M1000 Alarm Monitor Plus

HW revision: D

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1. Introduction

This manual describes the D-revision of the M1000 Alarm monitor. This revision is the 4th generation of the well-known M1000 Alarm Monitor. The M1000 unit has been installed aboard ships, at chemical plants, oil rigs and many other places where clear and concise alarm monitoring is required.

In default configuration the new M1000D is fully compatible with the previous revisions of M1000.

The M1000 Alarm Monitor is an alarm panel with 10 digital sensor inputs. The unit has separate indications of first incoming alarm, following alarms and acknowledged alarms. It also has dedicated inputs for remote reset and blocking of alarms.

The unit can be configured for sensor health monitoring and monitoring of its own supply voltage and insulation level of its power supply.

Scalable System

Multiple M1000 units can be interconnected to form a large scale alarm system. In this situation functions are available for synchronizing the flashing of the LEDs and enabling global indication of first alarm for all connected units.

Alarm related parameters like time delays, reset functions and other features can be configured through 16 programming switches or from a PC via USB.

Configuration by PC

PC configuration is done through a USB interface. The M1000 will behave as a mass storage device and the configuration software can be started directly from the unit, without installation of additional software on the PC.

Alarm Log

The M1000 offers an alarm log that is accessible through the USB interface. The alarm viewer can be started directly from the M1000 (mass storage device).

Communications

Communication with external equipment is available through an isolated RS485 interface (Modbus RTU protocol), or through the built in Ethernet interface (Modbus TCP).

PC as remote display

It is possible to use a PC as remote display for alarm and log display. This is done through the embedded web server.

Applications

The M1000 can be used in virtually any application where signals from digital sensors are monitored. Typical applications are engine monitoring, tank level monitoring or door monitoring. Since the unit is marine approved, it can also be used in water ingress detection systems or many other marine applications.

2. Installation

The M1000 is designed for flush mounting in a 138 mm x 138 mm cut out. The unit is secured by tightening four mounting brackets against the switchboard plate.

The M1000 front includes a text label for easy description of the 10 alarms. The label texts can be printed on a printer. SELCO provides a Microsoft Word template available at

http://www.selco.com/products/alarm-monitoring/m1000-alarm-monitor/

The label is easily inserted behind the front plate window by a small opening.

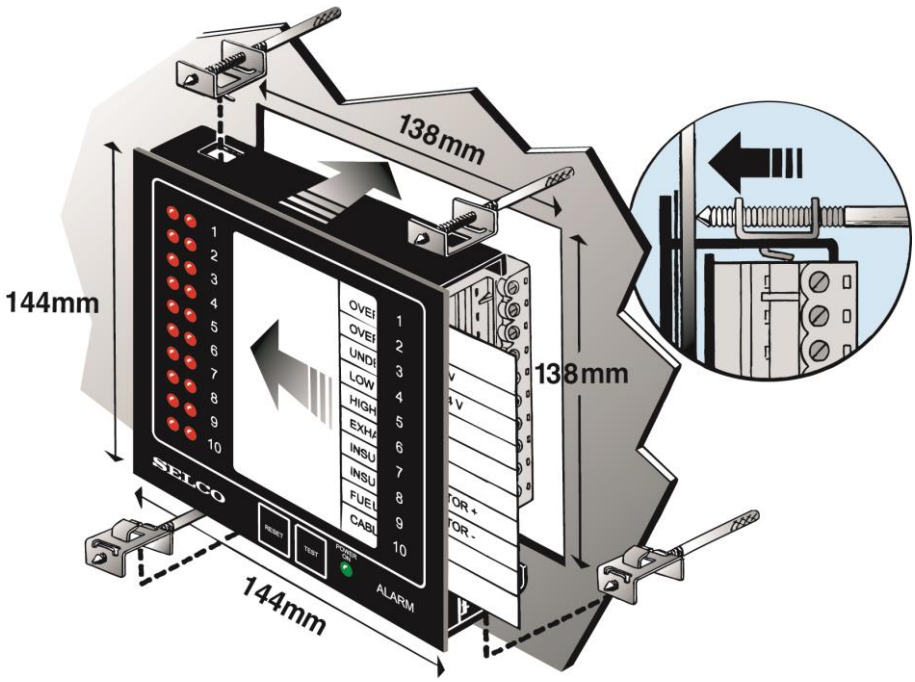


Figure 1

3. Rear View

RESET - terminal 12
Resets the siren relay and the ALARM-OUT signal (terminal 27). Flashing light in the LEDs will change to steady light if the input signal is still active. Active when connected to positive supply (terminal 28).

TEST - terminal 11
Will activate all LEDs to perform a lamp test. Active when connected to positive supply (terminal 28).

INPUTS - terminals 1-10
Alarm inputs for connection of voltage free contacts, normally open or normally closed with positive reference. Negative reference is also possible through use of external pull-up resistors.

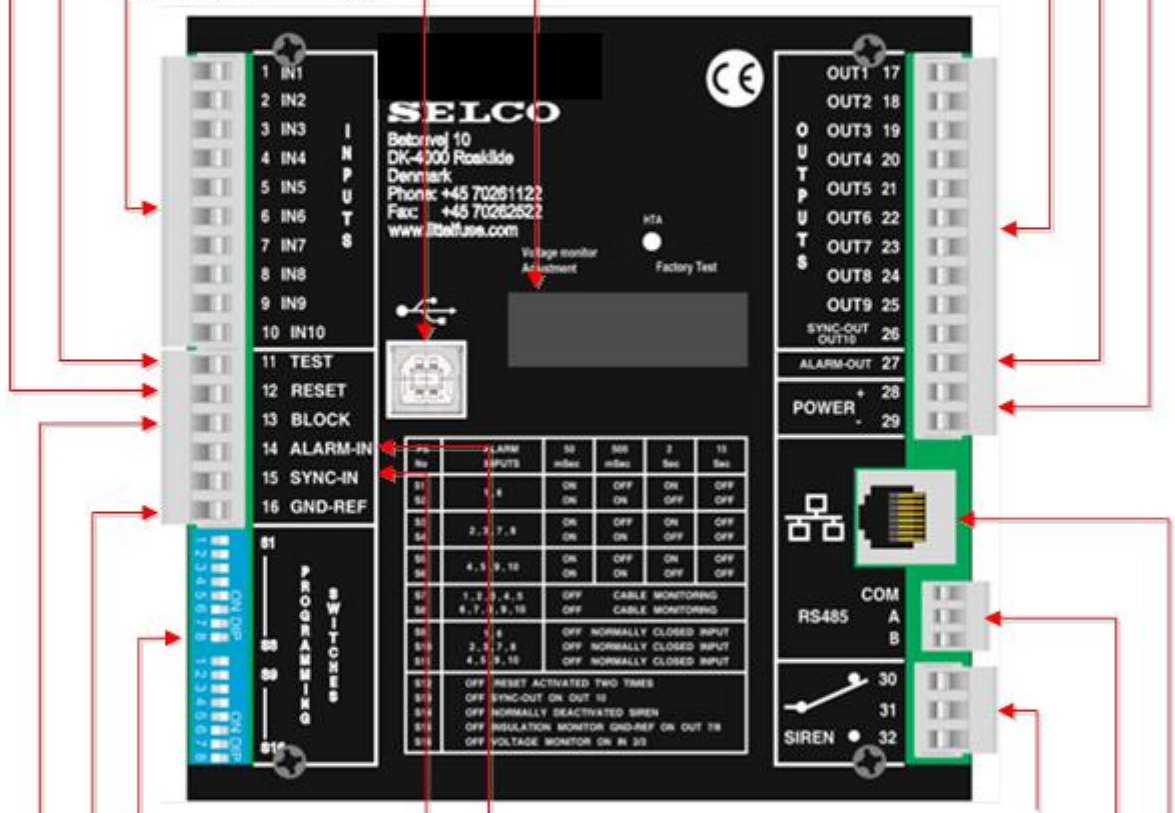
USB interface
Interace for PC based configuration and read out of log file.

Voltage monitor adjustment.
The adjustment potentiometer for the voltage monitor is located behind this plastic cover.

POWER - terminals 28-29
DC power supply.

ALARM-OUT - terminal 27
Activates when the first alarm is detected. Used for indication of first incoming alarm in a multiple unit installation. ALARM-OUT is an open collector output.

OUTPUTS - terminals 17-26
Open collector outputs for remote control of relays or external lamps. Operates as "electronic contacts" to minus supply (negative reference when active).



PROGRAMMING SWITCHES
Programming switches S1 - S16 are used for configuration. The table printed on the rear side of the unit describes the functions.

GND-REF - terminal 16
Used as a ground reference for the insulation monitoring function. Configured by programming switch S15.

BLOCK - terminal 13
Will block for new incoming alarms. Active when connected to positive supply (terminal 28).

ALARM-IN - terminal 14
Provides indication of first incoming alarm in a multiple unit installation.

SYNC-IN - terminal 15
Provides synchronization of LED flashing between units in a multiple unit installation. Configured by programming switch S13.

SIREN - terminals 30-32
Internal siren relay with a voltage free change over contact, which is activated at any new alarm.

RS485
Interface for field-bus communication. Supports MODBUS RTU protocol.

Ethernet
Interface for remote monitoring through HMI or embedded webserver.

4. Functions and DIP switch configuration

The functions described in this section assume that the M1000 unit has been configured for default operation – all the programming switches are ON and in factory default configuration.

The sensors (alarm contacts) connect the alarm inputs of the M1000 to its supply voltage (24 VDC). An activated input will cause the appropriate alarm channel to activate. The activation of an alarm is indicated by a flashing light in the related LEDs and the activation of the related open collector output.

The First incoming alarm is indicated with a quick flashing light, following alarms are indicated with slow flashing light. The LEDs will keep flashing until the alarms are acknowledged, even though the signals have been disconnected from the input terminals.

Pressing the RESET button will acknowledge all new alarms and all LEDs will change to steady light, provided that the related input signals are still present upon acknowledgement. Pressing the RESET button will also cause the siren relay to deactivate. Each open collector output will stay active as long as the related LEDs are lit.

4.1 Input and output terminals

All input terminals are located on the left side of the unit and all output terminals are located on the right side (facing the rear plate).

The sensor inputs IN1 to IN10 are considered active when connected to positive supply and inactive when disconnected.

Note that the alarm inputs can be configured to operate with normally open as well as normally closed contacts.

The outputs are “Open Collector” outputs. An open collector output will be at negative supply level when active and at positive supply level when inactive.

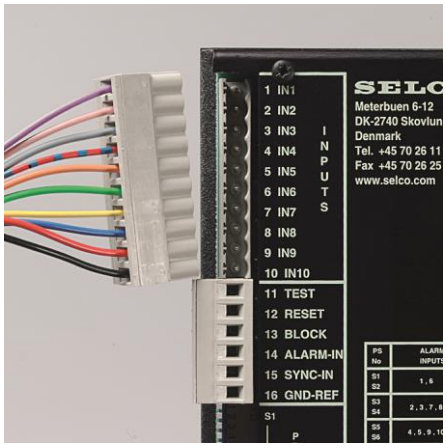


Figure 2

No current originates from an open collector output; it should only be considered an electronic contact to minus supply level. External voltage, equal to the unit supply voltage, must always be provided to drive the relay or lamp controlled by an open collector output. Maximum drive capacity of an output is 150mA.

4.2 DIP Switch Configuration table

Below table shows an overview over the DIP Switch configuration options.

PS NO	ALARM INPUTS	50 mSec	500 mSec	2 Sec	15 Sec
S1	1 , 6	ON	OFF	ON	OFF
S2		ON	ON	OFF	OFF
S3	2 , 3 , 7 , 8	ON	OFF	ON	OFF
S4		ON	ON	OFF	OFF
S5	4 , 5 , 9 , 10	ON	OFF	ON	OFF
S6		ON	ON	OFF	OFF
S7	1 , 2 , 3 , 4 , 5	OFF	CABLE MONITORING		
S8	6 , 7 , 8 , 9 , 10	OFF	CABLE MONITORING		
S9	1 , 6	OFF	NORMALLY CLOSED INPUT		
S10	2 , 3 , 7 , 8	OFF	NORMALLY CLOSED INPUT		
S11	4 , 5 , 9 , 10	OFF	NORMALLY CLOSED INPUT		
S12	OFF RESET ACTIVATED TWO TIMES				
S13	OFF SYNC-OUT ON OUT 10				
S14	OFF NORMALLY DEACTIVATED SIREN				
S15	OFF INSULATION MONITOR GND-REF ON OUT 7/8				
S16	OFF VOLTAGE MONITOR ON IN 2/3				

Figure 3

4.3 Input Delays

Each input can be configured with an input delay. Programming switches S1 to S6 are used (see 4.2) to select a predefined delay for a combination of inputs. Input delays are convenient where alarms are dependent upon the time of activation, e.g. a freezer door alarm - alarm condition would occur only if the door is left open for more than 15 seconds. Delay values are according to the programming table.

Other delay configurations are available using PC based configuration.

4.4 Cable Monitoring

By setting switch S7 and S8 to OFF, cable monitoring is activated for the cables connecting the voltage free contacts to the inputs. Cable monitoring provides extra security to the alarm system. Cable faults are indicated with short flashing pulses on the corresponding alarm channels. Cable fault indications will be overridden by activation of input alarms and indicated with normal alarm flash or steady light indication.

Two types of cable monitoring are available: Default Cable Monitoring and Extended Cable Monitoring. Extended Cable Monitoring can be enabled using PC based configuration. In Default Cable Monitoring there is only cable break monitoring (using measuring resistor R1) for normally open inputs and only short circuit

monitoring (using measuring resistor R2) for normally closed inputs. However, the system is still safe as other cable faults will be indicated as alarms.

In Extended Cable Monitoring there are cable break monitoring and short circuit monitoring for both types of inputs. In addition to being safe, a more correct indication is now achieved. In this case both R1 and R2 should be used. Connections are shown below

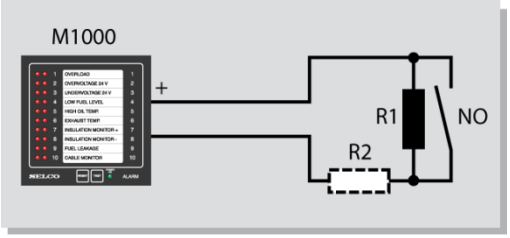


Figure 4: Normally Open Input. Cable break monitoring (and short circuit monitoring)
R1 = 82kΩ, (R2 = 4.7kΩ)

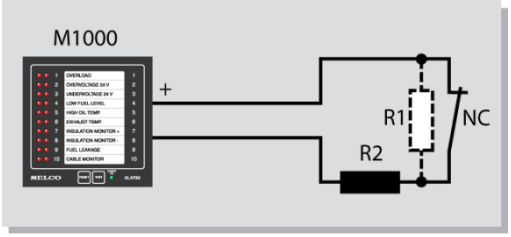


Figure 5: Normally Closed Input. Short circuit monitoring (and cable break monitoring)
R2 = 4.7kΩ, (R1 = 82kΩ)

4.5 Normally Open or Normally Closed Contacts

Programming switches S9 to S11 determine the state and operation of the voltage free contact connected to an input terminal. A normally open (NO) contact is disconnected when no alarm is present. A normally closed (NC) contact provides a signal when no alarm is present. Normally closed relay contacts are often used as they provide the safety of alarm monitoring in case the supply is lost.

Individual selections of normally open or normally closed contacts are possible using PC based configuration.

4.6 Reset Activated Two Times

After reset with programming switch S12 in OFF position, the steady light is maintained until reset is again activated, provided that the fault has been cleared.

Optional reset functions are available using PC based configuration.

4.7 Processor and Software Watchdog function

The M1000 includes a microprocessor and software watchdog function. The alarm output for this is the siren relay output (terminals 30 – 31 – 32).

In default configuration the siren relay output is normally energized. This means as long as the processor and software work, the relay coil is energized and the relay is activated. In case the processor fails, the software stops or the power supply is lost, the relay coil will no longer be energized and the relay will drop out, thus the relay contacts change position.

Note that the siren relay is not exclusively reacting on a watch dog fault; it will also react on any new alarm and power supply failure. **The watch dog function is only available with normally energized siren relay.**

4.8 Normally Deactivated Siren

In default configuration the siren relay is operating as normally energized relay. In case of any new alarm, supply voltage failure or a watchdog error, the siren relay will cause terminals 30 and 31 to be shorted. Setting programming switch S14 to OFF will invert the function so that connection between terminals 31 and 32 exists only during alarm condition.

Note that in case the siren relay is configured normally energized, the watch dog function is disabled.

4.9 Synchronizing of LED between multiple units (Sync-Out on Output 10)

The sync-out function provides the possibility of synchronized LED flashing between multiple M1000 units. The selection of this function by programming switch S13 on one arbitrary unit disables the default output function of terminal 26 (output 10). Sync-out has no functional importance other than providing synchronized flashing. Connection is done as shown below.

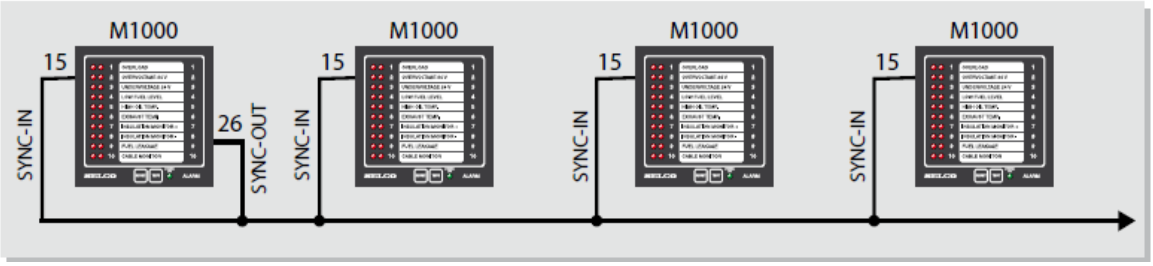


Figure 4: Wiring for Synchronized Flashing

4.10 First Incoming Alarm on Multiple Units

The M1000 includes a quick flashing light indicating the first incoming alarm. This function can be extended to cover multiple units, thus it will be possible to indicate the first of e.g. 40 alarms. In order to obtain this function, a single wire must be interconnected between all the M1000 units. The wire must have connection to ALARM-IN (terminal 14) and ALARM-OUT (terminal 27) on each unit as shown below.

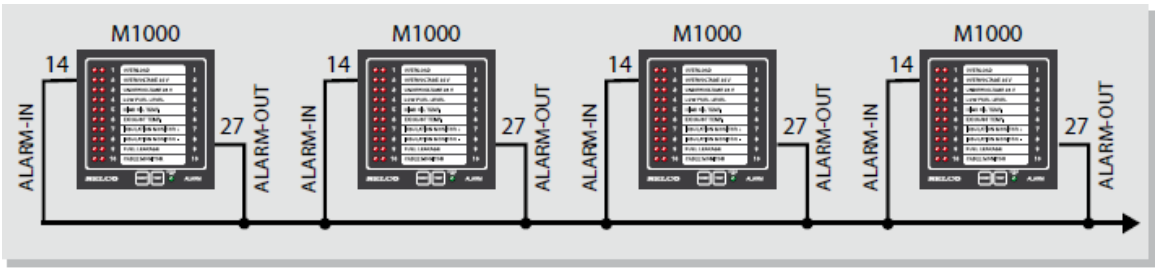


Figure 5: First Incoming Alarm on Multiple Units

4.11 Insulation Monitoring

By setting programming switch S15 to OFF and connecting GND REF (terminal 16) to ground, channels 7 and 8 are configured for insulation monitoring. If the insulation resistance between ground (terminal 16) and positive supply (terminal 28) becomes less than 25kΩ ± 8kΩ, channel 8 will indicate alarm. If insulation resistance between ground and negative supply (terminal 29) becomes less than 25kΩ ± 8kΩ, channel 7 will indicate alarm.

4.12 Voltage Monitoring

By setting programming switch S16 to OFF, channels 2 and 3 are set for supply voltage monitoring. A resistor selected according to the voltage monitoring formula, must be connected to terminal 2. The voltage monitoring wiring diagram shows the connection. External voltage supply should then be adjusted to lower voltage limit UL. Press and hold RESET while adjusting the potentiometer on the rear side of the unit, until alarm is indicated on channel 3.

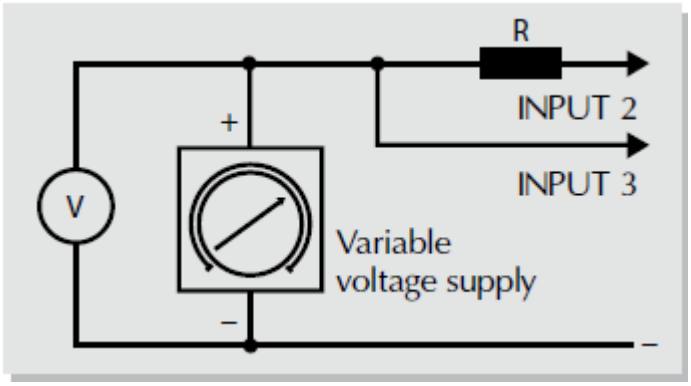


Figure 6: Wiring for Voltage Monitoring

The calculated resistor determines a fixed distance between lower voltage limit indicated on channel 3 and upper voltage limit indicated on channel 2. By adjusting the potentiometer, over and under voltage limits can be changed, but still with a fixed percentage separation. Reset the alarm unit and check that alarm occurs at the voltage limit intended.

$$R = \frac{16 \times (U_O - U_L)}{U_L}\ k\Omega$$ with **U_O = Over voltage limit** and **U_L = Lower voltage limit**

4.13 Input Blocking

Connecting terminal 13 to positive supply will prevent the M1000 from detecting new alarms. Blocking is released by disconnecting the supply from terminal 13. Direct connection to the supply will block all inputs.

Blocking of individual inputs can be done by use of external components or through PC configuration.

Blocking of individual inputs by use of external components:
- Direct connection: All inputs are blocked
- 84 kΩ in series: Inputs 1, 2, 3, 6, 7 and 8 are blocked
- 4.7 kΩ in series: Inputs 1 and 6 are blocked

Alternatively blocking of individual inputs can be done through PC configuration.

Note that the blocking function will also block cable monitoring alarms.

4.14 Test Function

The TEST push button and the TEST terminal (terminal 11) provide illumination of all LEDs. An extended test function is available by the simultaneous activation of both the TEST and RESET push buttons. Press and hold the two push buttons: LEDs will illuminate, after 3 seconds the siren relay will activate, and after 6 seconds the outputs will activate.

4.15 Dimming

It is possible to adjust the brightness of the front panel LEDs by pressing the TEST push button, or connecting TEST terminal (terminal 11) to positive supply (terminal 28), for more than 6 seconds.

Dimming is done in 4 consecutive levels. The default brightness is re-obtained by activation of the TEST signal for 2 seconds.

Dimming can also be done from a controller (PC or PLC) via the RS485 interface or Ethernet.

4.16 M1000 as a repeating panel

All or individual alarms from the M1000 can also be repeated at a different location on another M1000 as illustrated below. The outputs 1, 4 and 9 are hardwired together through a “pull-up” resistor of 4.7kΩ. When one of the outputs is activated the input voltage to the upper M1000 will be at zero volts and indicated as a group alarm. Input 1 and 6 on this M1000 should be configured as normally closed inputs (programming switch S9 off).

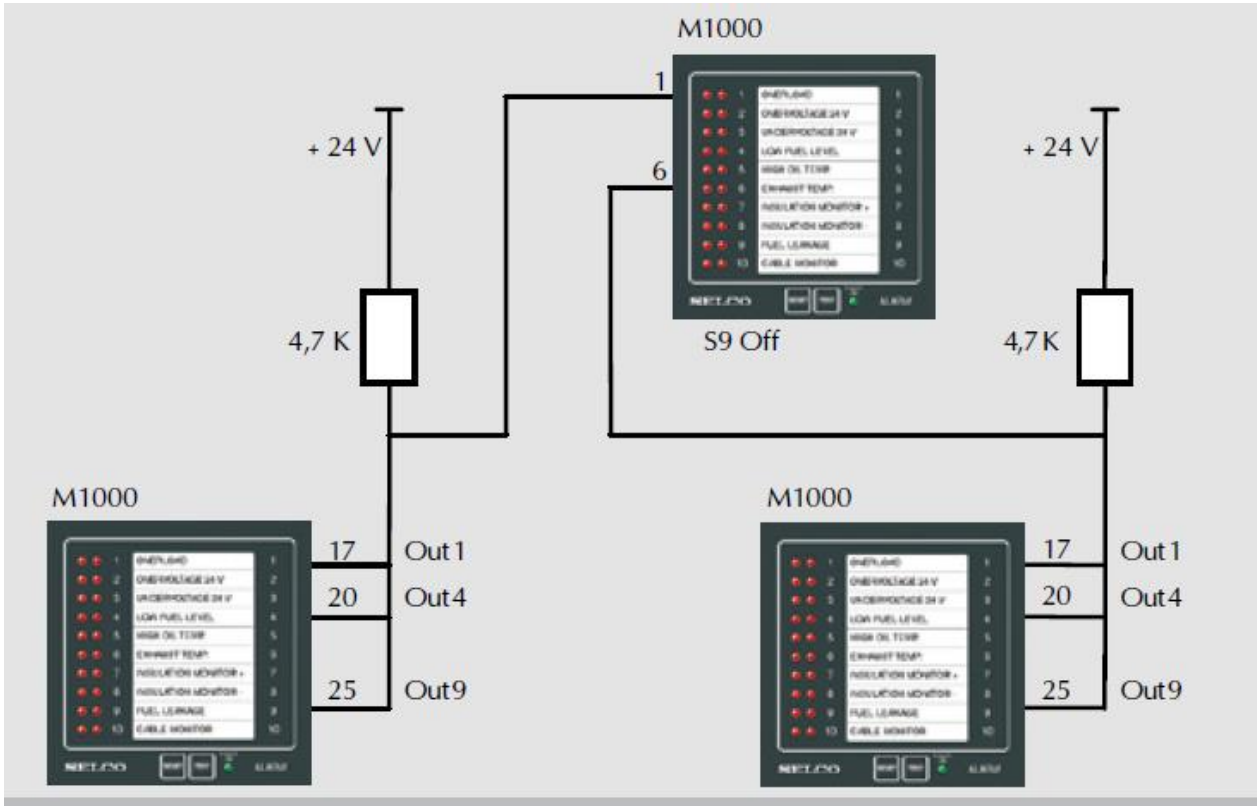


Figure 7: M1000 as repeater panel

5. Configuration via PC

The M1000 can be configured by PC through the USB interface. PC configuration greatly expands the number of programmable options. Thus adjustable delays for each individual alarm, extra reset functions, and many other features not available by the programming switches can be configured.

5.1 USB Interface

The M1000 contains configuration software, data logs, and event records that can be accessed through the USB Interface. No drivers or software installation is required to access configuration or data. Use a USB A-B cable as shown below to connect the M1000 to a computer.

Figure 8

The PC application for configuring the M1000 is pre-installed on the internal M1000 drive. When the M1000 is connected to a PC, the M1000 drive will appear in the file manager.

NOTE: The configuration and log-viewer applications are HTML Applications (HTA). HTA is a proprietary Microsoft™ technology and is only supported on Microsoft Windows systems. Once configured, the data log file can be accessed on any platform.

5.2 Connecting to a PC

The M1000 requires supply voltage before connecting the USB cable.
A powered M1000 will enter service mode when a PC is connected with a USB cable. In service mode, alarm logging is still active, but new alarm will not be visible in the log before the USB cable is unplugged and then plugged in again. The M1000 will remain in service mode until the USB cable is disconnected. When connected to a PC, the M1000 appears as a mass-storage device and a drive will be displayed in the file manager. This drive behaves like any standard drive. Files can be copied to or from the drive or even dragged and dropped. The drive includes a Configuration folder and a Log folder.

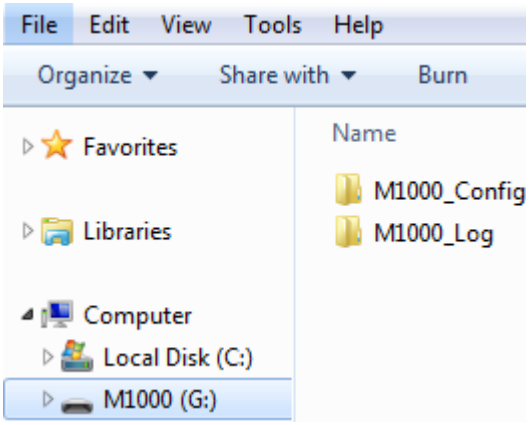


Figure 9

NOTE: The changes made in the configuration software will not be stored unless saved. The configuration changes will be activated when the USB cable is disconnected.

NOTE: The Log drive operates as a First-In, First-Out (FIFO) log. When the Log drive is full, the oldest entry will be removed to make room for a new event.

5.3 Configuration Software

The configuration software for the M1000 is located in the Configuration folder on the M1000 drive. To run the software, open the Configuration folder in the PC file manager and double-click on the M1000Config.hta file. The features of the software are outlined in subsequent sections of this manual.

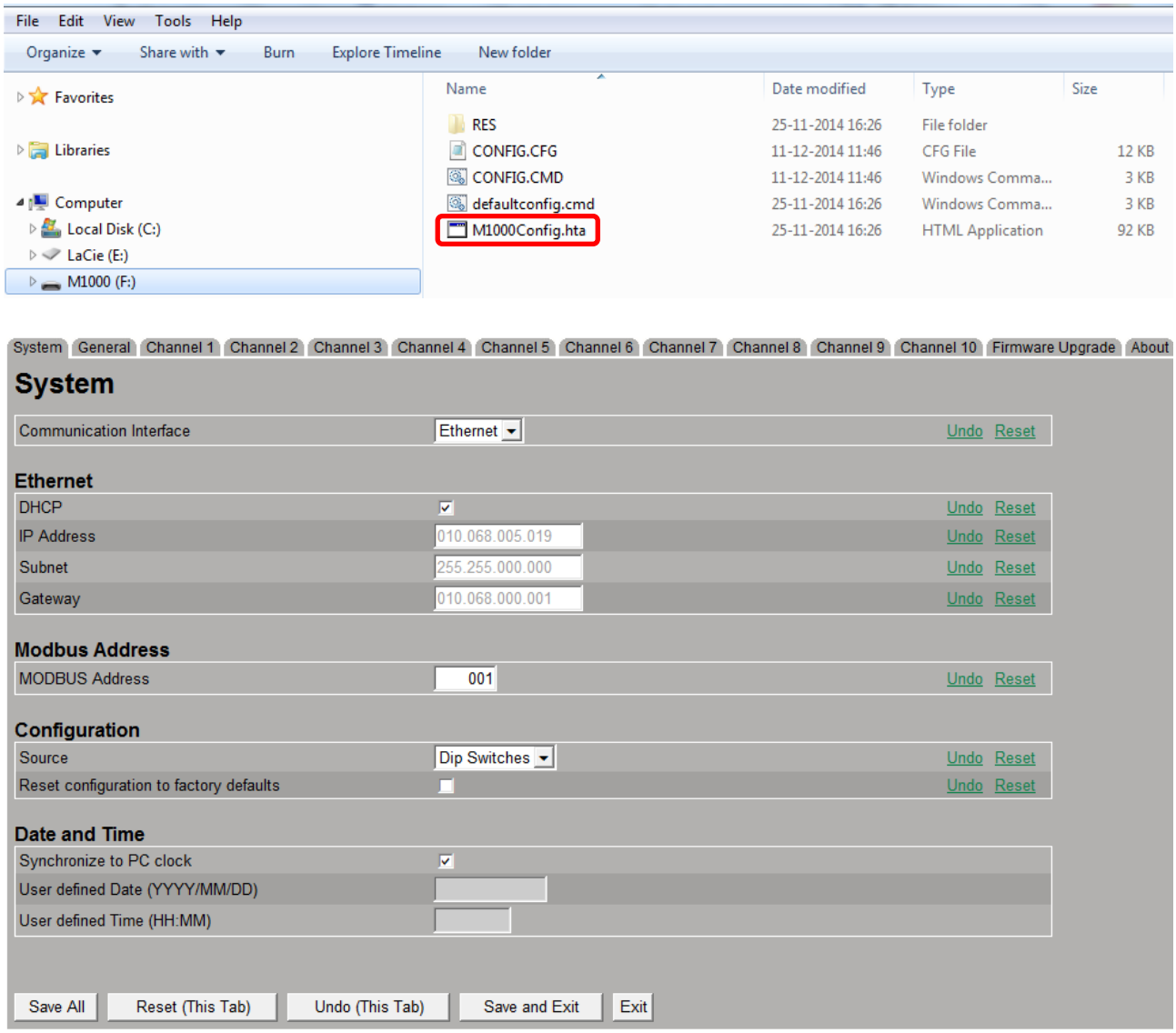


Figure 10

Configuration Software Tabs

The configuration software is displayed in a window with 14 tabs along the top of the screen.
Click on a tab to display the relevant configuration options.

System Set system parameters, such as communication interfaces and addresses, Dip Switch or PC configuration and date/ time.

General Parameters such as device name, behaviour of the siren relay, common alarm output, reset options and special features are configured on the General tab.

Channel There is one channel tab for each input channel. Here all the channel specific settings are configured. These settings are time delay, normally open/

	normally closed input contact, cable monitoring, channel specific reset options, output and alarm blocking configuration and alarm text.
Firmware Upgrade	This tab is used during firmware upgrade. It guides the user through the firmware upgrade process.

Configuration Software Buttons

There are five buttons along the bottom of the configuration software window that are common to every tab.

Save All	Save all configuration settings made in every tab.
Reset (This Tab)	Reset all configuration settings in this tab to the factory default. Changes will not be stored until they are saved.
Undo (This Tab)	Undo any changes that have been made to the current tab since opening the configuration software.
Save and Exit	Save all configuration settings made in every tab and exit the configuration software.
Exit	Exit the configuration software. No changes will be saved unless the Save All button has been pressed. If the Save All button is clicked accidentally, use the Undo (This Tab) button on any tab where changes were made and then Save and Exit.

There are two buttons for each configuration setting, Undo and Reset. The Undo button will cancel any changes made to the value before the configuration software was opened. The Reset button will load the factory default for that setting.

5.4 System Tab

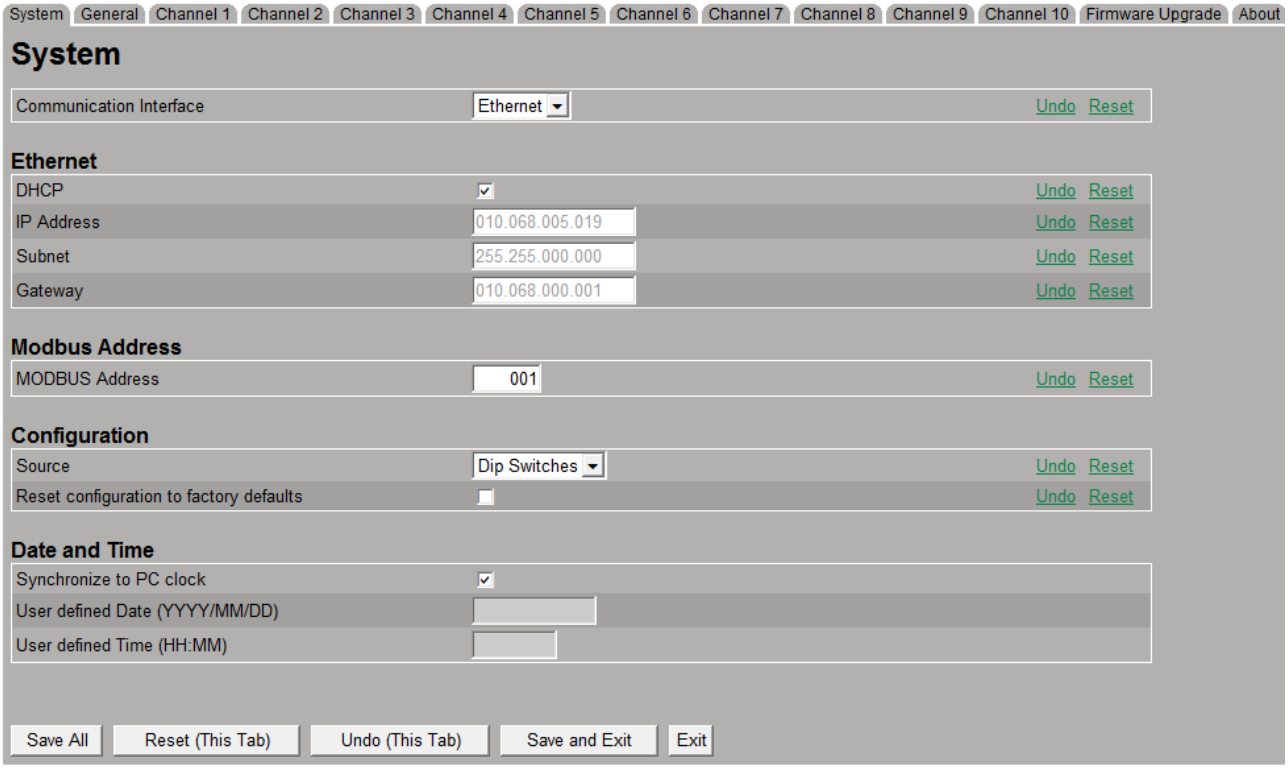


Figure 11

Parameter	Options	Description
Communication Interface	Ethernet RS-485	Here the communication interface can be chosen. Default is Ethernet
Ethernet DHCP, IP Address, Subnet, Gateway	Check mark	In case the check mark is set, the M1000 will receive its IP address, subnet and gateway from the server it is connected to. Otherwise they can be configured manually.
Modbus Address	00 - 62	Slave address on the MODBUS RTU
Configuration Source	DIP Switches Software	When DIP Switches are selected, all settings can only be adjusted by the dip switches on the rear side of the M1000C unit. When Software is selected all settings can only be adjusted by PC configuration.
Reset configuration to factory defaults	OFF ON	Factory Default Setting When set to ON all settings will be DELETED! This will restore M1000 back to the default configuration.
Date and time Synchronize to PC clock User defined date (YYY/MM/DD) User defined time (HH:MM)	ON OFF	ON is factory Default Setting - M1000 will retrieve its date and time setting from the connected PC. OFF means date and time are manually adjusted

5.5 General Tab

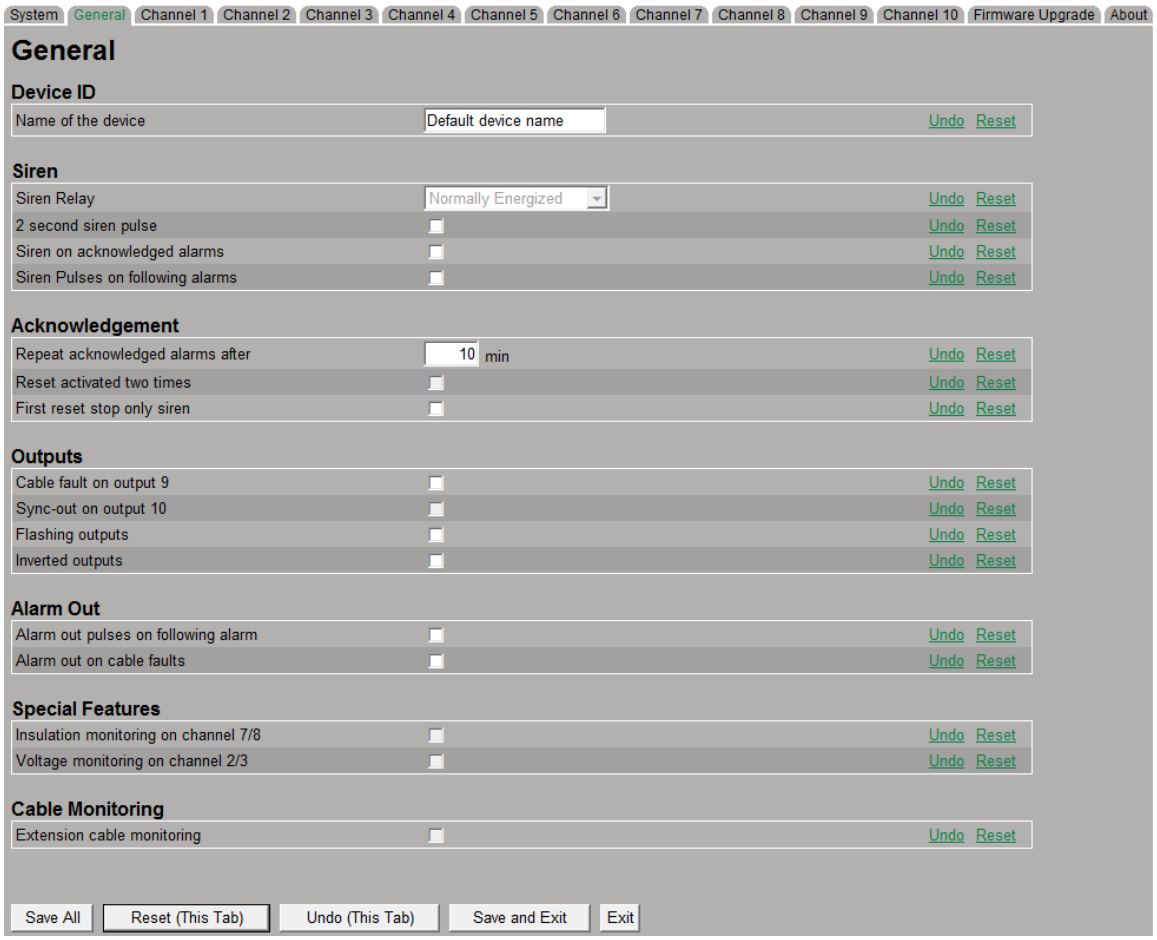


Figure 12

Parameter	Options	Description
Device ID		
Name of the device	Free text	Alarm panel name
Siren		
Siren Relay	Normally Energized/ Normally De-energized	Normally energized is the default setting. It means that in case no alarm is present, the siren relay will be energized. In case a new alarm appears, the siren relay will de-energize. Configuring it to normally de-energized inverts this function.
2 second siren pulse	OFF ON	OFF is factory default setting In default the siren relay will remain active (de-energized) until reset is pressed. In case this tick mark is set to ON; the siren will only give a 2s pulse.
Siren on acknowledged alarms	OFF ON	Off is factory default setting. In default configuration the siren relay will be deactivated after pressing reset. If this function is activated, the siren relay will stay active until the alarm signal is deactivated even if the unit has been reset.
Siren pulses on following alarms	OFF ON	Factory default setting. If this function is activated and in case the siren relay is already activated and a new alarm is appearing on the M1000, the siren relay will de-activate for 1s and then activate again.
Acknowledgement		
Repeat acknowledged alarms after	0-30 min	Acknowledged alarms are repeated as new alarms after selected counts of minutes, provided that the fault(s) is/are still present. TIP: This security function prevents the operator from forgetting an important alarm condition after having acknowledged the alarm(s).
Reset activated two times	OFF ON	OFF is factory default setting If set to ON, after reset the steady light is maintained until reset is again activated, provided that the fault has been cleared.
First reset stop only siren	OFF ON	OFF is factory default setting. If set to ON, the first reset will only de-activate the siren. The LED will still remain flashing and the common alarm output (27) will remain activated. Second reset will change the LED to constant light and deactivate the common alarm output (27)

Acknowledgement

In default configuration acknowledgement (resetting) of alarms works as follows:

Scenario 1: Resetting of alarms while the alarm is still active on the input

The alarm input is activated, the alarm LED goes flashing, the interconnected output, the common alarm-output (terminal 27) and the siren go ON. When reset button is being activated, the alarm LED changes to steady light and the siren goes OFF together with common alarm-output (terminal 27). The interconnected output still remains ON. When the alarm input is de-activated, display and the interconnected output go OFF:

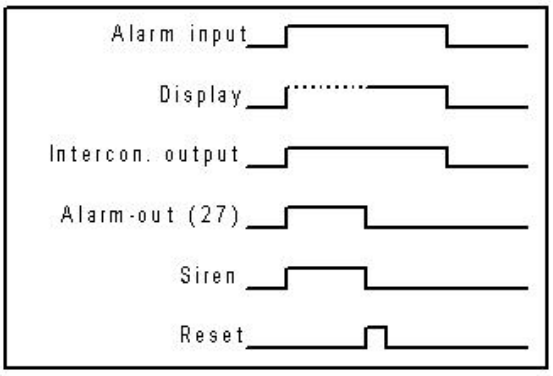


Figure 13

Scenario 2: Resetting of alarms in case the alarm has already disappeared from the input

The alarm input is activated, the alarm LED goes flashing, the interconnected output, the common alarm-output (terminal 27) and the siren go ON. The alarm disappears from the input (alarm input is de-activated), the alarm LED is still flashing and the interconnected output, common alarm-output (terminal 27) and the siren are still ON. When reset button is being activated, the display and the siren go OFF, together with the common alarm-output (terminal 27), and the interconnected output.

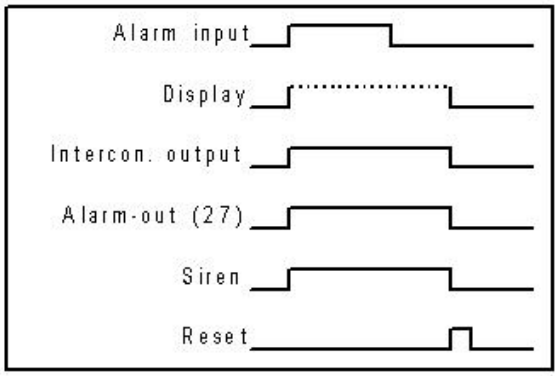


Figure 14

5.6 Channel Tab

There is one Channel Tab for each input channel. Here parameters like alarm delays and alarm names can be configured individually for each channel.

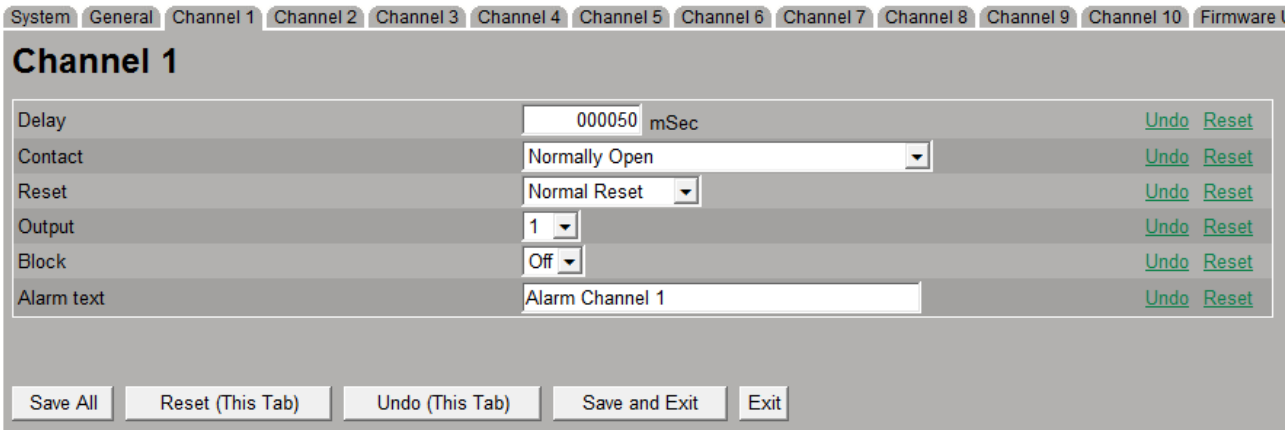
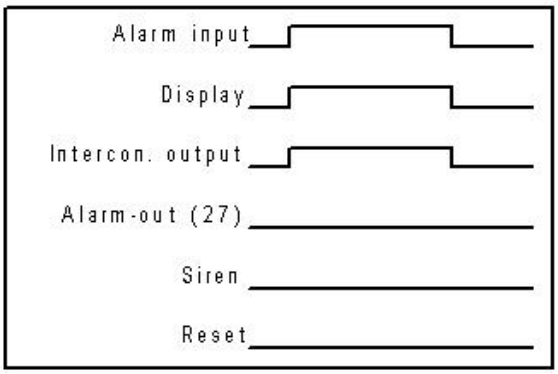


Figure 15

Parameter	Options	Description
Delay	Range 10 ms to 99 s	Configuration of the time delay for the selected channel in milliseconds 10 ms – 99000 ms
Contact	This setting concerns contact function (NO/NC). M1000D need to know which kind of sensor/switch is connected to the input(s). Cable monitoring can be configured here for each input individually.	
	Normally Open	The connected sensor is a normally open switch
	Normally Closed	The connected sensor is a normally closed switch
	Normally Open with cable monitoring	The connected sensor is a normally open switch, cable monitoring for this sensor input is activated.
	Normally closed with cable monitoring	The connected sensor is a normally closed switch, cable monitoring for this sensor input is activated.
Reset	Normal Reset	Normal reset is the default reset setting, similar to the programming switch S12 (ON). Scenarios: Both scenario 1 and 2 apply to the Normal reset setting. Please refer to Figure 13 and Figure 14 for further information.
	Automatic Reset	Automatic reset means that an alarm will automatically reset in case it disappears from the input. Thus in case the alarm disappears from the input, the LED state can change from flashing LED to dark, without resetting the alarm.
	Local Reset	Channels working with local reset cannot be reset with the external reset signal, if It's connected through a 39 KΩ resistor. The resistor has to be connected in series with the external reset signal (terminal 12). It's still

		possible to perform reset on the reset button (on front or external positioned button connected directly to terminal 12). Scenarios: Both scenario 1 and 2 apply to the Local Reset setting. Please refer to Figure 13 and Figure 14 for further information.
	Indicator Reset	Display and interconnected output(s) follow the alarm input. It isn't possible (or necessary) to reset channels with this configuration. Alarm input is activated, the display goes Steady and the interconnected output goes ON. Alarm input is de-activated, display and interconnected output goes OFF. Note: When this setting is used, siren and alarm-out (terminal 27) isn't activated on this channel. When this setting is used, siren and alarm-out (terminal 27) isn't activated on this channel.  Figure 16
Output	Range 1 - 10	Any of the outputs 1 – 10 can be assigned to an alarm. Like this it is possible to create group alarm outputs.
Block	On/ Off	This function is used for blocking of alarms. The control signal for this is the positive supply voltage connected to terminal 13 (Block). As long as the Block input is active, all alarms that have this parameter set to On will be supressed.
Alarm Text	Free Text	Here the alarm description can be typed. The alarm description will appear in the log file, both the locally saved log and the log viewer through Ethernet.

5.7 Firmware Upgrade Tab

Firmware upgrade can be done with the configuration software and the firmware file. Choose the Firmware Upgrade Tab and follow the instructions on the screen.

It is not necessary to back up configuration file or log. These files are automatically backed up during the firmware upgrade and restored to the unit after upgrade.

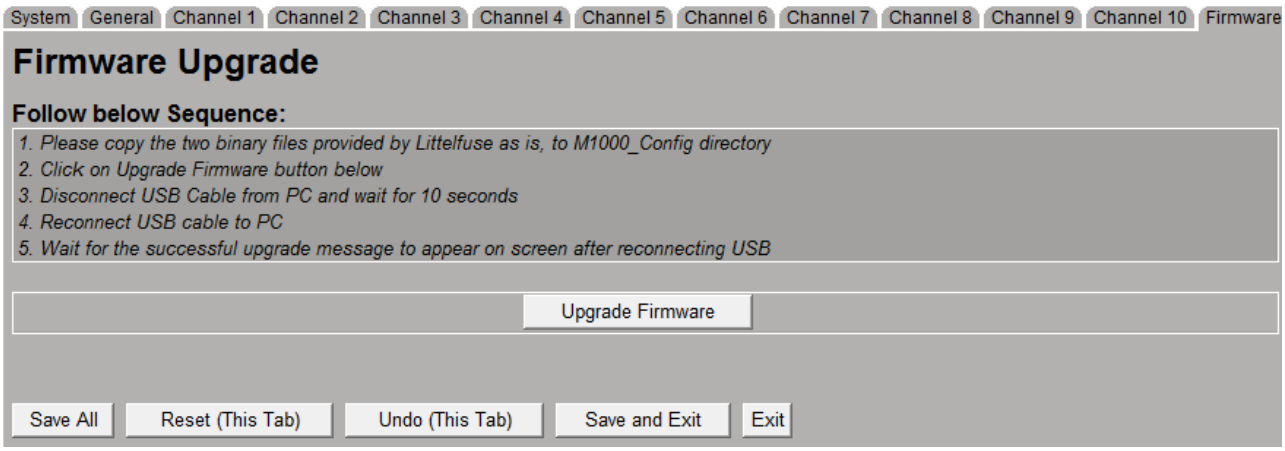

System
General
Channel 1
Channel 2
Channel 3
Channel 4
Channel 5
Channel 6
Channel 7
Channel 8
Channel 9
Channel 10
Firmware
Firmware Upgrade
Follow below Sequence:
1. Please copy the two binary files provided by Littelfuse as is, to M1000_Config directory
2. Click on Upgrade Firmware button below
3. Disconnect USB Cable from PC and wait for 10 seconds
4. Reconnect USB cable to PC
5. Wait for the successful upgrade message to appear on screen after reconnecting USB
Upgrade Firmware
Save All
Reset (This Tab)
Undo (This Tab)
Save and Exit
Exit

Figure 17

5.8 About Tab

This Tab provides information on unit type and hardware and software revision.

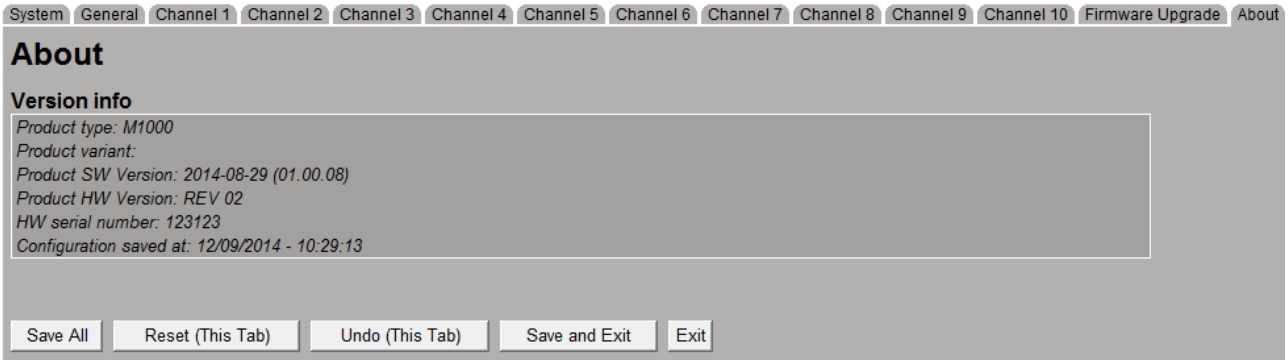


Figure 18

6. Alarm Log

The M1000 includes an alarm log that is accessible through the USB interface or the embedded webserver.

For viewing the log through USB, connect the M1000 with the USB A to B cable (part number K1025) to the computer.

The unit will then appear as a mass storage device in the Windows Explorer:

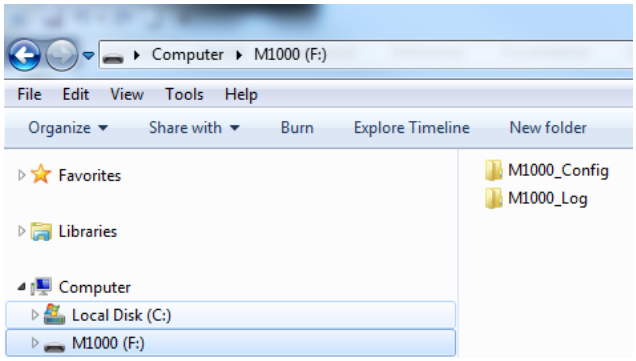


Figure 19

Double click on the Log folder:

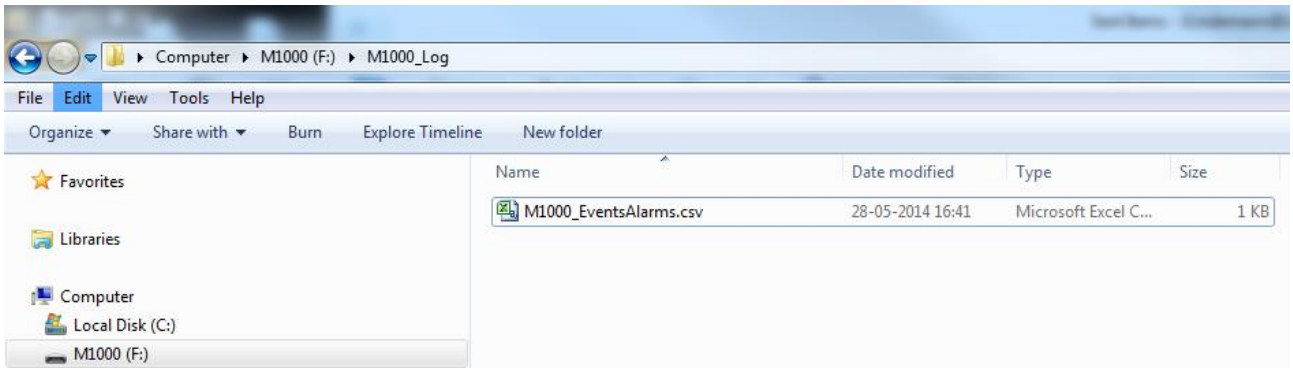


Figure 20

The log file is saved in csv format and can be opened with Microsoft Excel. All events are being saved, incl.

- start-up of the unit
- changes in the configuration
- firmware upgrades
- appearance of new alarms
- acknowledging of alarms
- disappearing of alarms

	A	B	C	D	E	F	G
84	2014-27-05	09:39:48	FIRST	Alarm 10			
85	2014-27-05	09:39:48	OFF	Alarm 10			
86	2014-27-05	09:39:51	ACK	Alarm 10			
87	2014-28-05	13:49:21	EVENT	M1000 startup			
88	2014-28-05	13:49:21	EVENT	Ethernet hardware interface present			
89	2014-28-05	13:49:21	EVENT	Power on reset occurred			
90	2014-28-05	13:49:24	EVENT	Ethernet disconnected			
91	2014-28-05	13:49:35	FIRST	Alarm 01			
92	2014-28-05	13:49:38	ACK	Alarm 01			
93	2014-28-05	13:49:38	OFF	Alarm 01			

Figure 21

Column A shows the date of the event.

Column B shows the time of the event.

Column C shows what has happened:

- **FIRST** – a new alarm has appeared. This is the first unacknowledged alarm on the unit (in order to distinguish this alarm from alarms that might follow).
- **NEW** – a new alarm has appeared
- **ACK** – an alarm has been acknowledged (reset)
- **OFF** – an alarm disappeared from the input
- **EVENT** – Condition change on the unit. The description for this is shown in column D

Column D shows the alarm channel or the event description

- **Alarm 1** - alarm channel 1
- **M1000 startup** – M1000 has been powered up. The unit will not loose the log in case it is switched off.
- **Ethernet hardware interface present** – This message appears after power up once the Ethernet interface has initialised.
- **Ethernet disconnected** – Appears once after power up in case no Ethernet communication is connected or on Ethernet communication loss

Note that when the M1000 is connected to USB, alarm logging is still active, but incoming new alarms will not be visible in the log before the USB cable is unplugged and then plugged in again.

7. Communications

7.1 RS485 interface, MODBUS-RTU protocol

The physical interface consists of a two wire half-duplex RS485 interface. The connection terminals of the RS485 interface plug are marked “A” and “B”. Terminal “A” is positive, while terminal “B” is negative.
RS485 works with a single master (e.g. a PLC or a PC). The master controls all communication on the bus.
The M1000 units operate as slaves and will simply respond to commands issued by the master.
The two-wire RS485 bus is working in half-duplex mode. As half duplex does not allow simultaneous transmission and reception, it’s required that the master control direction of the data flow.
It is also possible to use a master with a full duplex RS485 interface; however it is necessary to connect the two positive and negative signals together. Thus Tx+ and Rx+ become “A”, while Tx and Rx- becomes “B”.

RS485 cable

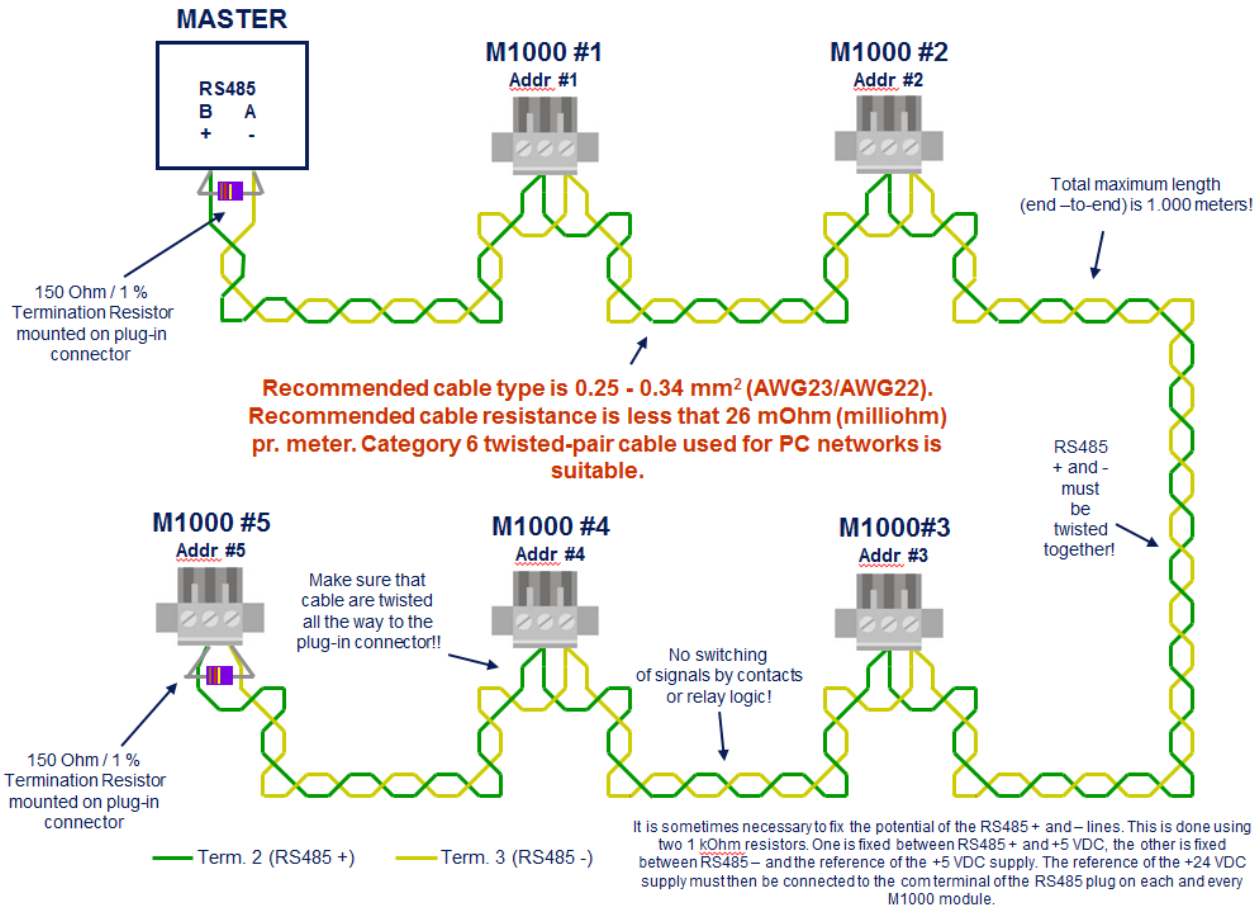


Figure 22

RS485 Configuration
In order for the communication to work between the master and slave units, the communication setting must be adjusted to match. The following communication settings are applicable:

Baud Rate	Parity	Data Bits	Stop Bits
1200	None	7	1
2400		8	2
4800			
9600			
19200			

Upon delivery the M1000 units are configured as follows:
9600 Bits/s, No parity, 8 data bits and 1 stop bits.

A detailed description of the MODBUS RTU protocol can be downloaded from the SELCO web-site at http://www.selco.com/products/alarm-monitoring/m1000-alarm-monitor/

7.2 Ethernet interface, MODBUS-TCP protocol

The M1000 is equipped with an Ethernet interface which supports communication by MODBUS TCP protocol.

The basic functionality of the Modbus TCP communication is the same as with the RS485 communication, however Ethernet offers a couple of advantages compared to RS485.

Thus Ethernet allows for a multi master system, higher communication speeds and transmission across other media, such as the internet.

Ethernet communication is of great advantage to those users who want to connect their M1000 system to modern HMI and SCADA systems.

7.3 Embedded Web Server (PC as remote display)

The M1000 includes an embedded webserver. When the M1000 is connected to the LAN or the Internet, a PC can act as remote display for the M1000. The front of the unit and the alarm log can be shown on the web browser. All that is needed for that is the IP address of the M1000. It can be configured manually in the configuration software of M1000 or provided automatically by the M1000 through DHCP. This is done in the configuration software.

PC as remote display for M1000

In order to use a PC as remote display, the IP address of the M1000 is needed. For finding the IP address, connect the M1000 to the PC via the USB cable and start the configuration software as described in the Configuration via PC section of this manual.

Choose the SYSTEM tab:

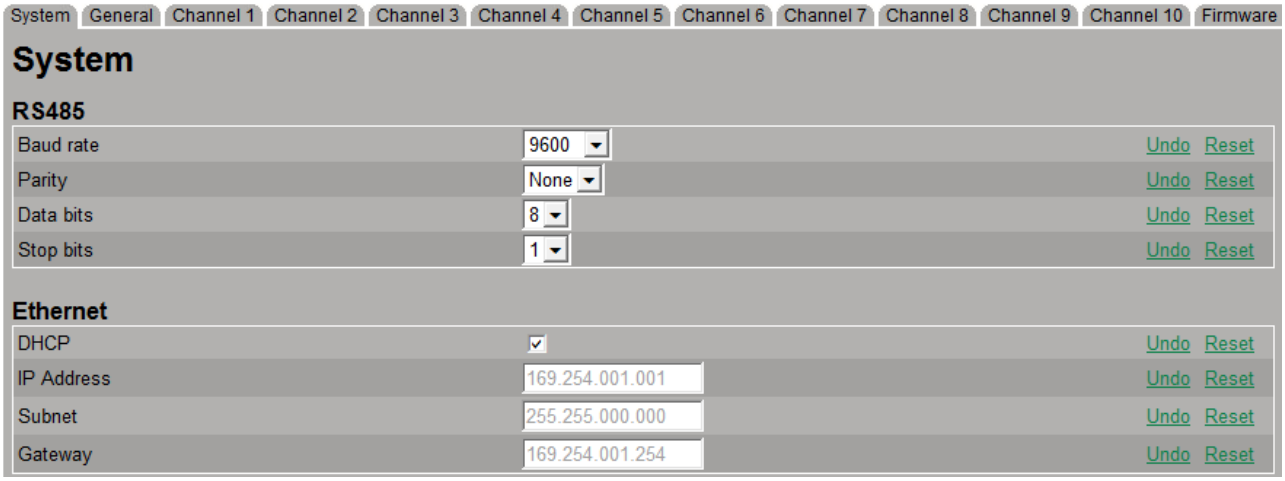


Figure 23

The IP address can either be configured manually or automatically through DHCP.

Manual configuration of the IP address

For manual configuration remove the tick mark in DHCP and type addresses.

Automatic configuration of the IP address

For automatic configuration of the IP address:

- Connect M1000 to power supply
- Connect to the computer via USB
- Start configuration software
- Check that there is a check mark in DHCP (if not set the check mark, press Save and Exit, disconnect the USB plug and wait 5 s)
- Connect the M1000 to a Local Area Network
- Toggle the power supply
- Connect the USB cable, open the configuration software and choose the System Tab:

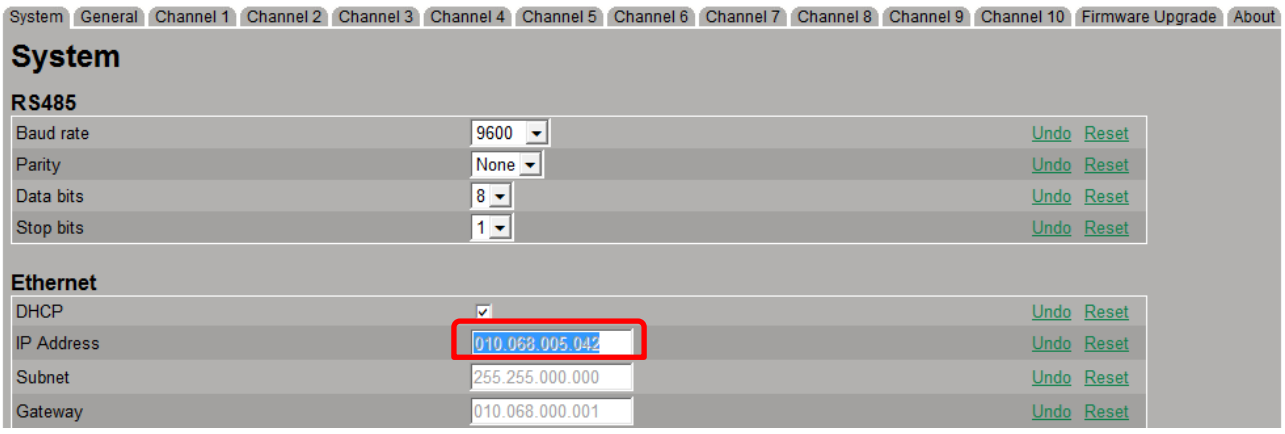


Figure 24

Copy the IP address and paste it into the address field of your web browser (remove the zeros before the digit numbers as in below example):

The web browser will now show a front view of the M1000 with all LED indications. It is possible to reset alarms and do a remote LED test through the web browser. The alarm texts shown on the front are the texts configured in the configuration software.

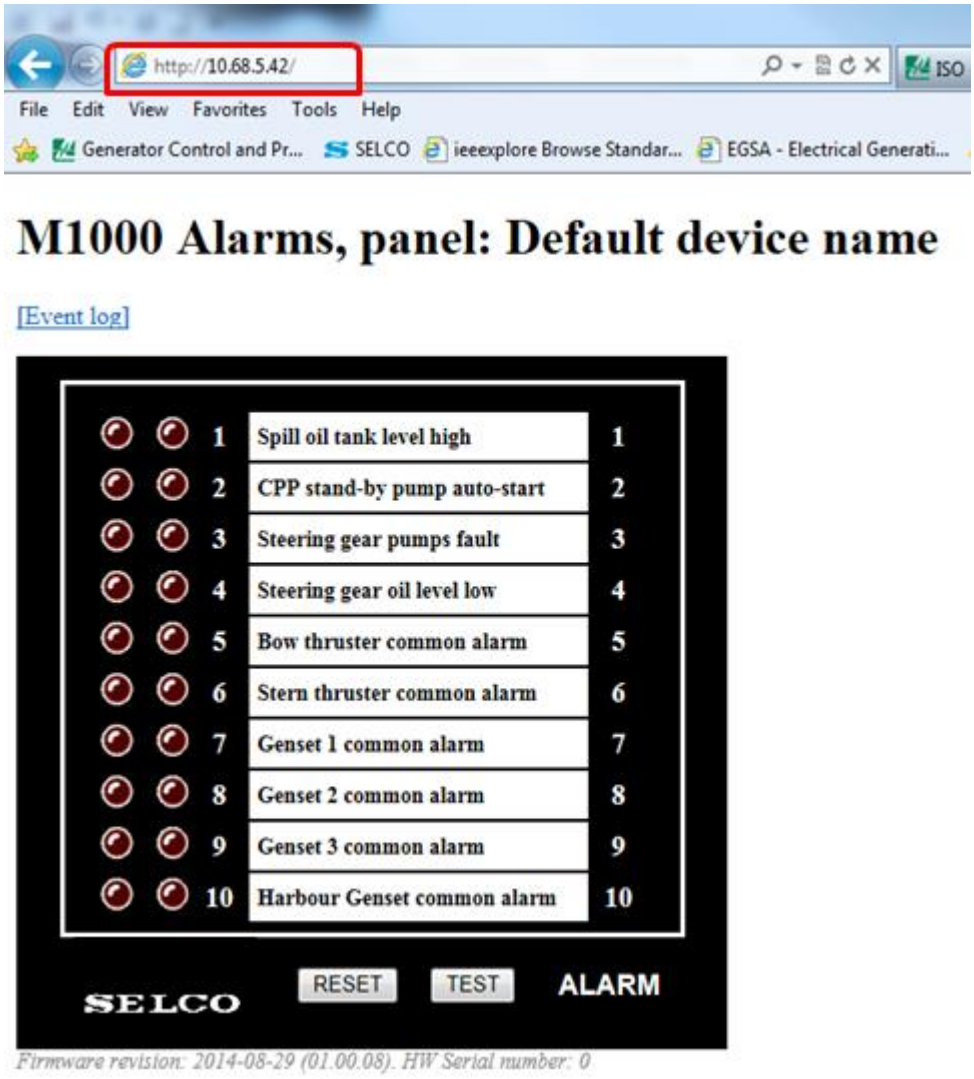


Figure 25

Remote Log View through PC

The event log is accessible through the web browser as well. Click on the Event Log link (see above picture) to view the log:

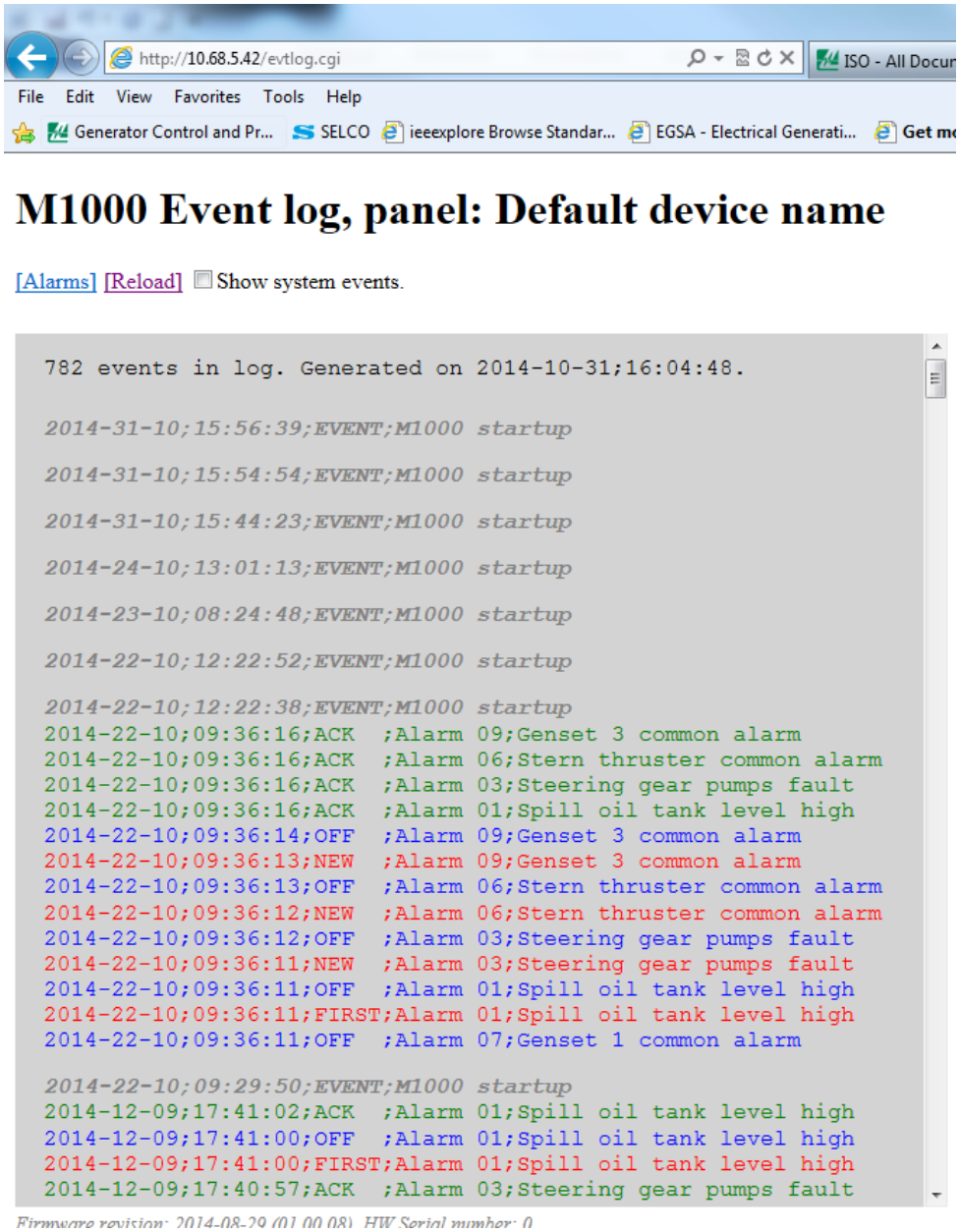


Figure 26

The log shows the date and time of the event, event type (alarm or event) and the alarm text.

The grey printed events show date and time when the unit has been powered up **(EVENT)**.

Red marked events show new incoming alarms **(ALARM)**.

Green marked events show when an alarm has been acknowledged **(ALARM)**.

Blue marked events show when an alarm has disappeared from an input **(ALARM)**.

8. Typical Wiring Examples

8.1 Normally open sensors without cable monitoring

Below diagram shows the default connection of the input and output terminals of the M1000 unit. Inputs are connected to positive supply by voltage free contacts. Lamps are connected to the outputs; the lamps are supplied from same source as the unit. An external switch is provided blocking of alarms. There is no cable monitoring for the sensors in this application.

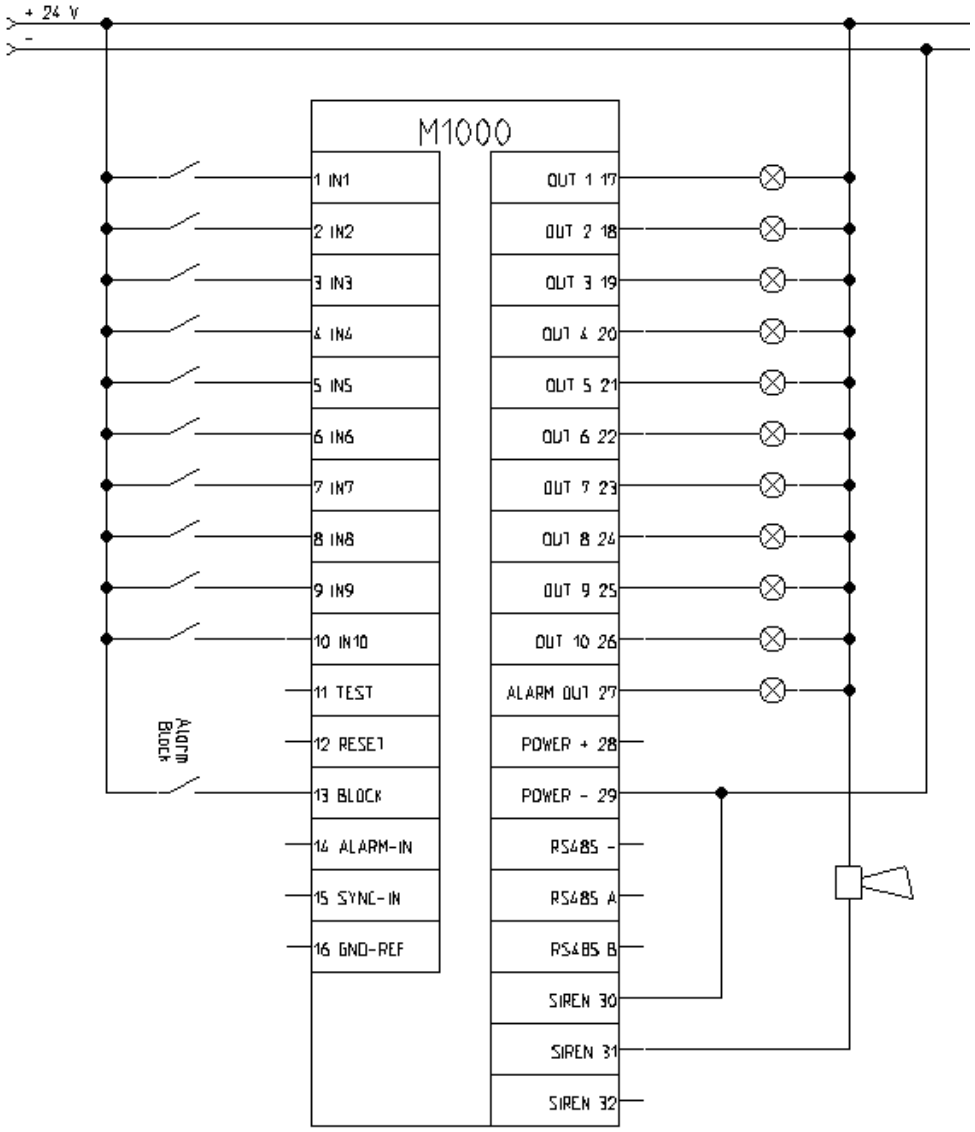


Figure 27

8.2 Normally open sensors with cable monitoring

This diagram shows the connection with 10 normally open sensors with cable monitoring. Relays are connected to the outputs. An external switch is provided blocking of alarms.

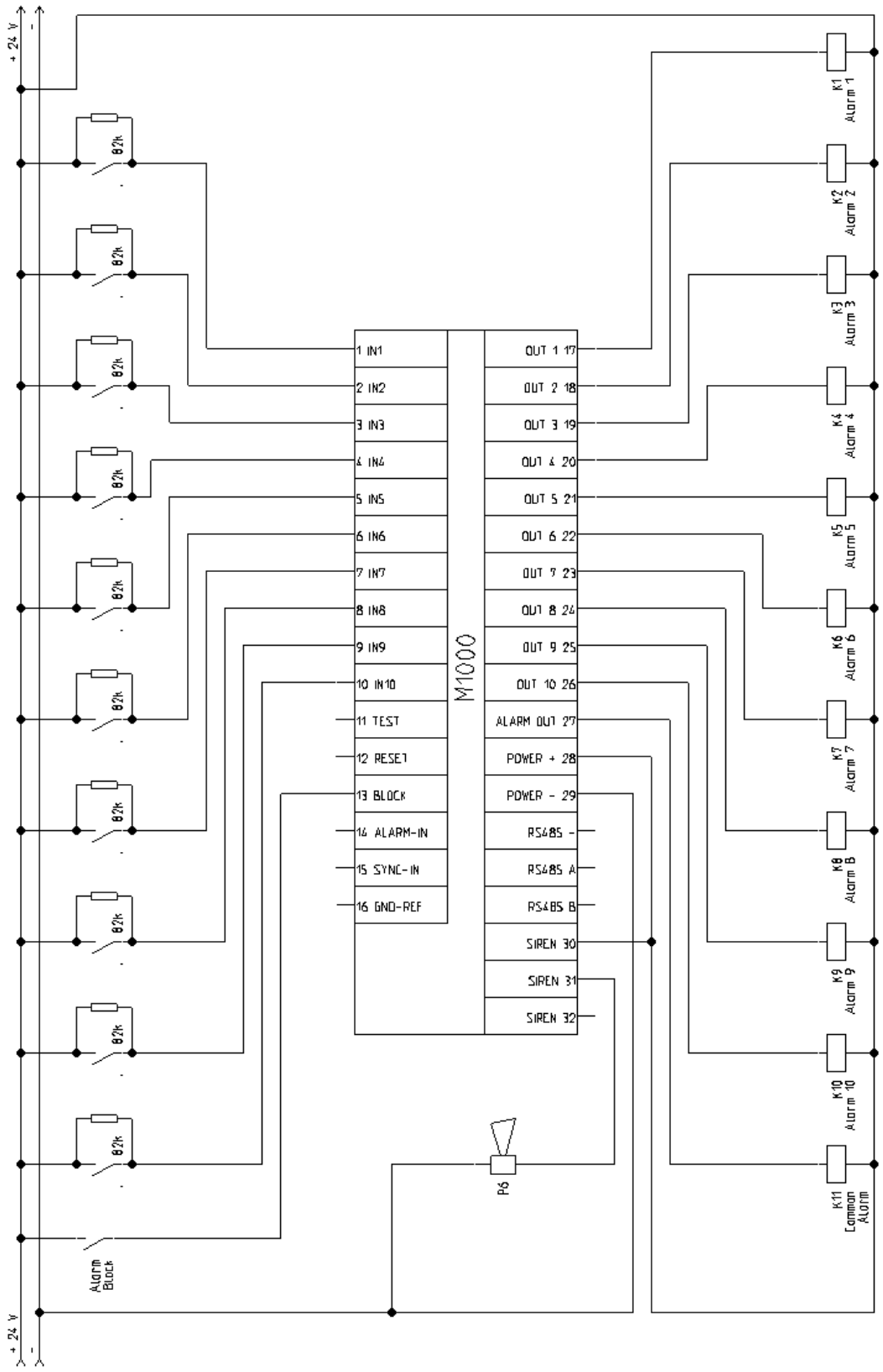


Figure 28

9. Specifications

Voltage Supply	12-24 Vdc-30%/+30% (8-32 VDC), 180mA
Max. Power Consumption	180 mA
Ambient Temp.	–20°C to +70°C
Siren Relay Contact	220 Vac/2 A; 30 VDC/2 A, 30 W
Output	Open collector outputs, max. 150 mA per channel
Resistance in Sensing Cable	Max. 1000 Ω
Insulation Monitor	25 kΩ±8 kW (50 kΩ±10 kΩ for M1000-11-XXC)
Impulse Test	4.5 kV 1/50 µsec.
EMC	CE according to EN50081-1, EN50082-1, EN50081-2, EN50082-2 and EN61000-2-6
Programming	16 dip-switches or PC through USB interface
Communication	Ethernet Modbus TCP and RS485 Modbus RTU
Weight	0.4 kg
Unit Dimensions	H 144 mm (5.7”); W 144 mm (5.7”); D 35 mm (1.4”)
Panel Cut-out Dimensions	H 138 mm (5.4”); W 138 mm (5.4”)
Protection Degree at Front	IP54