iDRN-FP

FREQUENCY/PULSE 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

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

To connect the signal input proceed as follows:

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 Vdc to the signal conditioner (I1). 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 V, since the peak current may reach 1 to 5 Amps for a few milliseconds.

2. Ensure that if the selected mode or signal source is different from the default then change them using serial communication explained later in this manual.

Operation:
Note: When connecting a pulse signal, ensure that the input signal voltage is less than or equal to the rating. The unit may be damaged if the input voltage exceeds the maximum rating.

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 Vdc to the signal conditioner (I1).

2. Ensure that if the selected mode or signal source is different from the default then change them using serial communication explained later in this manual.

TTL/CMOS Input: (Use software to set: no pull up/down). Low <= 0.8 V, High >= 3.5 V (For Input: 0.2 Hz to 16 KHz)
Low <= 0.8 V, High >= 12 V (For Input: 0.2 Hz to 50 KHz)
NAMUR Sensors (Use software to set: 1KΩ pull down to RTN and 8.2V Excitation.)

For measuring a low level signal riding on top of a large DC signal, connect a 0.1uF capacitor. See Detail.

Use software to set 1KΩ pull down to RTN.

OPERATING MODES:
Frequency: Range = 0.2 Hz to 50 KHz
Max. Input Frequency: 30 KHz. for Input Level: 0-5 V
Max. Input Frequency: 50 KHz. for Input Level: 0-12 V

FREQUENCY
0 to 9,9999 Hz
10 to 99,999 Hz
100 to 999,999 Hz
1000 to 9999.9 Hz
10000 to 99999.9 Hz
0 to 50000 Hz
0.1 Hz

Totalize with Reset: Range = 0 to 999999, if reading is larger than 999999, then reading is converted to floating point number, i.e. 9.99E9 (maximum).
Max. Input Frequency: 30 KHz. for Input Level: 0-5 V
Max. Input Frequency: 50 KHz. for Input Level: 0-12 V
A-B Totalize (Reset input used as +A input): Range = -99999 to 999999, if reading is larger than 999999, then reading is converted to floating point number, i.e. -9.99E9 (minimum), 9.99E9 (maximum).
Max. Input Frequency: 30 KHz. for Input Level: 0-5 V
Max. Input Frequency: 25 KHz. for Input Level: 0-12 V
Quadrate (Reset input used as second input): Range = -99999 to 999999, if reading is larger than 999999, then reading is converted to floating point number, i.e. -9.99E9 (minimum), 9.99E9 (maximum).
Max. Input Frequency: 30 KHz. for Input Level: 0-5 V
Max. Input Frequency: 25 KHz. for Input Level: 0-12 V

\* Resolution is 1 count.

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 Impedance:
Input: 1MΩ to +EXC Reset: 100K to +5V

Input Over-Voltage Protection:
With 1K pull down: 14V With 3K pull up: 20V
Without pull up/down: 60V

Excitation:
5, 8, 2 or 12.5V at 25mA, programmable

Accuracy at 25 °C:
±0.1% of Full scale Crystal time base accuracy: ± 50 ppm

Temperature Stability:
± 50 ppm/°C typical
Time base stability: ± 1ppm/°C

Step Response for RS232 Output:
1.0 second to 99% of the final value (Filter time constant of 0, Gate time = 0.05 Sec)

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
X01<DATA><CR>

Only for reading (X01 command).
Note: When connecting a pulse signal, ensure that the input signal voltage is less than or equal to the rating.

Step response is controlled by the gate time. If gate time is increased then response time is longer.

Other modes: response time is not controlled by the gate time.

Analog Output Step Response Time:
2 seconds to 99% of the final value

Warm up to Rated Accuracy:
30 minutes

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

Analog Output Linearity:
0.1% of FS

Input Power:
10 to 32 Volt DC

Power Consumption:
3 Watts (125mA at 24V DC)

Operating Ambient:
-5 to +55 °C

Storage Temperature:
-40 to +85 °C

Relative Humidity:
90% at 40 °C
Non-condensing

Dimensions:

Introduction:
The frequency/pulse signal conditioners are high performance instruments which operates in 4 different modes. Input can be programmed to read different signal sources including low level pulse, open collector and TTL/CMOS signals. Key features are: programmable excitation and input; operates as a rate meter, totalizer with reset, A-B totalizing and Quadrate; 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 the input signal to a computer or a PLC. Additional features include three way isolation between DC power, signal input and analog output/RS232.

Set up your System

Power Connection (or power to Analog Output/Communication) 1800V Peak
Power Connection (or power to Signal Input) 1800V Peak
Power Connection (Signal Input to Analog Output/Communication) 1400V

Computer Connection (DB9 or DB25 to RJ12)

Computer Power Connection

Adapter (DB9-RJ12, #DB25-RJ12)

Test Lead and connector for signal input

SIGNAL CONDITIONER MODULE

Input Type:
Min. Low level signal input (magnetic pickups): From 0 mV to 120 mV
Open Collector NPN (Use software to set: 3 KΩ pull up to 5V): Max. current source = 1.66 mA
Open Collector PNP (Use software to set: 1KΩ pull down to RTN): Max. current sink = 12.5 mA

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

11. 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 configuration of each signal conditioner.

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

13. 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: * W014
To reset the device, type: * Z01
Cycle power to the unit.

Modbus Register Definition

<table>
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<tr>
<th>Reg.</th>
<th>Read Function</th>
<th>Write Function</th>
<th>T of byte</th>
</tr>
</thead>
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<td>1</td>
<td>Input Range</td>
<td>Input Range</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
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<td>Input/Output Conf.</td>
<td>1</td>
</tr>
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<td>Filter Time Constant</td>
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<td>Scale Support</td>
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<td>Offset Support</td>
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<td>7</td>
<td>Comm. Parameters</td>
<td>Comm. Parameters</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Comm. Bus Format</td>
<td>Comm. Bus Format</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Comm. Data Format</td>
<td>Comm. Data Format</td>
<td>1</td>
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<tr>
<td>10</td>
<td>Comm. Device Addr</td>
<td>Comm. Device Addr</td>
<td>1</td>
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<td>Comm. Recog. Char</td>
<td>Comm. Recog. Addr Add</td>
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<td>Unit of Measure</td>
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<td>Date Time</td>
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<td>Debounce Time</td>
<td>2</td>
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<td>Transmit Time</td>
<td>2</td>
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<td>Main Value</td>
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<td>Sub Value</td>
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<td>Value Address</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Value Offset</td>
<td>Value Offset</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>Not Supported</td>
<td>M.S. bytes Output Scale 2</td>
<td>2</td>
</tr>
<tr>
<td>21</td>
<td>Not Supported</td>
<td>L.S. byte Output Scale 2</td>
<td>2</td>
</tr>
<tr>
<td>22</td>
<td>Not Supported</td>
<td>L.S. byte Output OFFSET 1</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>Not Supported</td>
<td>L.S. byte Output OFFSET 2</td>
<td>1</td>
</tr>
</tbody>
</table>

Note:
1) Main, Peak, Valley value: 4 bytes will be sent from the unit.a. Highest byte always 00h.
b. 2nd highest byte: (MSB is sign) 1 (negative), 0 (positive).c. Next 3 bits are number of decimal points.d. Low nibble of second byte, and lowest 2 bytes are the value.2) Bus Format: Bit 5 1/0 = Modbus/Newport3) Output Scale/Offset Write: Due to write scale/offset being an operation 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.

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