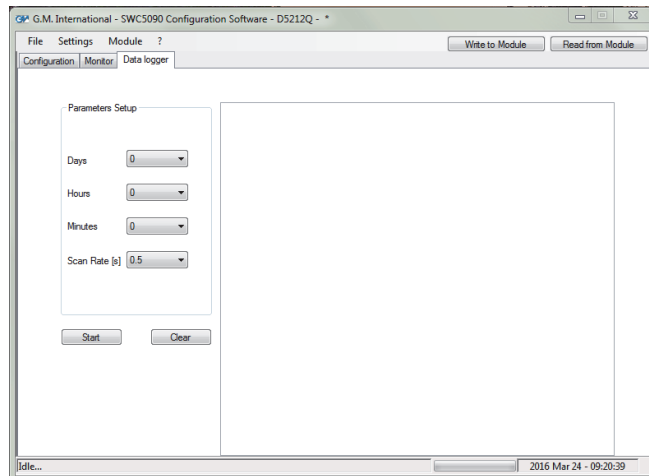
Screenshots:



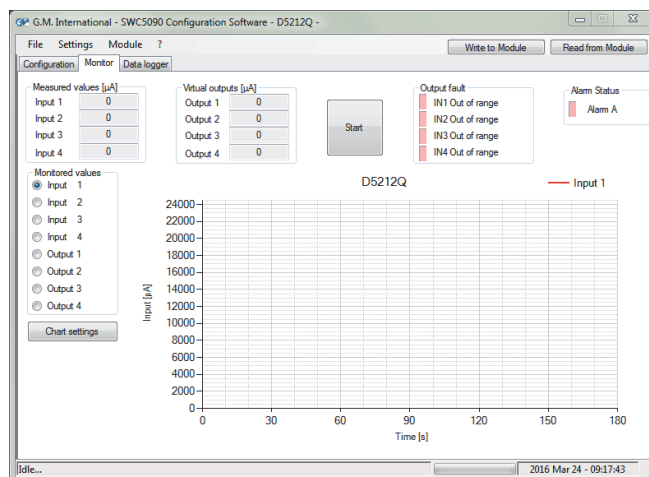
Alarm Configuration



Input Configuration



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.

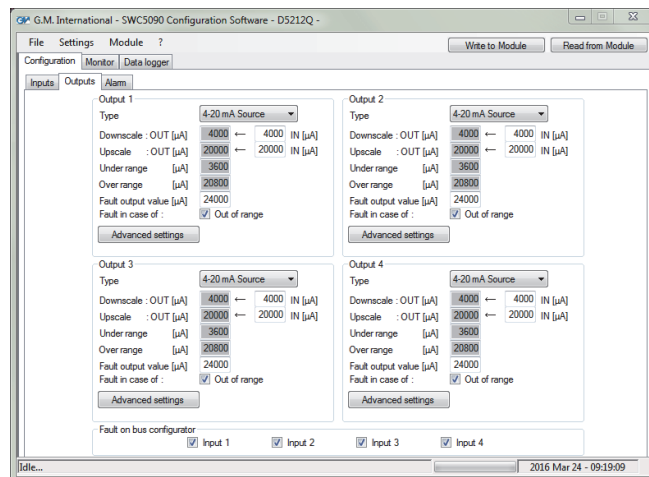
FAULT:

alarm is triggered when input is out of configured range

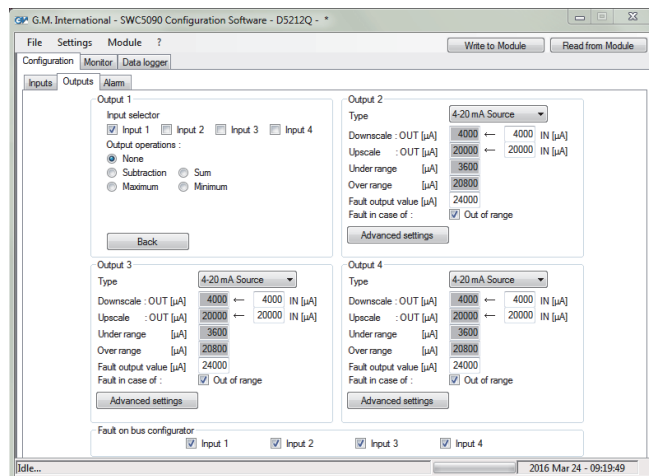
In case of fault:

- ☐ 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:



Output Configuration



Output Advanced