INSTRUCTION MANUAL

Frequency-Pulse Converter, Repeater and Trip Amplifiers Din-Rail Model D1060S

Characteristics

General Description: The single channel DIN-Rail Frequency-Pulse Converter, Repeater and Trip Amplifiers D1060S converts and repeats a low level frequency signal from magnetic pick-up, contact, proximity, open-collector transistor sensor, TTL CMOS located in Hazardous Area, into a 0/4-20 mA or 0/1-5 V or 0/2-10 V signal to drive a Safe Area load. Repeater output can be direct, divided by 10, 100, 1000, 10000, 100000, 1000000 or programmed with alarm function. One independent Alarm Trip Amplifier is also provided. Alarm energizes, or de-energizes, an SPST optocoupled open-collector transistor for high, low or low-startup alarm functions. The alarm trip point is settable over the entire input signal range. When repeater output is used as alarm output the unit provides two independent alarms.
Function: 1 channel I.S. input from frequency-pulse signals, provides 3 port isolation (input/output/supply) and current (source mode) or voltage output signal. In addition it repeats the frequency input and provides one SPST transistor with adjustable alarm trip point.
Signalling LEDs: Power supply indication (green), frequency input (yellow), alarms (red).
Configurability: Software configurable for frequency range, mA or V output signal, alarm parameters, transistor operation, by GM Pocket Portable Configurator PPC 1090, powered by the unit or configured by PC via RS-232 serial line with PPC1092 Adapter and SWC1090 Configurator software. DIP-Switch configurable for hardware setting of input sensor.
EMC: Fully compliant with CE marking applicable requirements.

Technical Data

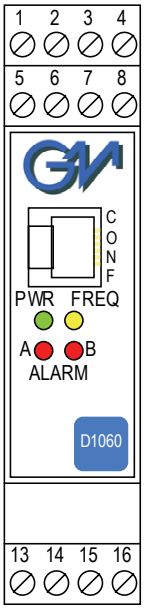
Supply: 12-24 Vdc nom (10 to 30 Vdc) reverse polarity protected, ripple within voltage limits ≤ 5 Vpp.
Current consumption @ 24 V: 60 mA with 20 mA output and transistors energized.
Current consumption @ 12 V: 110 mA with 20 mA output and transistors energized.
Power dissipation: 1.3 W with 24 V supply, 20 mA output and transistors energized.
Max. power consumption: at 30 V supply voltage, overload condition, transistors output energized and PPC1090 connected, 1.9 W.
Isolation (Test Voltage): I.S. In/Out 1.5 KV; I.S. In/Supply 1.5 KV; Analog Out/Supply 500 V; Analog Out/Digitals Out 500 V; Digital Outs/Supply 500 V; Digital Out/Digitals Out 500 V;
Input: magnetic pick-up, contact, proximity to EN60947-5-6, open-collector transistor for frequency signal up to 50 KHz, TTL CMOS.
Magnetic pick-up sensitivity: ≥ 20 mVpp up to 100 Hz input, ≥ 50 mVpp up to 1 KHz, ≥ 100 mVpp up to 5 KHz, ≥ 500 mVpp up to 20 KHz, ≥ 1 Vpp up to 50 KHz.
Switching current levels: ON ≥ 2.1 mA, OFF ≤ 1.2 mA, switch current ≈ 1.65 mA ± 0.2 mA hysteresis (for proximity or transistor input).
Equivalent source: 8 V 1 KΩ typical (8 V no load, 8 mA short circuit).
Integration Time: 100 ms.
Resolution/Visualization: 1 mHz for 50 Hz range, 10 mHz for 500 Hz range, 100 mHz for 5 KHz range, 1 Hz for 50 KHz range.
Input range: 0 to 50.5 KHz maximum.
Burnout: downscale analog output signal for loss of input signal.
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: 1 µA current output or 1 mV voltage output.
Transfer characteristic: linear direct or reverse.
Response time: ≤ 50 ms (10 to 90 % step change).
Output ripple: ≤ 20 mVrms on 250 Ω load.
Repeater Output: voltage free SPST optocoupled open-collector transistor.
Output factor: direct 1:1 or divided by 10, 100, 1000, 10000, 100000 or 1000000.
Open-collector rating: 100 mA at 35 Vdc (≤ 1.5 V voltage drop).
Leakage current: ≤ 50 µA at 35 Vdc.
Frequency response: 50 KHz maximum.
Alarm: ***Trip point range:*** within rated limits of input range (see input for step resolution).
Delay time: 0 to 1000 s, 100 ms step.
Hysteresis: 0 to 5 Hz for 50 Hz range, 0 to 50 Hz for 500 Hz range, 0 to 500 Hz for 5 KHz range, 0 to 5 KHz for 50 KHz range (see input visualization parameters for step resolution).
Output: voltage free SPST optocoupled open-collector transistor.
Open-collector rating: 100 mA at 35 Vdc (≤ 1.5 V voltage drop).
Leakage current: ≤ 50 µA at 35 Vdc.
Performance: Ref. Conditions 24 V supply, 250 Ω load, 23 ± 1 °C ambient temperature.
Input:
Calibration and linearity accuracy: ≤ ± 0.05 % of full scale of selected input range.
Temperature influence: ≤ ± 0.005 % of full scale input range 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 94/9/EC Atex Directive and to 2004/108/CE EMC Directive.
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:
II (1) G [Ex ia Ga] IIC, II (1) D [Ex ia Da] IIIC, I (M1) [Ex ia Ma] I, II 3G Ex nA II T4, [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I associated electrical apparatus.
Uo/Voc = 10.9 V, Io/Isc = 1.1 mA, Po/Po = 3 mW at terminals 13-16.
Uo/Voc = 15.5 V, Io/Isc = 13 mA, Po/Po = 48 mW at terminals 14-15.
Uo/Voc = 10.9 V, Io/Isc = 23 mA, Po/Po = 60 mW at terminals 15-16.
Ui/Vmax = 30 V, Ci = 0 nF, Li = 0 nH at terminals 13-16.
Um = 250 Vrms, -20 °C ≤ Ta ≤ 60°C.
Approvals: DMT 01 ATEX E 042 X conforms to EN60079-0, EN60079-11, EN60079-26, EN61241-0, EN61241-11,
IECEx BVS 07.0027X conforms to IEC60079-0, IEC60079-11, IEC60079-26, IEC61241-0, IEC61241-11, IMQ 09 ATEX 013 X conforms to EN60079-0, EN60079-15,
UL & C-UL E222308 conforms to UL913 (Div.1), UL 60079-0 (General, All Zones), UL60079-11 (Intrinsic Safety "i" Zones 0 & 1), UL60079-15 ("n" Zone 2), UL 1604 (Div.2) for UL and CSA-C22.2 No.157-92 (Div.1), CSA-E60079-0 (General, All Zones), CSA-E60079-11 (Intrinsic Safety "i" Zones 0 & 1), CSA-C22.2 No. 213-M1987 (Div. 2) and CSA-E60079-15 ("n" Zone 2) for C-UL, refer to control drawing ISM0140 for complete UL and C-UL safety and installation instructions,
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,
Russia according to GOST 12.2.007.0-75, R 51330.0-99, R 51330.10-99 [Exia] IIC X, Ukraine according to GOST 12.2.007.0,22782.0,22782.5 Exia IIC X,
DNV and KR Type Approval Certificate for marine applications.
Mounting: T35 DIN Rail according to EN50022.
Weight: about 155 g.
Connection: by polarized plug-in disconnect screw terminal blocks to accomodate terminations up to 2.5 mm².
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:	D1060S	
Power Bus enclosure		/B

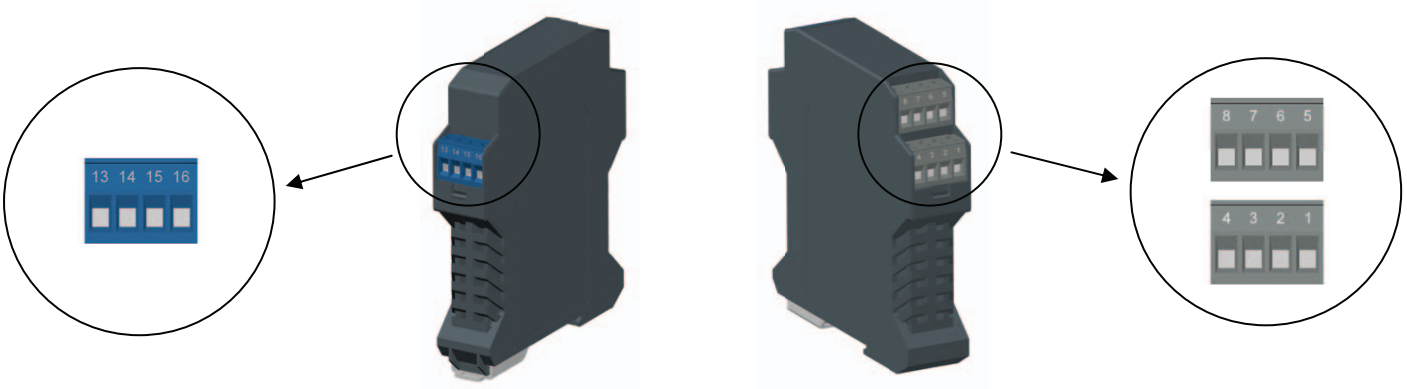
Operating parameters are programmable by the GM Pocket Portable Configurator PPC1090 or via RS-232 serial line with PPC1092 Adapter and SWC1090 Configurator software.
If the parameters are provided with the purchasing order the unit will be configured accordingly, otherwise the unit will be supplied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

Front Panel and Features



- Input from Zone 0 (Zone 20), Division 1, installation in Zone 2, Division 2.
- Magnetic pick-up, proximity input sensor.
- Frequency range DC to 50 KHz input.
- Repeater output direct or divided by 10, 100, 1000, 10000, 10000 or 1000000.
- 0/4-20 mA, 0/1-5 V, 0/2-10 V Output Signal linear or reverse.
- High Accuracy, µP controlled 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, Russian and Ukrainian Certifications.
- Type Approval Certificate DNV and KR for marine applications.
- High Reliability, SMD components.
- High Density, 1 channel converter, repeater and trip amplifier 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	Input Ch 1 for Magnetic Pick-up
14	+ Input Ch 1 for Proximity or for voltage free Contact or + Input Ch 1 for Open Collector
15	- Input Ch 1 for Proximity or voltage free Contact or Open Collector or + Input Ch 1 for TTL / CMOS
16	Input Ch 1 for Magnetic Pick-up or - Input Ch 1 for TTL / CMOS

SAFE AREA

1	+ Output Ch 1 for Current Source mode or + Output Ch 1 for Voltage Source mode
2	- Output Ch 1 for Current Source mode or - Output Ch 1 for Voltage Source mode
3	+ Power Supply 12 - 24 Vdc
4	- Power Supply 12 - 24 Vdc
5	+ Repeater Output or Alarm A
6	- Repeater Output or 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 D1060 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:

D1060 Terminals		D1060 Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
Ch1	13 - 16	Uo / Voc = 10.9 V	≤	Ui / Vmax
Ch1	14 - 15	Uo / Voc = 15.5 V		
Ch1	15 - 16	Uo / Voc = 10.9 V		
Ch1	13 - 16	Io / Isc = 1.1 mA	≤	Ii/ Imax
Ch1	14 - 15	Io / Isc = 13 mA		
Ch1	15 - 16	Io / Isc = 23 mA		
Ch1	13 - 16	Po / Po = 3 mW	≤	Pi / Pi
Ch1	14 - 15	Po / Po = 48 mW		
Ch1	15 - 16	Po / Po = 60 mW		

D1060 Terminals		D1060 Associated Apparatus Parameters		Must be	Hazardous Area/ Hazardous Locations Device + Cable Parameters
Ch1	13 - 16	Co / Ca = 2.05 µF Co / Ca = 14.4 µF Co / Ca = 63 µF	(IIC-A, B) (IIB-C) (IIA-D)	≥	Ci / Ci device + C cable
Ch1	14 - 15	Co / Ca = 508 nF Co / Ca = 3.11 µF Co / Ca = 12.5 µF	(IIC-A, B) (IIB-C) (IIA-D)		
Ch1	15 - 16	Co / Ca = 2.05 µF Co / Ca = 14.40 µF Co / Ca = 63.00 µF	(IIC-A, B) (IIB-C) (IIA-D)		
Ch1	13 - 16	Lo / La = 29 H Lo / La = 117 H Lo / La = 235 H	(IIC-A, B) (IIB-C) (IIA-D)	≥	Li / Li device + L cable
Ch1	14 - 15	Lo / La = 235 mH Lo / La = 941 mH Lo / La = 1883 mH	(IIC-A, B) (IIB-C) (IIA-D)		
Ch1	15 - 16	Lo / La = 72 mH Lo / La = 290 mH Lo / La = 580 mH	(IIC-A, B) (IIB-C) (IIA-D)		
Ch1	13 - 16	Lo / Ro = 12 mH/Ω Lo / Ro = 48.1 mH/Ω Lo / Ro = 96.2 mH/Ω	(IIC-A, B) (IIB-C) (IIA-D)	≥	Li / Ri device and L cable / R cable
Ch1	14 - 15	Lo / Ro = 585 µH/Ω Lo / Ro = 2342 µH/Ω Lo / Ro = 4685 µH/Ω	(IIC-A, B) (IIB-C) (IIA-D)		
Ch1	15 - 16	Lo / Ro = 594 µH/Ω Lo / Ro = 2378 µH/Ω Lo / Ro = 4757 µH/Ω	(IIC-A, B) (IIB-C) (IIA-D)		

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, current (Ui/Vmax) of the D1060 Associated Apparatus are not exceeded by the safety parameters (Uo/Voc) of the Intrinsically Safe device, indicated in the table below:

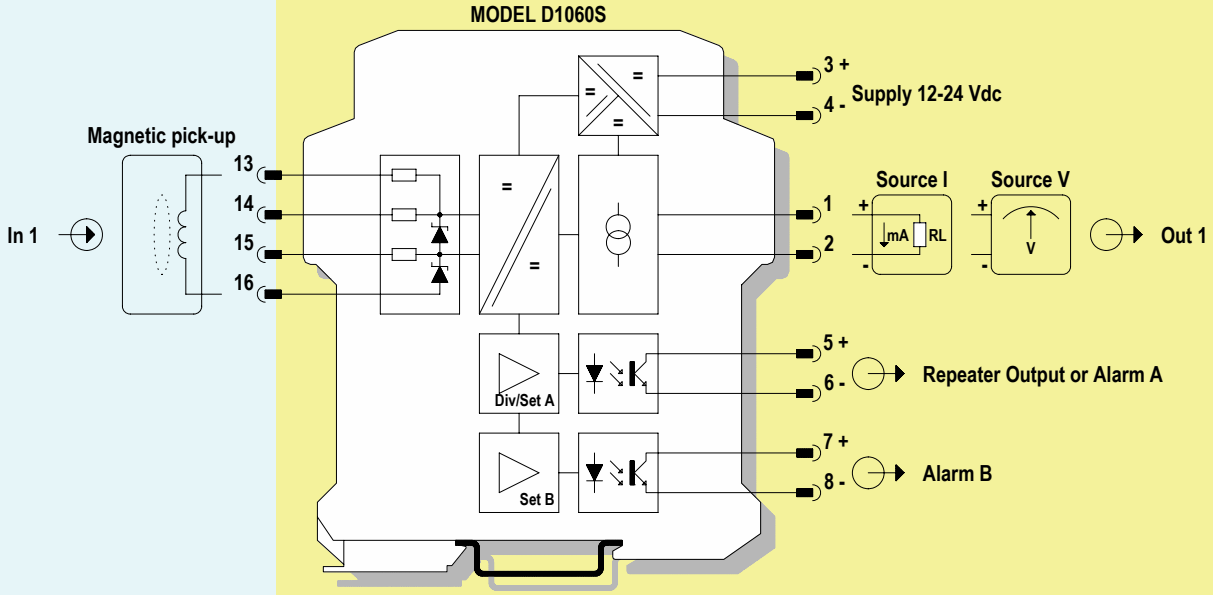
D1060 Terminals		D1060 Associated Apparatus Parameters	Must be	Hazardous Area/ Hazardous Locations Device Parameters
Ch1	13 - 16	Ui / Vmax = 30V	≥	Uo / Voc
Ch1	13 - 16	Ci = 0 nF, Li= 0 nH		

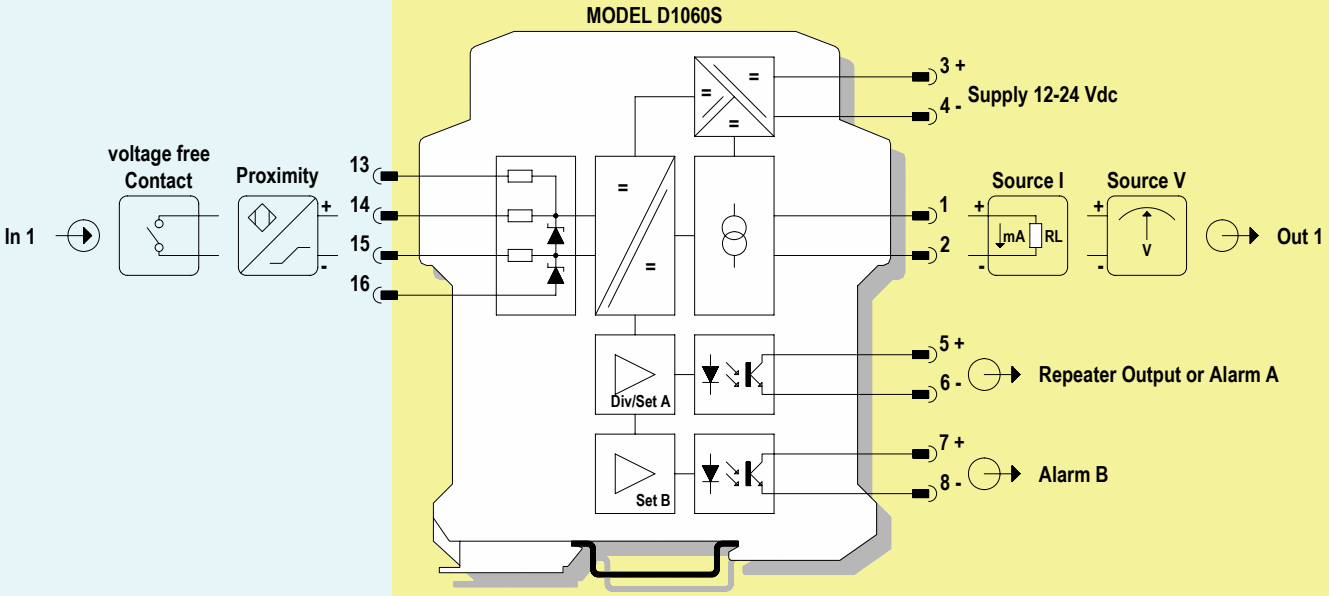
For installations in which both the Ci and Li of the Intrinsically Safe apparatus exceed 1 % of the Co and Lo parameters of the Associated Apparatus (excluding the cable), then 50 % of Co and Lo parameters are applicable and shall not be exceeded (50 % of the Co and Lo become the limits which must include the cable such that Ci device + C cable ≤ 50 % of Co and Li device + L cable ≤ 50 % of Lo).
If the cable parameters are unknown, the following value may be used: Capacitance 60pF per foot (180pF per meter), Inductance 0.20µH per foot (0.60µH per meter).
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

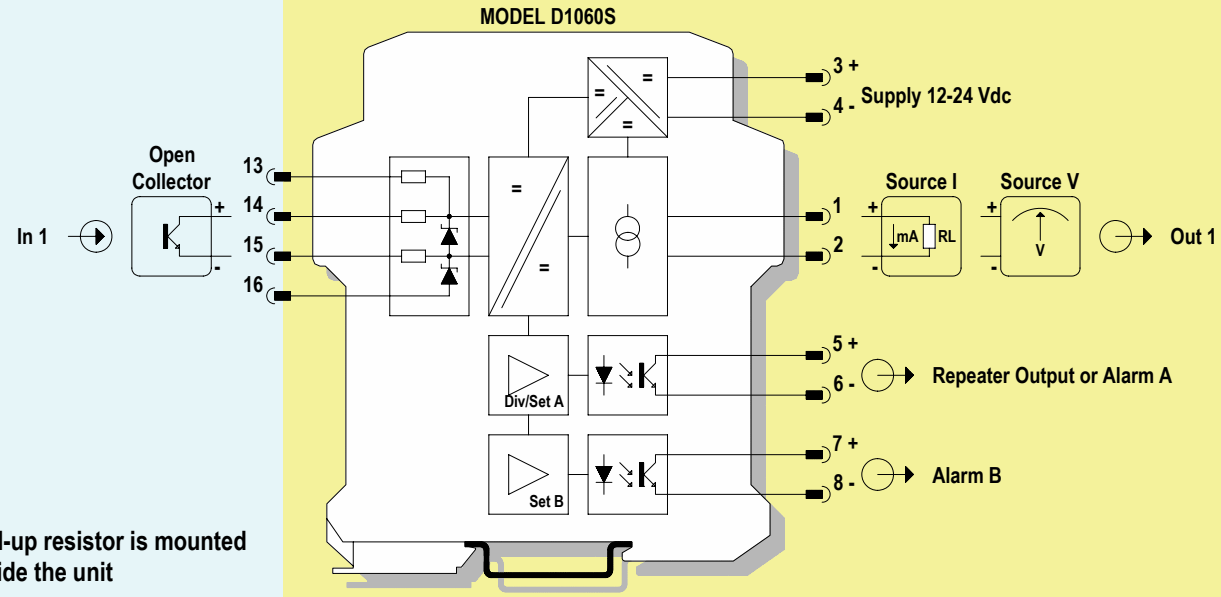




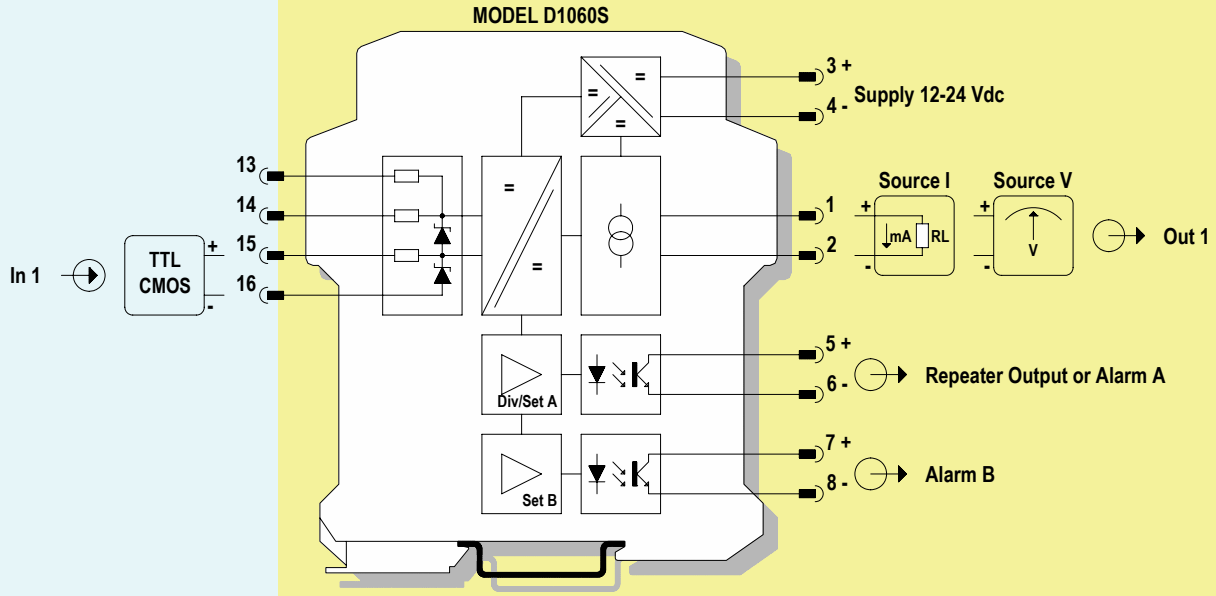
Function Diagram

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

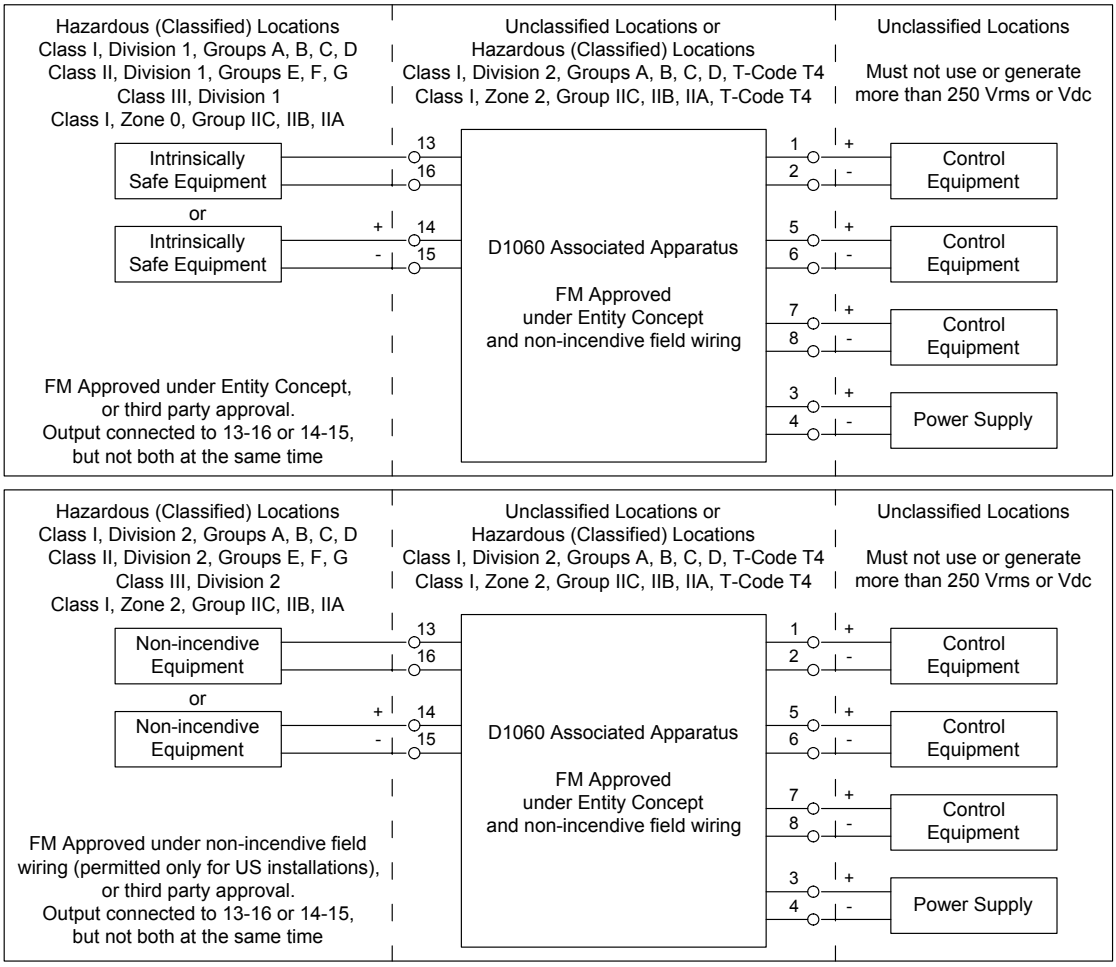


Note: **pull-up resistor is mounted inside the unit**



Warning

D1060 is an isolated Intrinsically Safe Associated Apparatus installed into standard EN50022 T35 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 EN/IEC60079-15, 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 D1060 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.
D1060 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.
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 D1060 accepts a frequency signal from Hazardous Area/Hazardous Locations (magnetic pick-up, proximity) and provides a 0/4-20 mA or 0/1-5 V or 0/2-10 V 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 transistor SPST open collector, alarm A and B, that can be configured as HIGH, LOW, LOW start-up alarm operating mode and NC or NO transistor operating mode. One channel of trip amplifiers, Alarm A, can also be configured for frequency repetition of input signal with direct signaling or divided by 10, 100, 1000, 10000, 100000 or 1000000. Presence of supply power is displayed by a green signalling LED, input frequency is displayed by a yellow LED, status of alarm output A and B is displayed by two red LED.

Installation

D1060 is a frequency input converter with trip amplifiers housed in a plastic enclosure suitable for installation on T35 DIN Rail according to EN50022.
D1060 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 and configuration DIP switches.
Identify the function and location of each connection terminal using the wiring diagram on the corresponding section, as an example:
Connect 12-24 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 positive alarm A output at terminal “5” and negative at “6”.
Connect positive alarm B output at terminal “7” and negative at “8”.
For a magnetic pick up input, connect high wire at terminal “13”, low and shield (if any) at terminal “16”.
For a proximity, contact and open collector sensor input, connect positive wire at terminal “14”, negative at terminal “15”.
For a TTL CMOS input, connect positive wire at terminal “15”, negative at terminal “16”.
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 output transistors checking the load rating to be within the maximum rating (100 mA, 35 V resistive load).
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.
Electrostatic Hazard: to avoid electrostatic hazard, the enclosure of D1060 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, D1060 series must be connected to SELV or SELV-E supplies.

Start-up

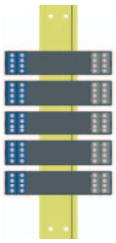
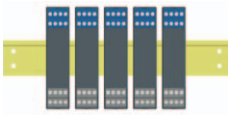
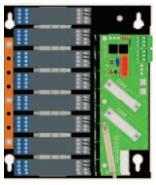
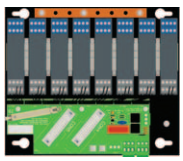
Before powering the unit check that all wires are properly connected, particularly supply conductors and their polarity, input and output wires, also check that Intrinsically Safe conductors and cable trays are segregated (no direct contacts with other non I.S. conductors) and identified either by color 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, alarm LED should reflect the input variable condition with respect to trip points setting, output channel must be in accordance with the corresponding input signal.

Installation in Cabinet

Power Dissipation of D1060 Isolators
Section “Technical Data” of D1060 isolator specifies the current consumption (maximum current from the nominal power supply, typical 24 Vdc, in normal operation); this data serves to dimension the current rating of the power supply unit. Section “Technical Data” indicates also the maximum power consumption (maximum power required from the power supply in the worst (abnormal) operating conditions like for example supply voltage at 30 Vdc, short circuit on the outputs and on the inputs terminals.
The power dissipated **Pd** inside the enclosure for analog signal isolators is: **Pd = Current Consumption (A) * Supply Voltage (V) - Power Dissipated into the input/output loads**
Analog signal isolators have higher dissipation than digital signal isolators. In analog signal isolators each transmitter requires and dissipates 15 V * 0.02 A = 0.3 W. Usually the loads outside the isolator dissipate 1/3 of the total power used. Isolators are not running at the maximum current all at the same time, the average power consumption of a multitude of isolators can be considered to be only 70 % of the value obtained from the section “Technical Data”. Considering the 1/3 load power and the 70 % above discussed, the power effectively dissipated internally by the isolators can therefore become ½ of the actual power delivered by the power supply. Digital barriers dissipate all the supply power inside the enclosure consequently the total power dissipation into a cabinet, with mixed analog and digital barriers, is determined by the number of channels more than by the number of isolator enclosures.
The following tables give advises for the DIN rail orientation (vertical or horizontal) of the barriers mounting, D1060S (single channel) isolators, installed on DIN rail, bus or custom board assembly.

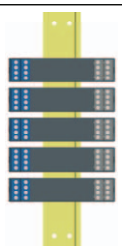
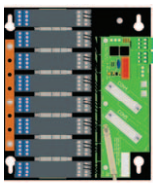
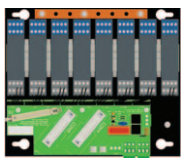
A) Cabinet with Natural Ventilation

Maximum recommended ambient temperature in °C depending on barrier type and installation method:

Type of Isolator	Single unit Installation	Installation of Multiple units with DIN-rail Bus		Installation on Custom Boards	
	Any orientation	Vertical	Horizontal	Vertical	Horizontal
					
D1060S	60°C	30°C	35°C	35°C	40°C

B) Cabinet with Forced Ventilation

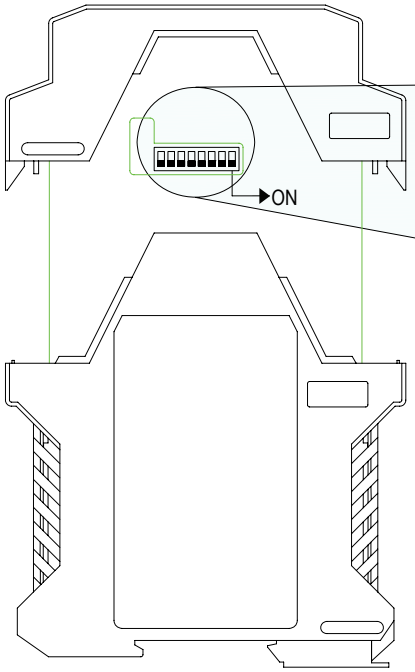
Maximum recommended ambient temperature in °C depending on barrier type and installation method:

Type of Isolator	Single unit Installation	Installation of Multiple units with DIN-rail Bus		Installation on Custom Boards	
	Any orientation	Vertical	Horizontal	Vertical	Horizontal
					
D1060S	60°C	40°C	45°C	45°C	50°C

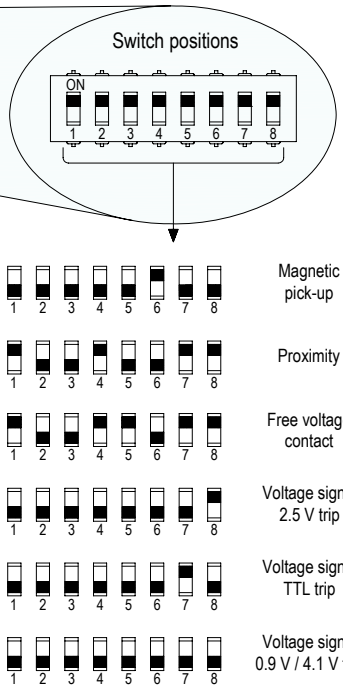
Configuration

A hardware configuration DIP switch is located on component side of pcb. This switch allows the configuration of input sensor type.

Side B Panel View



Dip switch configuration



Dip switch Configuration Summary Table

INPUT Sensor	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Magnetic pick-up	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
Proximity	ON	OFF	OFF	ON	OFF	OFF	ON	ON
Free voltage contact	ON	OFF	OFF	ON	ON	OFF	ON	ON
Voltage signal 2.5 V trip	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
Voltage signal TTL trip	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
Voltage signal 0.9 V / 4.1 V trip	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

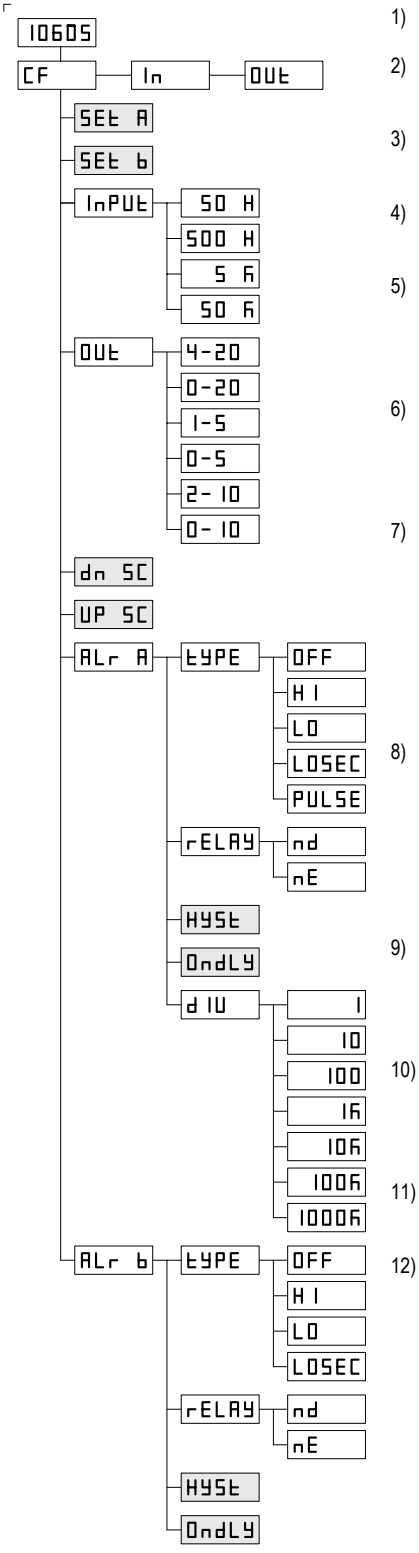
PPC1090 Operation

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 connecto 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.

PPC1090 Configuration

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.

D1060S Menu



Menu item description

1) **D1060S** [1 Level Menu]
Displays Model D1060S single channel frequency input converter plus trip amplifier. 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 range (maximum frequency input) configuration. Press “Enter” to set the input range, press the “Select” key for the next menu level item or “Up” key to return to second level. If you press “Enter” key, you can choose between 4 different input ranges; press “Select” key to change the range and then the “Enter” key to confirm the choice.
The input ranges are:

50 H	50 Hz full scale value (1 mHz frequency resolution)
500 H	500 Hz full scale value (10 mHz frequency resolution)
5 k	5000 Hz full scale value (100 mHz frequency resolution)
50 k	50000 Hz full scale value (1 Hz frequency resolution)

8) **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

9) **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

10) **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

11) **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.

12) **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)
PULSE	Alarm A output repeats the input frequency direct or divided by factor set in “DIV” menu. Available only on alarm A.

13) **Relay** [4 Level Menu]

Displays the transistor normal condition (A or B) configuration. Press "Enter" to set the transistor 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 transistor conditions; press "Select" key to change the type and then the "Enter" key to confirm the choice. The condition types are:

ND	transistor normally de-energized (normally open transistor, closed in alarm condition)
NE	transistor normally energized (normally close transistor, opened in alarm condition)

14) **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

15) **On dl** [4 Level Menu]

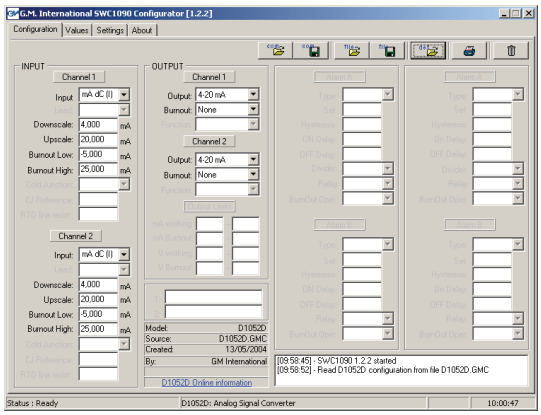
Displays the alarm activation delay (A or B) configuration. Press "Enter" to set the delay time value, press the "Select" key to the next menu level item or "Up" key to return to third level. If you pressed "Enter" key, you can set the delay value (100 ms step); press the "Select" key to highlight the character you want to change and then the "Up" and "Down" keys to select the number; confirm the modification with the "Enter" key

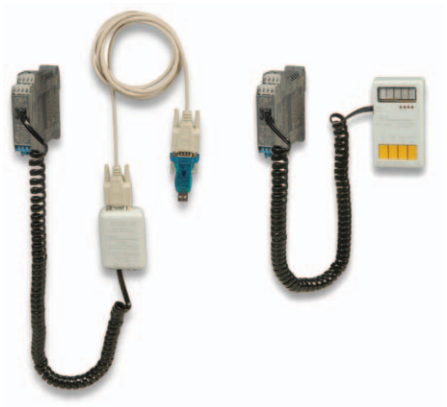
16) **Div** [4 Level Menu]

Displays the pulse divider output configuration. Press "Enter" to set the divider, press the "Select" key for the next menu level item or "Up" key to return to third level.
If you press "Enter" key, you can choose between 7 different divider factor; press "Select" key to change the value and then the "Enter" key to confirm the choice.
The divider factor are:

1	Output is repeated directly (e.g. 10 KHz input frequency, 10 KHz output frequency)
10	Output is repeated divided by 10 (e.g. 10 KHz input frequency, 1 KHz output frequency)
100	Output is repeated divided by 100 (e.g. 10 KHz input frequency, 100 Hz output frequency)
1 k	Output is repeated divided by 1000 (e.g. 10 KHz input frequency, 10 Hz output frequency)
10 k	Output is repeated divided by 10000 (e.g. 10 KHz input frequency, 1 Hz output frequency)
100 k	Output is repeated divided by 100000 (e.g. 10 KHz input frequency, 100 mHz output frequency)
1000 k	Output is repeated divided by 1000000 (e.g. 10 KHz input frequency, 10 mHz output frequency)

PPC1092, SWC1090 Configuration





INPUT SECTION:

Input: input range selection

☐ 50 Hz	frequency signal from DC to 50 Hz, 1 mHz resolution
☐ 500 Hz	frequency signal from DC to 500 Hz, 10 mHz resolution
☐ 5 KHz	frequency signal from DC to 5 KHz, 100 mHz resolution
☐ 50 KHz	frequency signal from DC to 50 KHz, 1 Hz resolution

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

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

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
☐ Pulse	repeats the input frequency, alarm A only

Set: input value of measuring range at which the alarm output is triggered
Hysteresis: alarm hysteresis value,
valid range: 0 to 5 Hz for 50 Hz range, 0 to 50 Hz for 500 Hz range,
0 to 500 Hz for 5 KHz range, 0 to 5 KHz for 50 KHz range.
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.
Divider: output divider rate for pulse type alarm A only

☐ 1	frequency input is repeated directly
☐ 10	frequency input is repeated divided by 10
☐ 100	frequency input is repeated divided by 100
☐ 1 K	frequency input is repeated divided by 1000
☐ 10 K	frequency input is repeated divided by 10000
☐ 100 K	frequency input is repeated divided by 100000
☐ 1000 K	frequency input is repeated divided by 1000000

OC Transistor: open collector transistor output condition

☐ ND	the transistor is in normally de-energized condition, it energizes (the output is closed) in alarm condition
☐ NE	the transistor is in normally energized condition, it de-energizes (the output is opened) in alarm condition

Each alarm output has independent configurations.