technology for safety

D1060

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:

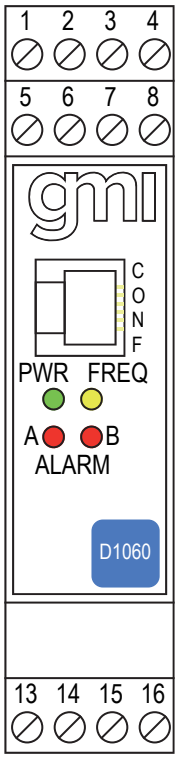
Software configurable for frequency range, mA or V output signal, alarm parameters, transistor operation, by GM Pocket Portable Configurator PPC 1090, powered by the unit or configured by PC via RS-232 serial line with PPC1092 Adapter and SWC1090 Configurator software. To operate PPC1090 or PPC1092 refer to instruction manual.

DIP-Switch configurable for hardware setting of input sensor.

EMC:

Fully compliant with CE marking applicable requirements.

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, INMETRO, EAC-EX, UKR TR n. 898 Certifications.
- Type Approval Certificate DNV and KR for maritime 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.

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.

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 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 = 10.9 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.
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, ANSI/ISA 12.12.02, ANSI/ISA 60079-0, ANSI/ISA 60079-11, C22.2 No.142, C22.2 No.157, C22.2 No.213, E60079-0, E60079-11, E60079-15.
EAЭC 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.
DNV No. TAA00002BM and KR No.MIL20769-EL001 Cert. for maritime applications.

Mounting: EN/IEC60715 TH 35 DIN-Rail.
Weight: about 155 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.

Parameters Table:

Safety Description	Maximum External Parameters			
	Group Cenelec	Co/Ca (µF)	Lo/La (mH)	Lo/Ro (µH/Ω)
Terminals 13-16				
Uo/Voc = 10.9 V	IIC	2.05	29000	12000
Io/Isc = 1.1 mA	IIB	14.40	117000	48100
Po/Po = 3 mW	IIA	63.00	235000	96200
Terminals 14-15				
Uo/Voc = 15.5 V	IIC	0.508	235	585
Io/Isc = 13 mA	IIB	3.110	941	2342
Po/Po = 48 mW	IIA	12.500	1883	4685
Terminals 15-16				
Uo/Voc = 10.9 V	IIC	2.05	72	594
Io/Isc = 23 mA	IIB	14.40	290	2378
Po/Po = 60 mW	IIA	63.00	580	4757

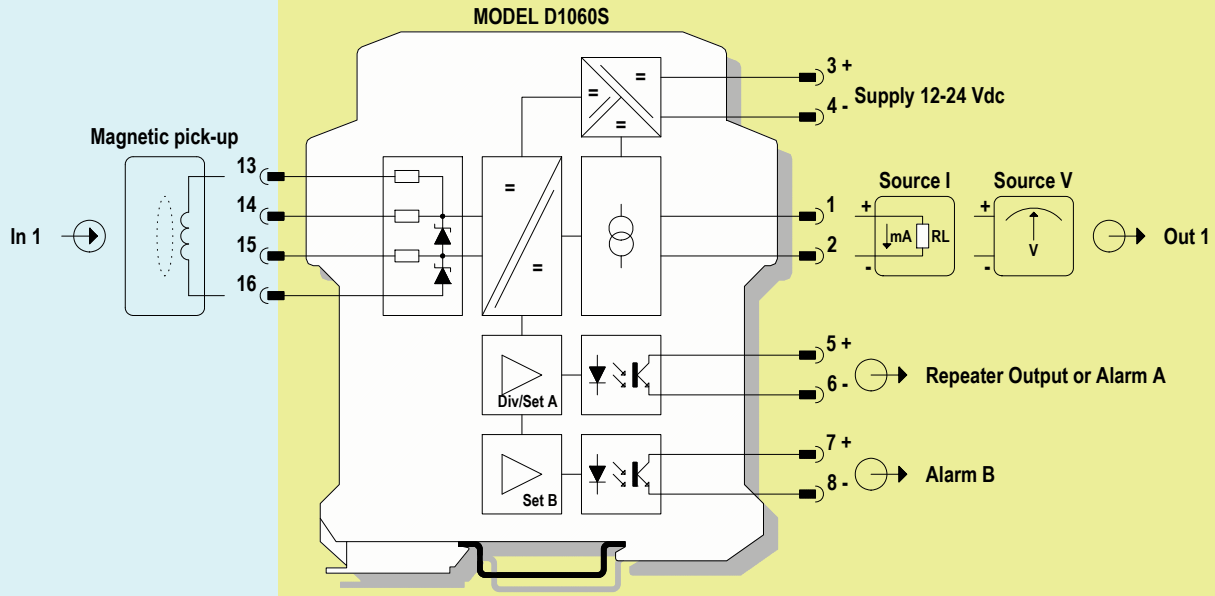
NOTE for USA and Canada:
IIC equal to Gas Groups A, B, C, D, E, F and G
IIB equal to Gas Groups C, D, E, F and G
IIA equal to Gas Groups D, E, F and G

Image:

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

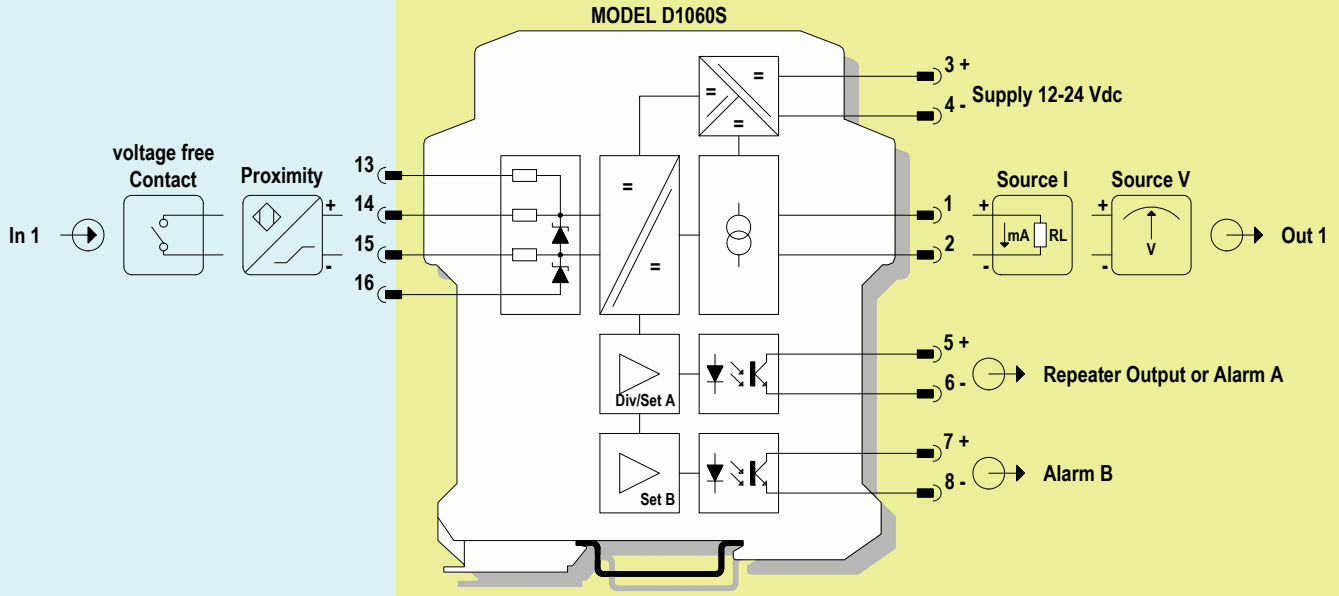
SAFE AREA, ZONE 2 GROUP IIC T4,
NON HAZARDOUS LOCATIONS, CLASS I, DIVISION 2,
GROUPS A, B, C, D T-Code T4, CLASS I, ZONE 2, GROUP IIC T4

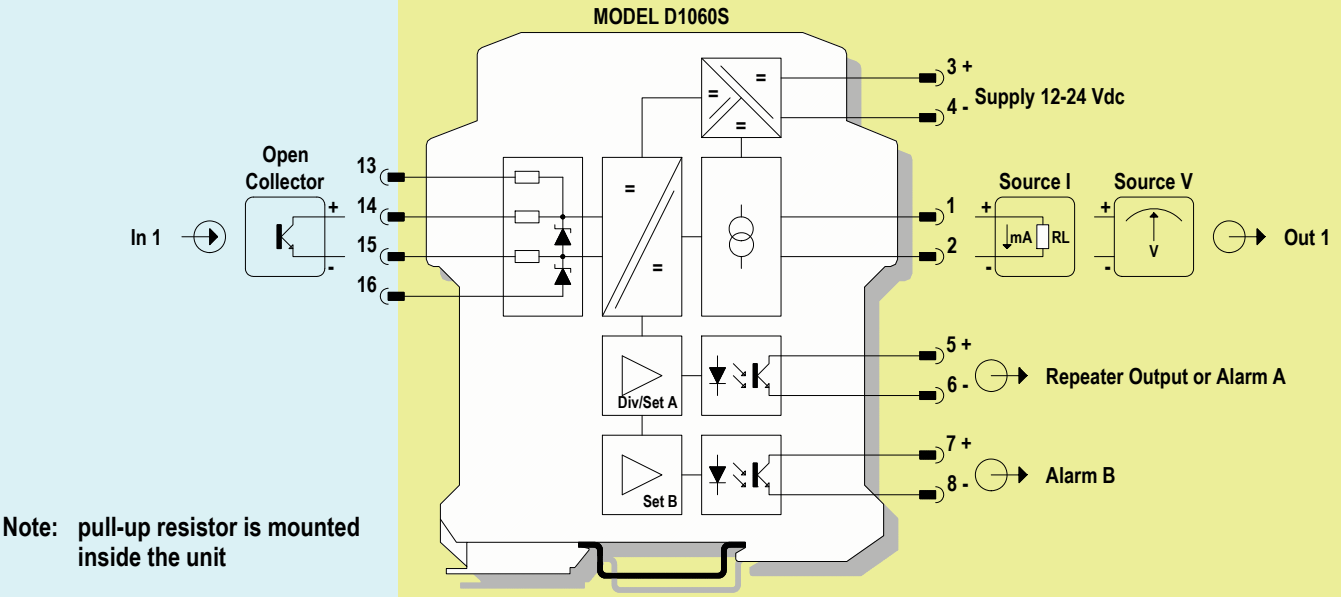


Function Diagram:

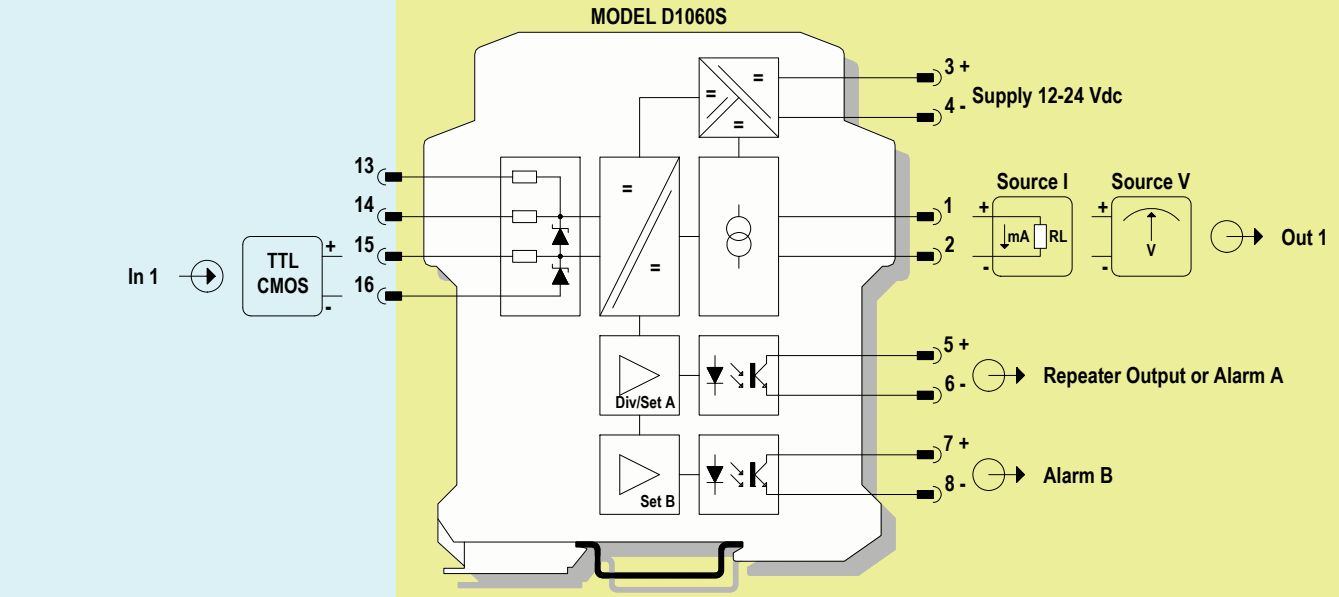
HAZARDOUS AREA ZONE 0 (ZONE 20) GROUP IIC,
HAZARDOUS LOCATIONS CLASS I, DIVISION 1, GROUPS A, B, C, D,
CLASS II, DIVISION 1, GROUPS E, F, G, CLASS III, DIVISION 1,
CLASS I, ZONE 0, GROUP IIC

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

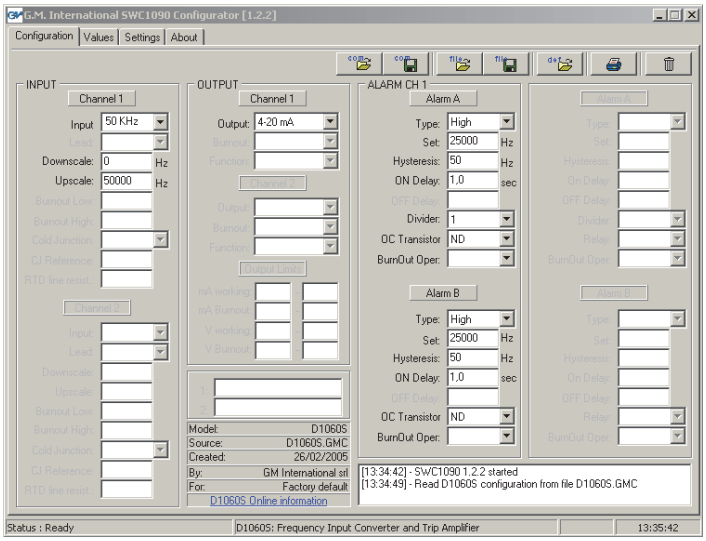


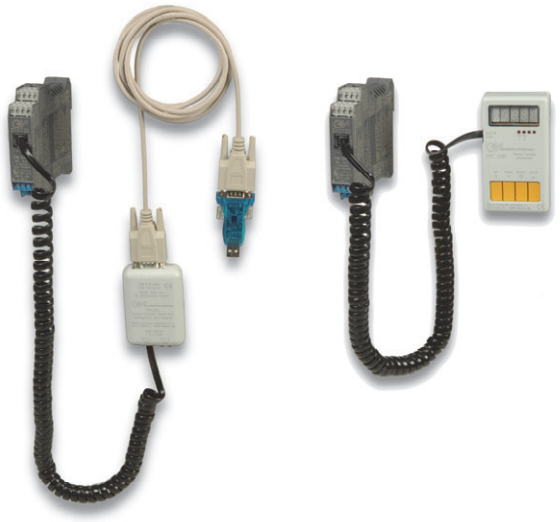


Note: pull-up resistor is mounted inside the unit



Friendly Configuration with SWC1090 Software and PPC1092 Adapter or Pocket Portable Configurator PPC1090:





Configuration Parameters:

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.