

START HERE

iDRN-ACC

AC CURRENT 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.

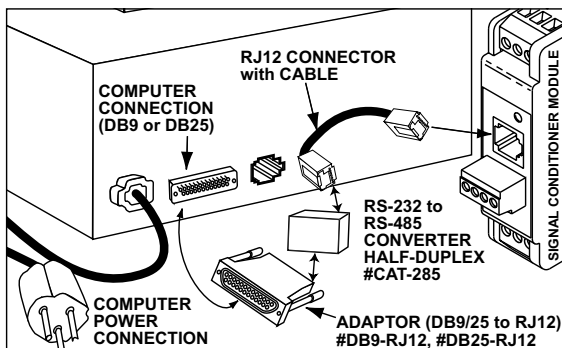
To download the latest software release (or request a free CD-ROM) please go to:

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



2

INPUT RANGES:

10 mA, 100 mA, 1 Amp, 5 Amp AC current
Dedicated input terminals for (10, 100 mA same input),
1 Amp and 5 Amp. Return terminal common to all ranges.

FREQUENCY RANGE:

30 Hz to 1KHz

INPUT IMPEDANCE:

3.3 Ohms for 10, 100 mA input
0.2 Ohms for 1 Amp input
0.04 Ohms for 5 Amp input

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:

100 dB

INPUT OVER-CURRENT 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:

± 0.2% of FS from 30 Hz to 1 KHz

TEMPERATURE STABILITY:

10, 100 mA Range 100 ppm/°C typical
1 Amp Range 150 ppm/°C typical
5 Amp Range 200 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>

3

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 V DC)

OPERATING AMBIENT:

-5 to +55 °C

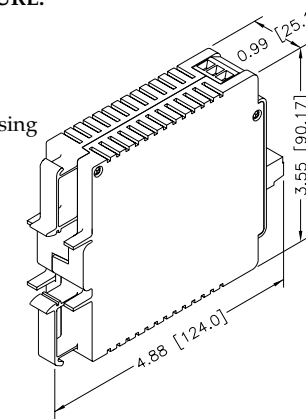
STORAGE TEMPERATURE:

-40 to +85 °C

RELATIVE HUMIDITY:

90% at 40 °C non-condensing

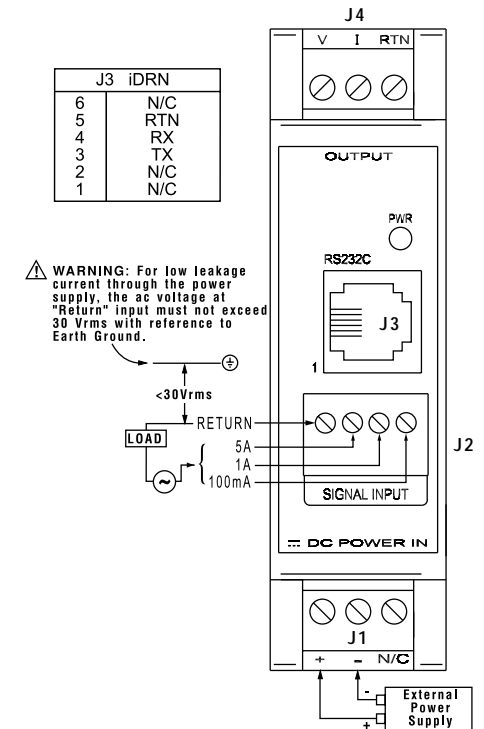
DIMENSIONS:



Introduction:

The AC current input signal conditioners are high performance instruments that measure AC currents in 4 ranges with dedicated inputs. The current ranges are 10 mA, 100 mA, 1 Amp and 5 Amps. Key features of the signal conditioners are built in internal current shunts, 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.

4



Operation:

Note: When connecting a current signal, ensure that the input signal current is less than or equal to the rating indicated on signal input label.

⚠ THERE ARE NO PROTECTIONS AGAINST OVERCURRENT AND THE UNIT WILL BE DAMAGED IF THE INPUT CURRENT EXCEEDS THE MAXIMUM RATING.

⚠ 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.

5

2. Determine the maximum current to be measured. 3. Determine the appropriate input connection. i.e. 10 mA, 100 mA have the same input, 1 Amp and 5 Amps have their own dedicated input. The return is common to all inputs.

4. Ensure that if the selected range is different from the default (5A) 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 current 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. 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.

6

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 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 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 CE 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.

TRADEMARK NOTICE:

Ω OMEGA, *omega.com* are trademarks of OMEGA Engineering, Inc.



iDRN-ACC AC Current Signal Conditioner

omega.com
Ω OMEGA®

OMEGAnet® On-Line Service www.omega.com	Internet e-mail info@omega.com
--------------------------------------------------------------------------------------	------------------------------------------------------------------------------

Servicing North America:

USA: ISO 9001 Certified	One Omega Drive, P.O. Box 4047 Stamford CT 06907-0047 TEL: (203) 359-1660 e-mail: info@omega.com	FAX: (203) 359-7700
Canada:	976 Berger Laval (Quebec) H7L 5A1 TEL: (514) 856-6928 e-mail: info@omega.ca	FAX: (514) 856-6886

For immediate technical or application assistance:

USA and Canada:	Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA® Customer Service: 1-800-622-2378 / 1-800-622-BEST® Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN®
Mexico and Latin American:	TEL: (001)800-TC-OMEGA® FAX: (001) 203-359-7807 En Español: (001) 203-359-7803 e-mail: espanol@omega.com

Servicing Europe:

Benelux:	Postbus 8034, 1180 LA Amstelveen, The Netherlands TEL: +31 20 3472121 FAX: +31 20 6434643 Toll Free in Benelux: 0800 0993344 e-mail: sales@omegashop.nl
Czech Republic:	Frvstatska 184, 733 01 Karviná TEL: +420 59 6311899 FAX: +420 59 6311114 e-mail: info@omegashop.cz
France:	11, rue Jacques Cartier, 78280 Guyancourt TEL: +33 1 61 37 29 00 FAX: +33 1 30 57 54 27 Toll Free in France: 0800 466 342 e-mail: sales@omega.fr
Germany/Austria:	Daimlerstrasse 26, D-75392 Deckenpfronn, Germany TEL: +49 7056 9398-0 FAX: +49 7056 9398-29 Toll Free in Germany: 0800 639 7678 e-mail: info@omega.de
United Kingdom: ISO 9002 Certified	One Omega Drive River Bend Technology Centre Northbank, Irlam Manchester M44 5BD United Kingdom TEL: +44 161 777 6611 FAX: +44 161 777 6622 Toll Free in England: 0800 488 488 e-mail: sales@omega.co.uk

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 12 months from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA'S WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUEST/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence. The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2004 OMEGA ENGINEERING, INC. All rights reserved.

This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of OMEGA ENGINEERING, INC.