Installation and User manual

Summary of Content

1. Introduction

The Configuration Software SWC5090 provides a PC user interface for D5000/D6000 series modules that allows the user to:

- Read and Write configuration parameters from and to the unit (via COM port);
- Restore data to and from local hard drive for backup;
- Monitor Input values (via COM port).
- Record monitoring sessions and save data to file.

1.1 Obtaining the SWC5090

The SWC5090 is absolutely free-of-charge and is distributed in each CD included in PPC5092 adapter package. Moreover, the most updated version can always be freely downloaded from www.gmintsrl.com

1.2 Configurable models

G.M. International models that can be configured via SWC5090 software are:

- Smart Solenoid Drivers: D5293S, D5294S, D5295S.
- Temperature Converters: D5072S, D5072D, D5273S, D6072S, D6072D, D6273S.
- Resistance Repeaters: D5072S-087, D5072D-087.
- Thermocouple/mV Repeaters: D5072S-096, D5072D-096.
- Analog Input: D5212Q, D6212Q
- Digital Input: D5231E, D6231E.
- Digital Output: D5240T.
- Analog Signal Converter and Trip Amplifiers: D5254S, D6254S.
- Load Cell/Strain Gauge Converter: D5246S.
- HART® Mux Modem: 5700.

1.3 Requirements

The Configuration Software has to be installed on a machine with the following minimum requirements:

- Pentium class Processor 200MHz;
- 800x600 pixels screen resolution;
- 256 MB RAM;
- 1 USB port;
- “Microsoft Windows” operating system with latest updates installed;
- Windows 7 and 8 users should set text size at 100% (Small) in the Display settings of the Control Panel (see screenshot in Figure 1).

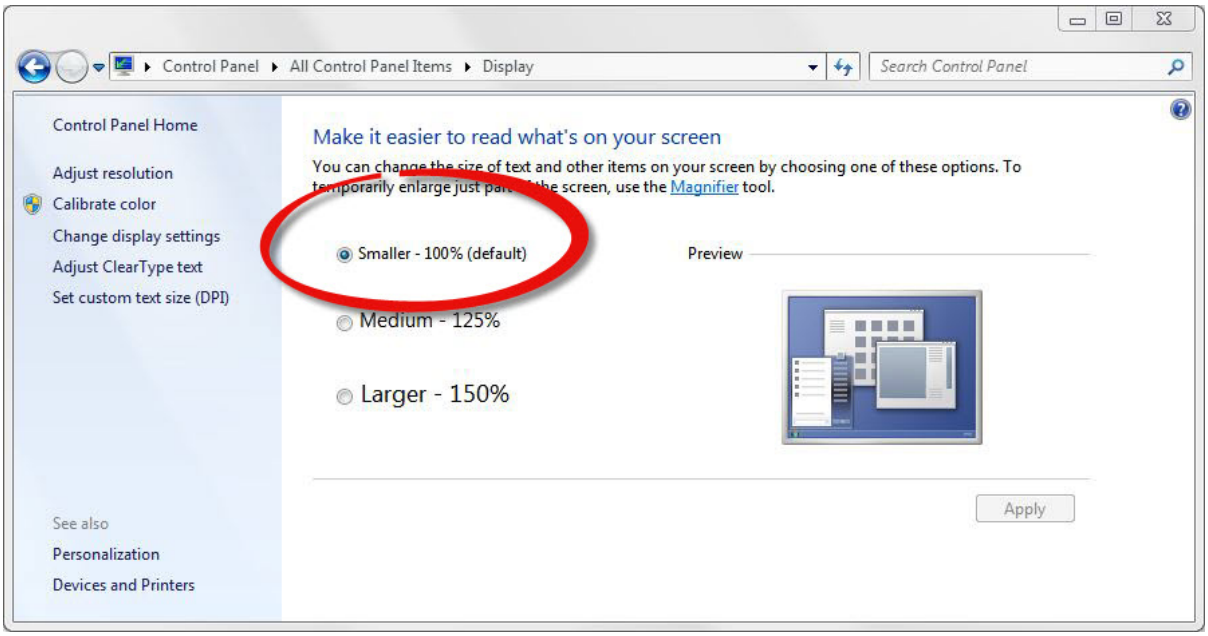


Figure 1: display text size settings screenshot.

Furthermore, the following items are required:

- PPC5092 (USB-to-MiniUSB Adapter) with correct drivers installed (See Section 8.1);
- MiniUSB cable (provided with PPC5092).

Figure 2: PPC5092 Adapter.

Figure 3: Mini-USB cable included with PPC5092.

2. SWC5090 Main Window

At start-up, the SWC5090 Configuration Software loads a Main Window, which is the same for all modules. The Main Window is basically a frame with a menu at the top and a bottom bar.

In case the module is already connected to the PC correctly, the SWC5090 detects it and asks the user if he wishes to Read parameters from module directly. COM port is automatically set in the configuration file for future sessions.

Instead, if the module is not connected at startup, the user can:

- decide to work offline by selecting the desired model from the “Module” entry in the Menu

- read offline parameters saved to file by going to “File -> Open file” entry in the Menu

If the module is connected after startup of the SWC5090, the user has to manually read parameters by pressing the dedicated button on the top right of the screen.

2.1 Main Menu

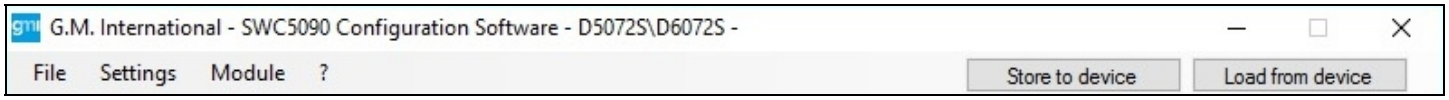


Figure 4: Menu.

The menu at the top of the Main Window (see Figure 4) is divided into the following entries:

- **“File”**
  - **Open:** load configuration data from local hard drive backup;
  - **Save:** save configuration data to the present local hard drive backup;
  - **Save as…:** save configuration data to a different local hard drive backup;
  - **Print Preview:** screen preview of the configuration report to be printed;
  - **Print:** configuration report print on paper;
  - **Exit:** exit from the configuration software.
- **“Settings”**
  - **Serial**

    In the COM Port Setup window (see Figure 5) the user can choose the COM Port of the PPC5092 in the drop-down menu at the top. The connection to the module can be tested by pressing the **“Test Port COM#”** button.

    Finally the COM Port can be updated by pressing the **“Update Com Port & Exit”** button or left unchanged by pressing the **“Exit without changes”** button.

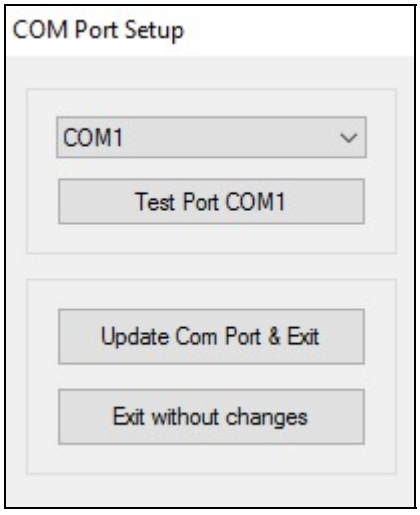


Figure 5: COM Port Setup window.

  - **Modbus**

    In the Module Modbus Setup window (see Figure 6) the user can introduce the Modbus address of the module (from 1 to 247), the Modbus Baud Rate (selectable among 4800, 9600, 19200, 38400, 57600 and 115200 bps) and the Modbus Format (no parity 1 stop bit, even parity 1 stop bit, odd parity 1 stop bit).

    The changes are saved by pressing the **“Ok”** button, while they are discarded by pressing **“Cancel”**. Note that the **“Store to device”** button on the menu bar must be pressed to make the Modbus settings effective. Moreover, the module must be power cycled.

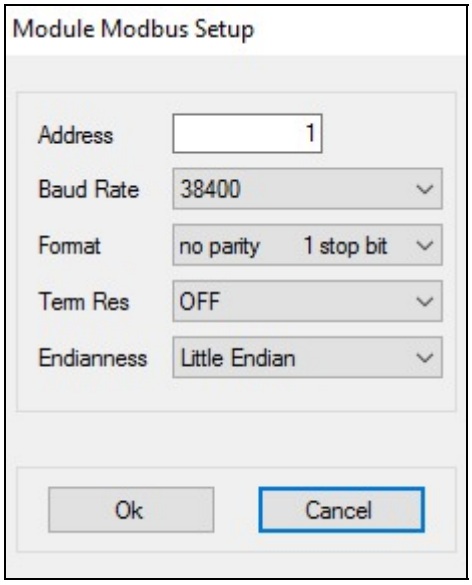


Figure 6: Modbus Setup window.

  - **Temperature Scale (only available with Temperature converters)**
    Choose between °C and °F. The setting is stored into the configuration file for future uses.

- **"Module"**
  - **Select Model:** during off-line operations, select the module window among supported ones;
  - **Show Identification:** show the instrument and option code, and the software and hardware release. Identification is only available after that a read operation from module has been successfully completed.
  - **Load Factory Settings:** loads default parameters to configurator screen, for the selected module.
- **"?"**
  - **Show EULA:** The End User License Agreement is displayed and a copy can be saved;
  - **Help:** Opens this document in pdf format;
  - **About SWC5090:** Shows the release of the current SWC5090 Configuration Software.
  - In the Update Manager window (see Figure 7) the user can automatically check the "Running Version" against the "Last released Version" from G.M. International database. The Configuration Software can be updated by pressing the "Update" button or left unchanged by pressing the "Exit" button.

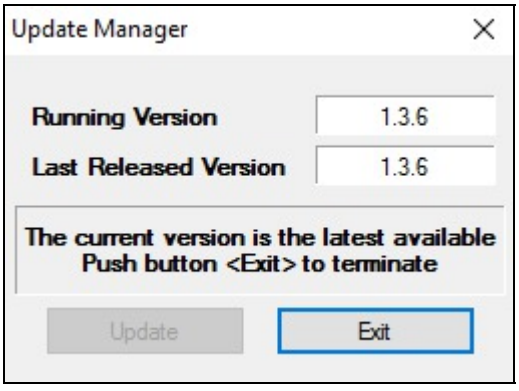


Figure 7: Update Manager window.

On the right of the menu, two quick buttons are available: **"Load from device"**, **"Store to device"**.
By pressing the first one, the configuration settings, the Modbus settings and the Tag currently stored in the Module are read from the module and displayed. Since this operation overwrites the settings on the screen, the user is asked for confirmation.

The **"Store to device"** button allows the storage to the Module of the configuration settings, the Modbus settings and the Tag, which are currently displayed on the Configuration window. By doing so, the previous settings saved on the Module are overwritten.

Note that all configuration functions are available only when offline (Monitor or Data Logger are inactive).

In particular, the **"Store to device"** button is activated only when configuration data was successfully read from the Module or loaded from a backup file.

2.2 Bottom Bar

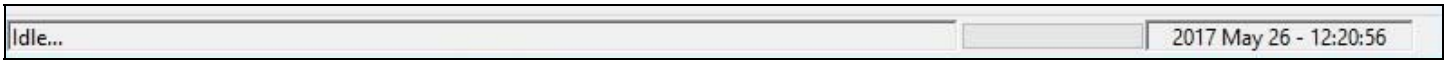


Figure 8: Bottom Bar.

The Bottom Bar (see Figure 8) includes a status bar, a progress bar that indicates that the operation is in progress, and the current date & time.

3. Application Windows

The center of the SWC5090 Configuration Software window is filled with the Application Window, which is different for each module. In the Application Window the user can read the field data, configure the data ranges and so on.

3.1 D5072S, D5072D, D5273S, D6072S, D6072D, D6273S (up to software revision 2)

D5072S, D5072D, D5273S, D6072S, D6072D, D6273S are Universal Converters and share the same screens, except for the number of input, output and alarm channels.

The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input**
  - **Output**
  - **Alarm**
- **Monitor**
- **Data Logger**

3.1.1 Configuration

3.1.1.1 Input

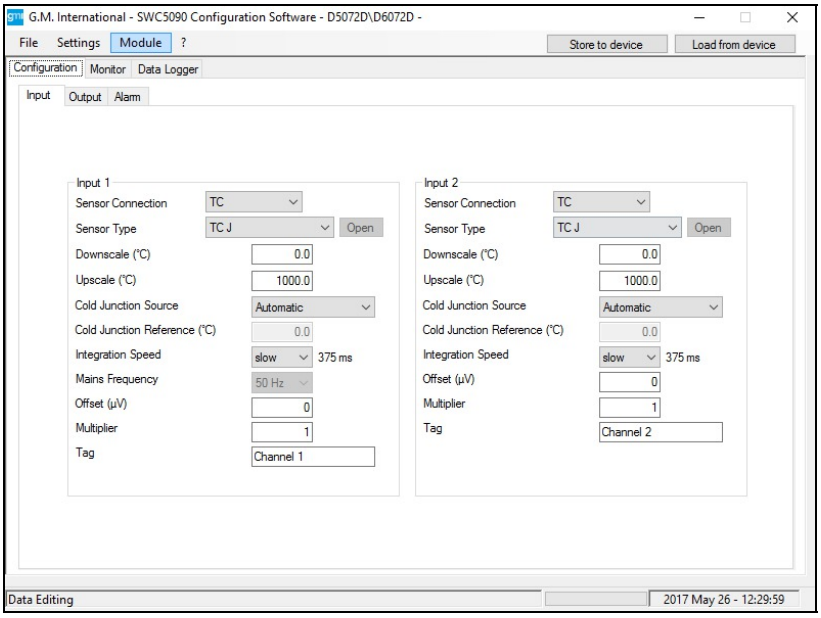


Figure 9: D5072D / D6072D Input configuration screen.

INPUT

Sensor Connection:

- TC
- RTD
- Potentiometer
- Voltage
- Resistance

Sensor Type: input sensor type (see list in section “Input specifications”)
possibility of configuring a completely customized input curve (TC/RTD)

Wires: 2, 3, 4 wires selection for RTD/Resistance inputs

Downscale: input value of measuring range corresponding to defined low output value

Upscale: input value of measuring range corresponding to defined high output value

Cold Junction Source: reference junction compensation type (thermocouple only)

- Automatic via internal compensator (1 for each channel)
- Fixed programmable temperature compensation at fixed temperature
- Other Input remote compensation using RTD on remaining channel

Cold Junction Reference: fixed temperature compensation value (Cold Junction type Fixed only), range from -60 to +100 °C.

Integration speed:

- Slow 250 ms (mV/TC,2 wire RTD); 375 ms (Pot.), 500 ms (3,4 wire RTD)
- Fast 50 ms (mV/TC,2 wire RTD); 75 ms (Pot.), 100 ms (3,4 wire RTD)

Mains Frequency:

- 50 Hz
- 60 Hz only available with fast integration speed

Offset: value to be added/subtracted to input (µV or mΩ depending on input sensor)

Multiplier: input multiplication value

Tag: 16 alphanumerical characters

Note: Downscale and Upscale settings should follow Minimum Span requirements stated in the data sheet, in order to avoid negative impacts on Output resolution.

3.1.1.2 Output

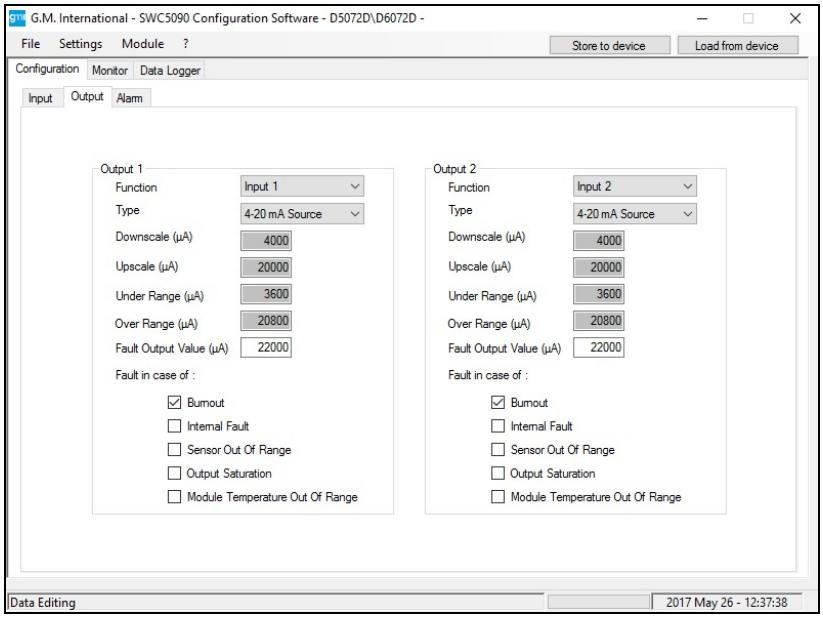


Figure 10: D5072D / D6072D Output configuration screen.

OUTPUT

Function:

- Input 1 — analog output represents input of first channel
- Input 2 — analog output represents input of second channel
- Input 1 + 2 — analog output represents the sum of the two input channels
- Input 1 - 2 — analog output represents the subtraction of the two input ch.
- Min(Input 1, Input 2) — analog output represents the lower of the two input ch.
- Max(Input 1, Input 2) — analog output represents the higher of the two input ch.

Type:

- 0-20 mA Sink
- 4-20 mA Sink
- Custom Sink — All Output parameters are fully customizable
- 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 downscale in normal working condition (range 0 to 24 mA)
Underrange: analog output downscale in underrange condition (range 0 to 24 mA)
Overrange: analog output downscale in overrange 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” in case of:

- Burnout — input sensor interruption
- Internal fault — module internal fault
- Sensor out of range — input sensor out of configured input range
- Output Saturation — output is below Underrange or above Overrange
- Module Temp. Out of range — internal module temp. under or over specified module operating temp. limits

3.1.1.3 Alarm

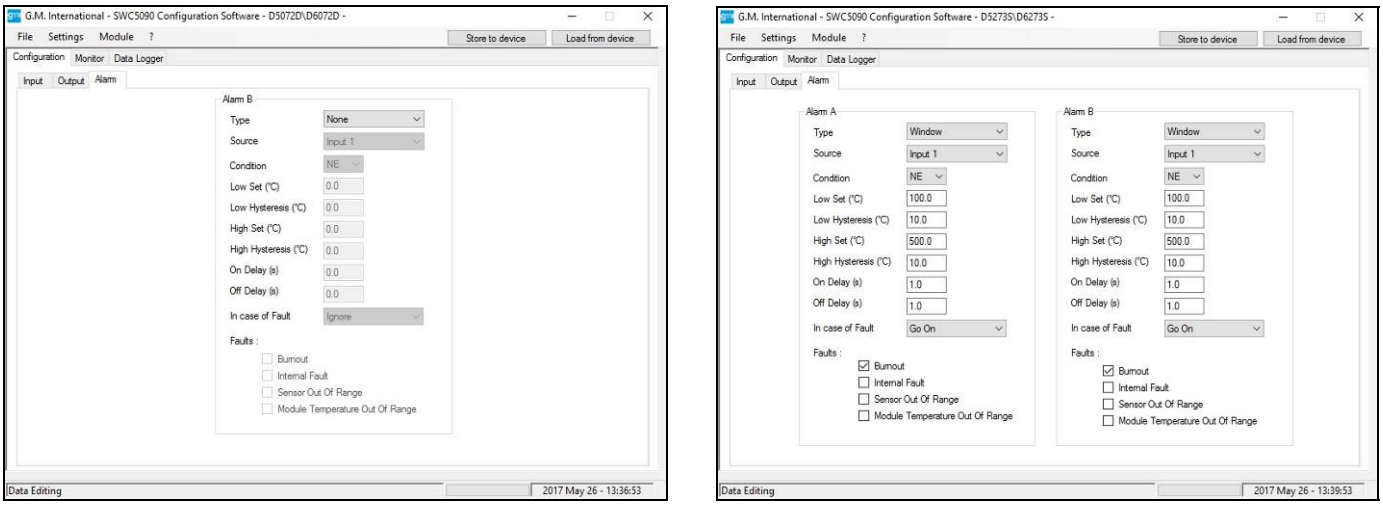


Figure 11: D5072D/D6072D (on the left) and D5273S/D6273S (on the right) alarm configuration screen.

ALARM

Type:

- None — alarm is disabled
- Low — alarm is triggered when source descends below “Low Set”
- LowLock — alarm is inhibited until source ascends over “Low Set” and then, it behaves as a standard “Low” configuration
- High — alarm is triggered when source ascends over “High Set”
- HighLock — alarm is inhibited until source descends below “High Set” and then, it behaves as a standard “High” configuration
- Window — alarm is triggered below “Low Set” and above “High Set”
- Fault Repeater — alarm output reflects selected (one or more) Fault status

Source: reference value for alarm triggering

- Input 1 — input of first channel
- Input 2 — input of second channel
- Input 1 + 2 — sum of the two input channels
- Input 1 - 2 — subtraction of the two input channels
- Min(Input 1, Input 2) — lower of the two input channels
- Max(Input 1, Input 2) — higher of the two input channels

Condition:

- NE — alarm output is normally energized when deactivated
- ND — alarm output is normally de-energized when deactivated

Low Set: source value at which the alarm is triggered (in Low, LowLock, Window)

Low Hysteresys: triggered Low alarm deactivates when source value reaches Low Set + Low Hysteresys (0-500 °C, 0-50 mV, 0-50 %)

High Set: source value at which the alarm is triggered (in High, HighLock, Window)

High Hysteresys: triggered High alarm deactivates when source value reaches High Set - High Hysteresys (0-500 °C, 0-50 mV, 0-50 %)

On Delay: time for which the source variable 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 source variable has to be in normal condition before the alarm output is deactivated; configurable from 0 to 1000 seconds in steps of 100 ms

In case of fault:

- Ignore — alarm is not affected
- Lock status — alarm remains in the same status as it was before Fault occurred

- Go On alarm is triggered,
- Go Off alarm is deactivated

Faults: if “Type” is set to “Fault repeater” select which faults will be repeated by alarm output; if “In case of fault” is different from “Ignore”, select which faults should influence alarm output behaviour.

3.1.2 Monitor

he SWC5090 is able to continuously scan the module and display real-time values on screen.

Note that while the module is being monitored, configuration screens are disabled.

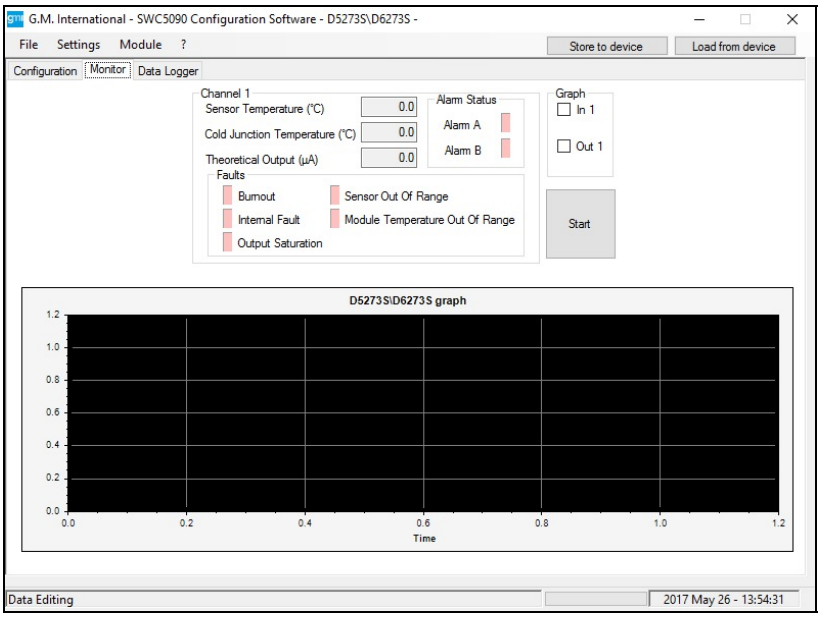


Figure 12: D5273S/D6273S Monitor screen.

The display shows Input and Theoretical Output values, fault and alarm status and a graph of chosen variable.

3.1.2.1 Input

Input variable is shown as it is detected by the module, after having applied configured calculations (Offset, Multiplier) and conversions.

Cold Junction Temperature shows the value of the internal Cold Junction; this value will influence the Output measure when Cold Junction configuration is set to “Automatic”.

3.1.2.2 Output

This value represents the theoretical output. During certain conditions, this value may differ from the measured value at output terminal blocks.

3.1.2.3 Alarm status

Alarm status is represented by a LED, which is RED when activated.

The LED status reflects the status of the Alarm exactly as configured.

3.1.2.4 Faults

Each Fault status is represented by a LED, which is RED when activated.

Note that the LED status does not take into account the current module configuration, therefore it only indicates the existence of the fault condition, independently from any configured behavior in case of fault.

3.1.2.5 Graph

The graph can show only one variable that must be chosen from the checkboxes above.

3.1.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.

By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.

After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.

Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

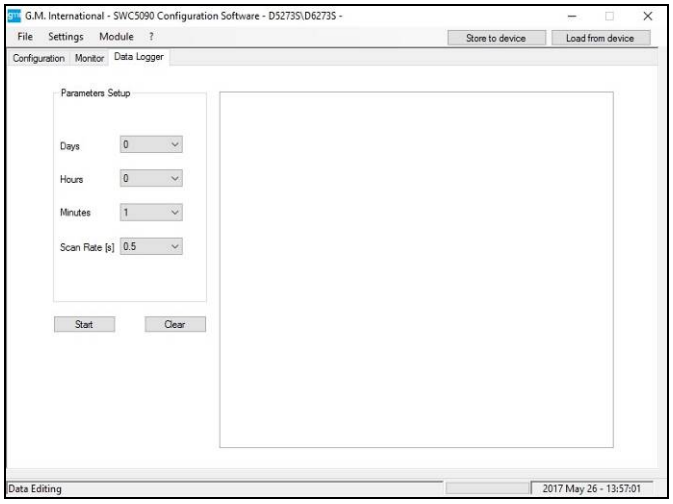


Figure 13: Data Logger screen.

3.2 D5072S, D5072D, D6072S, D6072D (from software revision 3)

D5072S, D5072D, D6072S, D6072D are Universal Converters and share the same screens, except for the number of input, output and alarm channels.

The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input**
  - **Output**
  - **Alarm**
- **Monitor**
- **Data Logger**

3.2.1 Configuration

3.2.1.1 Input

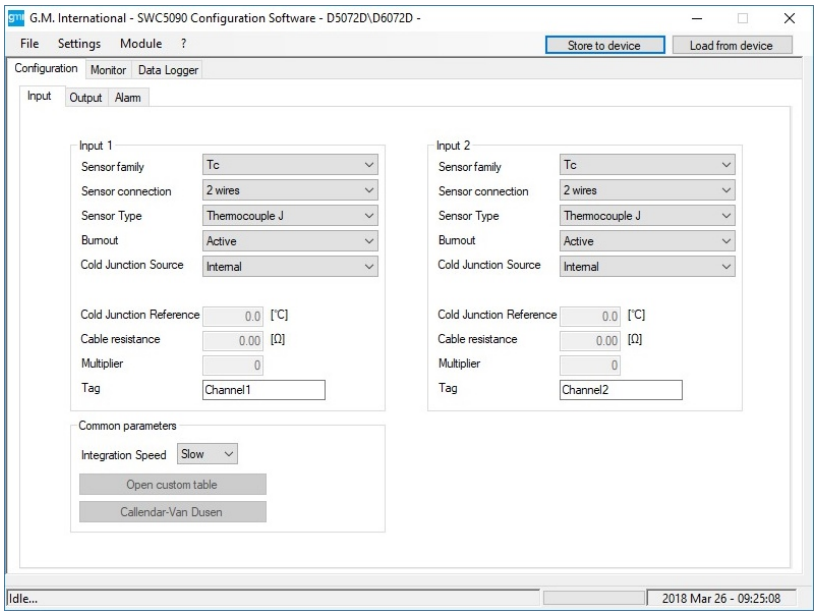


Figure 14: D5072D / D6072D Input configuration screen.

INPUT

Sensor family:

- TC
- RTD
- Voltage
- Resistance
- Potentiometer

Sensor Type: input sensor type (see list in section “Input specifications”)
possibility of configuring a completely customized input curve (TC/RTD)

Sensor connection: 2, 3, 4 wires selection for RTD/Resistance inputs
2 wires or External compensator selection for TC
3 wires selection for potentiometer

Downscale: input value of measuring range corresponding to defined low output value

Upscale: input value of measuring range corresponding to defined high output value

Cold Junction Source: reference junction compensation type (thermocouple only)

- Automatic via internal compensator (1 for each channel)
- Fixed programmable temperature compensation at fixed temperature
- Other remote compensation using RTD on remaining channel

Cold Junction Reference: fixed temperature compensation value (Cold Junction type Fixed only), range from -60 to +100 °C.

Cable resistance: available only for RTD and resistance sensors. Configurable from 0 to 50 Ω

External compensator: compensation using RTD, Callendar van dusen or custom curve.

Integration speed:

- Slow
- Fast

Multiplier: input multiplication value

Tag: 16 alphanumerical characters

Note: Downscale and Upscale settings should follow Minimum Span requirements stated in the data sheet, in order to avoid negative impacts on Output resolution.

3.2.1.2 Output

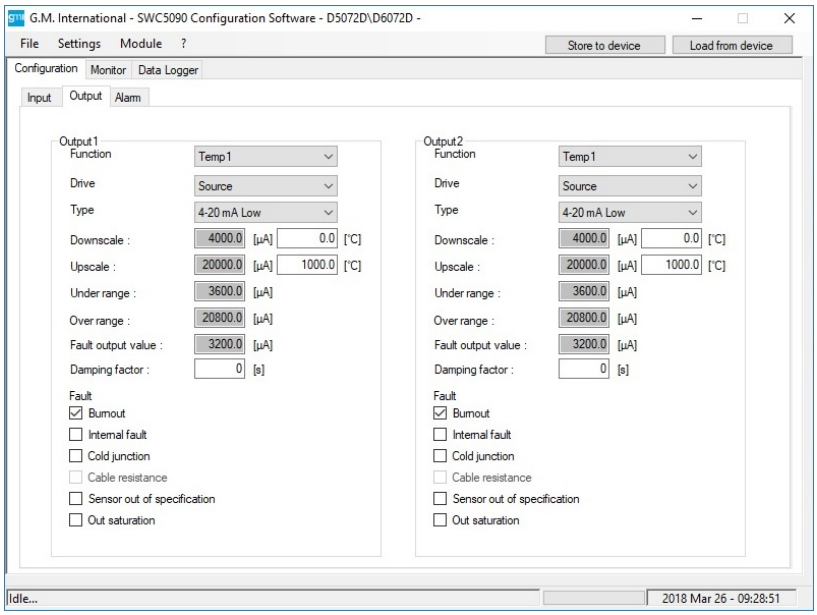


Figure 15: D5072D / D6072D Output configuration screen.

OUTPUT

Function:

- Temp 1 analog output represents input of first channel
- Temp 2 analog output represents input of second channel
- Temp 1 - 2 analog output represents the subtraction of the two input channels
- Temp 2 - 1 analog output represents the subtraction of the two input channels
- Temp mean represents the inputs mean value.
- Minimum analog output represents the lower of the two input channels
- Maximum) analog output represents the higher of the two input channels
- Redundancy When both sensors are available (no burnout condition) the input value represents the mean value of inputs. In case of one of them go on burnout condition, the input value represents the only working sensor.
- Value 1 analog output represents input of first channel (Not available only for TC\RTD sensors)
- Value 2 analog output represents input of second channel (Not available only for TC\RTD sensors)

Drive: Source, Sink mode.

Type:

- 4-20 mA Low
- 4-20 mA High
- 0-20mA High
- 4-20 mA NE43 Low, NAMUR RECOMMENDATION
- 4-20 mA NE43 High, NAMUR RECOMMENDATION
- Custom Scale: all Output parameters are fully customizable

Damping factor: causes conventional single-pole low pass filtering which is similar to an R-C network. Although high damping values will greatly suppress noise and make the output signal stable, it causes a slow response time.

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

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

Underrange: analog output downscale in underrange condition (range 0 to 24 mA)

Overrange: analog output downscale in overrange 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” in case of:

- Burnout input sensor interruption

- Internal fault — module internal fault
- Cold junction
- Cable resistance — when resistance value is higher than 50 Ω
- Sensor out of range — input sensor out of configured input range
- Output Saturation — output is below Underrange or above Overrange
- Module Temp. Out of range — internal module temp. under or over specified module operating temp. limits

3.2.1.3 Alarm

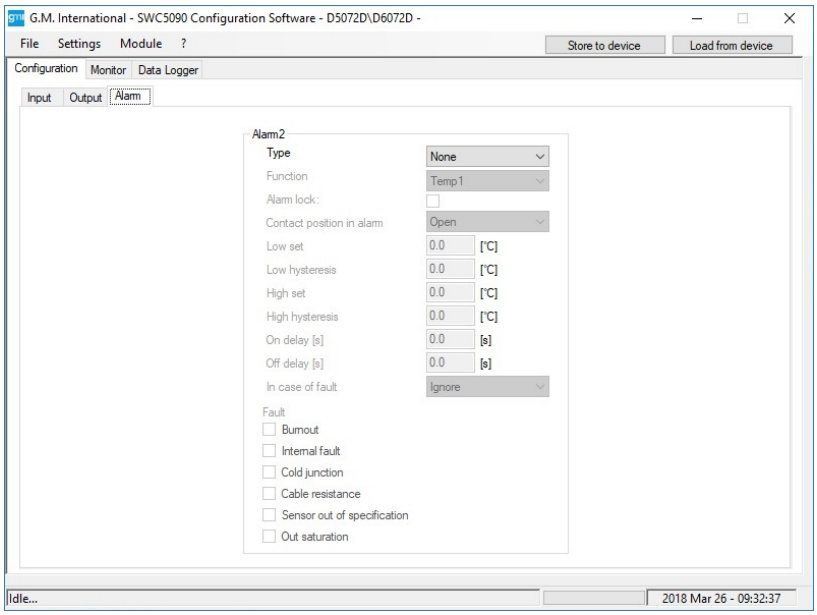


Figure 16: D5072D/D6072D alarm configuration screen.

ALARM

Type:

- None — alarm is disabled
- Low — alarm is triggered when source descends below “Low Set”
- High — alarm is triggered when source ascends over “High Set”
- Window — alarm is triggered below “Low Set” and above “High Set”
- Fault Repeater — alarm output reflects selected (one or more) Fault status

Function:

- Temp 1 — analog output represents input of first channel
- Temp 2 — analog output represents input of second channel
- Temp 1 - 2 — analog output represents the subtraction of the two input channels
- Temp 2 - 1 — analog output represents the subtraction of the two input channels
- Temp mean — represents the inputs mean value.
- Minimum — analog output represents the lower of the two input channels
- Maximum) — analog output represents the higher of the two input channels
- Redundancy — When both sensors are available (no burnout condition) the input value represents the mean value of inputs. In case of one of them go on burnout condition, the input value represents the only working sensor.
- Value 1 — analog output represents input of first channel (Not available only for TC\RTD sensors)
- Value 2 — analog output represents input of second channel (Not available only for TC\RTD sensors)

Alarm lock: alarm is inhibited until source ascends over “Low Set or descends below “High Set, and then it behaves as a standard “Low” or “High” configuration

Contact position in alarm:

- Open — alarm output is normally Open in case of alarm condition

- Closed alarm output is normally Closed in case of alarm condition

Low Set: source value at which the alarm is triggered (in Low, LowLock, Window)

Low Hysteresys: triggered Low alarm deactivates when source value reaches Low Set + Low Hysteresys

High Set: source value at which the alarm is triggered (in High, HighLock, Window)

High Hysteresys: triggered High alarm deactivates when source value reaches High Set - High Hysteresys

On Delay: time for which the source variable 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 source variable has to be in normal condition before the alarm output is deactivated; configurable from 0 to 1000 seconds in steps of 100 ms

In case of fault:

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

Faults: if “Type” is set to “Fault repeater” select which faults will be repeated by alarm output; if “In case of fault” is different from “Ignore”, select which faults should influence alarm output behaviour.

3.2.2 Monitor

The SWC5090 is able to continuously scan the module and display real-time values on screen.

Note that while the module is being monitored, configuration screens are disabled.

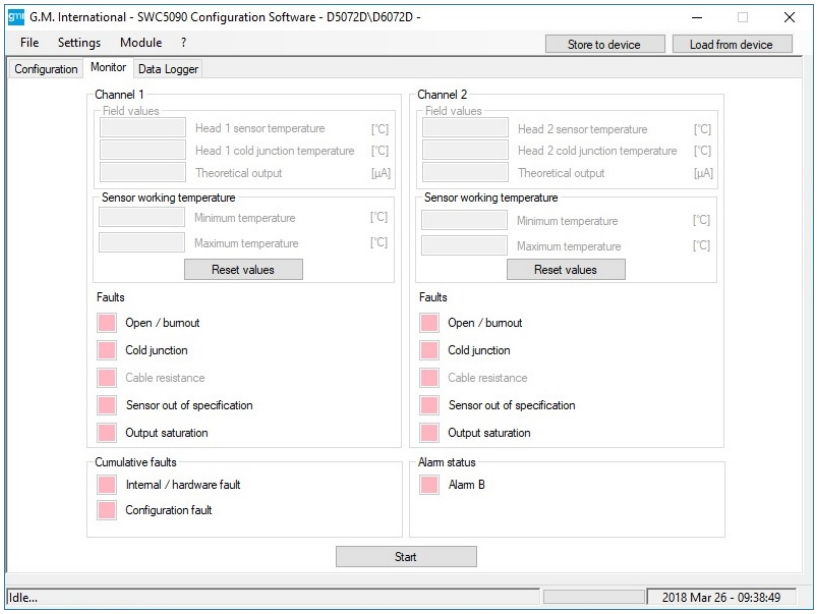


Figure 17: D5072D/D6072D Monitor screen.

The display shows Input and Theoretical Output values, fault and alarm status and a graph of chosen variable.

3.2.2.1 Input

Input variable is shown as it is detected by the module, after having applied configured calculations (Multiplier) and conversions.

3.2.2.2 Output

This value represents the theoretical output. During certain conditions, this value may differ from the measured value at output terminal blocks.

3.2.2.3 Alarm status

Alarm status is represented by a LED, which is RED when activated.

The LED status reflects the status of the Alarm exactly as configured.

3.2.2.4 Faults

Each Fault status is represented by a LED, which is RED when activated.

Note that the LED status does not take into account the current module configuration, therefore it only indicates the existence of the fault condition, independently from any configured behavior in case of fault.

3.2.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.

By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.

After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.

Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

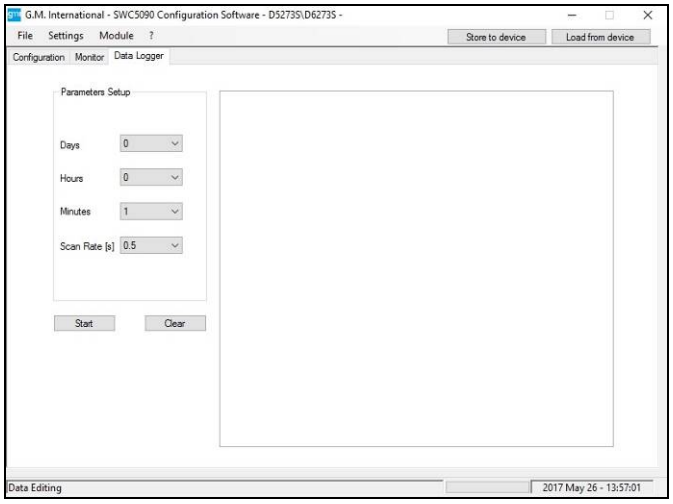


Figure 18: Data Logger screen.

3.3 D5072S-087, D5072D-087(from software revision 3)

D5072S-087, D5072D-087 are Universal Repeaters and share the same screens, except for the number of input, output and alarm channels.

The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input / Output**
- **Monitor**
- **Data Logger**

3.3.1 Configuration

3.3.1.1 Input

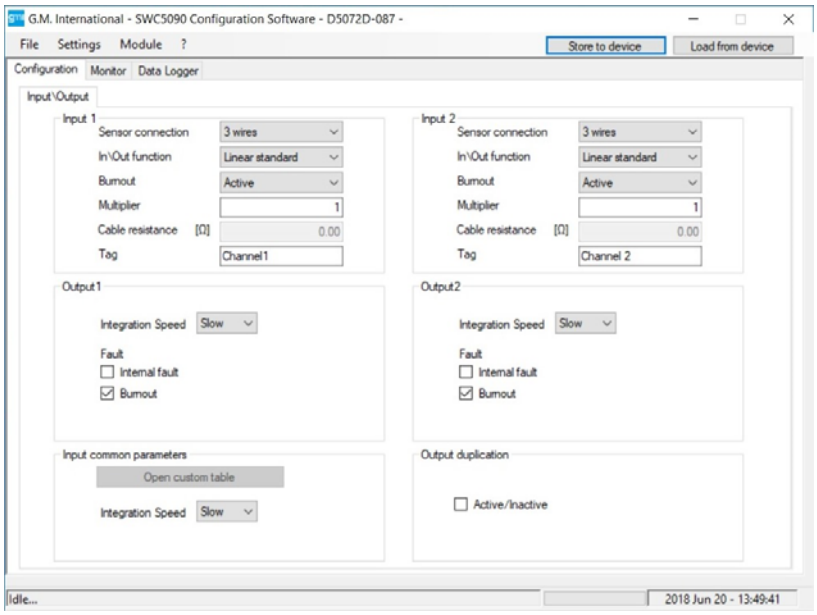


Figure 19: D5072D-087 Input / Output configuration screen.

INPUT

Sensor connection: 2, 3, 4 wires selection

Input / Output function:

- Linear standard: output reflects the input signal (standard range)
- Linear extended: output reflects the input signal (extended range)
- Custom: possibility of configuring a completely customized input curve

Burnout:

- Active: when selected burnout fault condition is triggered
- Inactive: when selected burnout fault condition is not triggered

Multiplier: input multiplication value

Cable resistance: configurable from 0 to 50 Ω

Tag: 16 alphanumerical characters

Output Integration speed:

- Slow
- Fast

Fault condition:

- Internal fault: module internal fault
- Burnout: input sensor interruption

Input Integration speed:

- Slow
- Fast

Output duplication:

- Active/inactive: when selected, it disables Input 2 and Output 2 configuration

3.3.2 Monitor

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

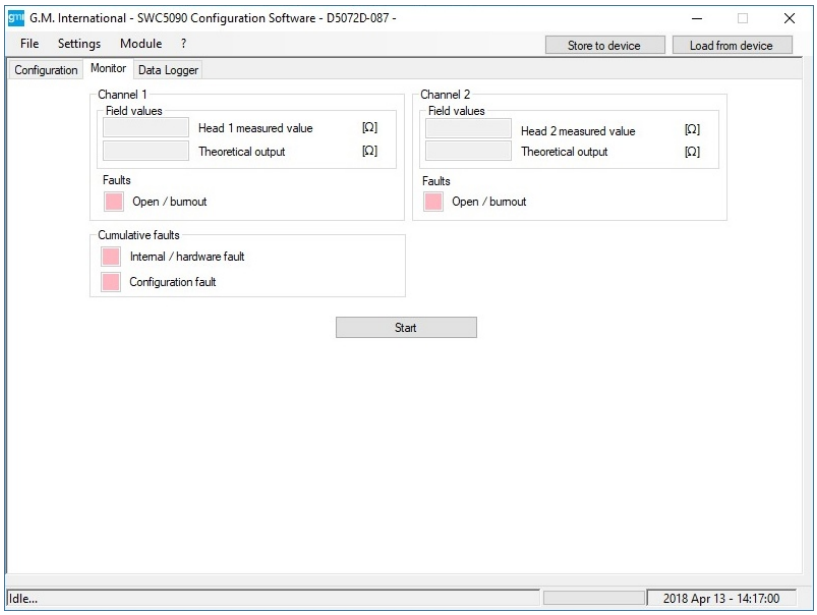


Figure 20: D5072D-087 Monitor screen.

The display shows Field values and Fault status.

3.3.2.1 Field values

Field values represent heads measured values and theoretical outputs.

3.3.2.2 Faults

Each Fault status is represented by a LED, which is RED when activated.

Note that the LED status does not take into account the current module configuration, therefore it only indicates the existence of the fault condition, independently from any configured behavior in case of fault.

3.3.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.

By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.

After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.

Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

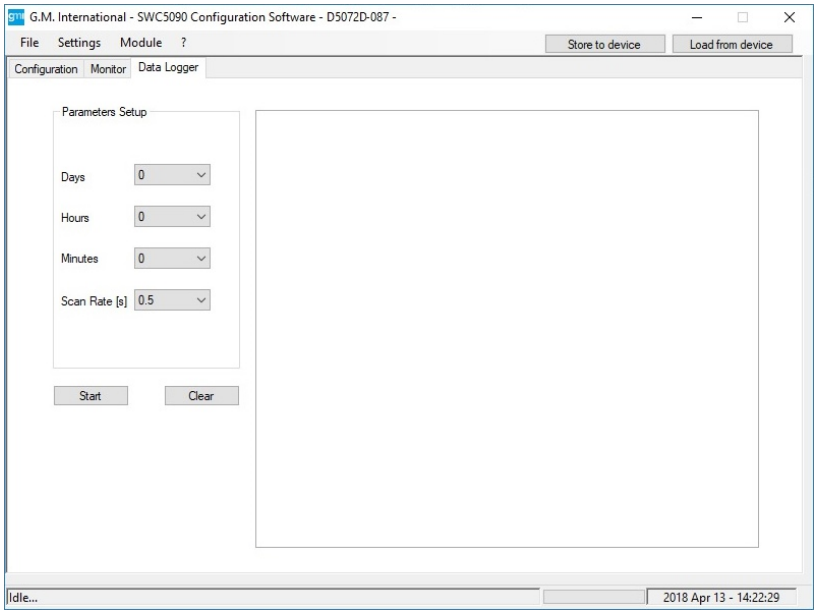


Figure 21: Data Logger screen.

3.4 D5072S-096, D5072D-096

D5072S-096, D5072D-096 are Universal Repeaters and share the same screens, except for the number of input, output and alarm channels.
The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input / Output**
- **Monitor**
- **Data Logger**

3.4.1 Configuration

3.4.1.1 Input

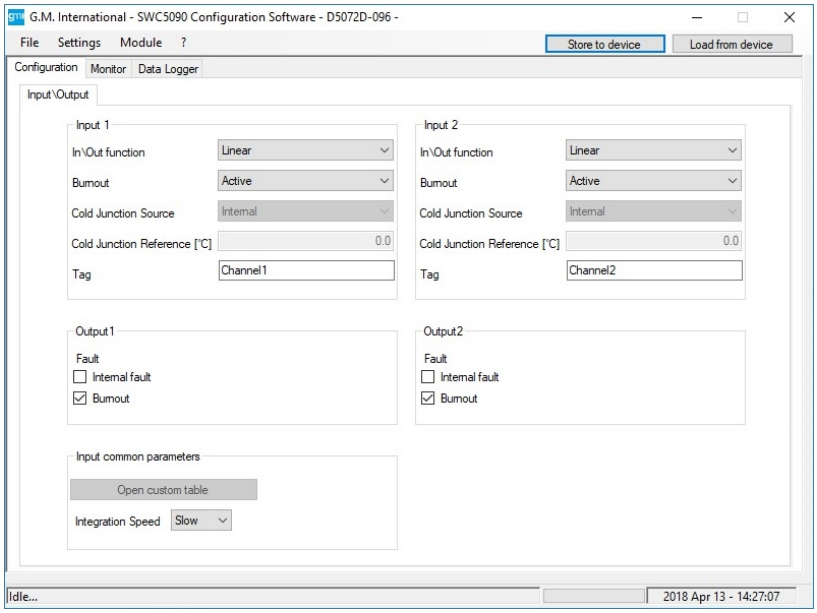


Figure 22: D5072D-096 Input / Output configuration screen.

INPUT
Input / Output function:

- Linear: output reflects the input signal
- Custom: possibility of configuring a completely customized input curve(Thermocouple)
- Thermocouple: input sensor type(see list in section “Input specifications”)

Burnout

- Active: when selected burnout fault condition is triggered

- Inactive: when selected burnout fault condition is not triggered

Cold junction source:

- Internal: via internal compensator (1 for each channel)
- External: programmable temperature compensation at fixed temperature

Cold Junction Reference: fixed temperature compensation value (Cold Junction type Fixed only), range from -60 to +100 °C.

Tag: 16 alphanumerical characters

Integration speed:

- Slow
- Fast

Fault condition:

- Internal fault: module internal fault
- Burout: input sensor interruption

3.4.2 Monitor

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

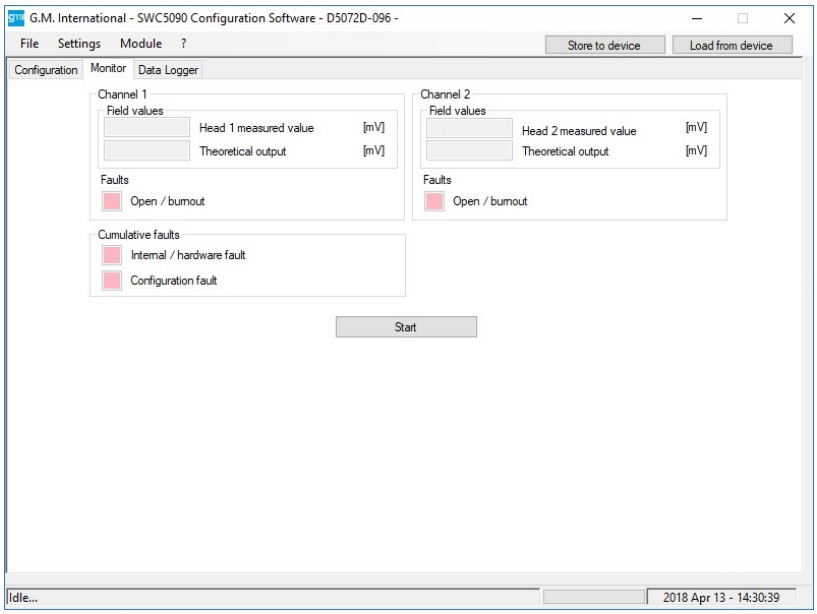


Figure 23: D5072D-096 Monitor screen.

The display shows Field values and Fault status.

3.4.2.1 Field values

Field values represent heads measured values and theoretical outputs.

3.4.2.2 Faults

Each Fault status is represented by a LED, which is RED when activated.
Note that the LED status does not take into account the current module configuration, therefore it only indicates the existence of the fault condition, independently from any configured behavior in case of fault.

3.4.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

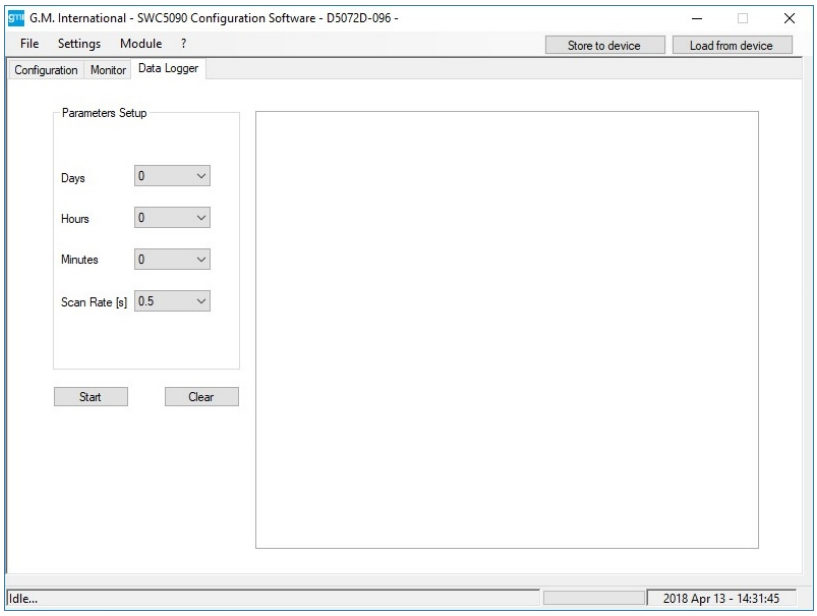


Figure 24: Data Logger screen.

3.5 D5231E / D6231E

D5231E is an intrinsically safe eight channel Switch/Proximity detector repeater interface.
Modbus RTU RS-485 output is available on Bus connector.
The Application Window user interface is organized into the following areas:

- **Configuration**
- **Monitor**
- **Data Logger**

3.5.1 Configuration

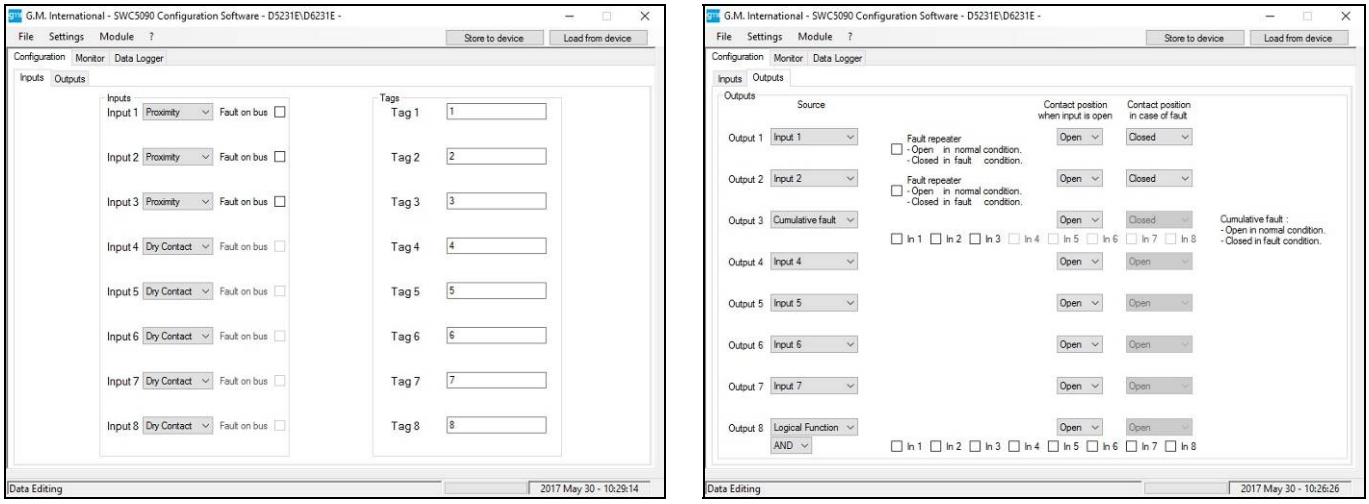


Figure 25: D5231E / D6231E input (on the left) and output (on the right) configuration screen.

Configuration parameters can be read and written from the module or from saved file. It is also possible to reset the module configuration to factory default settings. A report sheet containing complete configuration can be printed.

INPUTS 1 to 8:

- **Sensor Type:**
  - Proximity
  - Dry Contact

Note: To enable line diagnostic on Voltage free contacts, follow instructions in Section "Operation" of Instruction Manual ISM0172 and configure sensor as "Proximity".

TAGS 1 to 8:

16 alphanumerical characters

OUTPUTS 1 to 8:

- **Source:**
  - Input 1 Output represents Input 1
  - Input 2 Output represents Input 2
  - Input 3 Output represents Input 3
  - Input 4 Output represents Input 4
  - Input 5 Output represents Input 5
  - Input 6 Output represents Input 6
  - Input 7 Output represents Input 7
  - Input 8 Output represents Input 8
  - Logical function Output represents AND/OR function of selected inputs
  - Cumulative fault: Output represents OR function of selected inputs fault conditions
- **Contact: normal condition of output contact**
  - Open
  - Closed (for SIL applications)
- **In case of fault:**
  - Ignore Ignore
  - Open
  - Closed (for SIL applications)
- **Fault repeater:** Output represents Input Fault status
- **Logical Function:** visible only when selected in "Output source"
  Allows the logical binding of 2 or more (up to 8) Inputs.
  - AND Output represents AND logical function of selected Inputs,

- OR Output represents OR logical function of selected Inputs.

3.5.2 Monitor

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

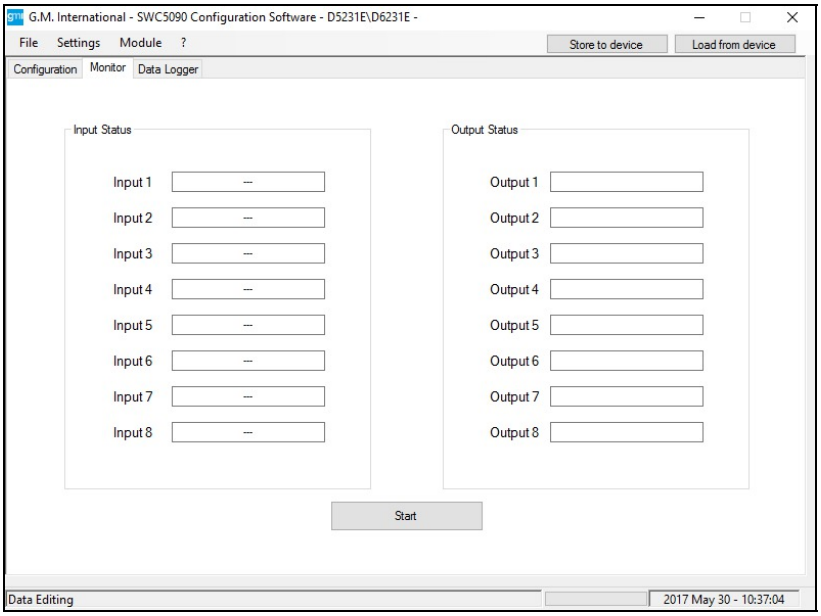


Figure 26: D5231E / D6231E Monitor screen.

INPUT STATUS:

- The status of each input is shown
  - Open circuit Open circuit fault (only for Proximity Inputs)
  - Off Off
  - On On
  - Short circuit Short circuit fault (only for Proximity Inputs)

OUTPUT STATUS:

- The status of each output contact is shown
  - Open
  - Closed

3.5.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

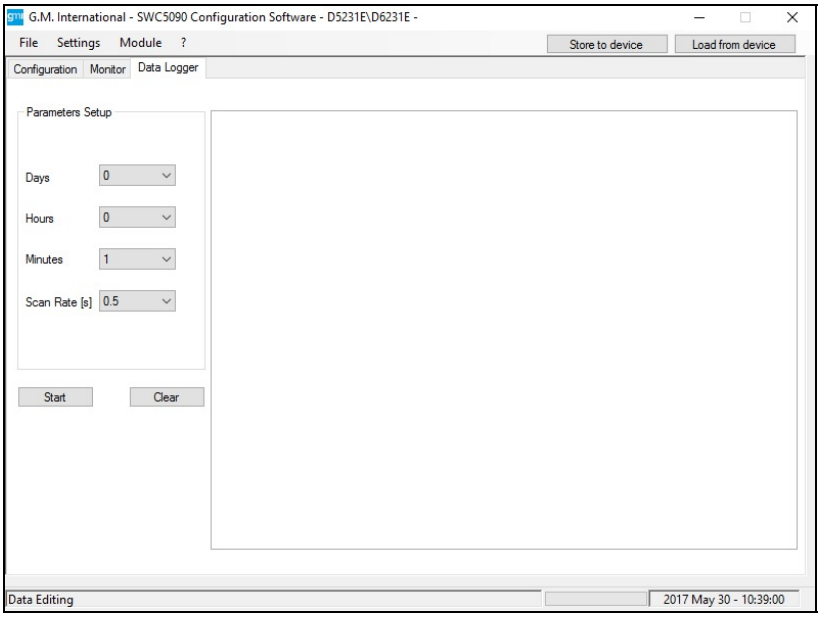


Figure 27: Data Logger screen.

PARAMETERS SETUP:

- **Days:** Number of days to acquire
- **Hours:** Number of hours to acquire
- **Minutes:** Number of minutes to acquire
- **Scan rate:** Frequency interval for acquisitions

3.6 D5240T

Note: Software revision of the module can be found by clicking on "Module > Show identification > Software revision".

D5240T is a Digital Output Isolator, suitable for driving solenoid valves, visual or audible alarms or other process control devices in Hazardous Area.

The Application Window user interface is organized into the following areas:

- **Configuration**
- **Data Logger**

3.6.1 Configuration

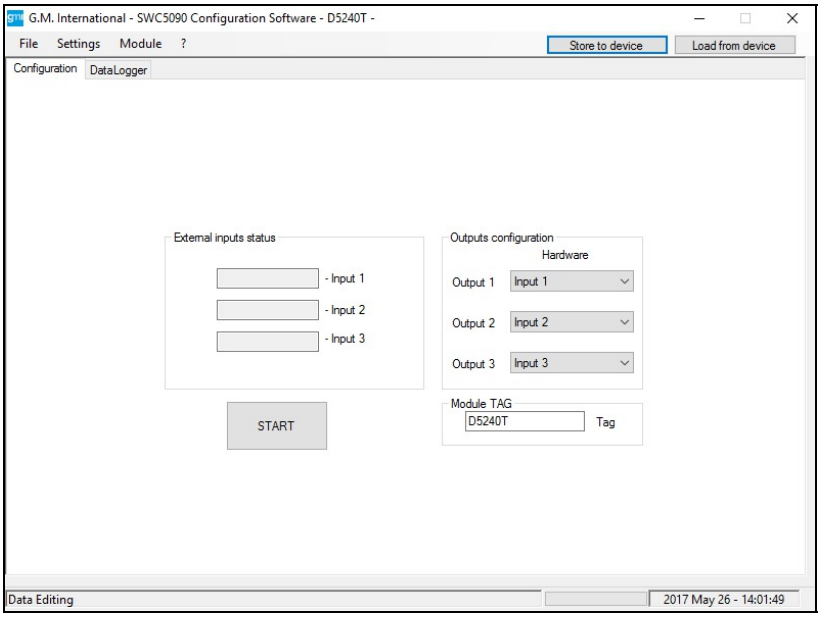


Figure 28: D5240T configuration screen.

Configuration parameters can be read and written from the module or from saved file. It is also possible to reset the module configuration to factory default settings. A report sheet containing complete configuration can be printed.

TAG: Identification of the specific operating loop of the module.

External inputs status: Status of each Input channel is indicated in the related field.

Outputs configuration: Each Output can be configured to be driven by an independent Input, or by its opposite.

D5240T Input can be Hardware (via Terminal blocks) and/or Software (via Modbus). Both types can be used to drive the Output. For Software input see next Section.

Hardware input:

Output 1 to 3:

- Input1: Output represents Input1
- Input2 :Output represents Input2
- Input3: Output represents Input3
- Not Input1: Output represents Not Input1 *
- Not Input2 :Output represents Not Input2 *
- Not Input3: Output represents Not Input3 *

* *Note: example: Input = 1; Output = 0*

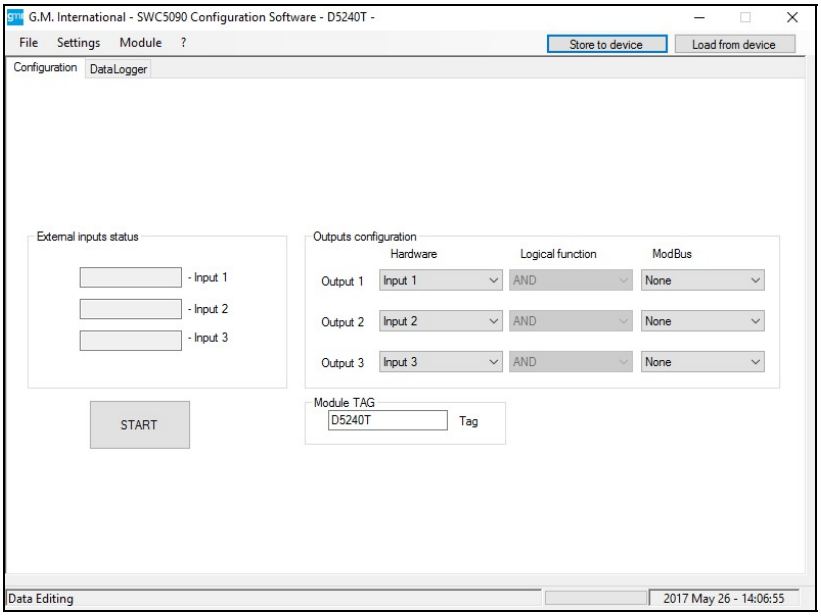


Figure 29: D5240T Advanced configuration options.

ADVANCED OPTIONS:

Advanced options for configuration can be found by clicking on the “Module > Advanced Options” entry of the main menu.
Hardware and Software Input can be logically combined to drive the Output.

Hardware Input	Logical function	Software Input	Output
0	AND	0	0
0	AND	1	0
1	AND	0	0
1	AND	1	1
0	OR	0	0
0	OR	1	1
1	OR	0	1
1	OR	1	1

Note: Selecting “Not Input” changes Input to opposite state (1 to 0; 0 to 1).
Note: Only when the selected Modbus input is different from “None”, the hardware input can be set to “None”.

3.6.2 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

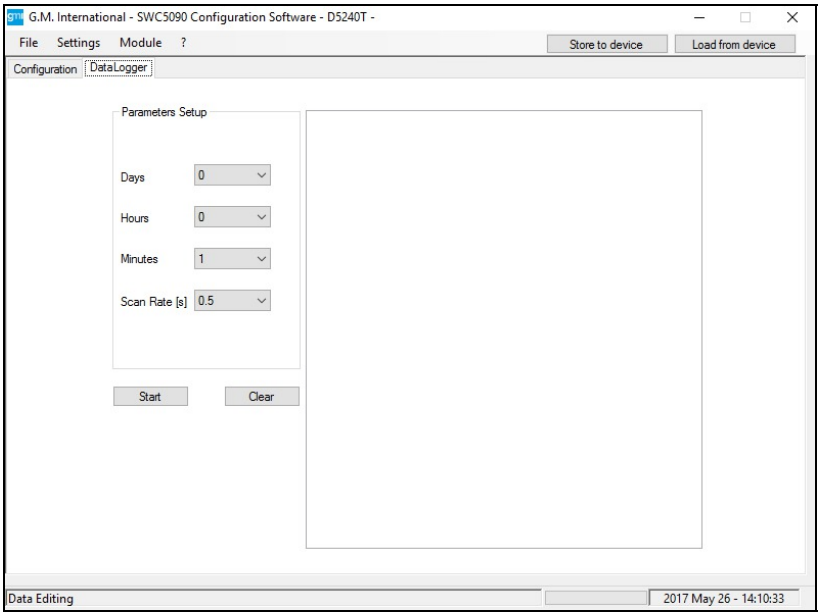


Figure 30: Data Logger screen.

PARAMETERS SETUP:
Days: Number of days to acquire
Hours: Number of hours to acquire
Minutes: Number of minutes to acquire
Scan rate: Frequency interval for acquisitions

3.7 D5293S, D5294S (software revision 0)

Note: Software revision of the module can be found by clicking on "Module > Show identification > Software revision".
The D5293S-D5294S Application Window user interface is organized into three Tabs:

- **Configuration**
  - User Manual Settings
  - Fault Conditions Monitoring
  - Tag
  - Acquire Functions
  - Continuous Scan
- **Monitor**
  - Measured Values
  - Graph

- **Data Logger**

3.7.1 Configuration

3.7.1.1 Continuous Scan

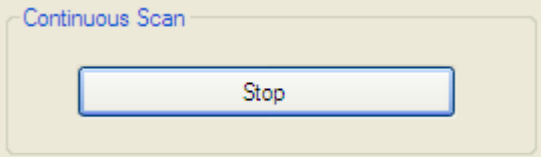


Figure 31: Continuous Scan box.

By pressing the **"Start"** button in the **Continuous Scan** box (see Figure 31), the module starts acquiring the data field (in the **Measured Values**) periodically. To interrupt data acquisition press the same button – this time the label will be **"Stop"** – shall be pressed.

3.7.1.2 Tag

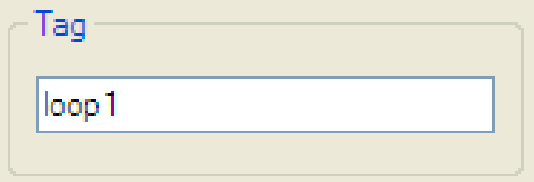


Figure 32: Tag box.

The **Tag** (see Figure 32) provides a label that can be associated to the specific loop.

3.7.1.3 User Manual Settings

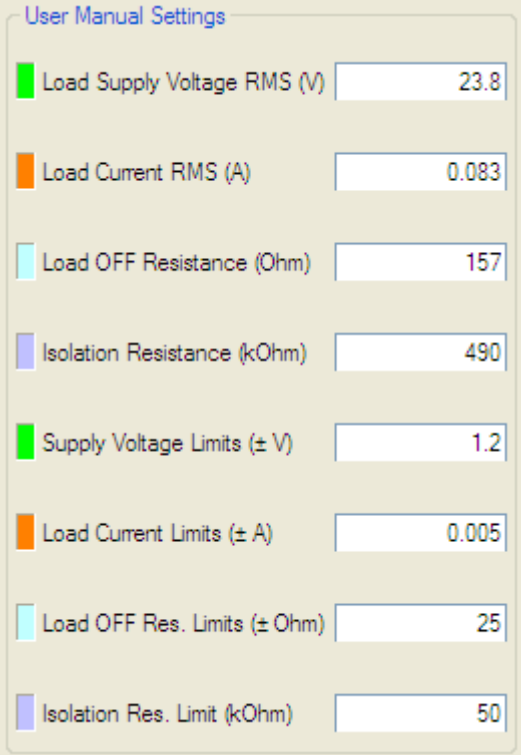


Figure 33: User Manual Settings box.

User Manual Settings (see Figure 33) can partially be acquired through the **Acquire Functions** and/or changed manually before being written to the D5293S/D5294S module through the **"Write to Module"** button on the Menu Bar. **User Manual Settings** include:

- **Load Supply Voltage RMS (V)**
  indicates the RMS voltage that is actually applied (in ON State, load energized) or that will be applied (in OFF State, load de-energized) to the load.
- **Load Current RMS (A)**
  represents the RMS current that is flowing through the load (hence it will be zero in OFF state).
- **Load OFF Resistance (Ω)**
  is the load resistance measured in OFF State. In ON State, this value will remain at the saturation value (5 kΩ)
- **Isolation Resistance (kΩ)**
  shows the leakage resistance to earth. Also the Isolation Resistance is measured only in OFF State; during ON State, it goes to the saturation value of 3 MΩ
- **Coil Integrity**
  monitors the status of the relay coil in ON State: “FAIL” indicates that a relay coil is in short-circuit
- **Driver Status**
  indicates whether the load has been energized (“ON”) or not (“OFF”)

User Manual Settings specify nominal values and limits that will activate the fault indication (red LED and two fault relay contacts). See Section 3.7.1.4 for more details.

Remember that only after pressing the **“Write to Module”** button on the Menu Bar **User Manual Settings** and **Fault Conditions Monitoring** become effective.

See Section 3.7.1.4 for an explanation of the color indicators on the left.

3.7.1.4 Fault Conditions Monitoring

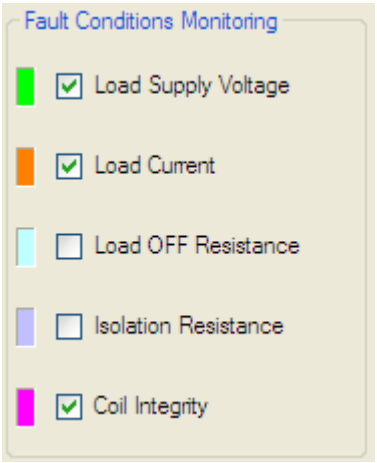


Figure 34: Fault Conditions Monitoring box.

Fault Conditions Monitoring (see Figure 34) indicate which subset of the User Manual Settings shall activate the fault. Therefore:

- If *Load Supply Voltage* is enabled,
  a measured *Load Supply Voltage RMS* outside the specified limits will activate the fault.
- If *Load Current* is enabled,
  a measured *Load Current RMS* outside the specified limits will activate the fault.
- If *Load OFF Resistance* is enabled,
  a measured *Load OFF Resistance* outside the specified limits shall activate the fault.
- If *Isolation Resistance* is enabled,
  only a measured *Isolation Resistance* below the specified limit shall activate the fault.
- If *Coil Integrity* is enabled,
  a coil short circuit in ON state shall activate the fault.

Note that, by activating the monitoring of a fault condition, the related color indicator on the left side becomes brighter together with the corresponding measured value and user manual settings. This color policy allows a fast identification of the quantities that contribute to the fault activation.

Fault Conditions Monitoring are combined with the **Driver Status**. While the *Load Supply Voltage RMS* can always be effective, the *Load Current RMS* and *Coil Integrity* can be active only during the ON State, whereas the *Load OFF Resistance* and the *Isolation Resistance* only during the OFF State.

Note also that only after pressing the **"Write to Module"** button on the Menu Bar the **User Manual Settings** and the **Fault Conditions Monitoring** will be saved onto the module, hence becoming effective.

3.4.1.5 Fault Activation

The fault is activated if at least one of the following conditions are met:

- *Load Supply Voltage* Monitoring is enabled AND
  ((*Load Supply Voltage RMS* < *Load Supply Voltage RMS* Nominal – *Supply Voltage Limits*) OR
  (*Load Supply Voltage RMS* > *Load Supply Voltage RMS* Nominal + *Supply Voltage Limits*))
- *Load Current* Monitoring is enabled AND the load is Activated AND
  ((*Load Current RMS* < *Load Current RMS* Nominal - *Load Current Limits*) OR
  (*Load Current RMS* > *Load Current RMS* Nominal + *Load Current Limits*))
- *Load OFF Resistance* Monitoring is enabled AND the load is De-activated AND
  ((*Load OFF Resistance* < *Load OFF Resistance* Nominal – *Load OFF Resistance* Limits) OR
  (*Load OFF Resistance* > *Load OFF Resistance* Nominal + *Load OFF Resistance* Limits))
- *Isolation Resistance* Monitoring is enabled AND the load is De-activated AND
  (*Isolation Resistance* < *Isolation Resistance* Nominal - *Isolation Resistance Limit*)
- *Coil Integrity* Monitoring is enabled AND the load is Activated AND *Coil Integrity* is *FAIL*.

<table>
<tr><th rowspan="2">Active Monitoring</th><th colspan="6">Driver Status</th></tr>
<tr><th colspan="3">OFF State</th><th colspan="3">ON State</th></tr>
<tr><td>Load Supply Voltage</td><td>$V_{meas} < V_{nom} - V_{lim}$</td><td>$V_{nom} - V_{lim} \le V_{meas}$
or
$V_{meas} \le V_{nom} + V_{lim}$</td><td>$V_{nom} + V_{lim} < V_{meas}$</td><td>$V_{meas} < V_{nom} - V_{lim}$</td><td>$V_{nom} - V_{lim} \le V_{meas}$
or
$V_{meas} \le V_{nom} + V_{lim}$</td><td>$V_{nom} + V_{lim} < V_{meas}$</td></tr>
<tr><td>Load Current</td><td colspan="3">Not applicable</td><td>$I_{meas} < I_{nom} - I_{lim}$</td><td>$I_{nom} - I_{lim} \le I_{meas}$
or
$I_{meas} \le I_{nom} + I_{lim}$</td><td>$I_{nom} + I_{lim} < I_{meas}$</td></tr>
<tr><td>Load OFF Resistance</td><td>$R_{meas} < R_{nom} - R_{lim}$</td><td>$R_{nom} - R_{lim} \le R_{meas}$
or
$R_{meas} \le R_{nom} + R_{lim}$</td><td>$R_{nom} + R_{lim} < R_{meas}$</td><td colspan="3">Not applicable</td></tr>
<tr><td>Isolation Resistance</td><td>$R_{meas} < R_{nom} - R_{lim}$</td><td colspan="2">$R_{nom} - R_{lim} \le R_{meas}$</td><td colspan="3">Not applicable</td></tr>
<tr><td>Coil Integrity</td><td colspan="3">Not applicable</td><td colspan="2">FAIL</td><td>OK</td></tr>
</table>

Table 1: Combination of Monitoring functions activation with Driver Status.

Table 1 shows how the activation of the various Monitoring functions combines with the Driver Status: a red cell indicates that the fault can be activated, while a green cell indicates that the fault cannot be activated.

Note again that only after pressing the **"Write to Module"** button on the Menu Bar, the **User Manual Settings** and **Fault Conditions Monitoring** will be exported to the module, hence becoming effective.

When the fault is activated, the red LED is lighted and the two fault relays open. On the Application Window the **Measured Values** that caused the fault turn red.

3.7.1.5 Acquire Functions

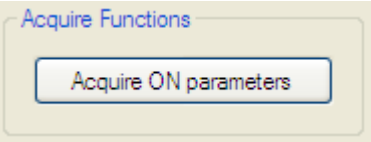


Figure 35: Acquire Functions box.

The **Acquire Functions** (see Figure 35) allows the user to acquire the **Measured Values** to the **User Manual Settings**.

These functions ease the user's task, while avoiding that the technical details (supply voltage, load current, load resistance, etc.) of the application are necessary for the module configuration. If the load is de-energized (OFF State), the **"Acquire OFF parameters"** button will copy the *Load Supply Voltage RMS* and the *Load OFF Resistance* to the corresponding **User Manual Settings**. If the load is energized (ON State), the **"Acquire ON parameters"** button will copy the *Load Supply Voltage RMS* and the *Load Current RMS* to the corresponding **User Manual Settings**.

Note that the data acquisition button can be pressed only when the continuous scan is active, hence avoiding to acquire outdated field values.

3.7.2 Monitor

3.7.2.1 Measured Values

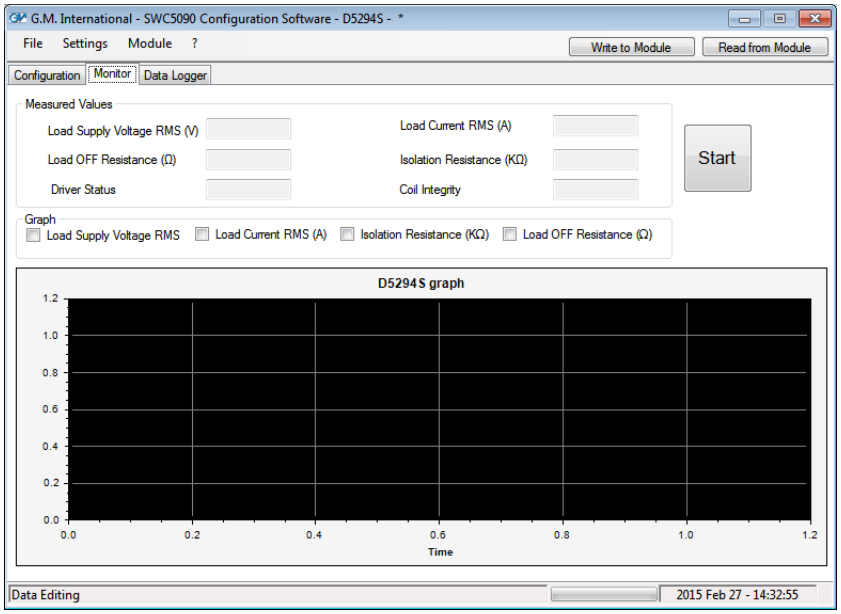


Figure 36: Monitor Tab.

Measured Values (see Figure 36) are periodically acquired from the field, when the Start/Stop is activated (odometer running in the Bottom Bar). When the Start/Stop button is deactivated, the **Measured Values** remain frozen to the last field acquisition value.

Measured Values include:

- **Load Supply Voltage RMS (V)**
  indicates the RMS voltage that is actually applied (in ON State, load energized) or that will be applied (in OFF State, load de-energized) to the load.
- **Load Current RMS (A)**
  represents the RMS current that is flowing through the load (hence it will be zero in OFF state).
- **Load OFF Resistance (Ω)**
  is the load resistance measured in OFF State. In ON State, this value will remain at the saturation value (5 kΩ)
- **Isolation Resistance (kΩ)**
  shows the leakage resistance to earth. Also the Isolation Resistance is measured only in OFF State; during ON State, it goes to the saturation value of 3 MΩ
- **Coil Integrity**
  monitors the status of the relay coil in ON State: "FAIL" indicates that a relay coil is in short-circuit
- **Driver Status**
  indicates whether the load has been energized ("ON") or not ("OFF")

See Section 3.7.1.4 for the explanation of the color indicators on the left.

3.7.2.2 Graph

It is possible to show the value of a variable on a graph. To do so, start acquisition by pressing the Start button and then select the desired variable by checking the corresponding checkbox.

Note that only one variable can be seen at a time.

3.7.3 Examples and Applications

Detailed examples of D5293S and D5294S configurations and applications can be found in a dedicated application note APN0036 which can be found on our website www.gmintsrl.com.

3.8 D5293S (software revisions 1 and 2) *

Note: Software revision of the module can be found by clicking on "Module > Show identification > Software revision".

The D5293S is a relay module suitable for the switching of safety related circuits, up to SIL 3 level according to IEC 61508:2010 Ed.2, for high risk industries.

The Application Window user interface is organized into the following areas:

- **Configuration**
- **Monitor**
- **Data Logger**

3.8.1 Configuration

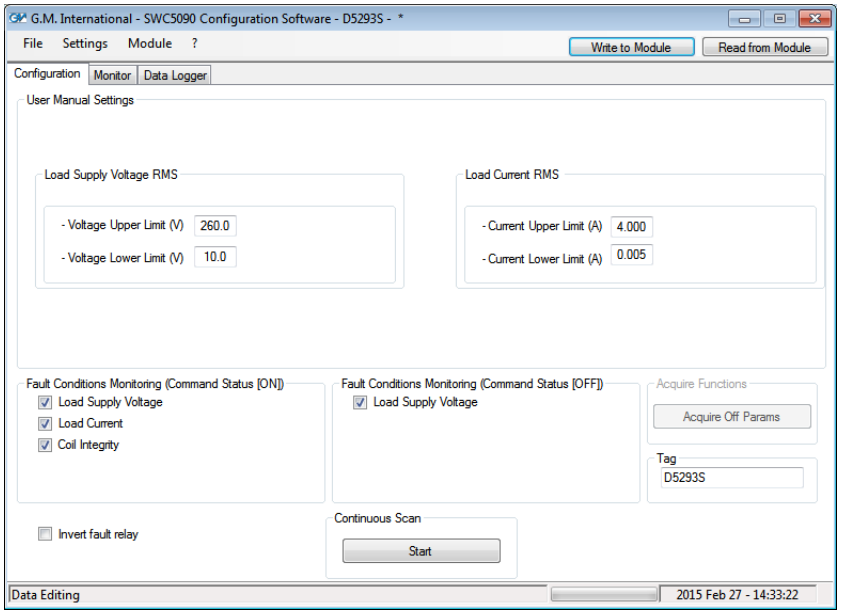


Figure 37: D5293S Configuration screen.

Configuration parameters can be read and written from the module or from saved file.
It is also possible to reset the module configuration to factory default settings.

---

* *For software revision n. 2, it is not possible to disable hysteresis and to check coil integrity.*

A report sheet containing complete configuration can be printed.

User Manual Settings:

Load Supply Voltage RMS

- Voltage Upper Limit (V): Maximum allowed load RMS voltage
- Voltage Lower Limit (V): Minimum allowed load RMS voltage

Load Current RMS

- Current Upper Limit (A): Maximum allowed load RMS current
- Current Lower Limit (A): Minimum allowed load RMS current

FAULT CONDITIONS MONITORING:

(Command Status [ON]): Faults contributing to the output cumulative fault when the driver is on.

FAULT CONDITIONS MONITORING:

(Command Status [OFF]): Faults contributing to the output cumulative fault when the driver is off.

- Load Supply Voltage: When checked, the load supply voltage can activate the cumulative fault.
- Load Current: When checked, the load current can activate the cumulative fault.
- Coil Integrity: When checked, the short circuit of any coil can activate the cumulative fault (only until **software revision 1**).

TAG: Identification of the specific operating loop of the module.

ACQUIRE FUNCTIONS: Acquisition and saving of the diagnostics field parameters.

- Acquire OFF parameters: The currently measured OFF parameters are copied to the USER MANUAL SETTINGS (available only when the driver is OFF).
- Acquire ON parameters: The currently measured ON parameters are copied to the USER MANUAL SETTINGS (available only when the driver is ON).

CONTINUOUS SCAN: Continuous measurement of the field parameters.

- Start/Stop: Activates/de-activates the measurement of the field parameters.

INVERT FAULT RELAY: When not checked, the output fault contacts open in case of fault. When checked, the output fault contacts close in case of fault.

ADVANCED OPTIONS:

Advanced options for configuration can be found by clicking on the “Module > Advanced Options” entry of the main menu.

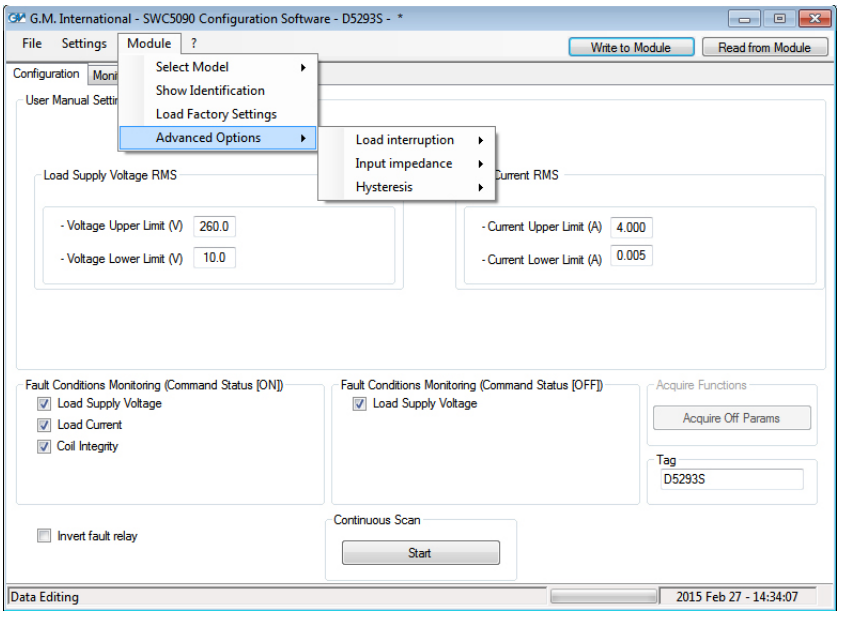


Figure 38: Advanced configuration options.

Load Interruption:

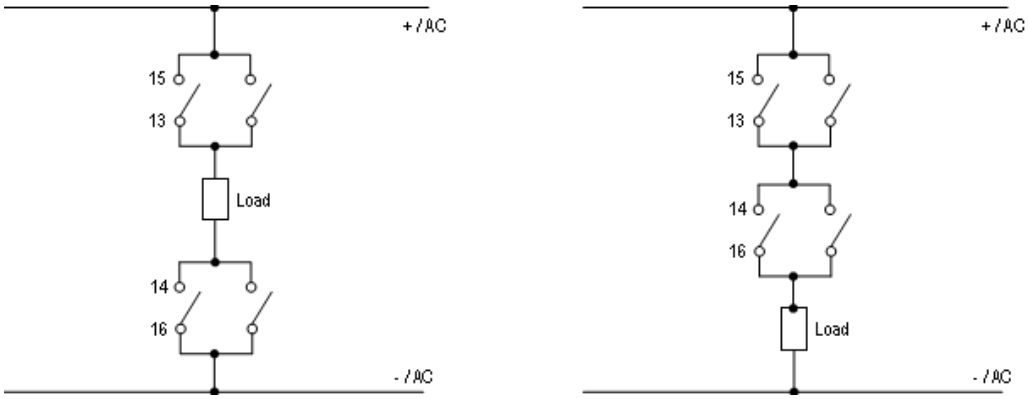


Figure 39: Bipolar (on the left) and unipolar (on the right) load interruption.

- Bipolar: Load is disconnected by removing connection to both AC/DC lines
- Unipolar: Load is disconnected only from one AC/DC line.

Input impedance:

- Mirror: The fault in the field is directly mirrored to the PLC DO.
- Always OFF: Input impedance seen by the PLC with Pulse Testing is always HIGH.
- Always ON: Input impedance seen by the PLC with Pulse Testing is always LOW.

3.8.1.1 Hysteresis (always visible since software revision 2):

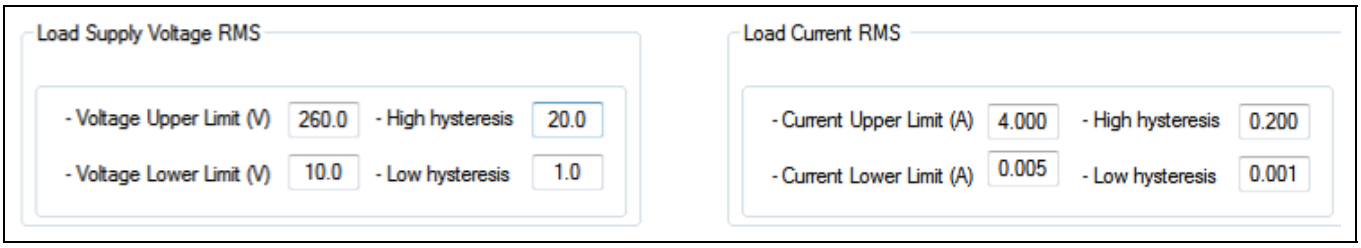


Figure 40: D5293S with Hysteresis enabled.

- **ON:**
  - Upper Fault condition is activated when signal is higher than Upper Limit and deactivates when lower than Upper Limit – High Hysteresis value.
  - Lower Fault condition is activated when signal is lower than Lower Limit and deactivates when higher than Lower Limit + Low Hysteresis value.
- **OFF:** No hysteresis is present and fault conditions are triggered exactly when signal is higher or lower than defined limits.

3.8.2 Monitor

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

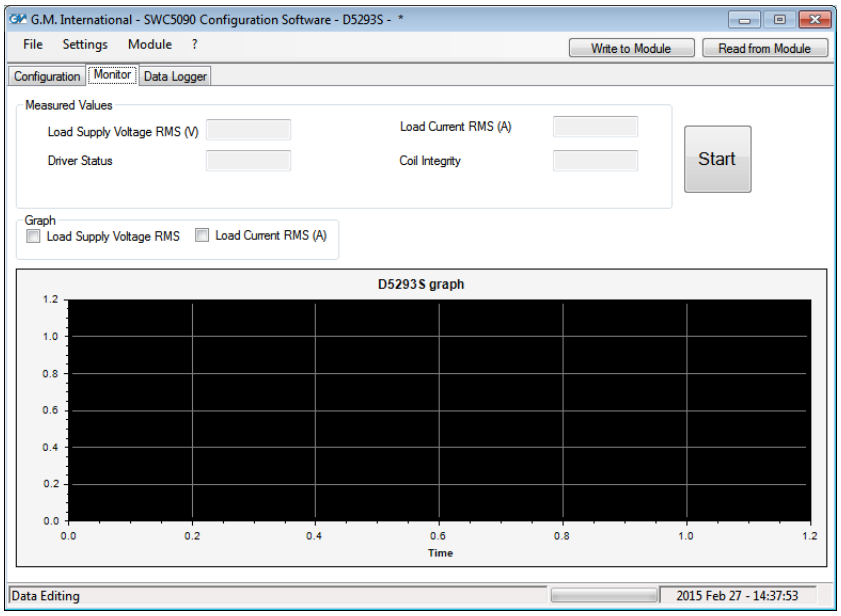


Figure 41: D5293S Monitor screen.

Measured Values (see Figure 41) are periodically acquired from the field, when the Start/Stop is activated (odometer running in the Bottom Bar). When the Start/Stop button is deactivated, the **Measured Values** remain frozen to the last field acquisition value.

Measured Values include:

- **Load Supply Voltage RMS (V)**
  indicates the RMS voltage that is actually applied (in ON State, load energized) or that will be applied (in OFF State, load de-energized) to the load.
- **Load Current RMS (A)**
  represents the RMS current that is flowing through the load (hence it will be zero in OFF state).
- **Coil Integrity**
  monitors the status of the relay coil in ON State: “FAIL” indicates that a relay coil is in short-circuit
- **Driver Status**
  indicates whether the load has been energized (“ON”) or not (“OFF”)

3.8.2.1 Graph

It is possible to show the value of a variable on a graph. To do so, start acquisition by pressing the Start button and then select the desired variable by checking the corresponding checkbox.

Note that only one variable can be seen at a time.

3.8.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.

By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.

After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.

Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

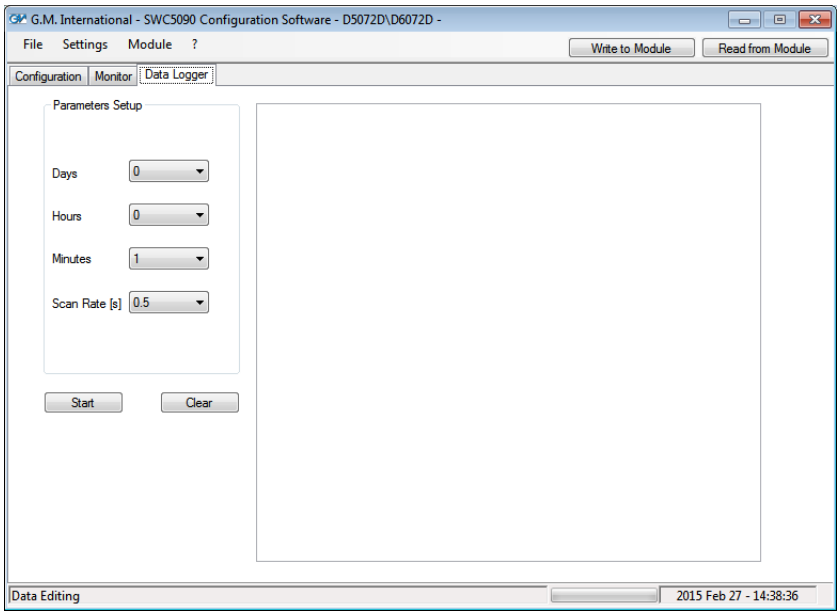


Figure 42: Data Logger screen.

PARAMETERS SETUP:

- **Days:** Number of days to acquire
- **Hours:** Number of hours to acquire
- **Minutes:** Number of minutes to acquire
- **Scan rate:** Frequency interval for acquisitions

3.9 D5294S, D5295S (software revisions 1 and 2) *

Note: Software revision of the module can be found by clicking on "Module > Show identification > Software revision".

D5294S and D5295S are relay module suitable for the switching of safety related circuits, up to SIL 3 level according to IEC 61508:2010 Ed.2, for high risk industries.

The Application Window user interface is organized into the following areas:

- **Configuration**

---

* *For software revision n. 2, it is not possible to disable hysteresis.*

- **Monitor**
- **Data Logger**

3.9.1 Configuration

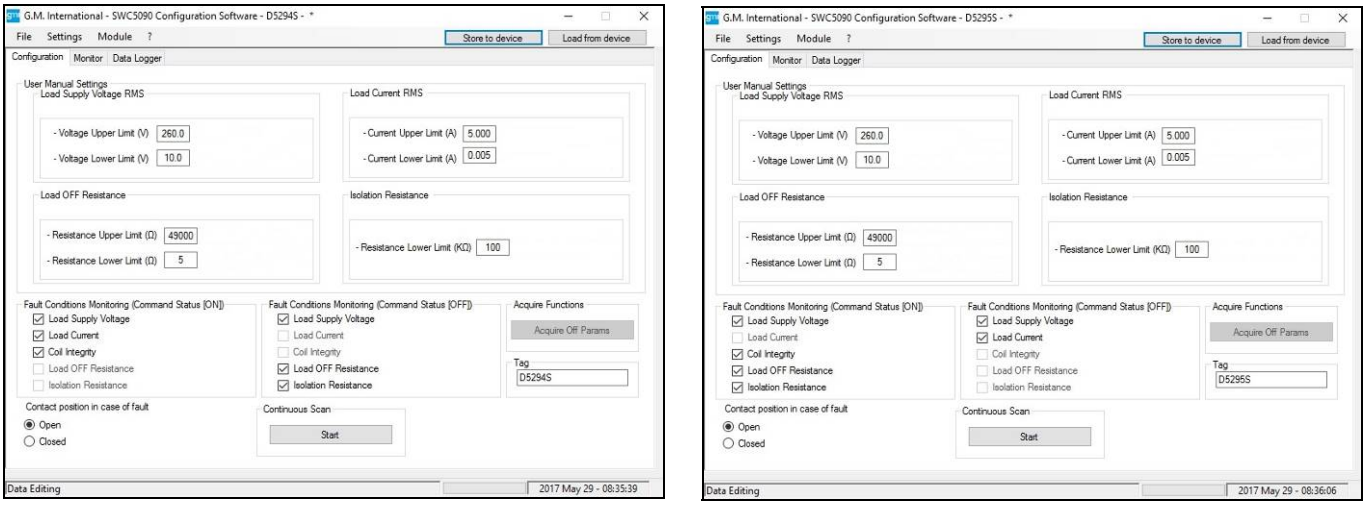


Figure 43: D5294S (on the left) and D5295S (on the right) configuration screen (software revision 1).

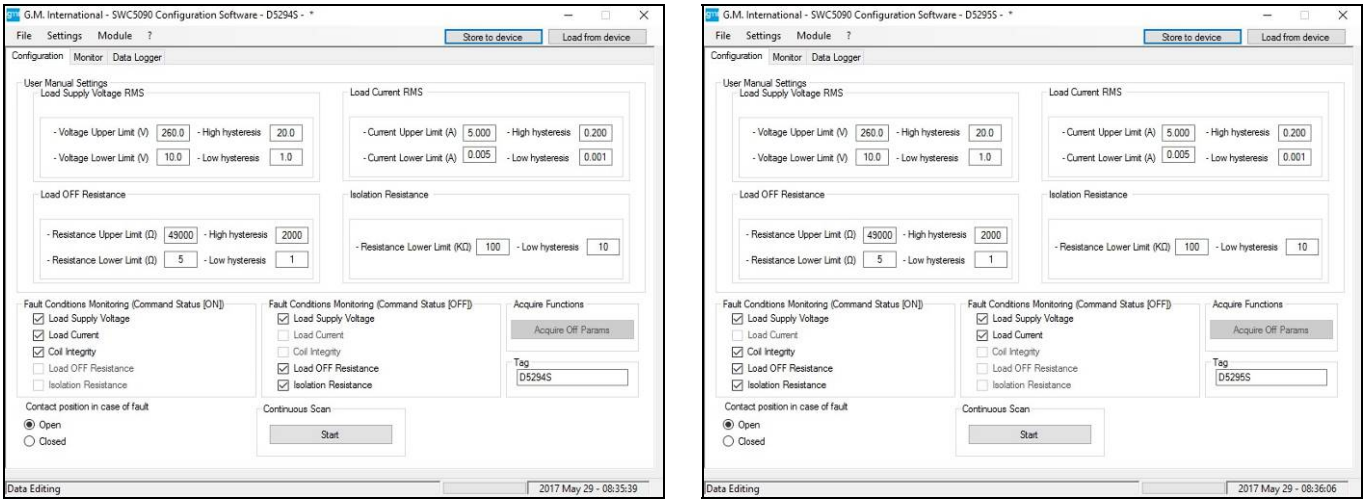


Figure 44: D5294S (on the left) and D5295S (on the right) configuration screen (software revision 2).

Configuration parameters can be read and written from the module or from saved file. It is also possible to reset the module configuration to factory default settings. A report sheet containing complete configuration can be printed.

User Manual Settings:

- Load Supply Voltage RMS
  - Voltage Upper Limit (V): Maximum allowed load RMS voltage
  - Voltage Lower Limit (V): Minimum allowed load RMS voltage
- Load Current RMS
  - Current Upper Limit (A): Maximum allowed load RMS current
  - Current Lower Limit (A): Minimum allowed load RMS current
- Load OFF Resistance
  - Resistance Upper Limit (Ω): Maximum allowed load OFF resistance

Resistance Lower Limit (Ω): Minimum allowed load OFF resistance

- Isolation Resistance
  - Resistance Lower Limit (kΩ): Minimum allowed load-to-earth isolation resistance

FAULT CONDITIONS MONITORING (Command Status [ON]):

Faults contributing to the output cumulative fault when the driver is on.

- Load Supply Voltage:
  When checked, the load supply voltage can activate the cumulative fault.
- Load Current: (only for D5294S)
  When checked, the load current can activate the cumulative fault.
- Coil Integrity:
  When checked, the short circuit of any coil can activate the cumulative fault.
- Load OFF Resistance: (only for D5295S)
  When checked, the load OFF resistance can activate the cumulative fault.
- Isolation Resistance: (only for D5295S)
  When checked, the load-to-earth isolation resistance can activate the cumulative fault.

FAULT CONDITIONS MONITORING (Command Status [OFF]):

Faults contributing to the output cumulative fault when the driver is off.

- Load Supply Voltage:
  When checked, the load supply voltage can activate the cumulative fault.
- Load Current: (only for D5295S)
  When checked, the load current can activate the cumulative fault.
- Load OFF Resistance: (only for D5294S)
  When checked, the load OFF resistance can activate the cumulative fault.
- Isolation Resistance: (only for D5294S)
  When checked, the load-to-earth isolation resistance can activate the cumulative fault.

TAG: Identification of the specific operating loop of the module.

ACQUIRE FUNCTIONS: Acquisition and saving of the diagnostics field parameters.

- Acquire OFF parameters: The currently measured OFF parameters are copied to the USER MANUAL SETTINGS (available only when the driver is OFF).
- Acquire ON parameters: The currently measured ON parameters are copied to the USER MANUAL SETTINGS (available only when the driver is ON).

CONTINUOUS SCAN: Continuous measurement of the field parameters.

- Start/Stop: Activates/de-activates the measurement of the field parameters.

INVERT FAULT RELAY: When not checked, the output fault contacts open in case of fault. When checked, the output fault contacts close in case of fault.

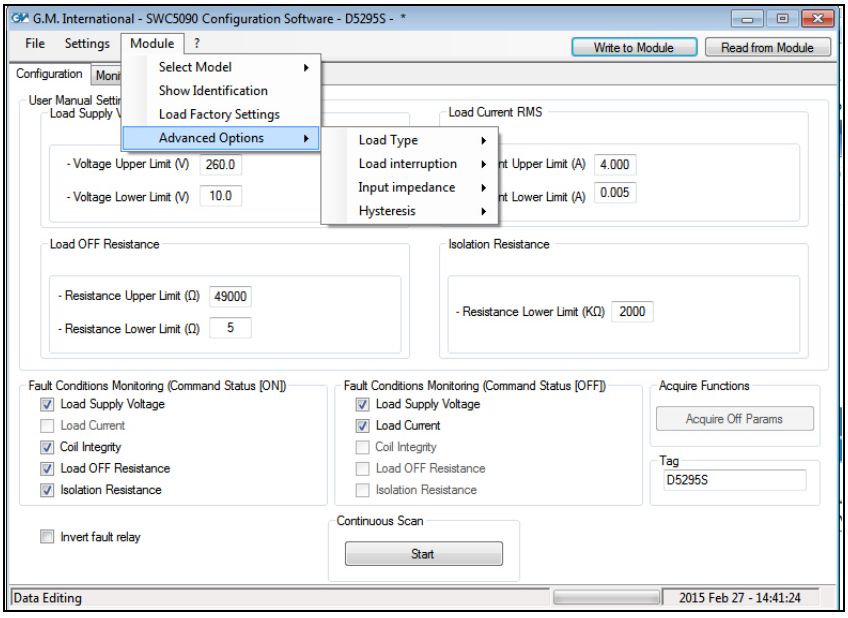


Figure 45: D5294S, D5295S Advanced configuration options.

ADVANCED OPTIONS:

Advanced options for configuration can be found by clicking on the *"Module > Advanced Options"* entry of the main menu.

Load Type:

- **Auto:** automatically selects Load type between Generic Load and Solenoid.
- **Generic Load:** any load up to 50 kΩ resistance.
- **Solenoid:** specific for Solenoid loads up to 10 kΩ; resistance is calculated even in presence of series connected diodes.

Load Interruption:

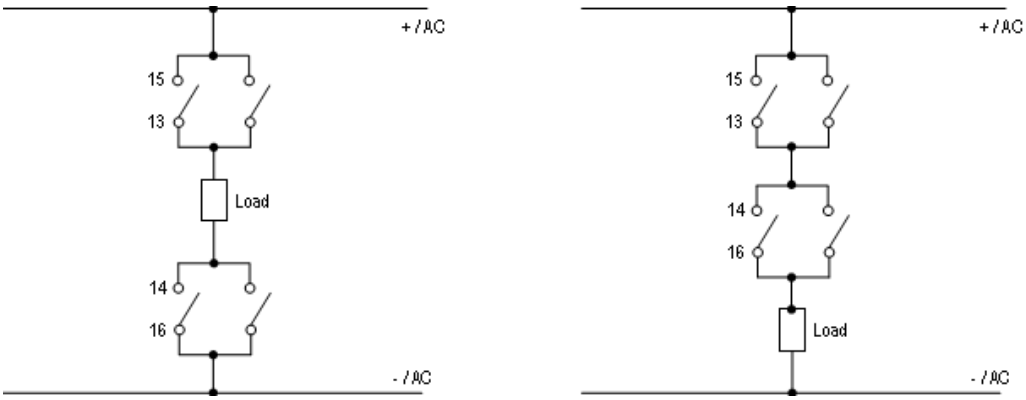


Figure 46: Bipolar (on the left) and unipolar (on the right) load interruption.

- **Bipolar:** Load is disconnected by removing connection to both AC/DC lines
- **Unipolar:** Load is disconnected only from one AC/DC line.

Input impedance:

- **Mirror:** The fault in the field is directly mirrored to the PLC DO.
- **Always OFF:** Input impedance seen by the PLC with Pulse Testing is always HIGH.
- **Always ON:** Input impedance seen by the PLC with Pulse Testing is always LOW.

3.9.1.1 Hysteresis (always visible since software revision 2):

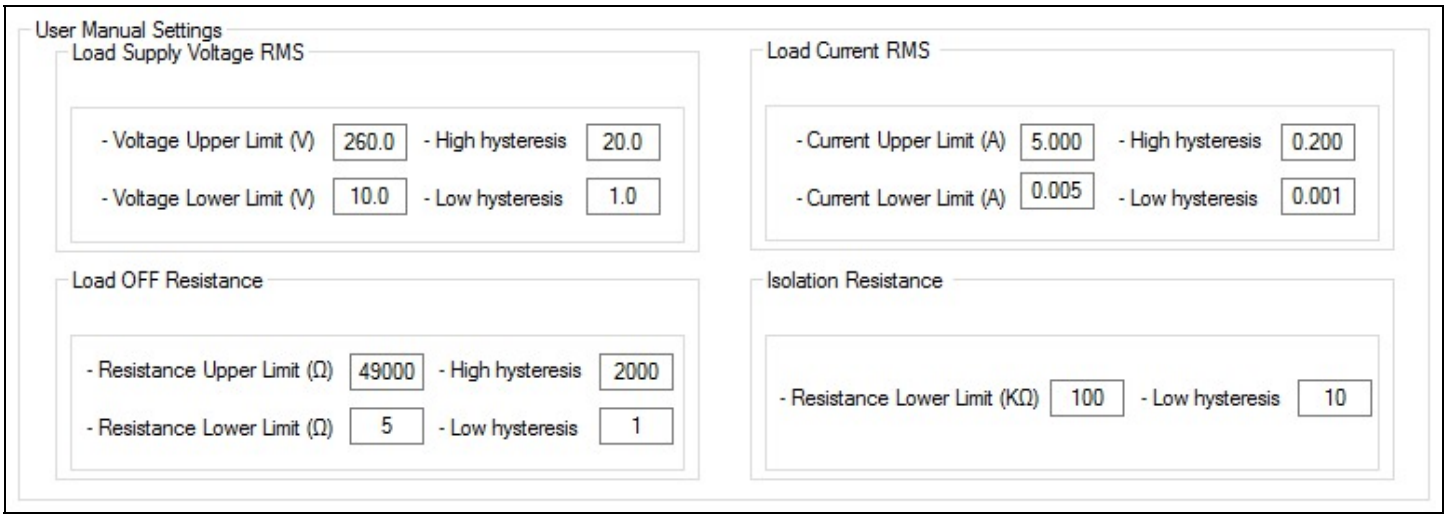


Figure 47: D5294S, D5295S with Hysteresis enabled.

- **ON:**
  - Upper Fault condition is activated when signal is higher than Upper Limit and deactivates when lower than Upper Limit – High Hysteresis value.
  - Lower Fault condition is activated when signal is lower than Lower Limit and deactivates when higher than Lower Limit + Low Hysteresis value.
- **OFF:**
  - No hysteresis is present and fault conditions are triggered exactly when signal is higher or lower than defined limits.

3.9.2 Monitor

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

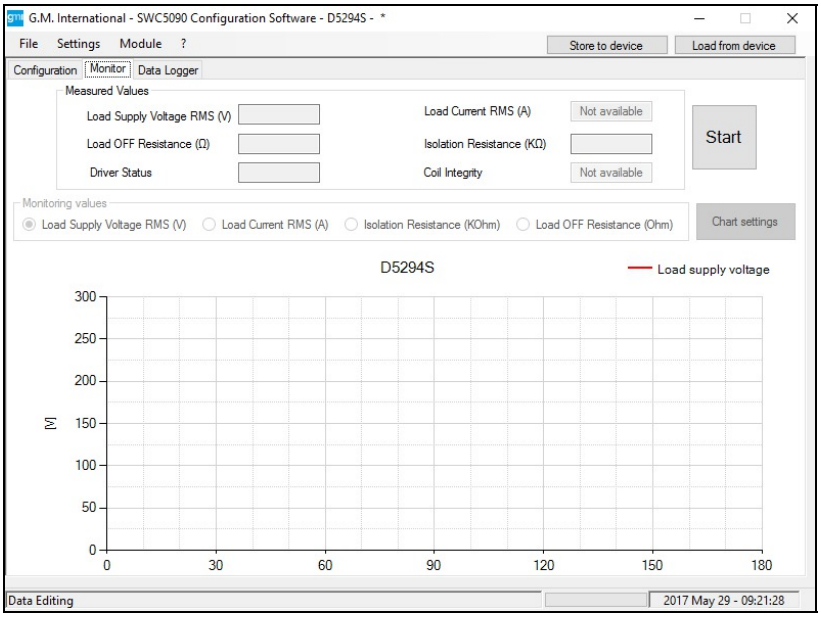


Figure 48: D5294S, D5295S Monitor screen.

Measured Values (see Figure 48) are periodically acquired from the field, when the Start/Stop is activated (odometer running in the Bottom Bar). When the Start/Stop button is deactivated, the Measured Values remain frozen to the last field acquisition value.
Measured Values include:

- **Load Supply Voltage RMS (V)**
  indicates the RMS voltage that is actually applied (in ON State, load energized) or that will be applied (in OFF State, load de-energized) to the load.
- **Load Current RMS (A)**
  represents the RMS current that is flowing through the load (hence it will be zero in OFF state).
- **Load OFF Resistance (Ω)**
  is the load resistance measured in OFF State. In ON State, this value will remain at the saturation value (5 kΩ)
- **Isolation Resistance (kΩ)**
  shows the leakage resistance to earth. Also the Isolation Resistance is measured only in OFF State; during ON State, it goes to the saturation value of 3 MΩ
- **Coil Integrity**
  monitors the status of the relay coil in ON State: “FAIL” indicates that a relay coil is in short-circuit
- **Driver Status**
  indicates whether the load has been energized (“ON”) or not (“OFF”)

3.9.2.1 Graph

It is possible to show the value of a variable on a graph. To do so, start acquisition by pressing the Start button and then select the desired variable by checking the corresponding checkbox.
Note that only one variable can be seen at a time.

3.9.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

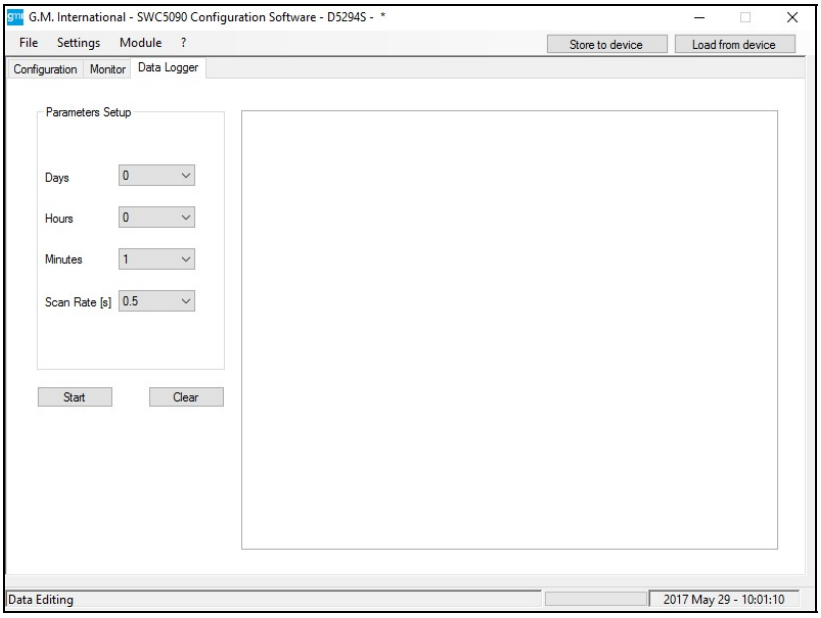


Figure 49: Data Logger screen.

PARAMETERS SETUP:

- **Days:** Number of days to acquire
- **Hours:** Number of hours to acquire
- **Minutes:** Number of minutes to acquire
- **Scan rate:** Frequency interval for acquisitions

3.10 D5264S

D5264S is Load Cell/Strain Gauge Bridge Isolating Converter module suitable for applications requiring SIL 2 level (according to IEC 61511) in safety related systems for high risk industries.

The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input**
  - **Output**
  - **Alarm**
- **Monitor**
- **Data Logger**

3.10.1 Configuration

3.10.1.1 Input / Output

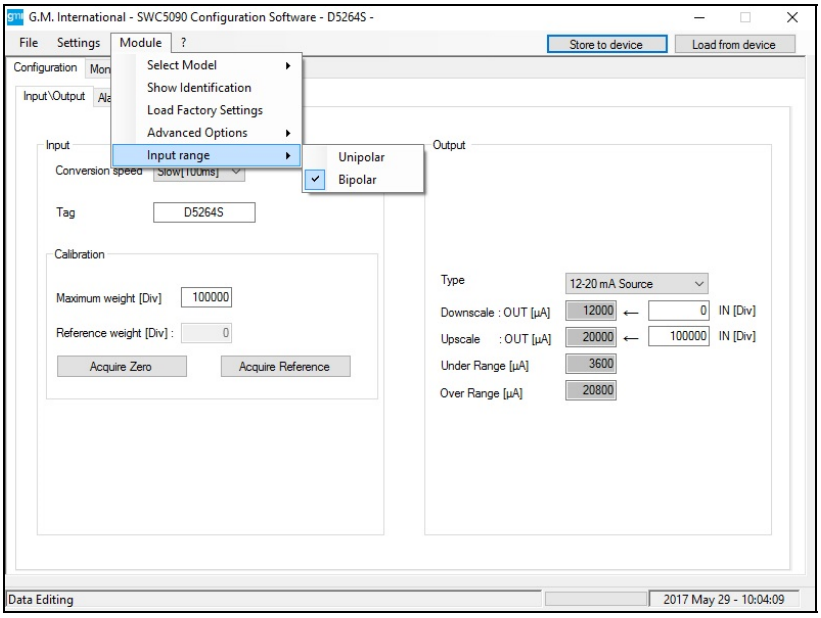


Figure 50: D5264S Input / output configuration screen.

INPUT

Conversion speed (Input data acquisition time):

- Slow: 100 ms
- Fast: 12.5 ms

Tag: 16 alphanumerical characters

Maximum weight: configurable from 0 to 100000 divisions. Higher values lead to greater resolutions.

Reference weight: weight used for calibration. Configurable form 0 to selected maximum weight.

Acquire Zero: press button to start the zero acquiring procedure.

Acquire Reference: press button to start reference acquiring procedure

Input range:

- Unipolar: the input scale ranges from 0 to the maximum value. This scale is particularly indicated to measure a weight.
- Bipolar: the input scale ranges form – to + maximum value. This scale is particularly indicated for other sensors, i.e. strain gauges.

OUTPUT

Type:

- 0-20 mA Sink
- 4-20 mA Sink
- Custom Sink All Output parameters are fully customizable.
- 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 downscale in normal working condition (range 0 to 24 mA)

Underrange: analog output downscale in underrange condition (range 0 to 24 mA)

Overrange: analog output downscale in overrange condition (range 0 to 24 mA)

3.10.1.2 Alarm

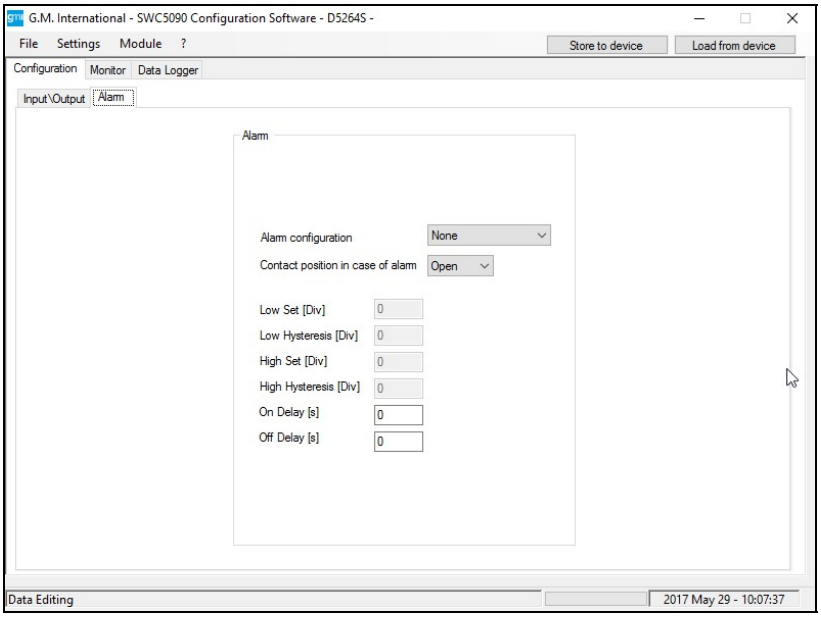


Figure 51: D5264S Alarm configuration screen.

ALARM

Configuration:

- None alarm is disabled
- Low alarm is triggered when source descends below “Low Set”
- High alarm is triggered when source ascends over “High Set”
- Window alarm is triggered below “Low Set” and above “High Set”

Contact position in case of 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: source value below which the alarm is triggered (in Low, Window)

Low Hysteresis: hysteresis on the low set value

High Set: source value above which the alarm is triggered (in High, Window)

High Hysteresis: hysteresis on the high set value

On Delay: time for which the source variable 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 source variable has to be in normal condition before the alarm output is deactivated; configurable from 0 to 1000 seconds in steps of 100 ms

3.10.2 Monitor

The SWC5090 is able to continuously scan the module and display real-time values on screen.

Note that while the module is being monitored, configuration screens are disabled.

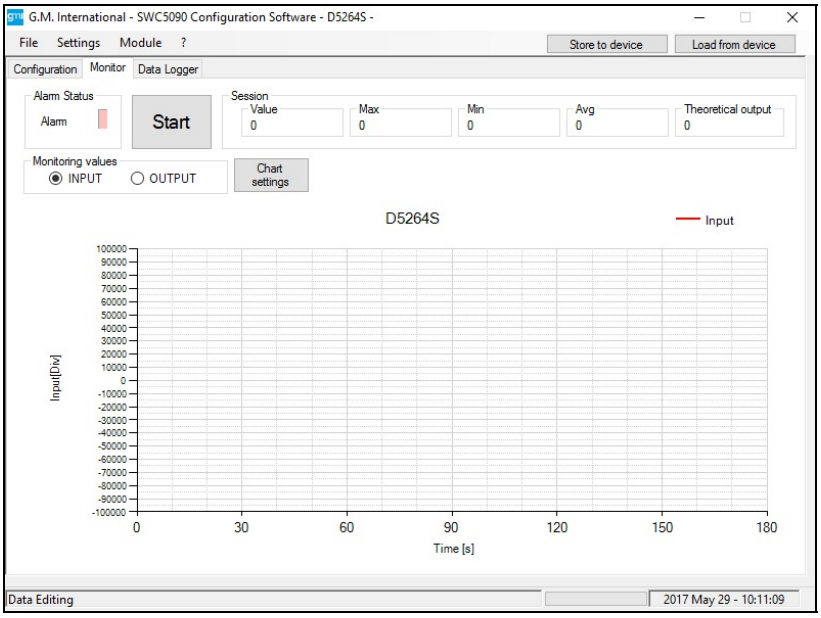


Figure 52: D5264S Monitor screen.

The display shows Input and Theoretical Output values, fault and alarm status and a graph of chosen variable.

3.10.2.1 Input

Input variable is shown as it is detected by the module.

3.10.2.2 Output

This value represents the theoretical output. During certain conditions, this value may differ from the measured value at output terminal blocks.

3.10.2.3 Alarm status

Alarm status is represented by a LED, which is RED when activated.
The LED status reflects the status of the Alarm exactly as configured.

3.10.2.4 Graph

The graph can show only one variable that must be chosen from the checkboxes above.

3.10.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

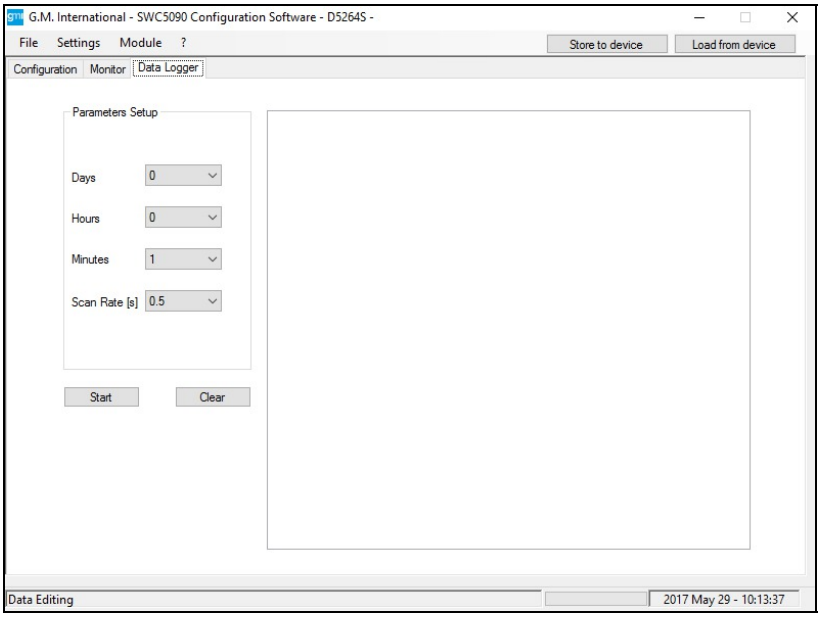


Figure 53: Data Logger screen.

3.11 D5254S / D6254S

D5254S / D6254S is Power Supply Repeater and Trip Amplifier.
The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input**
  - **Output**
  - **Alarm**
- **Monitor**
- **Data Logger**

3.11.1 Configuration

3.11.1.1 Input / Output

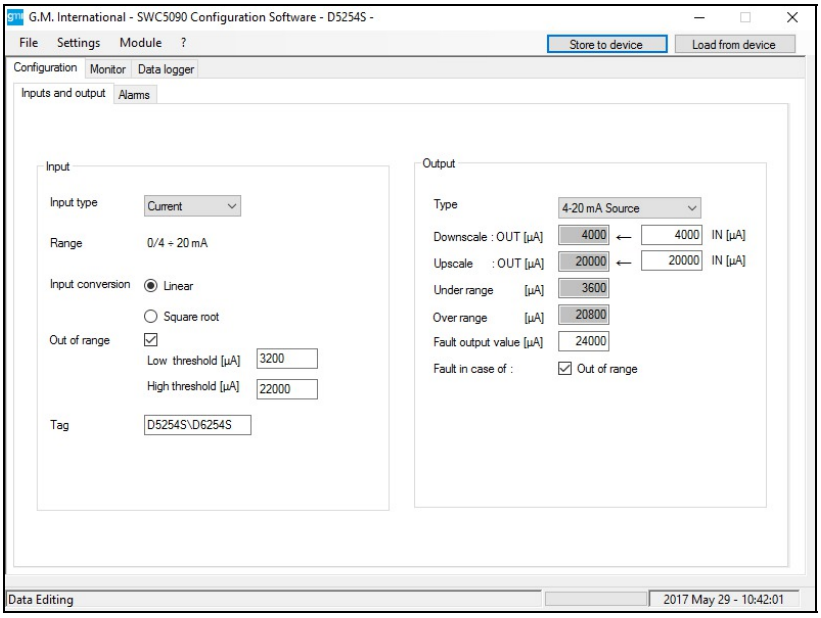


Figure 54: D5254S / D6254S Input / output configuration screen.

INPUT

Input Type:

- current
- voltage

Range:

- 0/4-20 mA represents the allowed input current ranges
- ± 12 V represents the allowed input voltage ranges

Input conversion:

- Linear the module repeats in linear scale the input to the output
- Square root the module converts in square root scale the input to output

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 Sink
- 4-20 mA Sink
- Custom Sink all Output parameters are fully customizable
- 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

3.11.1.2 Alarm

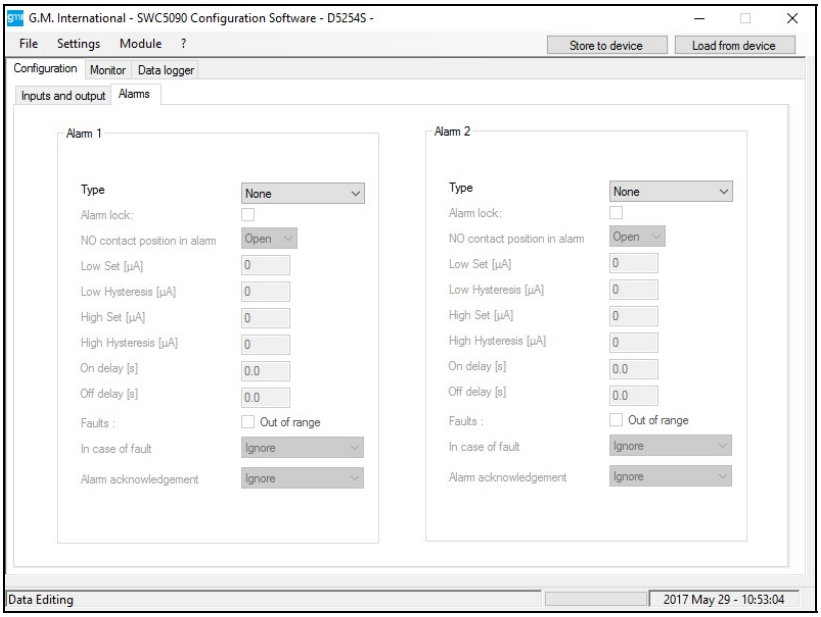


Figure 55: D5254S / D6254S Alarm configuration screen.

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.

NO contact position in case of 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 affected

- Lock status remains in the same status as it was before Fault occurred
- Alarm active alarm is triggered
- Alarm inactive alarm is deactivated

Alarm acknowledgement:

- Ignore alarm is automatically reset
- Active high a voltage source of 24 Vdc must be applied, at the relative terminals, to reset alarm
- Alarm active a voltage source of 0 Vdc must be applied, at the relative terminals, to reset the alarm

3.11.2 Monitor

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

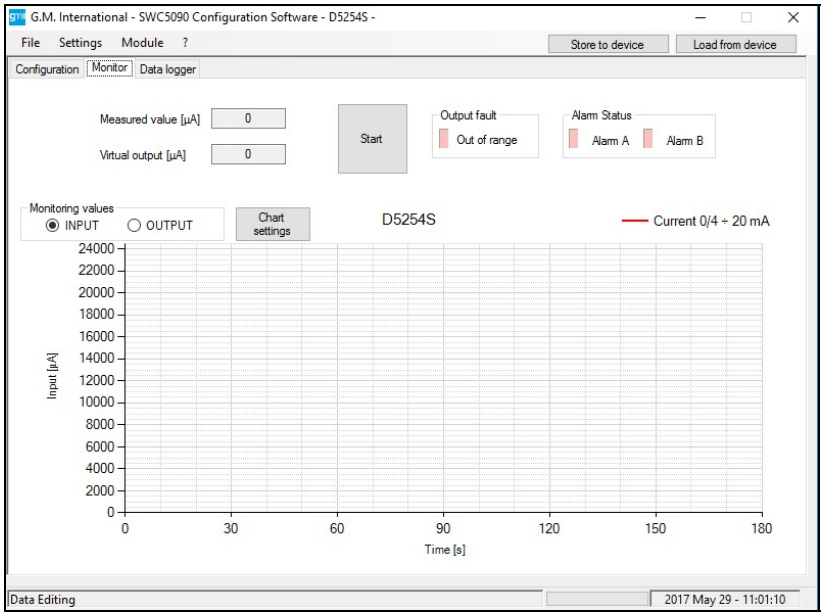


Figure 56: D5254S / D6254S Monitor screen.

The display shows Input and Theorical Output values, fault and alarm status and a graph of chosen variable.

3.11.2.1 Input

Input variable is shown as it is detected by the module.

3.11.2.2 Output

This value represents the theorical output. During certain conditions, this value may differ from the measured value at output terminal blocks.

3.11.2.3 Alarm status

Alarm status is represented by a LED, which is RED when activated.
The LED status reflects the status of the Alarm exactly as configured.

3.11.2.4 Fault

Fault status is represented by a LED, which is RED when activated.

3.11.2.5 Graph

The graph can show only one variable that must be chosen from the checkboxes above.

3.11.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

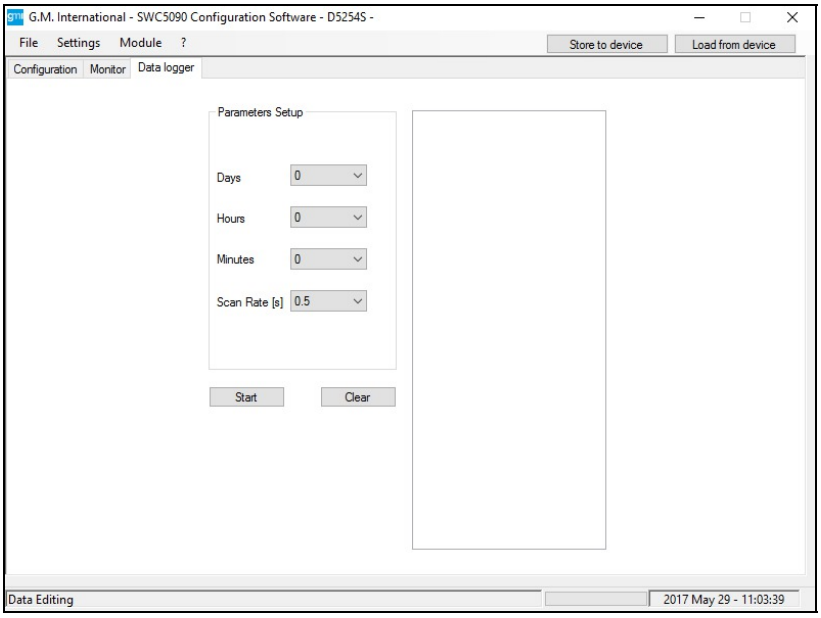


Figure 57: Data Logger screen.

3.12 D5212Q / D6212Q

D5212Q / D6212Q is Quadruple Repeater Power Supply.
The Application Window user interface is organized into the following areas:

- **Configuration**
  - **Input**
  - **Output**
  - **Alarm**
- **Monitor**
- **Data Logger**

3.12.1 Configuration

3.12.1.1 Input / Output

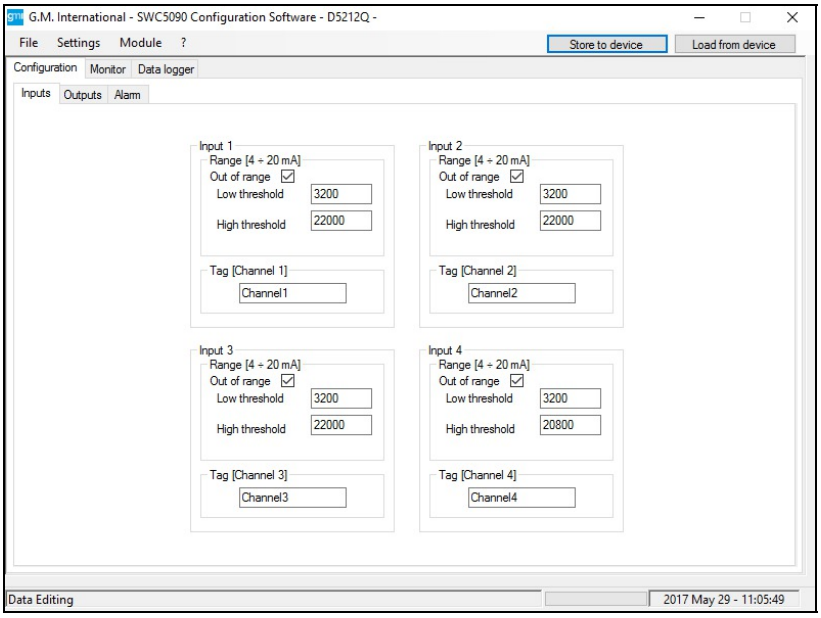


Figure 58: D5212Q / D6212Q Input / output configuration screen.

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

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

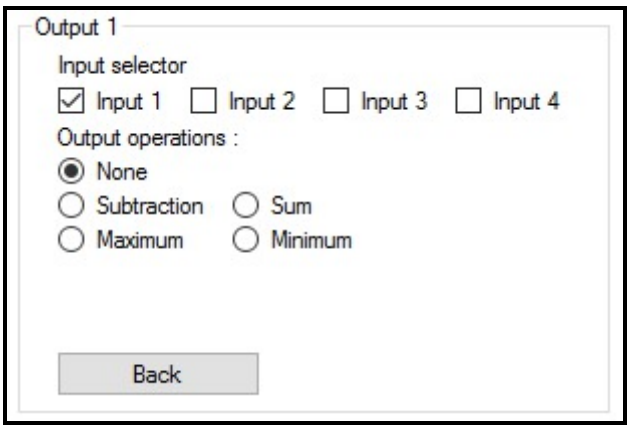


Figure 59: D5212Q / 6212Q advanced settings details.

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.

3.12.1.2 Alarm

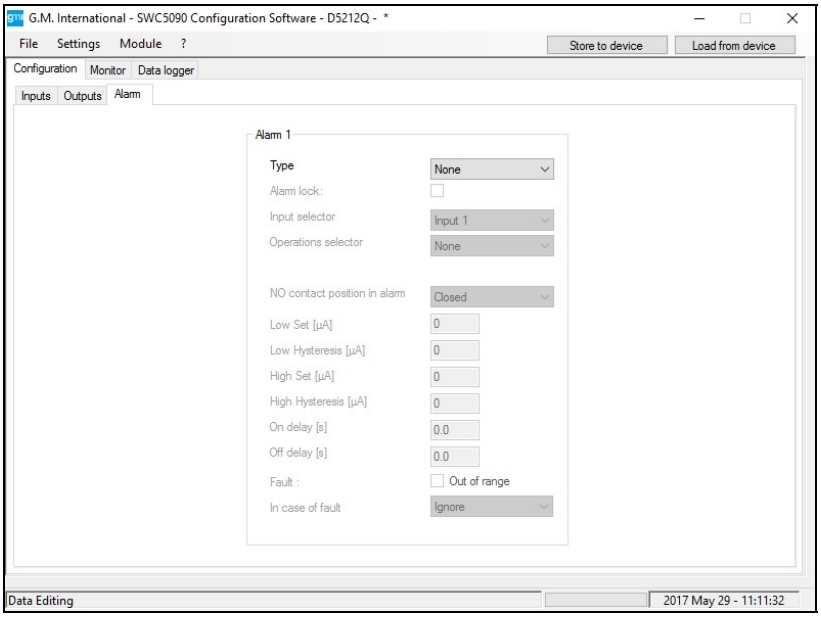


Figure 60: D5212Q / D6212Q Alarm configuration screen.

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

3.12.2 Monitor

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

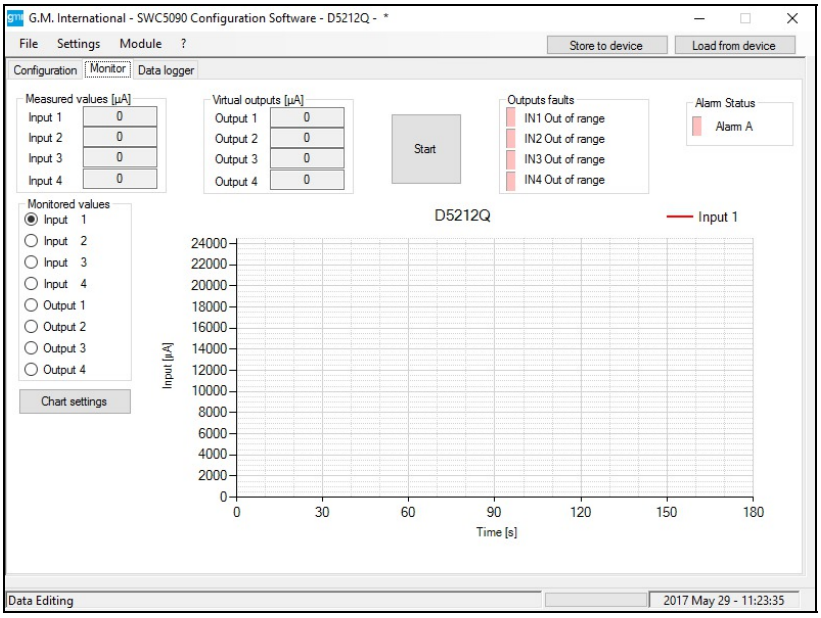


Figure 61: D5212Q / D6212Q Monitor screen.

The display shows Input and Theoretical Output values, fault and alarm status and a graph of chosen variable.

3.12.2.1 Input

This value represents the value read from field.

3.12.2.2 Output

This value represents the theoretical output value.

3.12.2.3 Alarm status

Alarm status is represented by a LED, which is RED when activated.
The LED status reflects the status of the Alarm exactly as configured.

3.12.2.4 Fault

Fault status is represented by a LED, which is RED when activated.

3.12.2.5 Graph

The graph can show only one variable that must be chosen from the checkboxes above.

3.12.3 Data Logger

The SWC5090 can monitor and record data from the module at constant configurable time intervals.
By changing the parameters, the user can decide the duration of the recording period and the frequency of readings.
After pressing “Start” button, the SWC5090 will prompt for a filename where the values will be stored in .CSV format.
Note that while the module is being recorded, Configuration screens are disabled, while Monitoring remains active.

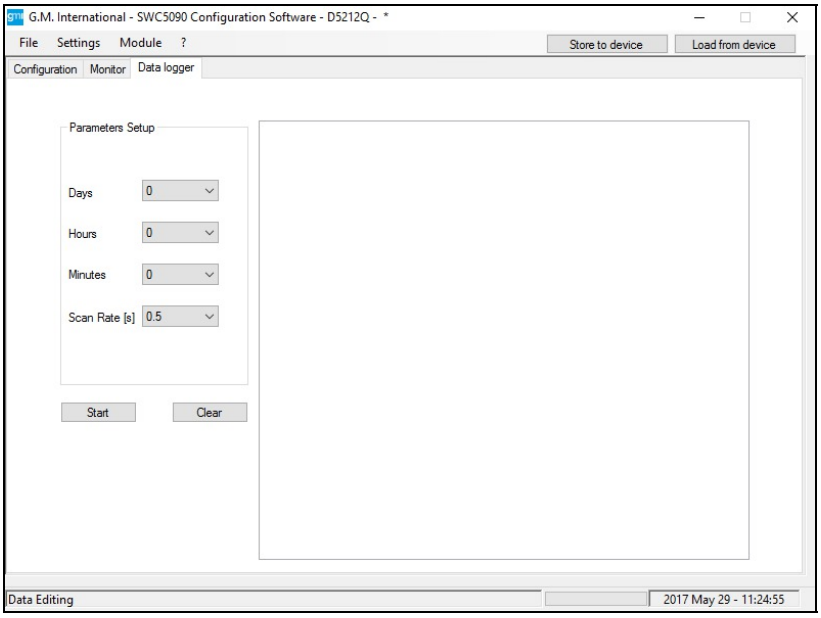


Figure 62: Data Logger screen.

3.13 5700

5700 is HART® Multiplexer Modem.

3.13.1 Configuration

To configure 5700 module, connect the device to PC through PPC5092, then click on **"Load from device"** button.

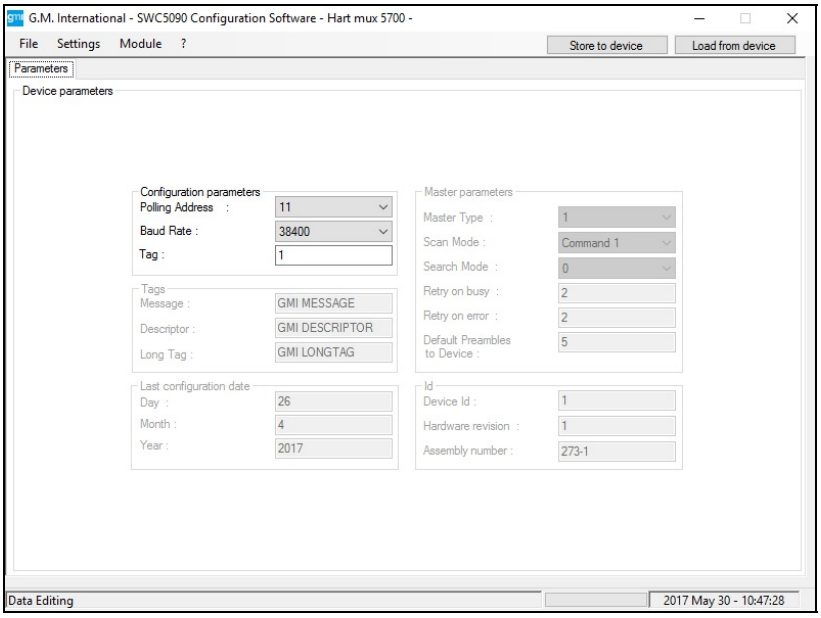


Figure 63: 5700 Parameters screen.

The only user configurable parameters are:

- **Polling address:** device address (from 0 to 62)
- **Baud rate:** data transmission speed (from 1200 to 115200 bit/s)
- **Tag:** identification of the specific module (maximum 8 alphanumerical characters)

4. Monitor

The SWC5090 is able to continuously scan the module and display real-time values on screen.

A graph of the chosen variable (Input or Output) can also be displayed.
Please refer to modules specific chapters for more details on this feature.

5. Data Logger

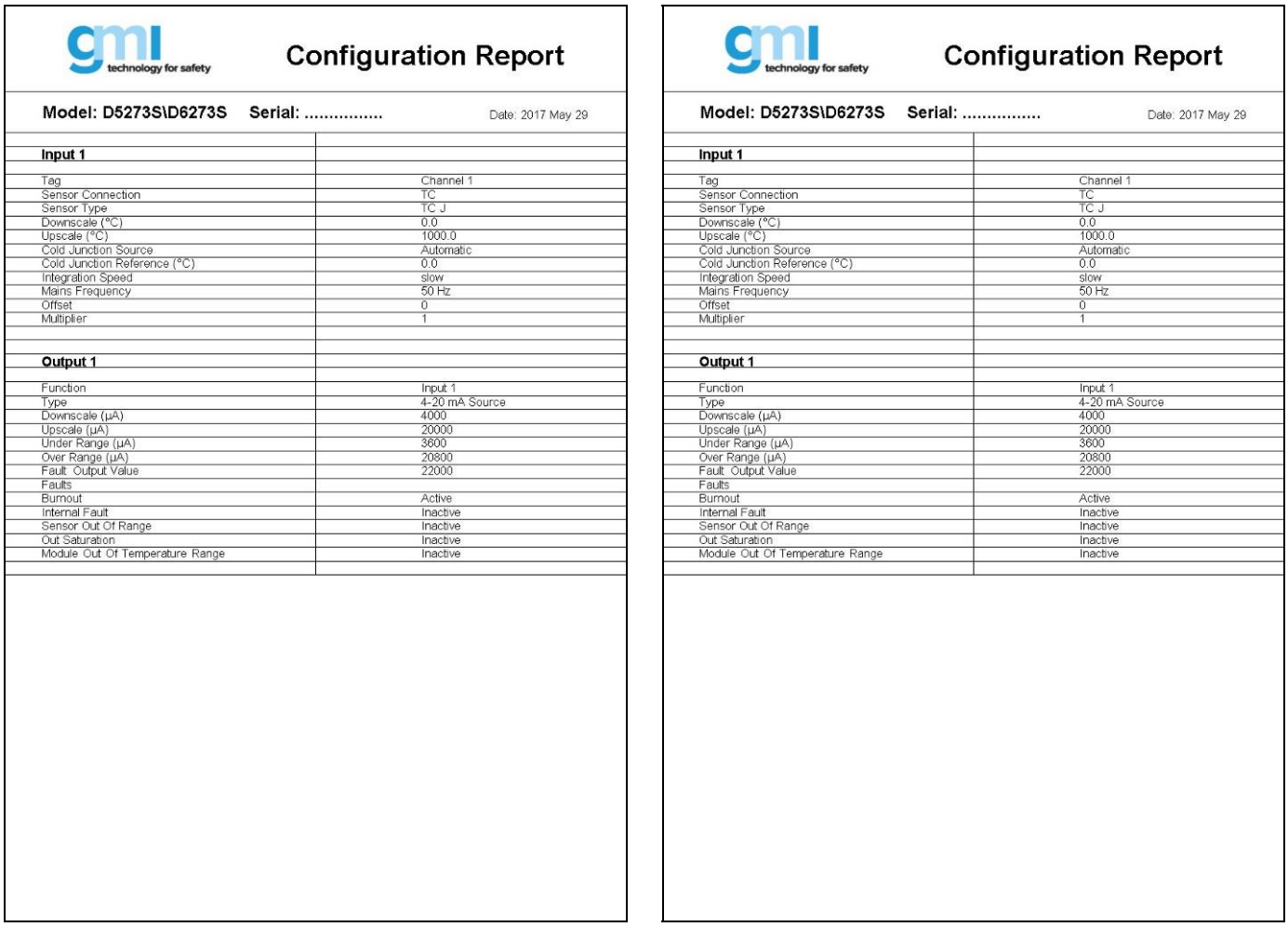
The SWC5090 can monitor and record data from them module at constant time intervals.
Data is stored on a Comma Separated Value file (.CSV).
Please refer to modules specific chapters for more details on this feature.

6. Configuration File

Each time the main User Interface window is closed, a configuration file (SWC5090.ini) is saved in the installation directory. The configuration file contains the last COM port used for the configuration and other parameters related to the software.

7. Report sheet

The SWC5090 can print the full configuration set in A4 format. Below an example configuration report.



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Configuration Report

Model: D5273S\D6273S **Serial: .....** Date: 2017 May 29

Input 1	
Tag	Channel 1
Sensor Connection	TC
Sensor Type	TC J
Downscale (°C)	0.0
Upscale (°C)	1000.0
Cold Junction Source	Automatic
Cold Junction Reference (°C)	0.0
Integration Speed	slow
Mains Frequency	50 Hz
Offset	0
Multiplier	1
Output 1	
Function	Input 1
Type	4-20 mA Source
Downscale (µA)	4000
Upscale (µA)	20000
Under Range (µA)	3600
Over Range (µA)	20800
Fault Output Value	22000
Faults	
Burnout	Active
Internal Fault	Inactive
Sensor Out Of Range	Inactive
Out Saturation	Inactive
Module Out Of Temperature Range	Inactive

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Configuration Report

Model: D5273S\D6273S **Serial: .....** Date: 2017 May 29

Input 1	
Tag	Channel 1
Sensor Connection	TC
Sensor Type	TC J
Downscale (°C)	0.0
Upscale (°C)	1000.0
Cold Junction Source	Automatic
Cold Junction Reference (°C)	0.0
Integration Speed	slow
Mains Frequency	50 Hz
Offset	0
Multiplier	1
Output 1	
Function	Input 1
Type	4-20 mA Source
Downscale (µA)	4000
Upscale (µA)	20000
Under Range (µA)	3600
Over Range (µA)	20800
Fault Output Value	22000
Faults	
Burnout	Active
Internal Fault	Inactive
Sensor Out Of Range	Inactive
Out Saturation	Inactive
Module Out Of Temperature Range	Inactive

Figure 64: Configuration Report example.

8. Installation and quick start

After having checked the requirements at Section 1.2, it is possible to proceed with the installation.

8.1 Installing the PPC5092 USB-to-MiniUSB Adapter driver

To install the adapter the user has the choice between:

- running the PPC5092.exe file located in the SWC5090 drivers directory;
- clicking on the “Install PPC5092” link in the “Programs Menu/SWC5090” directory;
- clicking on “Install PPC5092 drivers” voice inside the “?” menu in the SWC5090 software.

Please install PPC5092 drivers before inserting the adapter into an USB port of the PC.
After the installation has completed, insert the adapter in any available USB port.

8.2 Installing the SWC5090 Configuration Software

In case a previous version of the SWC5090 Configuration Software was installed on the system, it is preferable to uninstall it before continuing.
Launch the installer Setup.exe and follow the instructions.
An icon (SWC5090) will be added to the program startup menu and to the Desktop at the end of the process.

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