

# Installation and User manual

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# 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).



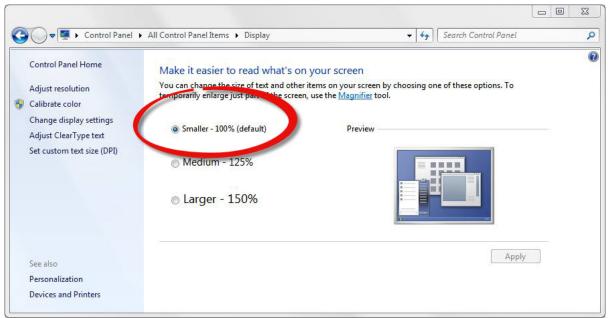


Figure 1: display text size settings screenshot.

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

gm G.M.	Internation	nal - SWC50	90 Configuration Software - D5072S\D6072S -		- 🗆 X
File	Settings	Module	?	Store to device	Load from device
			Ciaura di Manu		

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 dropdown 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.

COM1	~
Test Port	COM1
Update Com I	Port & Exit

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.



Revision: 10

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Address	1	
Baud Rate	38400	~
Format	no parity 1 stop bit	~
Term Res	OFF	~
Endianness	Little Endian	~

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.

Update Manager	×
Running Version	1.3.6
Last Released Version	1.3.6
The current version is the I Push button <exit> to</exit>	
Update	Exit

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

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#### 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

ile Settings Module ?			Store to device	Load from device
nfiguration Monitor Data Logger				
Input Output Alarm				
Input 1		Input 2		
Sensor Connection	c ~	Sensor Connection	TC v	
Sensor Type T	CJ V Open	Sensor Type	TC J	✓ Open
Downscale (°C)	0.0	Downscale (°C)	0.	
Upscale (°C)	1000.0	Upscale (°C)	1000.	-
Cold Junction Source	Automatic ~	Cold Junction Source	Automatic	~
Cold Junction Reference (°C)		Cold Junction Reference		1
Integration Speed	slow ~ 375 ms	Integration Speed		375 ms
Mains Frequency	50 Hz 🗸	Offset (µV)		
Offset (µV)	0	Multiplier		1
Multiplier	1	Тад	Channel 2	
Tag	Channel 1			
a Editing				2017 May 26 - 12:29:59

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 ( $\mu$ V or m $\Omega$  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.



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#### 3.1.1.2 Output

ile Settir				Store to device	Load from device
onfiguration	Monitor Data Logger				
Input Out	tput Alarm				
	Output 1		Output 2		_
	Function	Input 1 V	Function	Input 2	~
	Туре	4-20 mA Source V	Туре	4-20 mA Source	~
	Downscale (µA)	4000	Downscale (µA)	4000	
	Upscale (µA)	20000	Upscale (µA)	20000	
	Under Range (µA)	3600	Under Range (µA)	3600	
	Over Range (µA)	20800	Over Range (µA)	20800	
	Fault Output Value (µA	) 22000	Fault Output Value (µA)	22000	
	Fault in case of :		Fault in case of :		
	Burnout		Burnout		
	Internal	Fault	🗌 Internal Fa	ault	
	Sensor	Out Of Range	Sensor Ou	t Of Range	
	Output :	Saturation	Output Sa	turation	
	Module	Temperature Out Of Range	Module Te	emperature Out Of Range	e

Figure 10: D5072D / D6072D Output configuration screen.

# OUTPUT

•

#### **Function:** Input 1

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

## Type:

•

0-20 mA Sink .

Input 2

Input 1 + 2

Input 1 - 2

Max(Input 1, Input 2)

- 4-20 mA Sink
- Custom Sink
- 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 •
- Internal fault module internal fault
- input sensor out of configured input range • Sensor out of 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

- All Output parameters are fully customizable

input sensor interruption



#### 3.1.1.3 Alarm

File Settings Module ?			Store to device	Load from device	File Setting	ıs Module ?				Store to device	Load from device
Configuration Monitor Data Logger					Configuration (	Monitor Data Logger					
Input Output Alarm					Input Outp	ut Alarm					
Input Output Ham	Source III Condition III Low Set (°C) 0 Hugh Set (°C) 0 Hugh Hysteresis (°C) 0 On Delay (s) 0 Off Delay (s) 0	D D D			input Outp	Alam A Type Source Condition Low Set (°C) High Set (°C) High Hysteress (°C) On Delay (s) Off Delay (s) In case of Fault	Vindow Input 1 NE ~ 100.0 10.0 500.0 10.0 1.0 1.0 1.0 Go On	<ul> <li>×</li> <li>×</li> </ul>	Alam B Type Source Condition Low Set (°C) Low Hysteress (°C) High Hysteress (°C) Of Delay (s) Off Delay (s) In case of Fault	NE 100.0 10.0 10.0 10.0 1.0 1.0	× ×
	Burnout     Internal Fault     Sensor Out Of     Module Tempe	Range rature Out Of Range						Of Range	Faults : Burnout Internal F Sensor O Module 1		je

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

#### ALARM

#### Type:

	-	
٠	None	alarm is disabled
٠	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
٠	Window	alarm is triggered below "Low Set" and above "High Set"
•	Fault Repeater	alarm output reflects selected (one or more) Fault status
Sour	ce: reference valu	e for alarm triggering
٠	Input 1	input of first channel
٠	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
- Go Off alarm is deactivated

alarm is triggered,

**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.

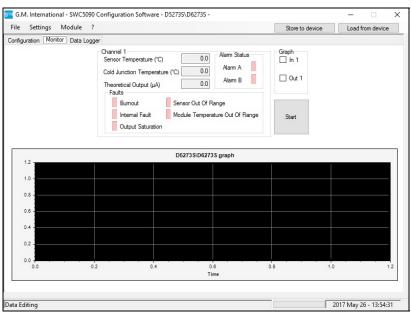


Figure 12: D5273S/D6273S Monitor screen.

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.

Settings Mo	dula 2		Store to device	Load from device
	0.0000 0.000		Store to device	Load from device
uration Monitor	Data Logger			
Parameters S	etup			
	0	~		
Days	U	×		
Hours	0	~		
Tiouro				
Minutes	1	~		
Scan Rate [s	0.5	~		
Start	(	lear		

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

le S	ettings Module ?			L	Store to device	Load from device
nfigurat	tion Monitor Data Logger	r				
nput	Output Alarm					
	Input 1			Input 2		
	Sensor family	Tc	~	Sensor family	Tc	~
	Sensor connection	2 wires	~	Sensor connection	2 wires	~
	Sensor Type	Thermocouple J	~	Sensor Type	Thermocouple J	~
		-				
	Burnout	Active	~	Burnout	Active	~
	Cold Junction Source	Internal	$\sim$	Cold Junction Source	Internal	$\sim$
	Cable resistance Multiplier Tag	0.00 [Ω] 0 Channel1		Cable resistance Multiplier Tag	0.00 [Ω] 0 Channel2	
	Common parameters					
	Integration Speed Slo	w v				
	Open custom t	able				
	Callendar-Van E	Jusen				

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  $\Omega$ 

**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

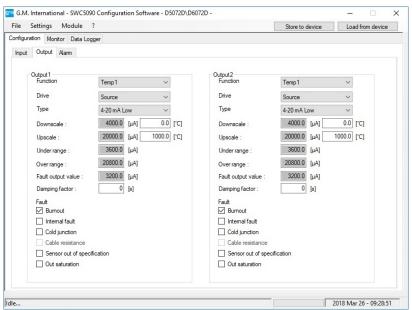


Figure 15: D5072D / D6072D Output configuration screen.

# 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
- Cold junction
- Cable resistance
- Sensor out of range
- Output Saturation
- Module Temp. Out of range
  - 3.2.1.3 Alarm

module internal fault

- when resistance value is higher than 50  $\Omega$
- input sensor out of configured input range
- output is below Underrange or above Overrange
- internal module temp. under or over specified module operating temp. limits

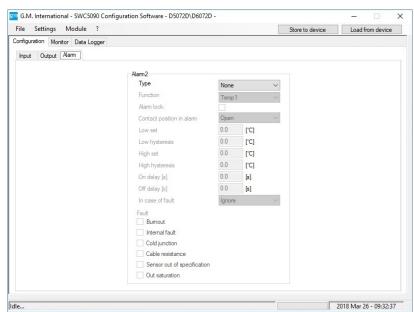


Figure 16: D5072D/D6072D alarm configuration screen.

## 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.

	Monitor Data Log Channel 1 Rield values	ger			
	- Field values			Channel 2	
				Field values	
		Head 1 sensor temperature	[°C]	Head 2 sensor temperature	[°C]
		Head 1 cold junction temperature	[°C]	Head 2 cold junction temperat	
		Theoretical output	[µA]	Theoretical output	[µA]
	Sensor working t			Sensor working temperature	
		Minimum temperature	[°C]	Minimum temperature	[°C]
		Maximum temperature	[°C]	Maximum temperature	[°C]
		Reset values		Reset values	
	Faults			Faults	
	Open / burr	nout		Open / burnout	
	Cold junctio	n		Cold junction	
	Cable resist	ance		Cable resistance	
	Sensor out	of specification		Sensor out of specification	
	Output satu	ration		Output saturation	
_	Cumulative faults			Alarm status	
	Internal / ha	ardware fault		Alam B	
	Configuratio	n fault			
			Sta	art	

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.

Store to device	Load from device

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

_	3 wires Linear standard Active 1 0 00 Channel 1	Input 2 Sensor connection In/Out function Burnout Multiplier Cable resistance [0] Teg Output2	3 wires   Inter standard  Active  Ohannel 2	d from device
ensor connection VOut function unout ubpler able resistance [Ω] sg	Linear standard Active 1 0.00	Sensor connection In VOut function Burrout Multiplier Cable resistance [Ω] Tag	Linear standard Active 1 0.00	
VOut function umout ultiplier able resistance [Ω] ag	Linear standard Active 1 0.00	Sensor connection In VOut function Burrout Multiplier Cable resistance [Ω] Tag	Linear standard Active 1 0.00	
VOut function umout ultiplier able resistance [Ω] ag	Linear standard Active 1 0.00	Sensor connection In VOut function Burrout Multiplier Cable resistance [Ω] Tag	Linear standard Active 1 0.00	
VOut function umout ultiplier able resistance [Ω] ag	Linear standard Active 1 0.00	In \Out function Burnout Mutiplier Cable resistance [Ω] Tag	Linear standard Active 1 0.00	
umout utipiler able resistance [Ω] ag	Active ~ 1	Burnout Mutopiler Cable resistance [Ω] Tag	Active ~ 1 0.00	
ultiplier able resistance [Ω] ag	0.00	Mutiplier Cable resistance [Ω] Tag	0.00	
able resistance [Ω]		Cable resistance [Ω] Tag	0.00	
20		Tag		
_		Tag		
_	unannei i		Channel 2	
		0.4		
tegration Speed Slow ault ] Internal fault ] Burnout	w ~	Integration Speed Slo Fault Internal fault Burnout	w V	
mon parameters		Output duplication		
Open custom ta	able			
tegration Speed Slow	R ~	Active/Inactive		
	Internal fault Burnout non parameters Open custom ta	internal fault Burnout	Internal fault Burnout Demout	Internal fault Burnout Internal fault Burnout Burnout Dopen custom table Definition Defi

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  $\Omega$ 

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.



	1 measured value	[0]	Channel 2 Field values		
Field values Head	1 measured value	101			
Theore		[Ω]		Head 2 measured value	[Ω]
	etical output	[Ω]		Theoretical output	[Ω]
Faults Open / bumout			Faults Open / b	umout	
Cumulative faults					
Internal / hardware fa	ault				
Configuration fault					
	ſ				
		St	art		
	Open / bumout Cumulative faults Internal / hardware faults	Open / burnout Cumulative faults Internal / hardware fault	Open / burnout Cumulative faults Internal / hardware fault Configuration fault	Open / burnout     Open / burnout     Open / b     Internal / hardware fault	Open / burnout Open / burnout Curnulative faults Internal / hardware fault Configuration fault

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.

le Settings Module ?	Store to device Load from device
nfiguration Monitor Data Logger	
Parameters Setup	
Days 0 V	
-	
Hours 0 V	
Minutes 0 ~	
Scan Rate [s] 0.5 V	
Scarrhae [a]	
Start Clear	

Figure 21: Data Logger screen.



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## 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

5	ettings Module ?				Store to device	Load from device
urat	ion Monitor Data Logger					
	Dutput					
JI \O	litput					
	Input 1			Input 2		
	In\Out function	Linear	~	In \Out function	Linear	~
	Bumout	Active	~	Bumout	Active	~
	Cold Junction Source	Internal	$\sim$	Cold Junction Source	Internal	$\sim$
	Cold Junction Reference [°C]		0.0	Cold Junction Reference [°C]		0.0
	Tag	Channel1		Tag	Channel2	
	Output1 Fault Internal fault Burnout			Output2 Fault Internal fault Burnout		
	Input common parameters Open custom table					
	Integration Speed Slow	~				

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.

ile Setti	ngs Mo	odule ?				Store to device	Load from device
nfiguration	Monitor	Data Logg	er				
	Channe Field v				Channel 2 Field values		
	Field	values	Head 1 measured value	[mV]	Field values	Head 2 measured value	[mV]
			Theoretical output	[mV]		Theoretical output	[mV]
	Faults				Faults		
	- (	Open / burn	nout		Open / bi	umout	
	Cumulat	tive faults					
	h	nternal / ha	ardware fault				
		Configuratio	n fault				
		Configuratio	n fault				
		Configuratio	n fault	Sta	art		
		Configuratio	n fault	Sta	art		
		Configuratio	n fault	St	art		
		Configuratio	n fault	St	art		
		Configuratio	nfault	St	art		
		Configuratio	nfault	St	art		
		Configuratio	nfault	St	art		
		Configuratio	nfault	St	art		
		Configuratio	nfault	St	art		

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.



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G.M. International - SWC5090 Configuration Software - D5072D-096 -		>
File Settings Module ?	Store to device	Load from device
onfiguration Monitor Data Logger		
Parameters Setup		
- danker ocep		
Days 0 V		
Hours 0 ~		
Minutes 0 ~		
Scan Rate [s] 0.5 V		
Start Clear		
		2018 Apr 13 - 14:31:45

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



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#### 3.5.1 Configuration

G.M. International - SWC5090 Configuration Software - D5231E\D623	ne- 🗆	🗙 📴 G.M. International - SWC5090 Configuration Software - D5231E\D6231E - 👘 🗆 🖂
File Settings Module ?	Store to device Load from device	File Settings Module ? Store to device Load from device
Configuration Monitor Data Logger		Configuration Monitor Data Logger
Inputs Outputs		Inputs Outputs
Inputs Input 1 Proximity V Fault on bus	Tags Tag 1 1	Outputs Source Contact position Contact position when input is open in case of fault
Input 2 Proximity V Fault on bus	Tag 2 2	Output 1 input 1 v Fault repeater Open v Closed v - Open in normal condition.
Input 3 Proximity V Fault on bus	Tag 3 3	Output 2 v Fault repeater Open v Obsed v Obsed v Obsed v
Input 4 Dry Contact 🗸 Fault on bus	Tag4 4	Output 3         Cumulative fault         Cumulative fault
Input 5 Dry Contact 💛 Fault on bus	Tag 5 5	Output 5 v Open v Open v
Input 6 Dy Contact 🗸 Fault on bus	Tag 6 6	Output 6 v Open v Open v
Input 7 Diy Contact 🗸 Fault on bus	Tag 7 7	Output 7 Input 7 V Open V
Input 8 Dry Contact 🗸 Fault on bus 🗌	Tag 8 8	Output 8         Logical Function         Open         Open            AND
Data Editing	2017 May 30 - 10:29	14 Dets Editing 2017 May 30 - 10:26:26

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.

le Settings Module ?			Store to device	Load from device
figuration Monitor Data Logger				
Input Status		Output Status		
Input 1	-	Output 1		
Input 2		Output 2		
Input 3	-	Output 3		
Input 4	-	Output 4		
Input 5	-	Output 5		
Input 6		Output 6		
Input 7	_	Output 7		
Input 8		Output 8		
		Start		

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.



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The Second	as Ma	dule ?	Chan	e to device	Load from device	
			3006	to device	Load from device	_
onfiguration	Monitor	Data Logger				
Parameters S	Setup					-
Days	0	$\sim$				
	_					
Hours	0	$\sim$				
Minutes	1	$\sim$				
Scan Rate [s	0.5	$\sim$				
Start		Clear				
						_

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

nfiguration	and a hadde to be			Store to device	Load from device
	DataLogger				
		External inputs status Input 1 Input 2	Outputs configural Output 1 Input Output 2 Input	Hardware	
		- Input 3	Output 3 Input		
		START	Module TAG D5240T	Тад	

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 \*

<sup>\*</sup> Note: example: Input = 1; Output = 0



Revision: 10

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ile Settings	Module	?				Store to a	levice	Load from	device
nfiguration Da	ataLogger								
External input	ts status		Outputs con			20 0000		29	
_				Hardware		Logical function	Mod	lBus	
		- Input 1	Output 1	Input 1	~	AND	None		~
		- Input 2					_		_
		- Input 3	Output 2	Input 2	~	AND	V	(	$\sim$
		- input 3	2003030						
			Output 3	Input 3	~	AND	✓ None		$\sim$
			Module TAG						
	START		D5240T		Tag				
	START				3				

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.



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💷 G.M. Internatio		nfiguration Softwa	are - D5240T -		– 🗆 X
File Settings	Module ?			Store to device	Load from device
Configuration Dat	taLogger				
	Parameters Setu Days (				
	Hours	~			
	Minutes 1	~			
	Scan Rate [s]	.5 ~			
	Start	Clear			
Data Editing				20	17 May 26 - 14:10:33

Figure 30: Data Logger screen.

## PARAMETERS SETUP:

Days: Number of days to acquireHours: Number of hours to acquireMinutes: Number of minutes to acquireScan 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

Contir	nuous Scan	
	Stop	

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

Tag —		
loop 1		

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

User Manual Settings	
Load Supply Voltage RMS (V)	23.8
Load Current RMS (A)	0.083
Load OFF Resistance (Ohm)	157
_	490
Isolation Resistance (kOhm)	
Supply Voltage Limits (± V)	1.2
Load Current Limits (± A)	0.005
Load OFF Res. Limits (± Ohm)	25
Isolation Res. Limit (kOhm)	50

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 k $\Omega$ )

• 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  $3 M\Omega$ 

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

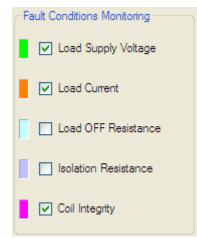


Figure 34: Fault Conditions Monitoring box.

**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 <u>at least one</u> 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)</li>
- Coil Integrity Monitoring is enabled AND the load is Activated AND Coil Integrity is FAIL.

Active		Driver Status					
Monitoring	OFF State			ON State			
Load Supply Voltage	$V_{\rm meas} < V_{\rm nom} - V_{\rm lim}$	$V_{\text{nom}} - V_{\text{lim}} \leq V_{\text{meas}}$ or $V_{\text{meas}} \leq V_{\text{nom}} + V_{\text{lim}}$	$V_{\rm nom} + V_{\rm lim} < V_{\rm meas}$	$V_{\rm meas} < V_{\rm nom} - V_{\rm lim}$	$V_{ m nom} - V_{ m lim}$ or $V_{ m meas} \leq V_{ m no}$	$\leq V_{\rm meas}$	$V_{\rm nom} + V_{\rm lim} < V_{\rm meas}$
Load Current	Not applicable		$I_{\rm meas} < I_{\rm nom} - I_{\rm lim}$				
Load OFF Resistance	$R_{\rm meas} < R_{\rm nom} - R_{\rm lim}$	$R_{ m nom} - R_{ m lim} \leq R_{ m meas}$ or $R_{ m meas} \leq R_{ m nom} + R_{ m lim}$	$\begin{array}{c} R_{\rm nom} - R_{\rm lim} \leq R_{\rm meas} \\ \text{or} \\ R_{\rm meas} \leq R_{\rm nom} + R_{\rm lim} \end{array} \qquad $		<u>Not app</u>	<u>licable</u>	
Isolation Resistance	$R_{\rm meas} < R_{\rm nom} - R_{\rm lim}$				<u>Not app</u>	licable	
Coil Integrity	Not applicable			FAIL			ОК

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

Acquire Functions				
Acquire ON parameters				

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 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

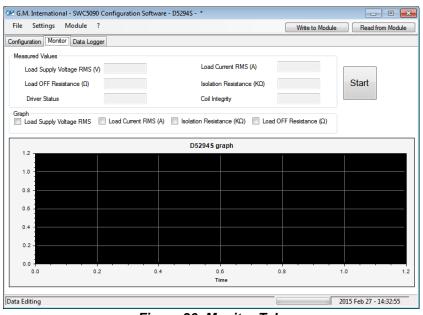


Figure 36: Monitor Tab.

**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 ( $\Omega$ ) is the load resistance measured in OFF State. In ON State, this value will remain at the saturation value (5 k $\Omega$ )
- 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 <u>www.gmintsrl.com</u>.

## 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

File Settings Module ?	Write to Module Read from Modu
onfiguration Monitor Data Logger	
User Manual Settings	
Load Supply Voltage RMS	Load Current RMS
- Voltage Upper Limit (V) 260.0	- Current Upper Limit (A) 4.000
- Voltage Lower Limit (V) 10.0	- Current Lower Limit (A) 0.005
<ul> <li>Load Supply Voltage</li> <li>Load Current</li> </ul>	Fault Conditions Monitoring (Command Status (OFF))         Acquire Functions           Image: Command Status (OFF)         Acquire Functions           Image: Command Status (OFF)         Acquire Functions
Load Supply Voltage	✓ Load Supply Voltage
✓ Load Current	Load Supply Voltage     Acquire Off Params     Tag

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.

<sup>\*</sup> 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.

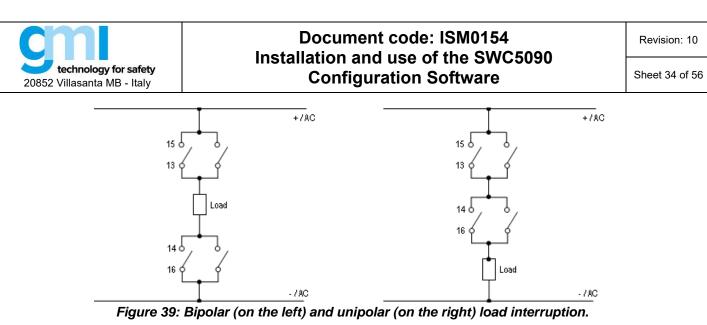
#### **ADVANCED OPTIONS:**

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

GM. Internation	al - SWC5090 Configuration Soft	ware - D5293S - *		- • •
File Settings	Module ?	_	Write to M	Nodule Read from Module
Configuration Moni User Manual Settir Load Supply Ve	Select Model , Show Identification Load Factory Settings Advanced Options , atage RMS		Durrent RMS	
	oper Limit (V) 260.0 wer Limit (V) 10.0		- Current Upper Limit (A) 4.00 - Current Lower Limit (A) 0.00	
Fault Conditions M	t	Fault Conditions Monitor	ng (Command Status (OFF)) ge	Acquire Functions Acquire Off Params Tag D5293S
Invert fault re	alay	Continuous Scan		
Data Editing				2015 Feb 27 - 14:34:07

Figure 38: Advanced configuration options.

#### 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):

Load Supply Voltage RMS	Load Current RMS
- Voltage Upper Limit (V) 260.0 - High hysteresis 20.0	- Current Upper Limit (A) 4.000 - High hysteresis 0.200
- Voltage Lower Limit (V) 10.0 - Low hysteresis 1.0	- Current Lower Limit (A) 0.005 - Low hysteresis 0.001

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.



Sheet 35 of 56

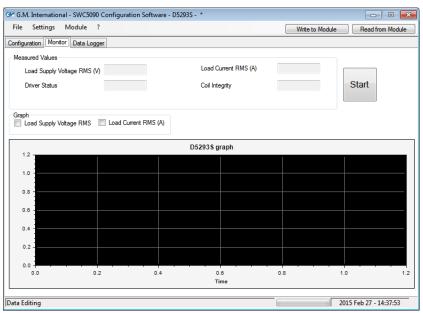


Figure 41: D5293S Monitor screen.

**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.



Sheet 36 of 56

🕼 G.M. International - SWC5090 Configuration Software - D5072D\D6072D -			
File Settings Module ?		Write to Module	Read from Module
Configuration Monitor Data Logger			
Parameters Setup			
Days 0 🗸			
Hours 0			
Hours			
Minutes 1			
Scan Rate [s] 0.5			
Start Clear			
Start			
Data Editing 2015 Feb 27 - 14:3		5 Feb 27 - 14:38:36	

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

<sup>\*</sup> For software revision n. 2, it is not possible to disable hysteresis.



- Monitor
- Data Logger

#### 3.9.1 Configuration

G.M. International - SWC5090 Configuration Software	ware - D5294S - *	- 🗆 ×	G.M. International - SWC5090 Configuration Software	ware - D5295S - *	- 🗆 ×
File Settings Module ?		Store to device Load from device	File Settings Module ?		Store to device Load from device
Configuration Monitor Data Logger			Configuration Monitor Data Logger		
User Manual Settings Load Supply Voltage RMS	Load Current RMS		User Manual Settings Load Supply Voltage RMS	Load Current RM	5
- Voltage Upper Limit (V) 260.0     - Voltage Lower Limit (V) 10.0	- Current Upper Li - Current Lower Li	State Internet and the second s	- Voltage Upper Limit (V) 260.0     - Voltage Lower Limit (V) 10.0		r Limit (A) 5.000 r Limit (A) 0.005
Load OFF Resistance	Isolation Resistance		Load OFF Resistance	Isolation Resistan	ce
- Resistance Upper Limt (Ω) 49000     - Resistance Lower Limt (Ω) 5	- Resistance Lower	Limit (KQ) 100	- Resistance Upper Limt (Ω) [49000] - Resistance Lower Limt (Ω) 5	- Resistance Lo	wer Limit (KD) 100
Fault Conditions Monitoring (Command Status (ON)) Load Supply Voltage Load Current Load Current Load Off Resistance Isolation Resistance	Fault Conditions Monitoring (Command Sta Load Supply Voltage Load Current Coll Integrity Load OFF Resistance Isolation Resistance	Acquire Functions Acquire Off Parame Tag [52545	Conditions Monitoring (Command Status (ON))     Load Supply Voltage     Load Current     Col Integrity     Load OFF Resistance     Jinolation Resistance	Fault Conditions Monitoring (Command Load Supply Voltage Load Current Coll Integrity Load OFF Resistance Isolation Resistance	Status (OFF) Acquire Functions Acquire Off Params Teg (D52955
Contact position in case of fault Open Closed	Continuous Scan Start		Contact position in case of fault Open Closed	Continuous Scan Start	
Data Editing		2017 May 29 - 08:35:39	Data Editing		2017 May 29 - 08:36:06

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

e Settings Module ?	5	Rore to device Load from device	File Settings Module ?		Store to device Load from device
figuration Monitor Data Logger			Configuration Monitor Data Logger		
lser Manual Settings Load Supply Voltage RMS	Load Current RMS		User Manual Settings Load Supply Voltage RMS	Load Current RMS	
- Voltage Upper Limit (V) 260.0 - High hysteresis     - Voltage Lower Limit (V) 10.0 - Low hysteresis	20.0         - Current Upper Limit (A)           1.0         - Current Lower Limit (A)		- Voltage Upper Limit (V) 260.0 - High hy     - Voltage Lower Limit (V) 10.0 - Low hy	steresis 20.0 - Current Upper Lin steresis 1.0 - Current Lower Lin	
Load OFF Resistance	Isolation Resistance		Load OFF Resistance	Isolation Resistance	
Resistance Upper Limit (Ω) 43000 · High hysteres     Resistance Lower Limit (Ω) 5 · Low hysteresi	- Resistance Lower Limit (KD	1) 100 - Low hysteresis 10		hysteresis 2000 - Resistance Lower	Limit (KΩ) 100 - Low hysteresis 10
ault Conditions Monitoring (Command Status [ON]) Supply Voltage Load Current Coll Heapthy Load OFF Resistance Isolation Resistance	Fault Conditions Monitoring (Command Status (DFF Lead Supply Votage Load Current Cold Heagity Lead OFF Resistance Isolation Resistance	Acquire Functions Acquire Off Params Tag D5294S	Load Cunditions Monitoring (Command Status [ON])     Load Supply Voltage     Load Current     Col Integrity     Load OFF Resistance     Isolation Resistance	Fault Conditions Monitoring (Command Stat Cod Supply Voltage Load Current Col Integrity Load OFF Resistance Isolation Resistance	Acquire Functions Acquire Off Params Tag D52955
ontact position in case of fault ) Open ) Closed	Continuous Scan Start		Contact position in case of fault Open  Closed	Continuous Scan Start	

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 ( $\Omega$ ): 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.

🐼 G.M. International - SWC5090 Configur	ation Software - D5295S - *
File Settings Module ?	Write to Module Read from Module
Configuration Monif Select Model	•
User Manual Settir Show Identificati	
Load Supply Load Factory Set	Load Current RMS
Advanced Optio	ns 🕨 Load Type 🔸
- Voltage Upper Limit (V) 260.0	Load interruption
- Voltage Lower Limit (V) 10.0	Input impedance  Hysteresis  I Lower Limit (A) 0.005
Load OFF Resistance	Isolation Resistance
- Resistance Upper Limit (Ω)         49000           - Resistance Lower Limit (Ω)         5	- Resistance Lower Limit (KΩ) 2000
Fault Conditions Monitoring (Command Status	
Load Supply Voltage Load Current	Load Supply Voltage     Acquire Off Params
Coil Integrity	Coll Intenity
<ul> <li>Load OFF Resistance</li> </ul>	Load OFE Resistance
✓ Isolation Resistance	Isolation Resistance
Invert fault relay	Continuous Scan
Data Editing	2015 Feb 27 - 14:41:24

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:

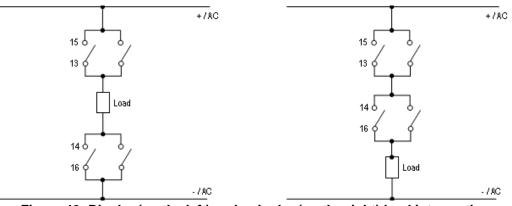


Figure 46: Bipolar (on the left) and unipolar (on the right) load interruption.

- 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):

- Voltage Upper Limit (V) 260.0 - High hysteresis 20.0	- Current Upper Limit (A) 5.000 - High hysteresis 0.200
- Voltage Lower Limit (V) 10.0 - Low hysteresis 1.0	- Current Lower Limit (A) 0.005 - Low hysteresis 0.001
ad OFF Resistance	Isolation Resistance
ad OFF Resistance Resistance Upper Limit (Ω) 49000 - High hysteresis 2000	Isolation Resistance - Resistance Lower Limit (ΚΩ) 100 - Low hysteresis 10

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.

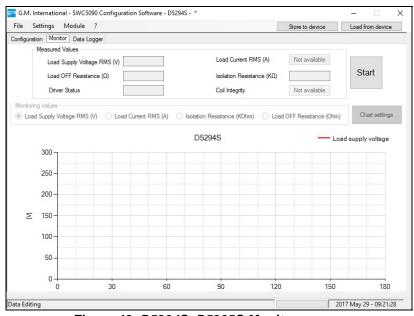


Figure 48: D5294S, D5295S Monitor screen.

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 ( $\Omega$ ) is the load resistance measured in OFF State. In ON State, this value will remain at the saturation value (5 k $\Omega$ )
- 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.



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		17.1	ion Software - D52949	5-*				>
le Settings	Module	?			Store to	device	Load from device	ŝ.
nfiguration Mo	nitor Data	Logger						
Parameters	Setup							1
Days	0	~						
Hours	0	~						
Minutes	1	~						
Scan Rate [	[s] 0.5	~						
Start		Clear						
Editing						20	17 May 29 - 10:01:1	10

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

G.M. International - SWC5090 Cont	iguration Software - D5264S -			
File Settings Module ?			Store to device	Load from device
Configuration Monitor Data Logger				
Input\Output Alarm				
	Alam			
	Alarm configuration	None ~		
	Contact position in case of alarm	Open ~		
	contact position in case of alarm	open v		
	Low Set [Div] 0			
	Low Hysteresis [Div] 0			
	High Hysteresis [Div] 0			
	On Delay [s]			
	Off Delay [s]			
ta Editing				2017 May 29 - 10:07:3

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.



Sheet 44 of 56

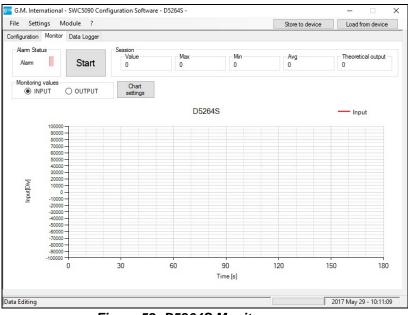


Figure 52: D5264S Monitor screen.

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.



G.M. International - SWC5090 Configuration Software - D5264	
File Settings Module ?	Store to device Load from device
Configuration Monitor Data Logger	
Parameters Setup	
Days 0 ~	
Hours 0 ~	
Minutes 1 ~	
Scan Rate [s] 0.5 V	
Start Clear	
Data Editing	2017 May 29 - 10:13:37

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

		Store to device Load from device
nfiguration Monitor puts and output Al;		
Input		Output
Input type	Current ~	Type 4-20 mA Source V
Range	0/4 ÷ 20 mA	Downscale : OUT [µA] 4000 ← 4000 IN [µA] Upscale : OUT [µA] 20000 ← 20000 IN [µA]
Input conversion	0	Under range [µA] 3600
Out of range	<ul> <li>Square root</li> <li>Low threshold [μΑ] 3200</li> <li>High threshold [μΑ] 22000</li> </ul>	Over range     [µA]     20800       Fault output value [µA]     24000       Fault in case of :     🗹 Out of range
Tag	D5254S\D6254S	

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

Settings Module ?			Store	e to device	Load from device
figuration Monitor Data logger					
outs and output Alarms					
Alam 1			Alam 2		
Туре	None	~	Туре	None	~
Alarm lock:			Alarm lock:		
NO contact position in alarm	Open 🖂		NO contact position in alarm	Open \vee	
Low Set [µA]	0		Low Set [µA]	0	
Low Hysteresis [µA]	0		Low Hysteresis [µA]	0	
High Set [µA]	0		High Set [µA]	0	
High Hysteresis [µA]	0		High Hysteresis [µA]	0	
On delay [s]	0.0		On delay [s]	0.0	
Off delay [s]	0.0		Off delay [s]	0.0	
Faults :	Out of range		Faults :	Out of range	
In case of fault	Ignore	$\sim$	In case of fault	Ignore	$\sim$
Alarm acknowledgement	Ignore	~	Alarm acknowledgement	Ignore	$\sim$
. tant as to formoughtform					

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.

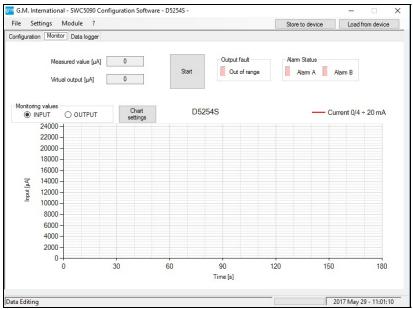


Figure 56: D5254S / D6254S Monitor screen.

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.



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ile Settings Module ?				S	tore to device	Load from device	
nfiguration Monitor Data logger	1						
	Parameters Se	tup		 			
	Days	0	~				
	Hours	0	~				
	Minutes	0	~				
	Scan Rate [s]	0.5	~				
	Start	(	Clear				

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

File Settings Module	?	Store to device	Load from device
onfiguration Monitor Data lo	gger		
Inputs Outputs Alarm			
	1	Input 2	
	Input 1 Range [4 ÷ 20 mA]	Range [4 ÷ 20 mA]	
	Out of range	Out of range	
	Low threshold 3200	Low threshold 3200	
	High threshold 22000	High threshold 22000	
	Tag [Channel 1]	Tag [Channel 2]	
	Channel1	Channel2	
	Input 3	Input 4	
	Range [4 ÷ 20 mA] Out of range	Range [4 ÷ 20 mA] Out of range	
	Low threshold 3200	Low threshold 3200	
	Low threshold 3200		
	High threshold 22000	High threshold 20800	
		NF()(3)(0)	
	Tag [Channel 3]	Tag [Channel 4]	
	Channel3	Channel4	

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.



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nput selector		_	
Input 1	Input 2	Input 3	Input 4
utput operations	8 :		
None None			
Subtraction	O Sum	1	
Maximum	O Mini	imum	

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

			Store to device	Load from device
Configuration Monitor Data logger				
Inputs Outputs Alarm				
	Alarm 1			
	Туре	None	~	
	Alarm lock:			
	Input selector	Input 1	~	
	Operations selector	None	~	
	NO contact position in alarm	Closed	~	
	Low Set [µA]	0		
	Low Hysteresis [µA]	0		
	High Set [µA]	0		
	High Hysteresis [µA]	0		
	On delay [s]	0.0		
	Off delay [s]	0.0		
	Fault :	Out of range		
	In case of fault	Ignore	~	

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.

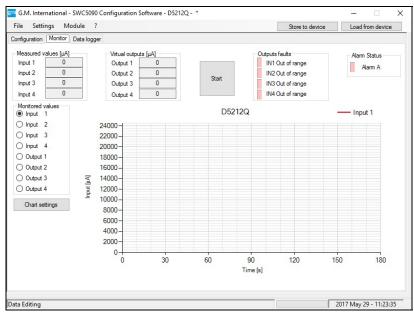


Figure 61: D5212Q / D6212Q Monitor screen.

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.



G.M. International - SWC5090 Configuration Software - D5212Q - *		>
le Settings Module ?	Store to device	Load from device
nfiguration Monitor Data logger		
Parameters Setup		
Days 0 ~		
Hours 0 V		
Minutes 0 ~		
Scan Rate [s] 0.5 V		
Start Clear		
Editing		2017 May 29 - 11:24:55

Figure 62: Data Logger screen.

### 3.13 5700

5700 is HART<sup>®</sup> Multiplexer Modem.

### 3.13.1 Configuration

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

ile Settings	Module ?			Store to device		Load from device	
rameters							-
evice paramete	ang						
	Configuration parameters Polling Address :	11 ~	Master parameters				
	Baud Bate :	38400 ~	Master Type :	1	~		
	1000	38400 ~	Scan Mode :	Command 1	~		
	Tag :	1	Search Mode :	0	~		
	Tags		Retry on busy :	2			
	Message :	GMI MESSAGE	Retry on error :	2			
	Descriptor :	GMI DESCRIPTOR	Default Preambles	5			
	Long Tag :	GMI LONGTAG	to Device :	5			
	Last configuration date —		ld				
	Day :	26	Device Id :	1			
	Month :	4	Hardware revision :	1			
	Year :	2017	Assembly number :	273-1			

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.



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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.

Configuration Report	Configuration Report			
Model: D5273S\D6273S Serial: Date: 2017 May 29	Model: D5273S\D6273S Serial: .	Date: 2017 May 29		
Input 1	Input 1			
Input 1       Channel 1         Sensor Type       TC J         Downscale (*C)       0.0         Upscale (*C)       0.0         Cold Junction Source       Automatic         Cold Junction Reference (*C)       0.0         Inlight and the second source       Slow'         Mains Frequency       50 Hz         Offsat       0         Multipler       1         Function       Input 1         Type       4-20 mA Source         Downscale (µA)       20000         Under Range (µA)       20000         Under Range (µA)       20000         Under Range (µA)       20000         Foult Study Value       22000         Foults       2         Burnout       Active         Informal Fault       Inactive         Sensor Out Of Range       Inactive         Module Out Of Temperature Range       Inactive	Input 1 Tag Tag Sensor Connection Sensor Type Downcale (°C) Upscale (°C) Cold Junction Source Cold Junction Reference (°C) Integration Speed Mains Frequency Offset Output 1 Function Type Downscale (µA) Under Range (µA) Under Range (µA) Over Range (µA) Fault Sensor Out Of Range Out Saturation Module Out Of Temperature Range	Channel 1 TC TC J 0,0 Automatic 0,0 Slow 50 Hz 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		

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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