
# INSTRUCTION MANUAL

## SIL 2 Analog Signal Converter and Trip Amplifiers Din-Rail Model D1053S

## SIL Applications

For Safety Related System and SIL2, SIL3 Applications according IEC61508 & IEC61511 Standards refer to "Functional Safety Manual" document number ISM0071

## Characteristics

**General Description:** The single channel DIN Rail Analog Signal Converter and Trip Amplifier D1053S accepts a voltage or current input from externally powered transmitters, located in Hazardous Area, and converts, with isolation, the signal to drive a Safe Area load. Output signal can be direct or reverse. Two independent Alarm Trip Amplifiers are also provided. Each alarm energizes, or de-energizes, an SPST relay for high, low, low-startup or burnout alarm functions.
The two alarm relays trip points are settable over the entire input signal range.
**Function:** 1 channel I.S. input from separately powered transmitters, provides 3 port isolation (input/output/supply) and current (source mode) or voltage output signal.
In addition it provides two SPST relay alarm contacts with adjustable alarm trip point.
**Signalling LEDs:** Power supply indication (green), alarm A (red), alarm B (red).
**Configurability:** Totally software configurable, no jumpers or switches, mA or V input/output signal, linear or reverse, alarm trip point, high, low, low-startup or burnout alarm mode, NE/ND relay operation, hysteresis, delay time, by GM Pocket Portable Configurator PPC1090, powered by the unit or configured by PC via RS-232 serial line with PPC1092 Adapter and SWC1090 Configurator software.
**EMC:** Fully compliant with CE marking applicable requirements.

## Technical Data

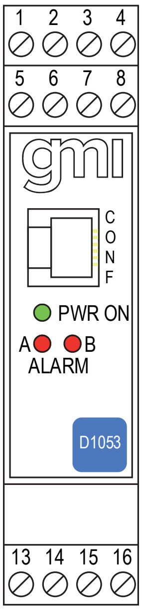
**Supply:** 24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 5 Vpp.
***Current consumption @ 24 V:*** 65 mA with 20 mA output and relays energized typical.
***Power dissipation:*** 1.5 W with 24 V supply, 20 mA output and relays energized typical.
***Max. power consumption:*** at 30 V supply voltage, overload condition, relays energized and PPC1090 connected, 2.1 W.
**Isolation (Test Voltage):** I.S. In/Outs 1.5 KV; I.S. In/Supply 1.5 KV; Analog Out/Supply 500 V; Analog Out/Alarm Outs 1.5 KV; Alarm Outs/Supply 1.5 KV; Alarm Out/Alarm Out 1.5 KV.
**Input:** 0/4 to 20 mA (-4 to +24 mA reading) separately powered input, voltage drop ≤ 0.5 V or 0/1 to 5 V or 0/2 to 10 V (-2 to +12 V reading) 1 MΩ impedance.
***Integration time:*** 100 ms.
***Resolution:*** 1 μA on current input, 1 mV on voltage input.
***Visualization:*** 1 μA on current input, 1 mV on voltage input.
***Input range:*** -4 to +24 mA on current input, -2 to +12 V on voltage input.
**Burnout:** enabled or disabled. Analog output can be programmed to detect burnout condition with downscale or highscale forcing.
Alarms can be programmed to detect burnout condition.
***Burnout range:*** low and high separated trip point value programmable between -5 to +25 mA on current input and -3 to +13 V on voltage input.
**Output:** 0/4 to 20 mA, on max. 600 Ω load source mode, current limited at 22 mA or 0/1 to 5 V or 0/2 to 10 V signal, limited at 11 V.
***Resolution:*** 2 μA current output or 1 mV voltage output.
***Transfer characteristic:*** linear or reverse.
***Response time:*** ≤ 50 ms (10 to 90 % step change).
***Output ripple:*** ≤ 20 mVrms on 250 Ω load.
**Alarm:**
***Trip point range:*** within rated limits of input sensor (see input for step resolution).
***Delay time:*** 0 to 1000 s, 100 ms step.
***Hysteresis:*** 0 to 5 mA on current or 0 to 5 V on voltage (see input for step resolution).
***Output:*** voltage free SPST relay contact.
***Contact rating:*** 2 A 250 Vac 500 VA, 2 A 250 Vdc 80 W (resistive load).
**Performance:** Ref. Conditions 24 V supply, 250 Ω load, 23 ± 1 °C ambient temperature.
***Input:***
***Calibration and linearity accuracy:*** ≤ ± 20 μA on current input or ≤ ± 10 mV on voltage input.
***Temperature influence:*** ≤ ± 2 μA, 1 mV of input for a 1 °C change.
***Analog Output:***
***Calibration accuracy:*** ≤ ± 0.1 % of full scale.
***Linearity error:*** ≤ ± 0.05 % of full scale.
***Supply voltage influence:*** ≤ ± 0.05 % of full scale for a min to max supply change.
***Load influence:*** ≤ ± 0.05 % of full scale for a 0 to 100 % load resistance change.
***Temperature influence:*** ≤ ± 0.01 % on zero and span for a 1 °C change.
**Compatibility:**
CE mark compliant, conforms to Directive:
2014/34/EU ATEX, 2014/30/EU EMC, 2014/35/EU LVD, 2011/65/EU RoHS.
**Environmental conditions:**
***Operating:*** temperature limits -20 to + 60 °C,
relative humidity max 90 % non condensing, up to 35 °C.
***Storage:*** temperature limits – 45 to + 80 °C.
**Safety Description:**
***ATEX:*** II (1)G [Ex ia Ga] IIC, II (1)D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I; II 3G Ex ec IIC T4 Gc
***IECEx:*** [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I; Ex ec IIC T4 Gc
***INMETRO:*** [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
Uo/Voc = 10.8 V, Io/Isc = 4 mA, Po/Po = 11 mW at terminals 14-15-16.
Ui/Vmax = 30 V, Ci = 4.5 nF, Li = 0 nH at terminals 14-15-16.
Um = 250 Vrms, -20 °C ≤ Ta ≤ 60°C.
***Approvals:***
DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11.
IECEx BVS 07.0027X conforms to IEC60079-0, IEC60079-11.
IMQ 09 ATEX 013 X conforms to EN60079-0, EN60079-7.
IECEx IMQ 13.0011X conforms to IEC60079-0, IEC60079-7.
INMETRO DNV 13.0108 X conforms to ABNT NBR IEC60079-0, ABNT NBR IEC60079-11.
UL & C-UL E222308 conforms to UL913, UL 60079-0, UL60079-11, UL60079-15,
ANSI/ISA 12.12.01 for UL and CSA-C22.2 No.157-92, CSA-E60079-0, CSA-E60079-11, CSA-C22.2 No. 213 and CSA-E60079-15 for C-UL.
FM & FM-C No. 3024643, 3029921C, conforms to Class 3600, 3610, 3611, 3810 and C22.2 No.142, C22.2 No.157, C22.2 No.213, E60079-0, E60079-11, E60079-15.
ЕАЭС RU C-IT.HA67.B.00113/20 conforms to GOST 31610.0, GOST 31610.11, GOST 31610.15.
СЦ 16.0034 X conforms to ДСТУ 7113, ГОСТ 22782.5-78, ДСТУ IEC 60079-15.
EXIDA Report No. GM04/10-27 R003, SIL 2 according to IEC 61508, IEC 61511.
Please refer to Functional Safety Manual for SIL applications.
DNV No. TAA00002BM and KR No.MIL20769-EL001 Cert. for maritime applications.
**Mounting:** EN/IEC60715 TH 35 DIN-Rail.
***Weight:*** about 160 g.
***Connection:*** by polarized plug-in disconnect screw terminal blocks to accomodate terminations up to 2.5 mm$^2$.
***Location:*** Safe Area/Non Hazardous Locations or Zone 2, Group IIC T4,
Class I, Division 2, Groups A, B, C, D Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA T4 installation.
***Protection class:*** IP 20.
***Dimensions:*** Width 22.5 mm, Depth 99 mm, Height 114.5 mm.

## Ordering information

| | | |
|---|---|---|
| Model: | D1053S | |
| Power Bus enclosure | | /B |

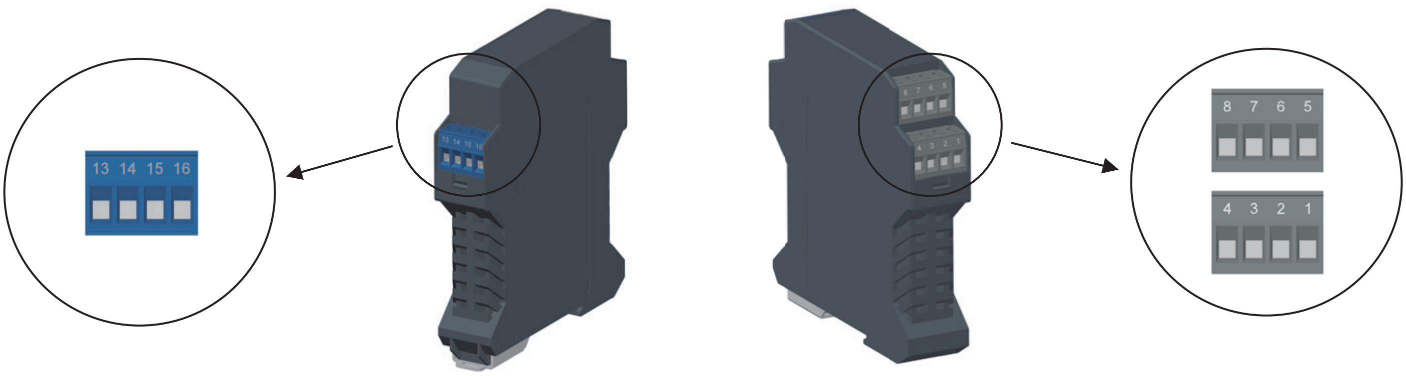
Operating parameters are programmable by the GM Pocket Portable Configurator PPC1090 or via RS-232 serial line with PPC1092 Adapter and SWC1090 Configurator software.
If the parameters are provided with the purchasing order the unit will be configured accordingly, otherwise the unit will be supplied with default parameters.

## Front Panel and Features




- SIL 2 according to IEC 61508, IEC 61511 using analog output or trip amplifiers or Tproof = 2 / 4 years (10 / 20 % of total SIF).
- PFDavg (1 year) 4.16 E-04, SFF 80 % using analog output.
- PFDavg (1 year) 4.11 E-04, SFF 82 % using trip amplifiers.
- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- 0/4-20 mA, 0/1-5 V, 0/2-10 V Input-Output Signal linear or reverse.
- Two independent trip amplifiers.
- Output for burnout detection.
- High Accuracy, µP controlled A/D converter.
- Three port isolation, Input/Output/Supply.
- EMC Compatibility to EN61000-6-2, EN61000-6-4.
- Fully programmable operating parameters.
- ATEX, IECEx, UL & C-UL, FM & FM-C, INMETRO, EAC-EX, UKR TR n. 898 Certifications.
- Type Approval Certificate DNV and KR for marine applications.
- High Reliability, SMD components.
- High Density, one channel, 2 trips per unit.
- Simplified installation using standard DIN Rail and plug-in terminal blocks.
- 250 Vrms (Um) max. voltage allowed to the instruments associated with the barrier.

## Terminal block connections




| HAZARDOUS AREA | |
|---|---|
| **13** | Not used |
| **14** | + Input Ch 1 for Signal Voltage |
| **15** | + Input Ch 1 for Signal Current |
| **16** | - Input Ch 1 for Signal Voltage or<br>- Input Ch 1 for Signal Current |

| SAFE AREA | |
|---|---|
| **1** | + Output Ch 1 for Current Source mode or<br>+ Output Ch 1 for Voltage Source mode |
| **2** | - Output Ch 1 for Current Source mode or<br>- Output Ch 1 for Voltage Source mode |
| **3** | + Power Supply 24 Vdc |
| **4** | - Power Supply 24 Vdc |
| **5** | Alarm A |
| **6** | Alarm A |
| **7** | Alarm B |
| **8** | Alarm B |

## Parameters Table

In the system safety analysis, always check the Hazardous Area/Hazardous Locations devices to conform with the related system documentation, if the device is Intrinsically Safe check its suitability for the Hazardous Area/Hazardous Locations and gas group encountered and that its maximum allowable voltage, current, power (Ui/Vmax, Ii/Imax, Pi/Pi) are not exceeded by the safety parameters (Uo/Voc, Io/Isc, Po/Po) of the D1053 Associated Apparatus connected to it. Also consider the maximum operating temperature of the field device, check that added connecting cable and field device capacitance and inductance do not exceed the limits (Co/Ca, Lo/La, Lo/Ro) given in the Associated Apparatus parameters for the effective gas group. See parameters on enclosure side and the ones indicated in the table below:

| D1053 Terminals | | D1053 Associated Apparatus Parameters | | Must be | Hazardous Area/ Hazardous Locations Device Parameters |
|---|---|---|---|---|---|
| Ch1 | 14 - 15 - 16 | Uo / Voc = 10.8 V | | ≤ | Ui / Vmax |
| Ch1 | 14 - 15 - 16 | Io / Isc = 4 mA | | ≤ | Ii/ Imax |
| Ch1 | 14 - 15 - 16 | Po / Po = 11 mW | | ≤ | Pi / Pi |

| D1053 Terminals | | D1053 Associated Apparatus Parameters | | Must be | Hazardous Area/ Hazardous Locations Device + Cable Parameters |
|---|---|---|---|---|---|
| Ch1 | 14 - 15 - 16 | Co / Ca = 2.135 μF<br>Co / Ca = 14.995 μF<br>Co / Ca = 65.995 μF | (IIC-A, B)<br>(IIB-C)<br>(IIA-D) | ≥ | Ci / Ci device + C cable |
| Ch1 | 14 - 15 - 16 | Lo / La = 2541 mH<br>Lo / La = 10167 mH<br>Lo / La = 20335 mH | (IIC-A, B)<br>(IIB-C)<br>(IIA-D) | ≥ | Li / Li device + L cable |
| Ch1 | 14 - 15 - 16 | Lo / Ro = 3520 μH/Ω<br>Lo / Ro = 14090 μH/Ω<br>Lo / Ro = 28180 μH/Ω | (IIC-A, B)<br>(IIB-C)<br>(IIA-D) | ≥ | Li / Ri device and L cable / R cable |

NOTE for USA and Canada:
IIC equal to Gas Groups A, B, C, D, E, F and G
IIB equal to Gas Groups C, D, E, F and G
IIA equal to Gas Groups D, E, F and G

When used with separate powered intrinsically safe devices, check that maximum allowable voltage (Ui/Vmax) of the D1053 Associated Apparatus are not exceeded by the safety parameters (Uo/Voc) of the Intrinsically Safe device, indicated in the table below:

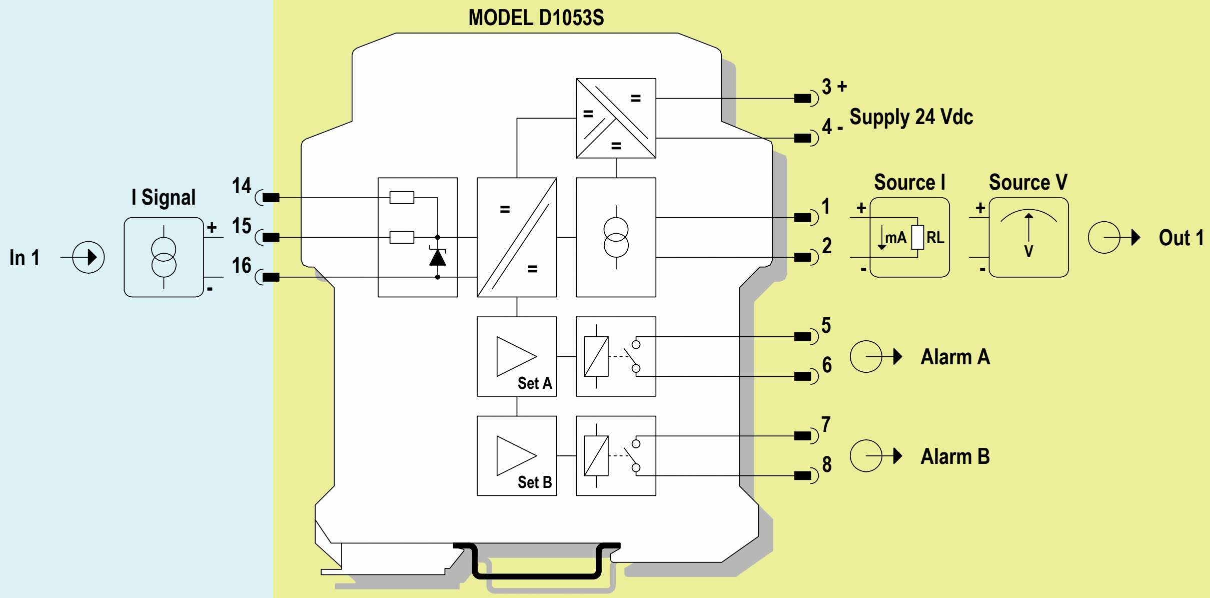
| D1053 Terminals | | D1053 Associated Apparatus Parameters | Must be | Hazardous Area/ Hazardous Locations Device Parameters |
|---|---|---|---|---|
| Ch1 | 14 - 15 - 16 | Ui / Vmax = 30V | ≥ | Uo / Voc |
| Ch1 | 14 - 15 - 16 | Ci = 4.5 nF, Li= 0 nH | | |

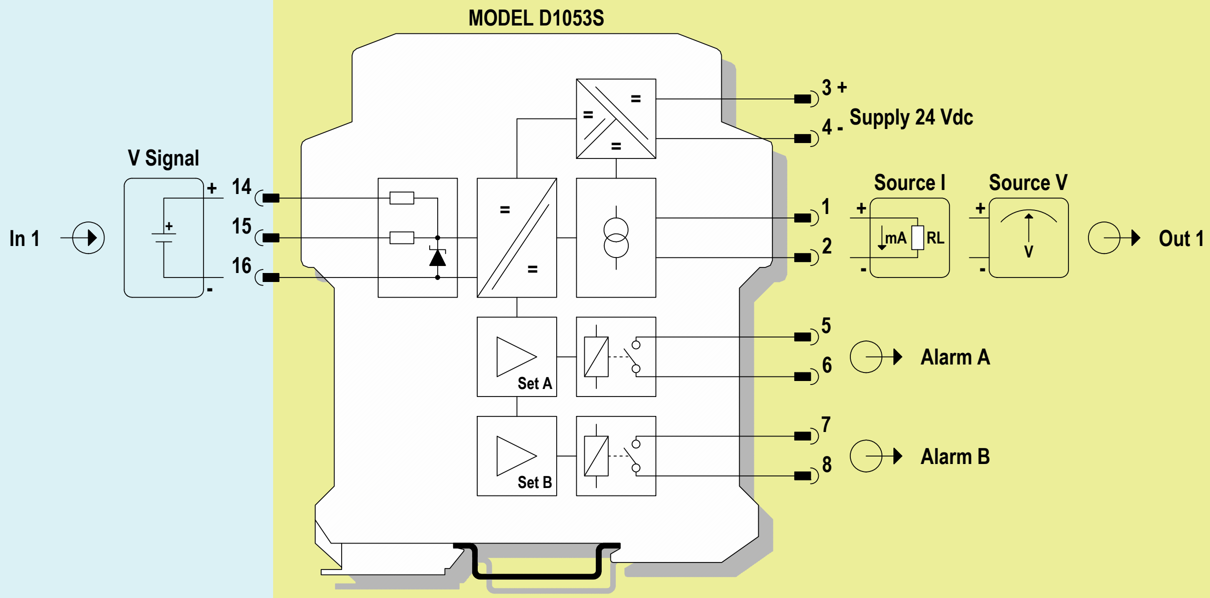
**For installations in which both the Ci and Li of the Intrinsically Safe apparatus exceed 1% of the Co and Lo parameters of the Associated Apparatus (excluding the cable), then 50% of Co and Lo parameters are applicable and shall not be exceeded** (50% of the Co and Lo become the limits which must include the cable such that Ci device + C cable ≤ 50 % of Co and Li device + L cable ≤ 50 % of Lo). The reduced capacitance of the external circuit (including cable) shall not be greater than 1 μF for Groups I, IIA, IIB and 600 nF for Group IIC. If the cable parameters are unknown, the following value may be used: Capacitance 200 pF per meter (60 pF per foot), Inductance 1 μH per meter (0.20 μH per foot).
The Intrinsic Safety Entity Concept allows the interconnection of Intrinsically Safe devices approved with entity parameters not specifically examined in combination as a system when the above conditions are respected.
For Division 1 and Zone 0 installations, the configuration of Intrinsically Safe Equipment must be FM approved under Entity Concept (or third party approved);
for Division 2 installations, the configuration of Intrinsically Safe Equipment must be FM approved under non-incendive field wiring or Entity Concept (or third party approved).

## Function Diagram

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

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

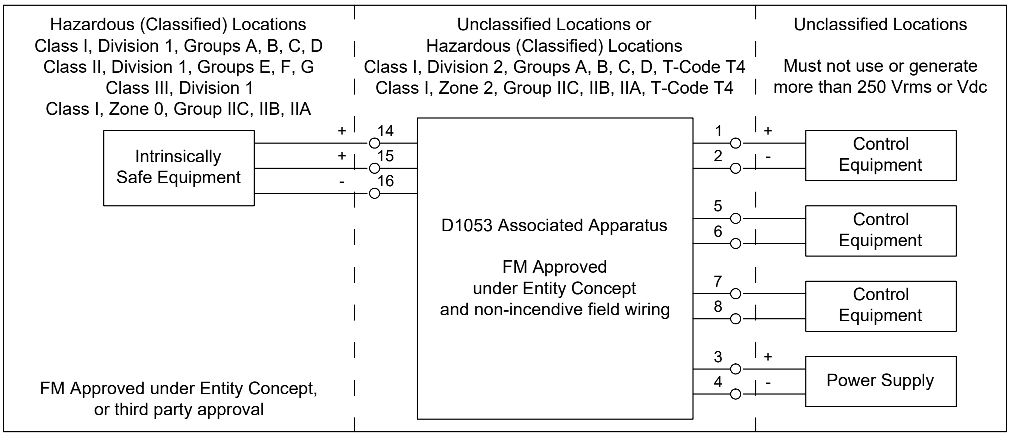


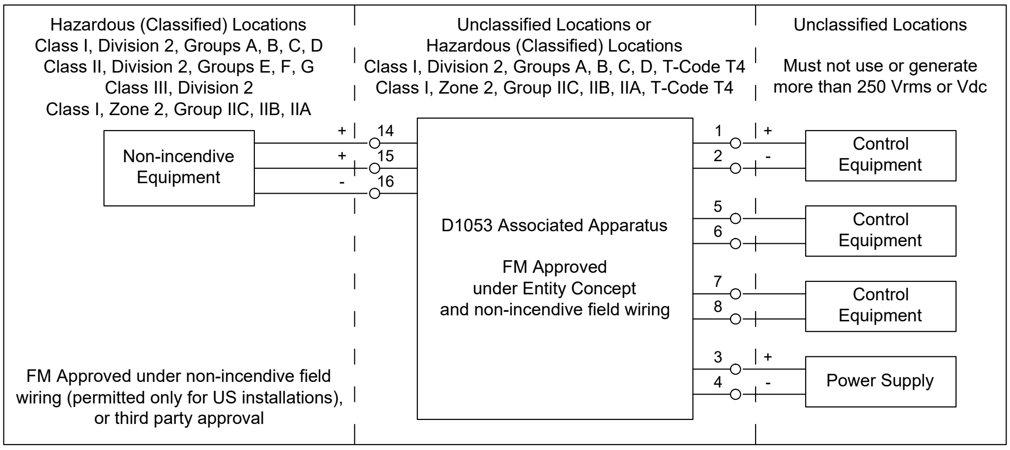




**For SIL applications, alarm contacts must be used in series with equal configuration.**
**Relay contact shown in de-energized position**

## Warning

D1053 is an isolated Intrinsically Safe Associated Apparatus installed into standard EN/IEC60715 TH 35 DIN-Rail located in Safe Area/ Non Hazardous Locations or Zone 2, Group IIC, Temperature Classification T4, Class I, Division 2, Groups A, B, C, D, Temperature Code T4 and Class I, Zone 2, Group IIC, IIB, IIA Temperature Code T4 Hazardous Area/Hazardous Locations (according to FM Class No. 3611, CSA-C22.2 No. 213-M1987, CSA-E60079-15) within the specified operating temperature limits Tamb -20 to +60 °C, and connected to equipment with a maximum limit for AC power supply Um of 250 Vrms.




Non-incendive field wiring is not recognized by the Canadian Electrical Code, installation is permitted in the US only.
For installation of the unit in a Class I, Division 2 or Class I, Zone 2 location, the wiring between the control equipment and the D1053 associated apparatus shall be accomplished via conduit connections or another acceptable Division 2, Zone 2 wiring method according to the NEC and the CEC.
Not to be connected to control equipment that uses or generates more than 250 Vrms or Vdc with respect to earth ground.
D1053 must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/international installation standards (e.g. IEC/EN60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines), BS 5345 Pt4, VDE 165, ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC) following the established installation rules, particular care shall be given to segregation and clear identification of I.S. conductors from non I.S. ones.
De-energize power source (turn off power supply voltage) before plug or unplug the terminal blocks when installed in Hazardous Area/Hazardous Locations or unless area is known to be nonhazardous.
**Warning: substitution of components may impair Intrinsic Safety and suitability for Division 2, Zone 2.**
**Warning: de-energize main power source (turn off power supply voltage) and disconnect plug-in terminal blocks before opening the enclosure to avoid electrical shock when connected to live hazardous potential**.
**Explosion Hazard: to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or unless area is known to be nonhazardous.**
Failure to properly installation or use of the equipment may risk to damage the unit or severe personal injury. The unit cannot be repaired by the end user and must be returned to the manufacturer or his authorized representative. Any unauthorized modification must be avoided.

## Operation

Input channel of D1053 accepts a current or voltage signal from Hazardous Area/Hazardous Locations from separately powered 3, 4 wire transmitter, voltage or current source, and repeats or converts the current or voltage to a 0/4-20 mA or 0/1-5 V or 0/2-10 V floating output to drive a load in Safe Area/Non Hazardous Locations. In addition to the analog output the barrier has also a two channel trip amplifiers providing two relay SPST contacts, alarm A and B, that can be configured as HIGH, LOW, LOW start-up, BURNOUT alarm operating mode and NE or ND relay operating mode. Presence of supply power is displayed by a green signaling LED, status of alarm output A and B is displayed by two red LED.

## Installation

D1053 is an analog signal converter and trip amplifiers housed in a plastic enclosure suitable for installation on EN/IEC60715 TH 35 DIN-Rail.
D1053 unit can be mounted with any orientation over the entire ambient temperature range, see section “Installation in Cabinet” and "Installation of Electronic Equipments in Cabinet" Instruction Manual D1000 series for detailed instructions.
Electrical connection of conductors up to 2.5 mm² are accommodated by polarized plug-in removable screw terminal blocks which can be plugged in/out into a powered unit without suffering or causing any damage **(for Zone 2 or Division 2 installations check the area to be nonhazardous before servicing)**.
The wiring cables have to be proportionate in base to the current and the length of the cable.
On the section “Function Diagram” and enclosure side a block diagram identifies all connections.
Identify the function and location of each connection terminal using the wiring diagram on the corresponding section, as an example:
Connect 24 Vdc power supply positive at terminal “3” and negative at terminal “4”.
Connect positive output of analog channel at terminal “1” and negative output at “2”.
Connect trip amplifier output of alarm A at terminal “5” and “6” and trip amplifier output of alarm B at terminal “7” and “8”.
In case of a current output transmitter, connect the wires at terminal “15” for positive and “16” for negative.
For voltage output transmitters connect signal at terminal “14” for positive and “16” for negative.

Intrinsically Safe conductors must be identified and segregated from non I.S. and wired in accordance to the relevant national/international installation standards (e.g. EN/IEC60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines), BS 5345 Pt4, VDE 165, ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC), make sure that conductors are well isolated from each other and do not produce any unintentional connection.
Connect SPST alarm contacts checking the load rating to be within the contact maximum rating (2 A, 250 V, 500 VA 80 W resistive load).
The enclosure provides, according to EN/IEC 60529, an IP20 minimum degree of protection. The equipment shall only be used in an area of at least pollution degree 2, as defined in EN/IEC 60664-1. For hazardous location, the unit shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with EN/IEC 60079-0, that must have a door or cover accessible only by the use of a tool. Units must be protected against dirt, dust, extreme mechanical (e.g. vibration, impact and shock) and thermal stress, and casual contacts.
If enclosure needs to be cleaned use only a cloth lightly moistened by a mixture of detergent in water.
**Electrostatic Hazard: to avoid electrostatic hazard, the enclosure of D1053 must be cleaned only with a damp or antistatic cloth.**
Any penetration of cleaning liquid must be avoided to prevent damage to the unit. Any unauthorized card modification must be avoided.
According to EN61010, D1053 series must be connected to SELV or SELV-E supplies.
Relay output contact must be connected to loads non exceeding category I, pollution degree I overvoltage limits.
**Warning: de-energize main power source (turn off power supply voltage) and disconnect plug-in terminal blocks before opening the enclosure to avoid electrical shock when connected to live hazardous potential**.

## Start-up

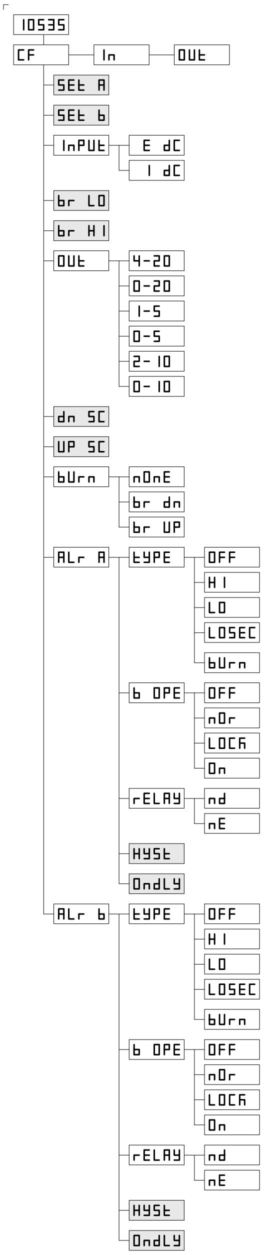
Before powering the unit check that all wires are properly connected, particularly supply conductors and their polarity, input and output wires, also check that Intrinsically Safe conductors and cable trays are segregated (no direct contacts with other non I.S. conductors) and identified either by color coding, preferably blue, or by marking. Check conductors for exposed wires that could touch each other causing dangerous unwanted shorts. Turn on power, the “power on” green led must be lit, output signal should be corresponding to the input from the transmitter, alarm LED should reflect the input variable condition with respect to trip points setting. If possible change the transmitter output and check the corresponding Safe Area output.

## PPC1090 Operation

The Pocket Portable Configurator type PPC1090 is suitable to configure the “smart” barrier of D1000 series. The PPC1090 unit is not ATEX, UL or FM approved and is only to be used in Safe Area/Non Hazardous Locations and prior to installation of the isolator and prior to connection of any I.S. wiring. Do not use PPC1090 configurator in Hazardous Area/Hazardous Locations. The PPC1090 configurator is powered by the unit (no battery power) when the telephone jack is plugged into the barrier (RJ12 6 poles connector type with 1:1 connection).
It has a 5 digit display, 4 leds and four push buttons with a menu driven configuration software and can be used in Safe Area/Non Hazardous Locations without any certification because it plugs into the non intrinsically safe portion of circuit.

The configuration procedure follows a unit specific menu. The display shows the actual menu item, the led shows the channel configured and the push button actuates as “Enter”, “Select”, “Down” and “Up” key. The “Enter” key is pressed to confirm the menu item, the “Select” key is pressed to scroll the menu item, the “Down” and “Up” keys are pressed to decrement or increment the numeric value of menu item. The “Up” key is also pressed to decrement the menu level. When the PPC1090 is plugged into the unit, the display shows the barrier model (first level menu). Then press the “Enter” key to the second level menu and the “Select” key to scroll the menu voice. When the selected menu item is displayed press the “Enter” key to confirm the choice. Follow this procedure for every voice of the menu. When a numeric menu item is to be changed, press the “Select” key to highlight the character and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key. To return to a higher level menu press the “Up” key.

## D1053S Menu



## Menu item description

1) **D1053S** [1 Level Menu]
Displays Model D1053S single channel analog signal converter and trip amplifiers. Press “Enter” key to second level menu.

2) **CF** [2 Level Menu]
Displays the parameters configuration menu. Press “Enter” key to configure the functional parameters, press the “Select” key to the next menu level item or “Up” key to return to first level.

3) **In** [2 Level Menu]
Displays the input variable monitoring. Press “Enter” to display the current input value reading, press the “Select” key to the next menu level item or “Up” key to return to first level.

4) **Out** [2 Level Menu]
Displays the analog output variable monitoring. Press “Enter” to display the current output value reading, press the “Select” key to the next menu level item or “Up” key to return to first level.

5) **Set A** [3 Level Menu]
Displays the SET A Trip Point Value configuration. Press “Enter” to set the trip point value, press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can set the set value; press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key

6) **Set B** [3 Level Menu]
Displays the SET B Trip Point Value configuration. Press “Enter” to set the trip point value, press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can set the set value; press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key

7) **Input** [3 Level Menu]
Displays the input sensor type configuration. Press “Enter” to set the input sensor, press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can choose between 2 different sensor; press “Select” key to change the input sensor and then the “Enter” key to confirm the choice. The input sensor are:
E dc Volt dc input from externally powered transmitter (range from -2 to +12 V)
I dc mA dc input from externally powered transmitter (range from -4 to +24 mA)

8) **Br LO** [3 Level Menu]
Displays the burnout LOW trip point value configuration. Press “Enter” to set the burnout condition trip point value (below this value indicate a burnout fault condition, set –5.000 to disable), press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can set the value; press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key

9) **Br HI** [3 Level Menu]
Displays the burnout HIGH trip point value configuration. Press “Enter” to set the burnout condition trip point value (above this value indicate a burnout fault condition, set 25.000 to disable), press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can set the value; press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key

10) **Out** [3 Level Menu]
Displays the analog output type configuration. Press “Enter” to set the analog output type and range, press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can choose between 6 different output types; press “Select” key to change the output type and range and then the “Enter” key to confirm the choice. The output types are:

| | | | |
|---|---|---|---|
| 4-20 | 4 to 20 mA current output | 0-20 | 0 to 20 mA current output |
| 1-5 | 1 to 5 V voltage output | 0-5 | 0 to 5 V voltage output |
| 2-10 | 2 to 10 V voltage output | 0-10 | 0 to 10 V voltage output |

11) **Dn Sc** [3 Level Menu]
Displays the input low scale configuration. Press “Enter” to set the low scale input value, press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can set the low input value; press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key

12) **Up Sc** [3 Level Menu]
Displays the input high scale configuration. Press “Enter” to set the high scale input value, press the “Select” key to the next menu level item or “Up” key to return to second level. If you pressed “Enter” key, you can set the high input value; press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key

13) **Burn** [3 Level Menu]
Displays the burnout configuration. Press “Enter” to set the burnout condition, press the “Select” key to the next menu level item or “Up” key to return to second level.
If you pressed “Enter” key, you can choose between 3 different burnout conditions; press “Select” key to change the burnout and then the “Enter” key to confirm the choice.
The condition types are:
none no burnout detection, the analog output follows the input value
br dn when in burnout condition, the analog output goes to down scale (0 mA or 0 V)
br up when in burnout condition, the analog output goes to high scale (22 mA or 11 V)

14) **Alr A / Alr B** [3 Level Menu]
Displays the Alarm A / Alarm B configuration menu. Press “Enter” to set the alarm condition, press the “Select” key to the next menu level item or “Up” key to return to second level.

15) **Type** [4 Level Menu]
Displays the alarm type (A or B) configuration. Press “Enter” to set the alarm condition, press the “Select” key to the next menu level item or “Up” key to return to third level. If you pressed “Enter” key, you can choose between 5 different alarm conditions; press “Select” key to change the type and then the “Enter” key to confirm the choice.
The condition types are:

| | |
|---|---|
| OFF | no alarm detection, the relay output is always in normal condition |
| HI | high alarm condition, the relay output change status when an alarm condition is detected (input variable goes above the set value) |
| LO | low alarm condition, the relay output change status when an alarm condition is detected (input variable goes below the set value) |
| LOSEC | low with start-up alarm condition, the relay output change status when an alarm condition after the start-up is detected (input variable starts below the set value but no alarm condition is signaled, after the warm-up the variable goes above the set value arming the alarm detection, then when the variable goes below the set value the alarm condition is signaled) |
| BURN | burnout alarm condition, the alarm condition change status when a burnout condition appear in the input variable (input variable goes below the “Br LO” set value or goes above the “Br HI” set value). |

16) **B Ope** [4 Level Menu]
Displays the functionality of alarm in burnout condition (A or B) configuration. Press “Enter” to set the burnout alarm condition, press the “Select” key to the next menu level item or “Up” key to return to third level. If you pressed “Enter” key, you can choose between 4 different alarm burnout conditions; press “Select” key to change the type and then the “Enter” key to confirm the choice. The types are:

| | |
|---|---|
| OFF | the alarm goes in disabled condition when a burnout is detected |
| NOR | the alarm follow the condition of input variable (not relevant burnout) |
| LOCK | the alarm is locked in the same position as before a burnout is detected |
| ON | the alarm goes in enabled condition when a burnout is detected |

Note that a minimum of 1 second delay (“On dl” item) is necessary to obtain the burnout detection on alarm conditions.

17) **Relay** [4 Level Menu]
Displays the relay normal condition (A or B) configuration. Press “Enter” to set the relay condition, press the “Select” key to the next menu level item or “Up” key to return to third level. If you pressed “Enter” key, you can choose between 2 different relay conditions; press “Select” key to change the type and then the “Enter” key to confirm the choice.
The condition types are:

| | |
|---|---|
| ND | relay normally de-energized (energized in alarm condition) |
| NE | relay normally energized (de-energized in alarm condition) |

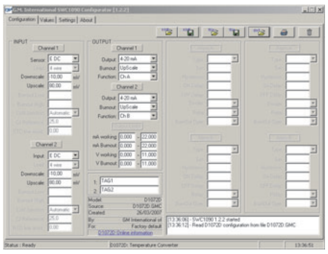
18) **Hyst** [4 Level Menu]
Displays the alarm hysteresis value (A or B) configuration. Press “Enter” to set the deadband value, press the “Select” key to the next menu level item or “Up” key to return to third level. If you pressed “Enter” key, you can set the hysteresis value (engineering value); press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key. The value is settable from 0 to 5000 points regarding the input sensor as specified.

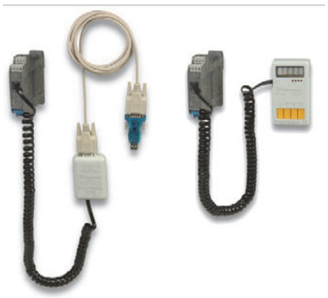
19) **On dl** [4 Level Menu]
Displays the alarm activation delay (A or B) configuration. Press “Enter” to set the delay time value, press the “Select” key to the next menu level item or “Up” key to return to third level. If you pressed “Enter” key, you can set the delay value (100 ms step); press the “Select” key to highlight the character you want to change and then the “Up” and “Down” keys to select the number; confirm the modification with the “Enter” key The value is settable from 0 to 1000 seconds in steps of 100 ms.

## PPC1092, SWC1090 Configuration

**INPUT SECTION:**

**Input:** input sensor type
☐ mA dc (I) current input, range from –4 to +24 mA
☐ V dc (E) voltage input, range from –2 to +12 V
**Downscale:** input value of measuring range corresponding to defined low output value.
**Upscale:** input value of measuring range corresponding to defined high output value.
**Burnout Low:** low burnout condition trip point value;
below this value a burnout fault condition is activated and the analog output is driven to the configured state (see Burnout in Output Section).
Setting this value outside the measuring range will disable this function.
**Burnout High:** high burnout condition trip point value;
above this value a burnout fault condition is activated and the analog output is driven to the configured state (see Burnout in Output Section).
Setting this value outside the measuring range will disable this function.





**OUTPUT SECTION:**

**Output:** analog output type
☐ 4-20 mA current output range from 4 to 20 mA
☐ 0-20 mA current output range from 0 to 20 mA
☐ 1-5 V voltage output range from 1 to 5 V
☐ 0-5 V voltage output range from 0 to 5 V
☐ 2-10 V voltage output range from 2 to 10 V
☐ 0-10 V voltage output range from 0 to 10 V
**Burnout:** analog output burnout state
☐ None burnout function is disabled; analog output represents the input measure as configured
☐ Downscale analog output is forced at zero
☐ Upscale analog output is forced to 22 mA for current output or 11 V for voltage output

**ALARM SECTION:**

**Type:** alarm type configuration
☐ Off alarm functionality is disabled
☐ High alarm is set to high condition, the alarm output is triggered whenever the input variable goes above the trip point value (Set)
☐ Low alarm is set to low condition, the alarm output is triggered whenever the input variable goes below the trip point value (Set)
☐ Low & Sec alarm is set to low condition with start-up, the alarm output is inhibited until the input variable goes above the trip point value (Set); afterwards it behaves as a Low configuration; typically used to solve start-up issues
☐ Burnout a burnout condition of the input triggers the alarm output
**Set:** input value of measuring range at which the alarm output is triggered
**Hysteresis:** alarm hysteresis value, valid range: 0 to 5 mA for current input; 0 to 5 V for voltage input
**ON Delay:** time for which the input variable has to be in alarm condition before the alarm output is triggered; configurable from 0 to 1000 seconds in steps of 100 ms.
**Relay:** relay condition
☐ ND the relay is in normally de-energized condition, it energizes (the output contact is closed) in alarm condition
☐ NE the relay is in normally energized condition, it de-energizes (the output contact is opened) in alarm condition
**BurnOut Oper:** alarm status when a burnout condition is detected
☐ Nor the burnout detection on the alarm output is disabled, the alarm follows the condition of the input variable
☐ Lock maintain the same alarm condition as before the burnout detection
☐ On the alarm condition is activated when a burnout is detected
☐ Off the alarm condition is deactivated when a burnout is detected

Each alarm output has independent configurations.