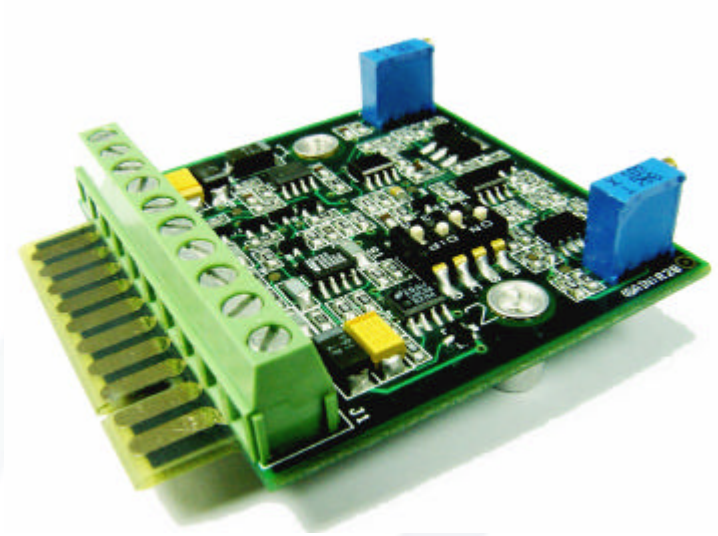
LIM-420

LVDT Signal Conditioning Module



Specifications • Operating Instructions • Installation

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Warranty

Schaevitz instruments are warranted during a period of one year from date of shipment to original purchaser to be free from defects in material and workmanship. The liability of Seller under this warranty is limited to replacing or repairing any instrument or component thereof which is returned by Buyer, at his expense, during such period and which has not been subjected to misuse, neglect, improper installation, repair, alteration, or accident. Seller shall have the right to final determination as to the existence and cause of a defect. In no event shall Seller be liable for collateral or consequential damages. This warrant is in lieu of any other warranty, expressed, implied, or statutory; and no agreement extending or modifying it will be binding upon Seller unless in writing and signed by a duly authorized officer.

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Every Schaevitz instrument is carefully inspected and is in perfect working order at the time of shipment. Each instrument should be checked as soon as received. If the unit is damaged in any way, or fails to operate, a claim should immediately be filed with the transportation company.

Service Concerns

If a Schaevitz instrument requires service, first contact the nearest Schaevitz Representative. He may be able to solve the problem without returning the unit to the factory. If it is determined that factory service is required, call the Repair Department for an RMA number before return.

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All units being returned to the factory require an RMA (Return Material Authorization) number before they will be accepted. This number may be obtained by calling the Repair Department at 1-800-745-8008 with the following information: model number, quantity, serial number, and symptoms of the problem, if being returned for service. You must include the original P.O. number or Schaevitz sales number if under warranty.

Inquiries

Address all inquiries on operation or applications to your nearest Sales Representative, or to Sales Manager, Schaevitz Sensors, 1000 Lucas Way, Hampton, VA 23666, USA.

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TABLE OF CONTENTS

SETUP INSTRUCTIONS

LIM-420 LVDT CURRENT MODULE

The LIM-420 Module is a DC-powered LVDT and RVDT signal conditioner board consisting of an oscillator, AC amplifier, demodulator, filter, DC amplifier and Voltage-Current conversion. Excitation is 3.5Vrms at 2.5KHz. There are six DIP switch-selectable gain ranges to match the full scale output of the LVDT or RVDT with 100mV RMS to 5.6V RMS and provide a 4-20mA analog output to the readout device or PLC analog input module. A board mounted gain control pot with a 2.5 to 1 ratio is provided.
The board mounted zero control pot provides ±2.5mA (±15%) adjustable shift to the Null which is 12mA.
The LIM-420 module is designed for either plug-in connection ,to a 10 position PC card edge connector, or hard wiring to a 10 point screw terminal barrier strip. It may be rack mounted with card edge guides ,or stacked by permanently attached threaded standoffs.

LIM-420 SPECIFICATIONS

Transducer excitation
Voltage…….…… 3.5±10% V rms
(up to 20mA, minimum sensor input impedance must be equal to or greater than 175Ω)
Frequency…….. 2.5KHz
Output…… 4-20mA
Maximum Loop Resistance…….. 500Ω(with +24VDC loop supply)
Output Noise & Ripple…….25μA rms (max)
Required Signal for 4-20mA Output
Minimum…….0.1 Vrms
Maximum…….. 5.6 Vrms
Sensitivity Adjustable
Fixed Ranges……6 selected by switch
Screwdriver adjustable……..2.5-1(20 turn trimmer)
Zero Adjustable ……±2.5mA(20 turn trimmer)
Non-linearity……0.05%
Frequency Response(-3dB)….. …….50Hz(nominal)
Temperature Coefficient……..<0.01% FSO/°F
…….(<0.02% FSO/°C)

Operating Temperature Range
……..-13F° to 185°F(-25°C to +85°C)
potentiometer with a 2.5 to 1 ratio
Input Power Requirements ……24VDC (18-30V) 50mA
Stability……<0.05% of FSO after 30 minute warm-up

LIM-420 CONNECTIONS

Power Connections		**Output Connections**	
+V (18~24V DC)	Pin 5	i-out(+)	Pin 1
-V (GND)	Pin 4	i-out(-)	Pin 10

LVDT Connections			**LIM420**
Color coded Leads		**Connector pins**	**Connections**
Pri 1	Brn or Yel/Red	F	Pin 2
Pri 2	Yel or Yel/Blk	E	Pin 3
Sec 1	Red	A	Pin 6
Sec 2	Blk	D	Pin 8
C/T	Blu & Grn	B&C	Pin 7

LVDT GAIN SELECTION

Switch S1 controls the first stage and second stage Amplifier gain.

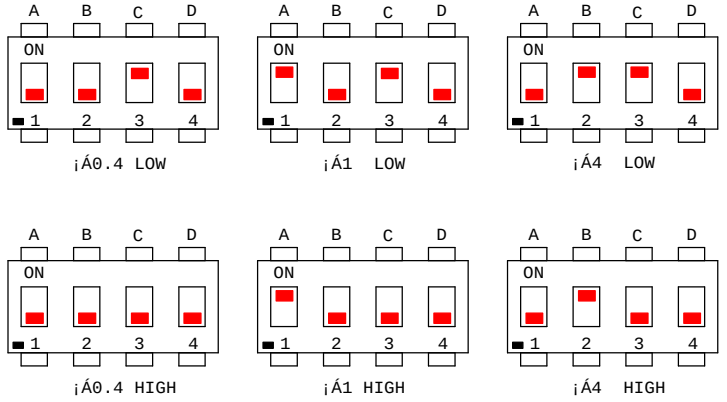
×0.4 GAIN, switch S1-A OFF, S1-B OFF

×1 GAIN, switch S1-A ON, S1-B OFF.

×4 GAIN, switch S1-A OFF, S1-B ON.

To select the LOW Gain, switch S1-C ON.

To select the HIGH Gain, switch S1-C OFF.



LIM-420 Gain Selection Table

1ST STAGE			**2ND STAGE**		**SENSITIVITY RANGE FOR 4-20mA OUTPUT CHANGE**
	SWITCHES			**SWITCH**	
GAIN	**S1-A**	**S1-B**	**GAIN**	**S1-C**	**(VRMS INPUT)**
×0.4	OFF	OFF	LOW	ON	2.10 TO 5.55
×0.4	OFF	OFF	HIGH	OFF	1.00 TO 2.64
×1.0	ON	OFF	LOW	ON	0.84 TO 2.22
×1.0	ON	OFF	HIGH	OFF	0.40 TO 1.00
×4.0	OFF	ON	LOW	ON	0.21 TO 0.55
×4.0	OFF	ON	HIGH	OFF	0.10 TO 0.26

NOTE: S1-D is not used
This table assumes you want to calibrate the LIM-420 for a 4-20mA, full scale output.

LVDT Sensor Setting Amplifier Gain:

You will need to calculate the LVDT full scale output, using the simple formula below.

LVDT/RVDT sensitivity *(in **mV** / V / .001")*
Times
The LVDT excitation voltage, (***3.5** V rms*. for the LIM-420)
Times
The full scale displacement of the LVDT in .001"
(i.e. a 1000 HR full scale is ± **1,000** thousandths of an inch).

Example 1,
The calculation for a 1000-HR, with a sensitivity of 0.39mV/V/.001", would be done as follows: **0.39**(mV) x **3.5**(V rms) x **1,000**(thousandths) = 1,365 mV full scale output, or 1.365 Volts at ± 1 inch.

Using the gain table on page 5, select the gain setting that appears to the left of the V rms range your full scale output falls into. In our example, you would select gain x 0.4, HIGH, or x 1, LOW, either will work, due to range overlap.

Example 2,
The calculation for a 050-HCA, with a sensitivity of 4.2mV/V/.001", would be done as follows: **4.2**(mV) x **3.5**(V rms) x **50**(thousandths) = 735mV full scale output, or 735 mVolts at ± 0.05 inch.

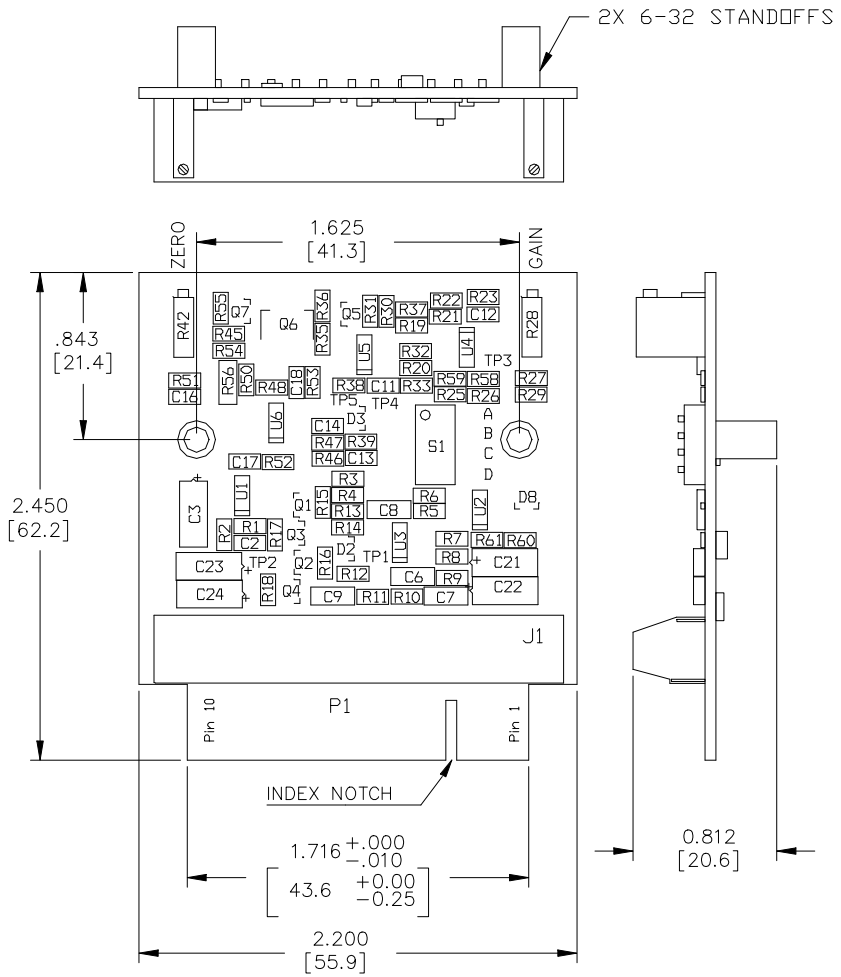
Using the gain table on page 5, select the gain setting that appears to the left of the V rms range your full scale output falls into. In our example, you would select gain x 1, HIGH.

Example 3,
The calculation for a R36AS-±30° RVDT, with a sensitivity of 2.2mV/V/° would be done as follows: **2.2**(mV) x **3.5**(V rms) x **30**(thousandths) = 231mV full scale output, or 231 mVolts at ±30°.

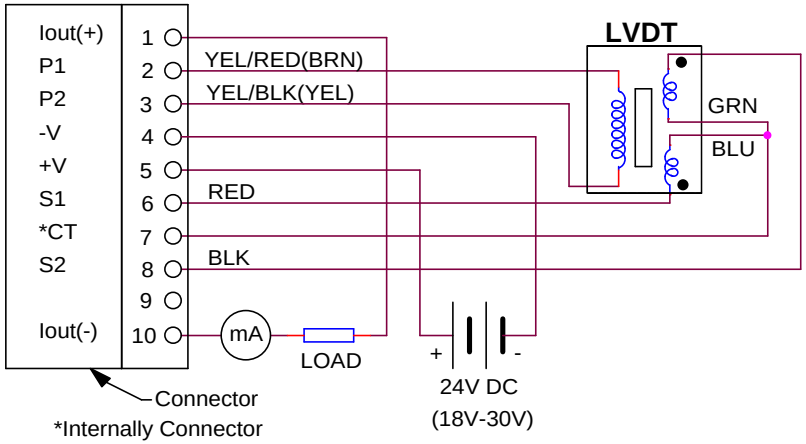
Using the gain table on page 5, select the gain setting that appears to the left of the V rms range your full scale output falls into. In our example, you would select gain x 4, HIGH, or x 4, LOW, either will work, due to range overlap.

Dimensions & Mating Connector Diagrams

DIMENSIONS(mm)



MATING CONNECTOR(OPTIONAL)



CALIBRATION

Turn unit on, allow 15 minute warm-up. Set gain to the correct position for the LVDT being used. Connect LVDT to the LIM-420 except for the Secondary 2 lead (Black lead). Place a temporary jumper to short Pin 6 and Pin 8. Turn the **Zero Control Pot** to obtain an output of 12mA. Remove the temporary jumper and connect the black lead to Pin 8. Adjust the LVDT core to get as close to 12mA current output as possible. This is the Null position of the transducer from which the plus and minus displacements are measured. **NOTE:** If this adjustment is mechanically difficult, approximate the correct position as closely as possible and then turn the **Zero Control Pot** to obtain a 12mA current output. However, the mechanical zero of the core must be within at least 5% of the rated full scale stroke of the LVDT. Displace the core from the Null position to exactly plus full scale displacement. Turn the **Span control** until the output reads the desired full scale current output, usually 20mA. If the required full scale reading can not be obtained by adjusting the **Span Control Pot**, change the gain to the next lower or higher level by changing the switch S1.

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