

## Warning

D1053 is an isolated Intrinsically Safe Associated Apparatus located in Non Hazardous Locations 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.

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. 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.

**Warning: substitution of components may impair Intrinsic Safety.**

**Avertissement: le remplacement des composants peut dégrader la Sécurité Intrinsèque**

**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.**

**Avertissement: couper la source d'alimentation principale (tension d'alimentation) et débrancher les blocs de jonction enfichables avant d'ouvrir l'enveloppe pour éviter un choc électrique lorsqu'il est connecté à un potentiel active dangereux.**

**Explosion Hazard: to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.**

**Danger d'Explosion: pour prévenir une inflammation de l'atmosphère inflammable ou combustible, couper l'alimentation avant de réparer.**

The enclosure provides, according to EN60529, an IP20 minimum degree of mechanical protection (or similar to NEMA Standard 250 type 1) for indoor installation, outdoor installation requires an additional enclosure with higher degree of protection (i.e. IP54 to IP65 or NEMA type 12-13) consistent with the effective operating environment of the specific installation.

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.

Any penetration of cleaning liquid must be avoided to prevent damage to the unit.

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.

## Technical Data

**Supply:** 24 Vdc nom (20 to 30 Vdc) reverse polarity protected, ripple within voltage limits  $\leq 5$  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  $\leq 0.5$  V or 0/1 to 5 V or 0/2 to 10 V (-2 to +12 V reading) 1 M $\Omega$  impedance.

**Integration time:** 100 ms.

**Resolution:** 1  $\mu$ A on current input, 1 mV on voltage input.

**Visualization:** 1  $\mu$ A 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  $\Omega$  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  $\mu$ A current output or 1 mV voltage output.

**Transfer characteristic:** linear or reverse.

**Response time:**  $\leq 50$  ms (10 to 90 % step change).

**Output ripple:**  $\leq 20$  mVrms on 250  $\Omega$  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 150 Vac 300 VA, 2 A 150 Vdc 80 W (resistive load).

**Performance:** Ref. Conditions 24 V supply, 250  $\Omega$  load, 23  $\pm$  1 °C ambient temperature.

**Input:**

**Calibration and linearity accuracy:**  $\leq \pm 20$   $\mu$ A on current input or  $\leq \pm 10$  mV on voltage input.

**Temperature influence:**  $\leq \pm 2$   $\mu$ A, 1 mV of input for a 1 °C change.

**Analog Output:**

**Calibration accuracy:**  $\leq \pm 0.1$  % of full scale.

**Linearity error:**  $\leq \pm 0.05$  % of full scale.

**Supply voltage influence:**  $\leq \pm 0.05$  % of full scale for a min to max supply change.

**Load influence:**  $\leq \pm 0.05$  % of full scale for a 0 to 100 % load resistance change.

**Temperature influence:**  $\leq \pm 0.01$  % on zero and span for a 1 °C change.

**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:**

associated apparatus for use in Non Hazardous Locations, AEx [ia], Ex [ia].

Provides intrinsically safe circuits for use in Class I, Division 1, Groups A, B, C, D; Class II, Division 1, Groups E, F, G; Class III, Division 1 and Class I, Zone 0, Group IIC Hazardous Locations.

**Approvals:** UL & C-UL E222308 conforms to UL 913 (Div. 1, 8th Ed., Rev. 2013-12-06), UL 60079-0 (General, All Zones, 6th Ed.), UL 60079-11 (Intrinsic Safety "i" Zones 0 & 1, 6th Ed.),

UL 61010-1 (3rd Ed., Rev. 2012-05-11) for UL

and CAN/CSA-C22.2 No. 157-92 (Reaffirmed 2012, Div. 1), CAN CSA-C22.2 No. 60079-0:11 (General, All Zones), CAN/CSA-C22.2 No. 60079-11:14 (Intrinsic Safety "i" Zones 0 & 1),

CAN/CSA-C22.2 No. 61010-1-12 (3rd Ed.) for C-UL.

**Mounting:** T35 DIN Rail according to EN50022.

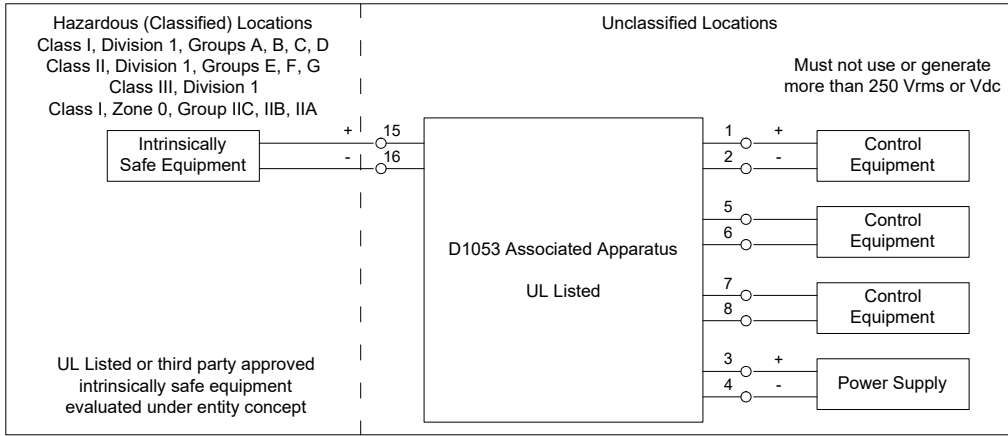
**Weight:** about 160 g.

**Connection:** by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm<sup>2</sup>.

**Location:** Non Hazardous Locations.

**Protection class:** IP 20.

**Dimensions:** Width 22.5 mm, Depth 99 mm, Height 114.5 mm.



**NOTE:**

This associated apparatus may also be connected to simple apparatus as defined in Article 504.2 and installed and temperature classified in accordance with article 504.10(B) of the National Electrical Code (ANSI/NFPA 70), or other local codes, as applicable.

This associated apparatus has not been evaluated for use in combination with another associated apparatus.

This associated apparatus provides galvanically isolated intrinsically safe circuits.

D1053 Terminals	Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
15 - 16	$U_o / V_{oc} = 10.8 V$	$\leq$	$U_i / V_{max}$
	$I_o / I_{sc} = 4 mA$	$\leq$	$I_i / I_{max}$
	$P_o / P_o = 11 mW$	$\leq$	$P_i / P_i$

The output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is straight line drawn between open-circuit voltage and short-circuit current.

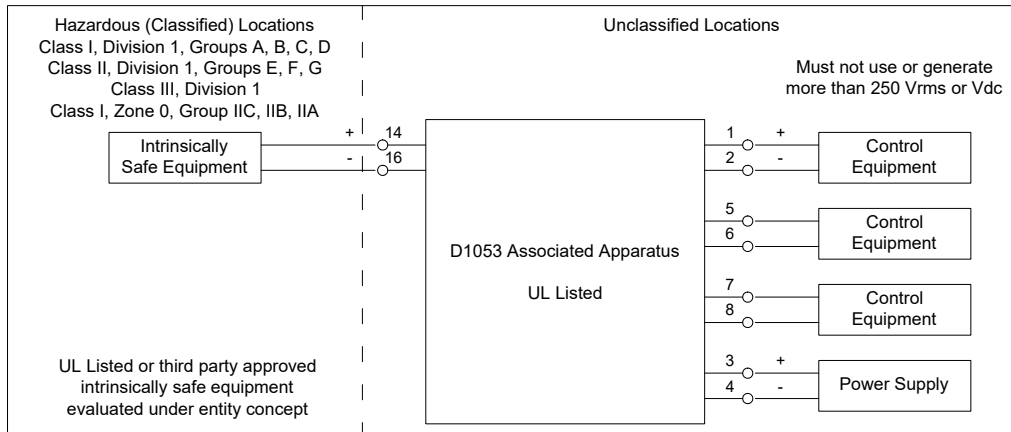
D1053 Terminals	Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
15 - 16	$U_i / V_{max} = 30V$	$\geq$	$U_o / V_{oc}$
	$C_i = 4.5 nF$ $L_i = 0 nH$		

**NOTE:**

when used with separate powered intrinsically safe devices, check that maximum allowable voltage ( $U_i/V_{max}$ ) of the D1053 Associated Apparatus are not exceeded by the safety parameters ( $U_o/V_{oc}$ ) of the Intrinsically Safe device.

D1053 Terminals	D1053 Associated Apparatus Parameters Zones (Divisions)	Must be	Hazardous Area/ Hazardous Locations Device + Cable Parameters
15 - 16	$C_o / C_a = 2.135 \mu F$ $C_o / C_a = 14.995 \mu F$ $C_o / C_a = 65.995 \mu F$ $C_o / C_a = 14.995 \mu F$	$\geq$	$C_i / C_i \text{ device} + C \text{ cable}$
	$L_o / L_a = 2541 mH$ $L_o / L_a = 10167 mH$ $L_o / L_a = 20335 mH$ $L_o / L_a = 10167 mH$	$\geq$	$L_i / L_i \text{ device} + L \text{ cable}$
	$L_o / R_o = 3520 \mu H/\Omega$ $L_o / R_o = 14090 \mu H/\Omega$ $L_o / R_o = 28180 \mu H/\Omega$ $L_o / R_o = 14090 \mu H/\Omega$	$\geq$	$L_i / R_i \text{ device and } L \text{ cable} / R \text{ cable}$

**NOTE:** for installations in which both the  $C_i$  and  $L_i$  of the Intrinsically Safe apparatus exceed 1 % of the  $C_o$  and  $L_o$  parameters of the Associated Apparatus (excluding the cable), then 50 % of  $C_o$  and  $L_o$  parameters are applicable and shall not be exceeded (50 % of the  $C_o$  and  $L_o$  become the limits which must include the cable such that  $C_i \text{ device} + C \text{ cable} \leq 50 \% \text{ of } C_o$  and  $L_i \text{ device} + L \text{ cable} \leq 50 \% \text{ of } L_o$ ). The reduced capacitance of the external circuit (including cable) shall not be greater than 1 $\mu F$  for Groups I, IIA (Group D), IIB (Group C), and 600nF for Group IIC (Group A and B). Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in the entity parameters table. If the cable parameters are unknown, the following may be used: Capacitance 60pF per foot (180pF per meter), Inductance 0.20 $\mu H$  per foot (0.60 $\mu H$  per meter).



**NOTE:**

This associated apparatus may also be connected to simple apparatus as defined in Article 504.2 and installed and temperature classified in accordance with article 504.10(B) of the National Electrical Code (ANSI/NFPA 70), or other local codes, as applicable.

This associated apparatus has not been evaluated for use in combination with another associated apparatus.

This associated apparatus provides galvanically isolated intrinsically safe circuits.

D1053 Terminals	Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
14 - 16	$U_o / V_{oc} = 10.8 V$	$\leq$	$U_i / V_{max}$
	$I_o / I_{sc} = 4 mA$	$\leq$	$I_i / I_{max}$
	$P_o / P_o = 11 mW$	$\leq$	$P_i / P_i$

The output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is straight line drawn between open-circuit voltage and short-circuit current.

D1053 Terminals	Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
14 - 16	$U_i / V_{max} = 30V$	$\geq$	$U_o / V_{oc}$
	$C_i = 4.5 nF$ $L_i = 0 nH$		

**NOTE:**

when used with separate powered intrinsically safe devices, check that maximum allowable voltage ( $U_i/V_{max}$ ) of the D1053 Associated Apparatus are not exceeded by the safety parameters ( $U_o/V_{oc}$ ) of the Intrinsically Safe device.

D1053 Terminals	D1053 Associated Apparatus Parameters Zones (Divisions)	Must be	Hazardous Area/ Hazardous Locations Device + Cable Parameters
14 - 16	$C_o / C_a = 2.135 \mu F$ $C_o / C_a = 14.995 \mu F$ $C_o / C_a = 65.995 \mu F$ $C_o / C_a = 14.995 \mu F$	$\geq$	$C_i / C_i \text{ device} + C \text{ cable}$
	$L_o / L_a = 2541 mH$ $L_o / L_a = 10167 mH$ $L_o / L_a = 20335 mH$ $L_o / L_a = 10167 mH$	$\geq$	$L_i / L_i \text{ device} + L \text{ cable}$
	$L_o / R_o = 3520 \mu H/\Omega$ $L_o / R_o = 14090 \mu H/\Omega$ $L_o / R_o = 28180 \mu H/\Omega$ $L_o / R_o = 14090 \mu H/\Omega$	$\geq$	$L_i / R_i \text{ device and } L \text{ cable} / R \text{ cable}$

**NOTE: for installations in which both the  $C_i$  and  $L_i$  of the Intrinsically Safe apparatus exceed 1 % of the  $C_o$  and  $L_o$  parameters of the Associated Apparatus (excluding the cable), then 50 % of  $C_o$  and  $L_o$  parameters are applicable and shall not be exceeded (50 % of the  $C_o$  and  $L_o$  become the limits which must include the cable such that  $C_i \text{ device} + C \text{ cable} \leq 50 \% \text{ of } C_o$  and  $L_i \text{ device} + L \text{ cable} \leq 50 \% \text{ of } L_o$ ).**  
 The reduced capacitance of the external circuit (including cable) shall not be greater than 1uF for Groups I, IIA (Group D), IIB (Group C), and 600nF for Group IIC (Group A and B). Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in the entity parameters table.  
 If the cable parameters are unknown, the following may be used:  
 Capacitance 60pF per foot (180pF per meter),  
 Inductance 0.20uH per foot (0.60uH per meter).