iDRN-ACV

AC VOLTAGE INPUT

General Description:

The iDRN Series of DIN rail-mountable signal conditioners are available for Thermocouple, RTD, Strain, Process, AC Voltage, AC Current and Pulse/Totalizer input types.

The factory calibrated signal conditioners are ideal for all process and power monitoring applications, they feature 3-way isolation, high accuracy input, programmable outputs, and are excellent front end interfaces for programmable logic controllers or data acquisition systems. For maximum user configurability the signal conditioners allow complete input-output scaling via a RS-232 connection to any PC or PLC.

Software Description:

The signal conditioner configuration program is a MS DOS/Windows program (this manual is for the Windows version). It is designed especially for the iDRN Series Signal Conditioner. This program will run on any PC with Windows application and will start automatically.

Free Serial Communication software and ActiveX Controls are on the CD-ROM enclosed with this shipment. To download the latest software release (or request a free CD-ROM) please go to: www.newportUS.com/software

What You need:

- Your choice of the signal conditioner
- IBM PC or compatible
- Windows software 3.1 or higher, or Windows 95/98
- RJ12 connector with telephone cable
- Adapter (DB9 or DB25 to RJ12)

Setting up your System
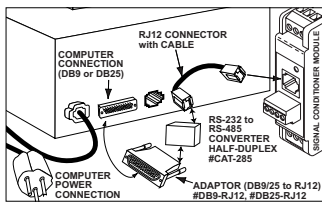
INPUT RANGES:
400 mV, 4V, 40 Volt, 400 Volt

FREQUENCY RANGE:
30 Hz to 1 KHz

INPUT IMPEDANCE:
2.1 Meg for all ranges.

ISOLATION:
Dielectric strength per 1 minute test based on EN 61010 for 50 Vdc or Vrms working voltage.
Three way Isolation:
- Power to Signal Input: 1800V Peak
- Power to Analog Output/Communication: 1800V Peak
- Signal Input to Analog Output/Communication: 1400V

COMMON MODE REJECTION:
100 dB

INPUT OVER-VOLTAGE PROTECTION:
10% Above full scale continuously.
100% Above full scale for 10 seconds.

ANALOG TO DIGITAL TECHNIQUE:
Dual slope

READ RATE:
3 readings/second

ACCURACY AT 25 °C:
400 mV, 4V, 40V and 400V ranges
49 Hz to 500 Hz ±0.2% of FS
30 Hz to 1KHz ±0.2% of FS ±10 counts

TEMPERATURE STABILITY:
400 mV and 40 Volt range 150 ppm/°C typical

4V and 400 Volt range 100 ppm/°C typical

STEP RESPONSE FOR RS232 OUTPUT:
2 seconds to 99% of the final value
(Filter time constant = 64)

RESPONSE TIME:
To verify the response time, check the carriage return <CR>, it will be sent at the end of the response. You can send another command after you receive the <CR>.

   i.e.   send: *X01
           response: X01<DATA><CR>

WARM UP TO RATED ACCURACY:
30 minutes

ANALOG OUTPUT SIGNAL TYPE:
Voltage: 0-10 Volt, maximum current 10mA

Current: 0-20 mA or 4-20 mA, maximum compliance voltage 10 Volts (maximum loop resistance 500Ω)

ANALOG OUTPUT LINEARITY:
0.1% of FS

ANALOG OUTPUT STEP RESPONSE TIME:
2 seconds to 99% of final value
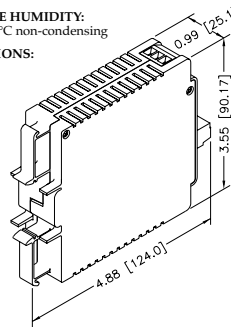
INPUT POWER:
10 to 32 Volt DC

POWER CONSUMPTION:
2.4 watts (100 mA at 24 Vdc)

OPERATING AMBIENT:
-5 to +55 °C

STORAGE TEMPERATURE:
-40 to +85 °C

**RELATIVE HUMIDITY:**
90% at 40 °C non-condensing

DIMENSIONS:

Introduction:

The AC voltage input signal conditioners are high performance instruments that measure AC voltages in 4 ranges which are as follows: 400 mV, 4 Volt, 40 Volt and 400 Volt. Key features of the signal conditioners are built in active attenuator, scalable analog output and a simple RS232 interface for scaling analog output and range selection. The RS232 interface may also be used for digital transmission of input signal to a computer or a PLC. Additional features include three way isolation between DC power, signal input and analog output/RS232.
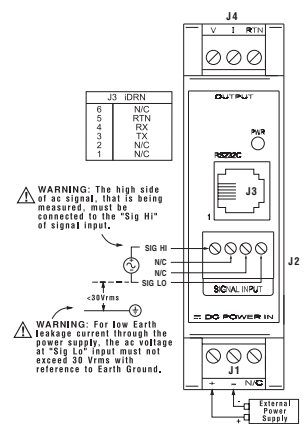
Operation:

Note: When connecting a voltage signal, extra care should be taken to prevent electrical shock. Always turn the signal power off before making connections to the signal conditioner.

⚠ **ALWAYS ENSURE THAT THE MAXIMUM VOLTAGE INPUT SIGNAL DOES NOT EXCEED 400 VOLTS AC.**

⚠ **PLEASE OBSERVE THE INPUT SIGNAL CONNECTION SPECIFIED IN THE SECTION BELOW. THIS DEVICE MUST ONLY BE INSTALLED BY A PROFESSIONAL ELECTRICIAN.**

Power Input and Analog Output Setup:

To connect the signal input proceed as follows:

1. Connect a DC power supply with an output voltage between 10 to 32 Volt DC to the signal conditioner (J1).

Note: If power supply used has current limiting, it may not be able to power the signal conditioners if the available output voltage is around 10 Volt, since the peak current may reach 1 to 5 amp for a few milliseconds.

2. Determine the maximum voltage to be measured.

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3. Determine the appropriate input signal range, i.e. 400 mV, 4 Volt, 40 Volt or 400 Volt. Also ensure that the frequency of AC source is within the specified limits.

4. Ensure that if the selected range is different from the default then change the internal range by using the Setup Software and select the appropriate range.

5. Connect the signal input to screw terminal, and ensure that the screws are tight. Failure to do so may cause electrical shock should the wires become loose and come out of the screw terminal.

6. To verify that the set up is correct, you may connect a DVM to the analog output. Once connected, power the signal conditioner and apply a known voltage from an AC source to input. Measure and compare with expected values. To custom scale the analog output proceed to the next step.

7. To view/change the scaling that relates the analog output to signal input: connect the RS232 output of the signal conditioner to an available serial port of a computer. The cable and the DB9 or DB25 connectors are available as an option.

8. Turn on the computer, start Windows 3.0 or higher and run the Signal Conditioner Configuration Setup Program.

9. Start the configuration program, you need to indicate which serial port is to be used for serial communication by checking the appropriate check box on the opening menu.

Note: It is not necessary to know the serial communication protocol. i.e. baud rate, parity, 7/8 data bit and stop bit; the program will determine this information automatically. However, it is good practice to mark the protocols used on the signal conditioner label if different from default.

10. Once the program starts it will automatically detect the signal conditioner configuration and will display a window of available options. To view the signal input click on the display on/off.

11. To change analog output scaling choose analog output scaling and enter the desired values.

12. Once the custom scaling is finished, **ensure that Send Configuration is clicked,** otherwise the changes will not take effect.

13. The input/output scaling may be fine tuned, while both communication and analog output are active. In fact you may make a change to the analog output in the configuration program, and watch the DVM connected to analog output of the signal conditioner follow the new settings.

14. You may save or print a particular configuration by selecting the file menu. It's always a good practice to both print and save the scaling of each signal conditioner.

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15. If the program is not able to establish communication then an error message is displayed. This happens either when the wrong serial port is specified or when the cable is disconnected.

16. The procedure to disable Continuous Mode and change the iDRN to Command Mode is as follows:

Using HyperTerminal, or any serial communication program, type: **Ctrl + S**
To change the device to Command Mode, type: **^AE**
To change the Bus Format Register, type: ***W0814**
To reset the device, type: ***Z01**
Cycle power to the unit.

Modbus Register Definition

Reg. #	Read Function	Write Function	# of byte
1	Input Range	Input Range	1
2	Input/Output Config.	Input/Output Conf.	1
3	Decimal Point	Decimal Point	1
4	Filter Time Constant	Filter Time Constant	1
5	Reading/Output Scale	Not supported	3
6	Reading/Output Offset	Not supported	3
7	Comm. Parameters	Comm. Parameters	1
8	Comm. Bus Format	Comm. Bus Format	1
9	Comm. Data Format	Comm. Data Format	1
A	Comm. Device Addr.	Comm. Device Addr.	1
B	Comm. Recog. Char.	Comm. Recog. Addr.	1
C	Unit of measure	Not supported	3
D	Gate Time	Gate Time	1
E	Debounce Time	Debounce Time	1
F	Transmit Time	Transmit Time	2
10	Main Value	Hard Reset	3
11	Peak Value	Reset Peak	1
12	Valley Value	Reset Valley	1
13	Not Supported	L.S. bytes Output Scale	2
14	Not Supported	M.S. byte Output Scale	1
15	Not Supported	M.S. bytes Output Offset	2
16	Not Supported	L.S. byte Output Offset	1

Note:
1) Main, Peak, Valley value: 4 bytes will send from the unit
  a. Highest byte always 00h.
  b. 2nd Highest byte: (MSB is sign (1=negative, 0=positive), next 3 bits are number of decimal points).
  c. Low nibble of second byte, and lowest 2 bytes are the value.
  d. The decimal point register has to set to: 1, 2, 3, or 4.
2) Bus Format: Bit 5 1/0 = Modbus/Newport
3) Output Scale/Offset Write:
  Due to write single only, two write operation is needed to write scale/offset, and to make it effective it needs to follow with Hard Reset command.
4) To configure to Newport protocol, set bit 5 of Bus Format to low and follow with Hard Reset command.

WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device, as the guide contains important information relating to safety and EMC.

It is the policy of NEWPORT to comply with all worldwide safety and EMC/EMI regulations that apply. NEWPORT is constantly pursuing certification of its products to the European New Approach Directives. NEWPORT will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but NEWPORT Electronics, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

PATENT NOTICE: This product is covered by one or more of the following patents: U.S. Pat. No. Des. 336,895, 5,274,577/ Canada 2052599, 2052600/ Italy 1249456, 1250938/ France Brevet No. 91 12756/ Spain 2039150, 2048066/ UK Patent No. GB2 249 837, GB2 248 954/ Germany DE 41 34398 C2.

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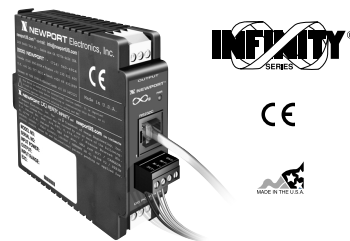
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AC Voltage Signal Conditioner

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