

Specifications

Input:

- Frequency
 - Full Scale Range: 2Hz to 10,000Hz.
 - Amplitude Range: 150mVp to 150Vrms
 - Impedance: >10K ohms
 - Overvoltage: 180Vrms, max.
 - Over-range: 20KHz, max.
 - Common Mode (Input to Gnd): 1800V, max.
 - Zero Turn-Up: 99% of full scale range (9998Hz)
 - Span Turn-Down: 99% of full scale range (2Hz)

Output:

- Voltage
 - Output: 0-5V, 0-10V
 - Source Impedance: <100 ohms
 - Drive: 10mA, max. (1K ohms, min. @ 10V)
- Current
 - Output: 0-1mA, 0-20mA, 4-20mA
 - Source Impedance: >100K ohms
- Compliance:
 - 0-1mA; 7.5V, max. (7.5K ohms, max.)
 - 0-20mA; 12V, max. (600 ohms, max.)
 - 4-20mA; 12V, max. (600 ohms, max.)

Accuracy (Including Linearity & Hysteresis):

±0.1% of selected range at 25°C

Stability:

±0.025%/°C maximum of selected range.

Excitation Voltage:

8VDC, for open collector and contact closure inputs. 5mA short circuit current max.

Response Time (10 to 90%):

500mSec., or 100 times the period of the full scale frequency.

Common Mode Rejection:

DC: 100dB
>60Hz: 80dB

Isolation:

1800VDC between input, output and power.

ESD Susceptibility:

Capable of meeting IEC 801-2 level 3(8KV)

LED Indication (green):

LVL (green):
Lit when power is on
Input < 107% then 8Hz flash
Input > -7% then 4Hz flash

IN (yellow):

Input range programming status

OUT (red):

Output range programming status

Humidity (Non-Condensing):

Operating: 15 to 95% @ 45°C
Soak: 90% for 24 hours @ 65°C

Temperature Range:

Operating: 0 to 55°C (5 to 131°F)
Storage: -25 to 70°C (-13 to 158°F)

Power:

2.5W max., 100 to 240VAC ±10%, 50 to 400Hz

Weight:

0.50 lbs

Wire Terminations:

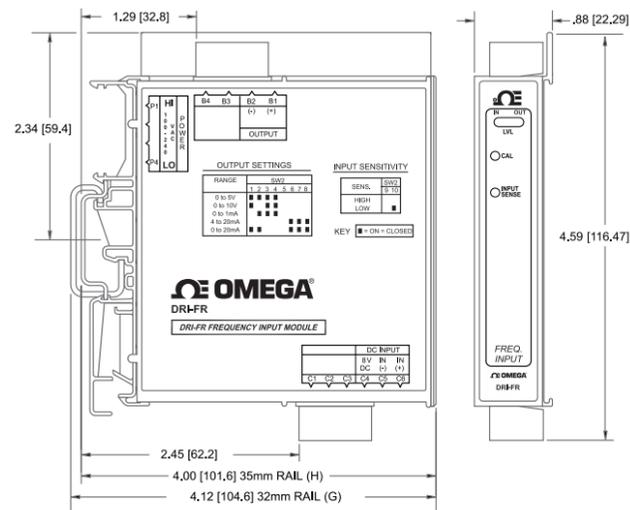
Screw terminals for 12-22 AWG

Agency Approvals:

UL recognized per standard UL508 (File No E99775).

Terminal	Connection	Terminal	Connection
B1	DC Output (+)	C4	Excitation Source (8VDC)
B2	DC Output (-)	C5	Frequency Input (-)
B3	Not Used	C6	Frequency Input (+)
B4	Not Used	P1	AC Power (Hot)
C1	Not Used	P2	Not Used
C2	Not Used	P3	Not Used
C3	Not Used	P4	AC Power (Neutral)

Dimensions



omega.com info@omega.com

Servicing North America:

U.S.A.:
Omega Engineering, Inc., One Omega Drive,
P.O. Box 4047, Stamford, CT 06907-0047 USA
Toll-Free: 1-800-826-6342 (USA & Canada only)
Customer Service: 1-800-622-2378
(USA & Canada only)
Engineering Service: 1-800-872-9436
(USA & Canada only)
Tel: (203) 359-1660
Fax: (203) 359-7700
e-mail: info@omega.com

For Other Locations Visit omega.com/worldwide

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

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC., warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's 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 malfunctions, 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 having been 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 in which wear is not warranted, include but are 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 the company 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 REQUESTS/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. Purchase order number 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 RETURNS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA.
1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the 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 customers the latest technology and engineering. OMEGA is a registered trademark of OMEGA ENGINEERING, INC.
© COPYRIGHT 2015 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, translated, or reduced to any electronic medium-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.



DRI-FR AC Powered Frequency Input DIN Rail Signal Conditioner

INSTRUCTION
SHEET

M5474/0715

Shop online at omega.com e-mail: info@omega.com
For latest product manuals: www.omegamannual.info



Provides an Isolated DC Output in Proportion to Input Frequency

- Eliminates Ground Loops
- Field Configurable Input Ranges 2Hz to 10,000Hz
- Field Configurable Output Ranges
- 150mV to 150V Input Amplitude
- Touch Calibration Technology
- DIN Rail Mounting with IQRL
- Universal AC Power 85 to 265 VAC
- Plug-in Terminals

Description

The DRI-FR is a DIN rail mount, frequency input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offers flexible, wide ranging capability for variable frequency drives, magnetic pickups, turbine flowmeters, and other pulse or frequency output transducers.

The input of the DRI-FR can be configured for any frequency span from 2Hz to 10,000Hz. The input amplitude threshold sensitivity can be adjusted from 150mVp to 10Vp to ensure accurate frequency measurement and minimize transient noise related errors. The maximum input amplitude is 150 Vrms. The output can be set for either 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA.

The DRI-FR can be field configured for virtually any frequency input to DC signal output within the ranges specified. There is also an 8VDC excitation source common to the input. This can be used as a signal source for relay contacts or as an excitation source for open collector type proximity sensors. The DRI-FR is AC powered and will accept any power between 85 and 265VAC.

Touch Calibration Technology

The DRI-FR utilizes Touch Calibration Technology to greatly simplify configuration. The high and low input ranges are stored in non-volatile memory and correspond to the high and low output range which is selected via DIP switches.

Diagnostic LEDs

The DRI-FR utilizes three diagnostic LEDs. The green (RUN) LED indicates DC power and input signal status. Active line power is indicated by an illuminated LED. If the input signal is 7% or more high, the LED will flash at 8Hz. If the input signal is 7% or more low, the LED will flash at 4Hz.

The yellow (IN) LED is lit when calibrating the input. The red (OUT) LED is lit when calibrating the output.

Application

The DRI-FR field configurable, frequency input signal conditioner is useful in eliminating ground loops and interfacing pulse output

transducers, such as turbine flow meters and magnetic pickups, to data acquisition and control systems.

Advanced digital technology, combined with ASIC technology, provides a stable output at low frequencies for higher accuracy, and 3-way isolation which completely eliminates ground loops from any source.

Configuration

Any 2Hz range from 0 to 10,000Hz can be converted to a full scale output signal (e.g. 0-2Hz/4-20mA or 9998-10,000Hz/4-20mA).

Unless otherwise specified, the factory presets the Model DRI-FR as follows:

Input Range: 0 to 1000Hz
Sensitivity: 1V RMS
Output Range: 4 to 20mA

Note that "Sensitivity" refers to the noise rejection level (the trigger threshold of the input).

For other I/O ranges, refer to the tables below.

WARNING: Do not change switch settings with power applied. Severe damage will result!

1. With power off, snap off the faceplate by lifting the right edge away from the heatsink. Then slide the heatsink forward and off the module. The output switch block (SW2) is located under the heatsink. Choose the desired output voltage/current range from Table 1 and set positions 1-8 of SW2.

2. Set the input sensitivity switch (SW2, 9 & 10) to LO for input amplitudes between 150mVp and 50Vrms, with noise rejection to 1Vp; or to HI for input amplitudes between 500mVp and 150Vrms, with noise rejection up to 10Vp.

3. Return the heatsink to its original position and attach the faceplate before beginning calibration.

Calibration

For best results, calibration should be performed in the operating installation, allowing at least one hour for thermal stability of the system. If pre-calibration on a test bench is preferred, then an output load equal to the input impedance of the device connected to the DRI-FR output is recommended, along with a 20 minute warm up period.

Note: An ACPB rail is required to power the modules. See Ordering Information.

1. Install the module on a piece of DIN rail and the I/Q Rail mounting combination. See the ACPB rail data sheet for details.

2. Connect the input to a calibrated frequency source and the output to a voltage or current meter. Apply power and allow the system to reach thermal equilibrium (approx 20 minutes).

3. Adjust the input frequency to the desired maximum and observe that the output has increased and is sensing the input. If the output fails to increase, turn the sensitivity potentiometer in a counterclockwise direction until the output begins to change proportionally to the input.

Note: The level LED may not appear to be on if the new range is less than 10% of the previously calibrated range.

4. With the green LED on press the CAL button for 5 seconds to enter the calibration mode. The yellow and green LEDs will now be on.

5. Input the maximum desired frequency and press the CAL button to store. The yellow LED will now be the only LED on.

6. Input the minimum desired frequency and press the CAL button to store. The green and red LEDs will now be on.

Note: The most reliable way to input 0Hz is to short circuit the input pins (C5 & C6).

7. To precisely adjust the maximum output, adjust the input frequency until the output reads within $\pm 0.1\%$ of the maximum selected output range. This typically occurs near 90% of the HI input frequency. Press the CAL button to store the value. The red LED will now be on.

8. To precisely adjust the minimum output, lower the input frequency until the output reads within $\pm 0.1\%$ of the minimum selected output. This typically occurs near 10% of the HI input frequency. Press the CAL button to store the value. The yellow and Red LEDs will be on. The green LED should be dim.

9. Press the CAL button once again to exit the calibration mode. The green LED will now be on.

10. Check the minimum and maximum input-to-output calibration. Repeat steps 1 to 8 if calibration is not within desired specifications.

Note 1: To reset the unit while in the calibration mode, push the CAL button and hold for 5 seconds.

Note 2: Removing power to the unit at anytime before Step 8 will restore previous settings and calibration.

Optimal Sensitivity

If the amplitudes of the input frequency are within the sensitivity parameters (i.e. 150mVp - 1Vp for LO and 0.5Vp - 10Vp for HI), then the sensitivity parameters can be set for optimum noise rejection.

1. Set the input near midrange (50% input) or to a frequency that exhibits the minimum pulse amplitude.

2. Turn the sensitivity pot (SENS) clockwise (CW) until the output drops to minimum.

3. Turn the sensitivity pot counter-clockwise (CCW) a turn or two until the output returns to the previous level.

4. Run the input through the entire frequency range to make sure that the pulses are sensed at both the low and high input frequencies. If the output drops out during this test, turn the sensitivity pot counterclockwise another turn or two until the output picks up. Repeat to validate sensitivity settings.

Table 1: Output Range Settings

Ranges	Selector SW2							
	1	2	3	4	5	6	7	8
0 to 5V	■	■	■	■				
0 to 10V	■		■	■				
0 to 1mA		■	■	■				
4 to 20mA						■	■	■
0 to 20 mA	■	■			■		■	■

Key: ■ = 1 = ON or Closed

Table 2: Input Sensitivity Settings

Sensitivity	SW2	
	9	10
High (0.5 to 10Vp; 150Vrms maximum)		
Low (150mVp to 1Vp; 50Vrms maximum)		■

Key: ■ = 1 = On or Closed

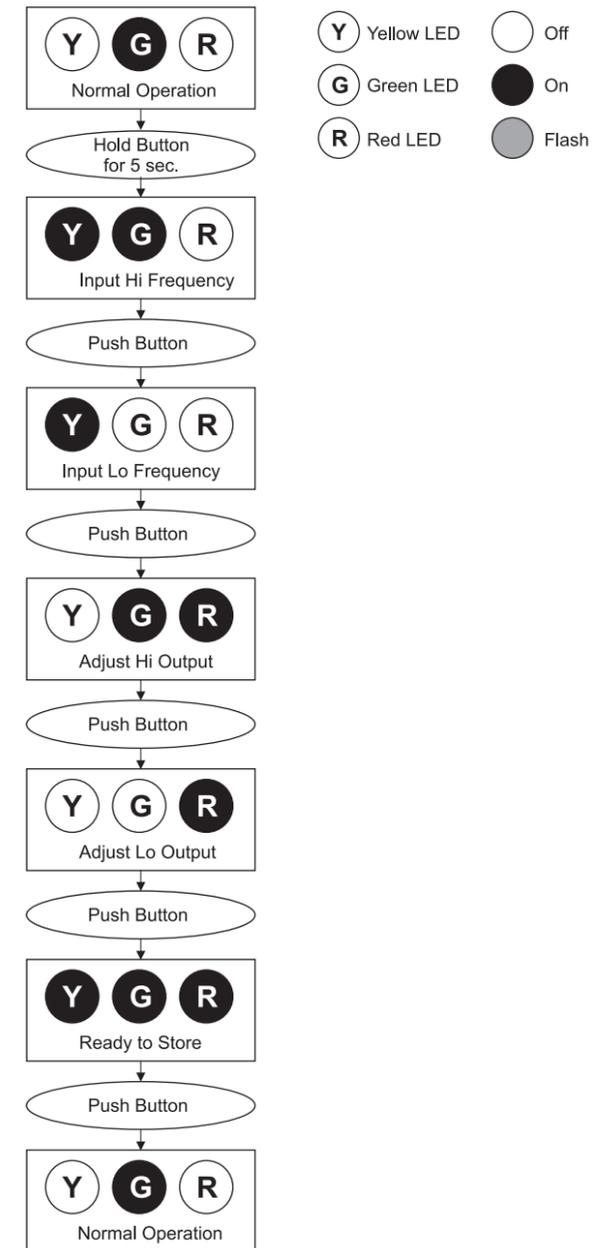


Figure 1: DRI-FR Calibration Flow Chart