

START HERE

## iDRN-PR PROCESS 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:

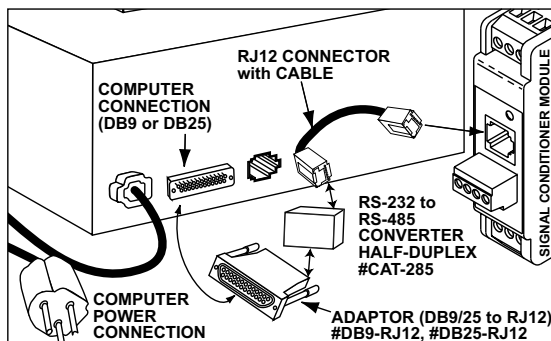
The signal conditioner configuration program is a MS DOS/Windows program (this manual is for the Windows version). It is designed especially for the iDRN Series Signal Conditioner. This program will run on any PC with Windows application and will start automatically.

**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.omega.com/software](http://www.omega.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



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**INPUT RANGES:**  
±20mA; ±400mV, ±1V, ±2V, ±5V, and ±10V  
Ratiometric or nonratiometric

**EXCITATION:**  
14V or 10V @ 25mA

**INPUT IMPEDANCE:**  
Voltage Range: 1MΩ  
Current Range: 10Ω

**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 Peak

**COMMON MODE REJECTION:**  
100dB

**INPUT OVER-RANGE PROTECTION:**  
Voltage input: 50V  
Current input: 50mA

**MODE:**  
Linear, Square root, Linear totalize, Square root totalize

**ANALOG TO DIGITAL TECHNIQUE:**  
Multiple slopes

**READ RATE:**  
8 readings/second, automatic polarity

**ACCURACY AT 25 °C:**  
±0.1% of FS ± 2 counts

**TEMPERATURE STABILITY:**  
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)

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**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

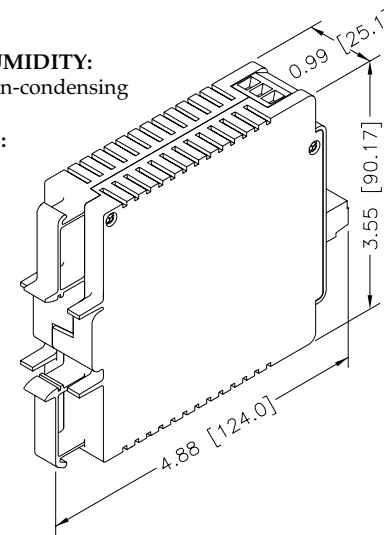
**POWER CONSUMPTION:**  
3 watts (125 mA at 24Vdc)

**OPERATING AMBIENT:**  
-5 to +55 °C

**STORAGE TEMPERATURE:**  
-40 to +85 °C

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

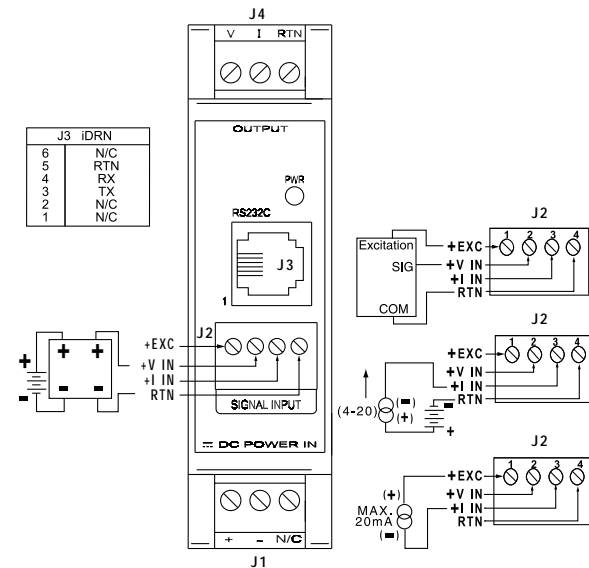
### DIMENSIONS:



### Introduction:

The Process input signal conditioners are high performance instruments that measure DC currents/voltages in 6 ranges which are as follows: ±20mA; ±400mV, ±1Volt, ±2Volts, ±5Volts, and ±10Volts. Key features of the signal conditioners are operation in linear or square root and process totalize modes, 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.

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### Operation:

#### 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 32Volt 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 10Volt, since the peak current may reach 1 to 5 amp for a few milliseconds.
2. Determine the maximum voltage to be measured.
3. Determine the appropriate input signal range, i.e. ±20mA; ±400mV, ±1Volt, ±2Volts, ±5Volts, or ±10Volts.
4. Ensure that if the selected range is different from the default then change the internal range which is controlled by the software by using serial communication explained later in this manual.
5. Connect the signal input to screw terminal, and ensure that the screws are tight. Connect voltage sources to pin 2 of J2 and current sources to pin 3 of J2.

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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 a DC 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 (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. 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.

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 accidentally disconnected.

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

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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      | Analog Output Scale  | Analog Output Scale      | 3         |
| 6      | Analog Output Offset | Analog Output Offset     | 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     | -                    | -                        | -         |
| 12     | Reading Scale        | Reading Scale            | 3         |
| 13     | Reading Offset       | Reading Offset           | 3         |
| 14     | Not Supported        | L.S. byte Output Scale   | 1         |
| 15     | Not Supported        | M.S. bytes Output Offset | 1         |
| 16     | Not Supported        | L.S. byte Output Offset  | 2         |

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

The information contained in this document is believed to be correct, but OMEGA Engineering, 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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## iDRN-PR Process Signal Conditioner

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