TEXMATE INC

Fits the Leopard Family
FREQ./RPM INPUT MODULE WITH 24 V EXC.

Low-pass Filter Header.
20 kHz, 2 kHz, 200 Hz.

Switching Comparator.
Prevents false triggering.

Input Connector.
Freq. Input.
24 V Excitation.

Sensor Header.
Mag, Namur, Source, Sink.

De-coupling Header.
20 mHz high pass filter.

Interface to
Leopard Meter.

Signal Type Header.
AC, mV or digital logic.
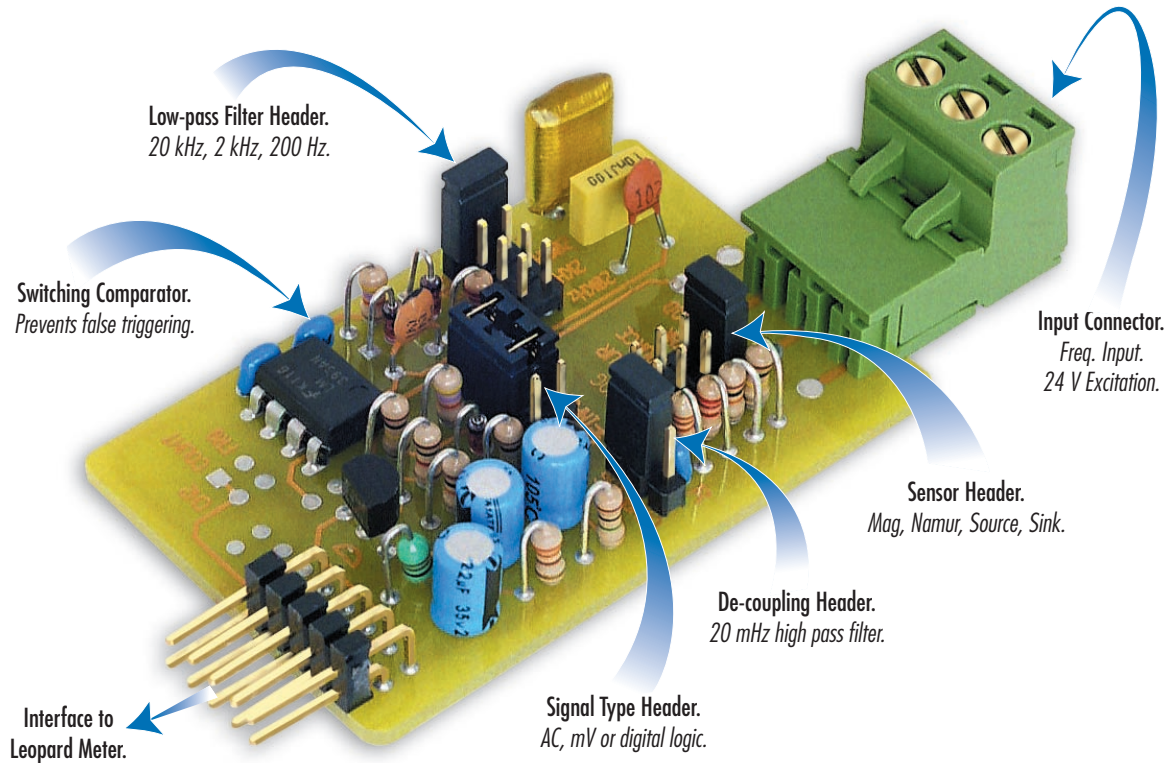
Your first choice frequency/rpm input module.

Should your transducer be a magnetic pick-up outputting small AC volts or an open-collector transistor switching voltage levels, the IF05 is easily connected with a selection of configuration headers. These headers provide a variety of options to interface to time varying or change-of-state signals.
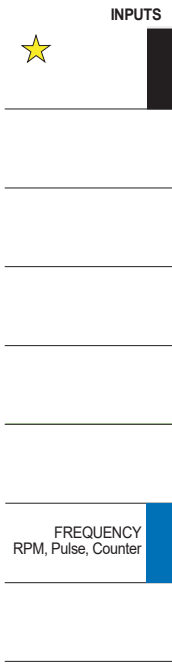
Input Module Order Code Suffix

IF05

BL-40F
BL-40RPM
DL-40F
DL-40RPM

Hardware Module Specifications	
Signal Input	0-24 V DC, 0-30 V AC.
Low-pass Filter Header	Off, 200 Hz, 2 kHz, 20 kHz cut off frequency.
De-coupling Header	DC component removed by 0.02 Hz high-pass filter.
Sensor Header	Optional sink / source for digital transistor or switch interface; specific Namur 2-wire proximity detector option; magnetic pick-up (AC) choice.
Signal Type Header	Choice of DC (logic) or AC signal type.
Frequency Response	Set by Leopard meter configuration software. Display to 9999 counts.
Excitation Voltage	24 V DC (50 mA maximum) to power external transducers.
Maximum Input Frequency	20 kHz.

INPUTS

FREQUENCY
RPM, Pulse, Counter

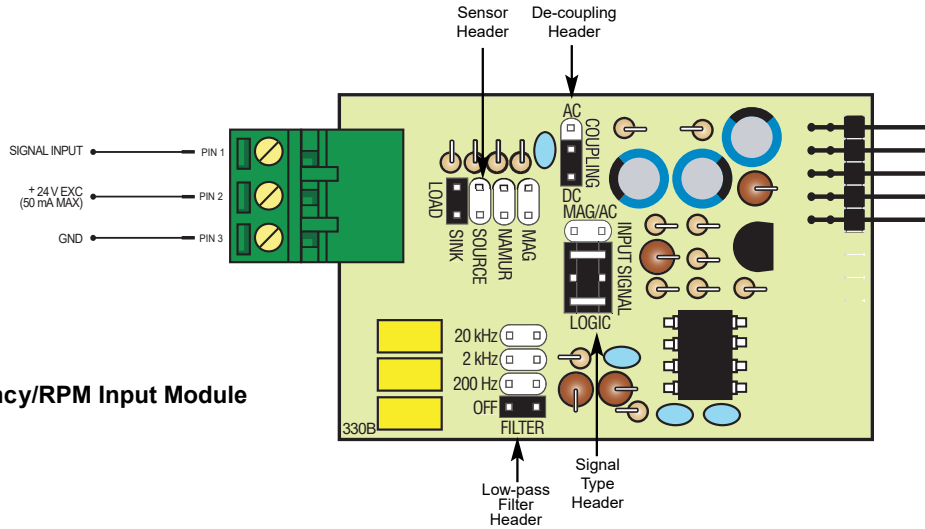# Connector Pinouts & Module Layout

Figure 1 – IF05 Frequency/RPM Input Module

Detailed Description

The IF05 is a frequency/RPM input module designed specifically for BL-40F, BL-40RPM, DL-40F, and DL-40RPM meters in the Leopard family range. The IF05 input module receives and conditions a frequency input via pin 1 and supplies the input to the meter for further processing. Selectable on-board headers provide configuration settings allowing different sensor types to be selected along with high and low-pass filtering.
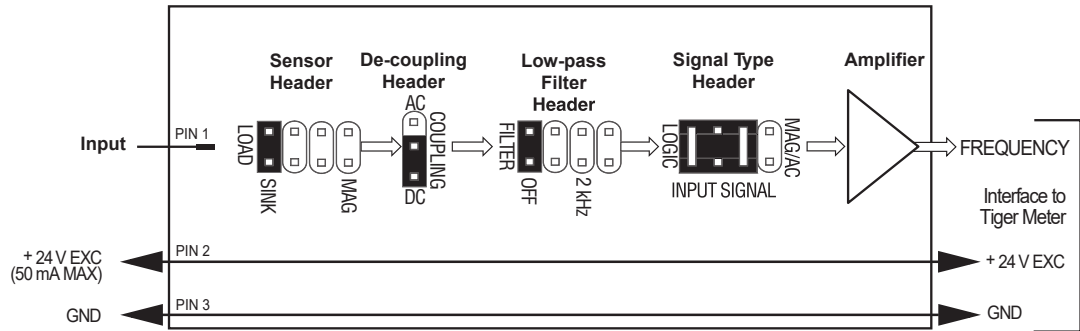

Figure 2 – IF05 Frequency/RPM Input Module Signal Flow Diagram

Interface Configuration Examples

The following example diagrams show the various header settings and input connections required for a range of input sensor types.

Example 1 – NPN Open-collector Output with Proximity Switch

Figure 3 shows a 3-wire proximity switch taking +24 V excitation from the meter with an NPN open-collector signal output connected to the input module as frequency with no filtering.

The input header is set to SINK connecting the signal output to +24 V via an on-board 10 k pull-up resistor. As the proximity switch is activated, the signal is forced to ground.

Header Note:
- *Sensor Header set to SINK.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to LOGIC.*
- *De-coupling Header set to DC.*

Header Note:
- *If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.*

Figure 3 – 3-wire Proximity Switch with NPN Open-collector Output

When sensor activated, PIN 1 is at 0 V
When sensor not activated, PIN 1 is at 24 V
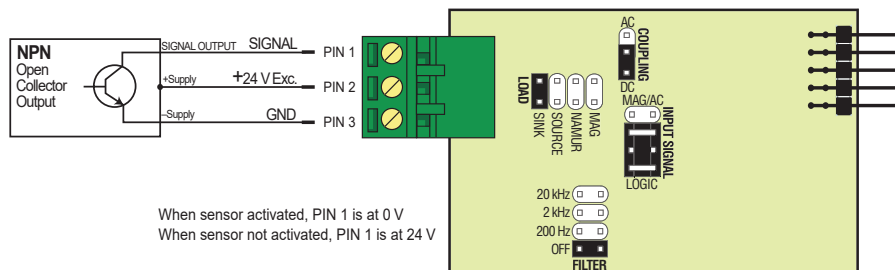
Example 2 – PNP Open-collector Output with Proximity Switch

Figure 4 shows a 3-wire proximity switch taking +24 V excitation from the meter with a PNP open-collector signal output connected to the input module as frequency with no low-pass filtering.

The input header is set to SOURCE connecting the input signal to a 10 k pull-down resistor to ground. When the proximity switch is activated, the input signal switches from 0 V to +24 V.
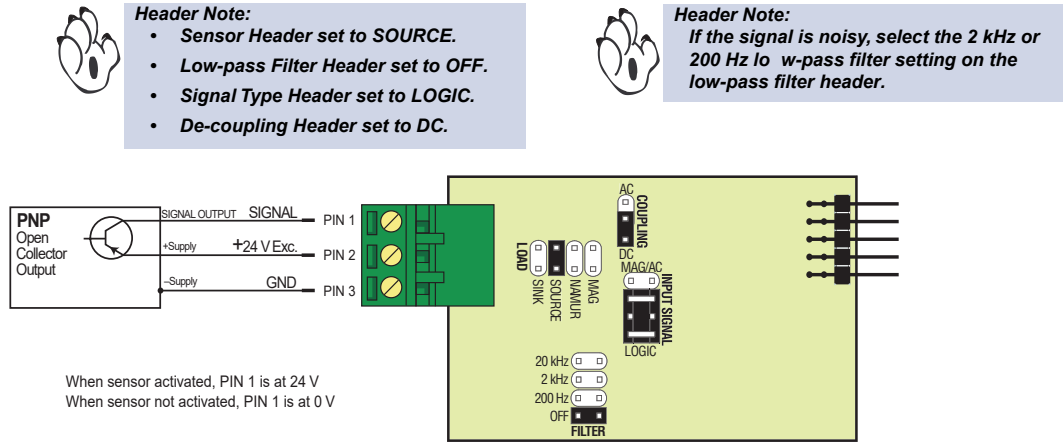
Header Note:
- *Sensor Header set to SOURCE.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to LOGIC.*
- *De-coupling Header set to DC.*

Header Note:
If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.

When sensor activated, PIN 1 is at 24 V
When sensor not activated, PIN 1 is at 0 V

Figure 4 – 3-wire Proximity Switch with PNP Open-collector Output

Example 3 – Hall Effect / Magnetic Pickup – mV Input

Figure 5 shows a magnetic pickup. With small AC signals a shielded cable should be used to avoid stray pickup.
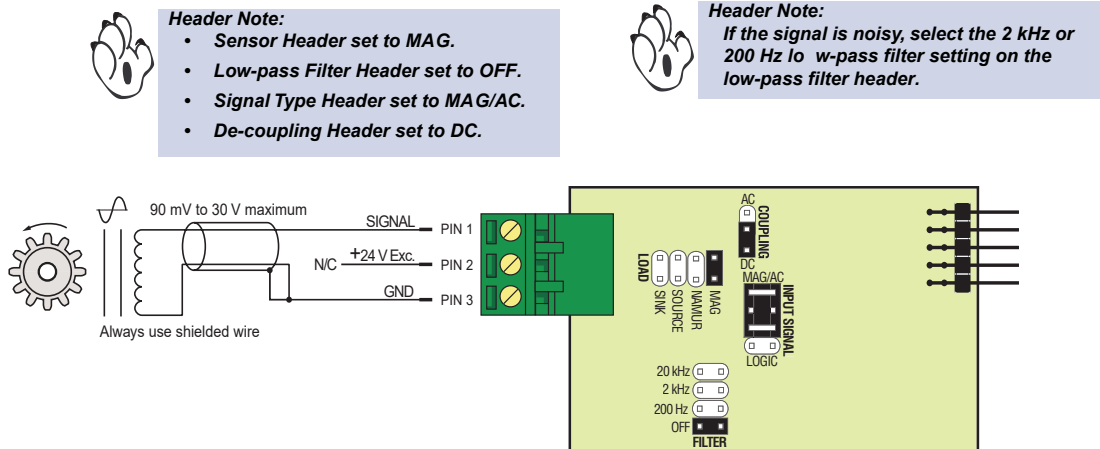
Header Note:
- *Sensor Header set to MAG.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to MAG/AC.*
- *De-coupling Header set to DC.*

Header Note:
If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.

90 mV to 30 V maximum

Always use shielded wire

Figure 5 – Hall Effect / Magnetic Pickup – mV Input

Example 4 – TTL Input

Figure 6 shows a TTL input. The TTL input requires the sensor header to be placed in the SINK position. In this example the TTL logic has a separate +5 V supply.
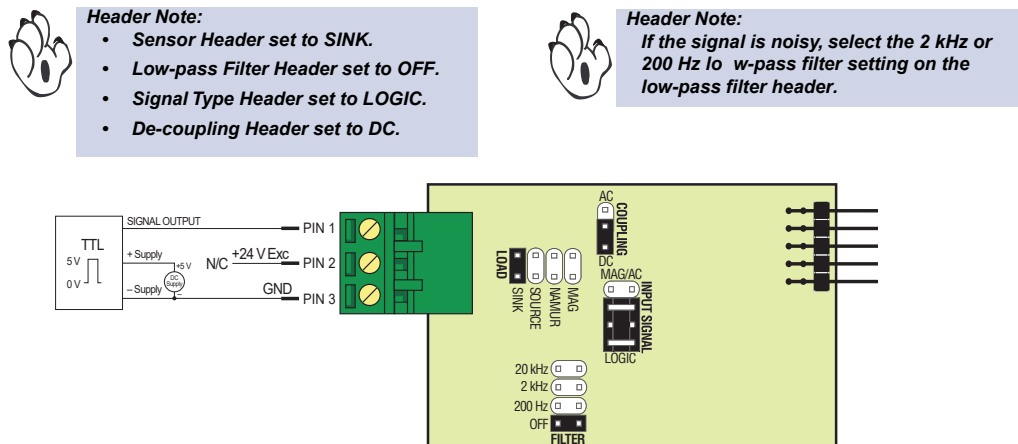
Header Note:
- *Sensor Header set to SINK.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to LOGIC.*
- *De-coupling Header set to DC.*

Header Note:
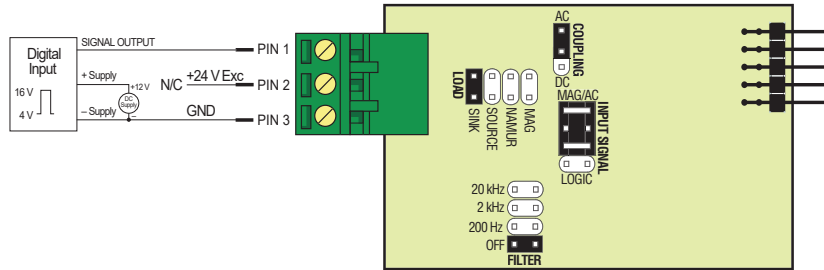*If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.*

Figure 6 – TTL Input

Example 5 – Digital Input with DC Voltage Offset

Figure 7 shows a digital input with voltage offset. In this situation the DC component of the signal is removed by selecting the AC option on the decoupling header. The digital input has its own supply voltage.

Header Note:
- *Sensor Header set to SINK.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to MAG/AC.*
- *De-coupling Header set to AC.*

Header Note:
If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.

Figure 7 – Digital Input with DC Component

Example 6 – Pushbutton Switch

Figure 8 shows a pushbutton switch. The low-pass filter header is set to 200 Hz to debounce mechanical contacts . The sensor header is set to SINK to pull-up the input signal to +24 V until it is switched to ground when the pushbutton is pressed.

Header Note:
- *Sensor Header set to SINK.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to LOGIC.*
- *De-coupling Header set to DC.*

Header Note:
If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.

When switch is open PIN1 is at 24 V
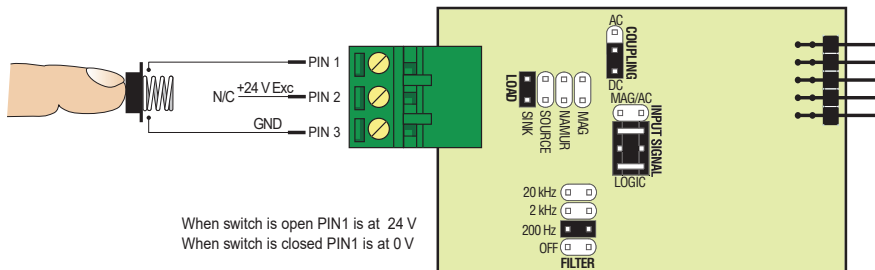When switch is closed PIN1 is at 0 V

Figure 8 – Pushbutton Switch

Example 7 – NAMUR Sensor

Figure 9 shows a NAMUR 2-wire proximity detector. Set the sensor header to NAMUR to ensure the detector has the correct output load (2 k Ω pull-down resistor) and to protect the sensor at +24 V excitation voltage. The current output of these detectors vary in response to the proximity of the target metal.

Header Note:
- *Sensor Header set to NAMUR.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to LOGIC.*
- *De-coupling Header set to DC.*

Header Note:
If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.

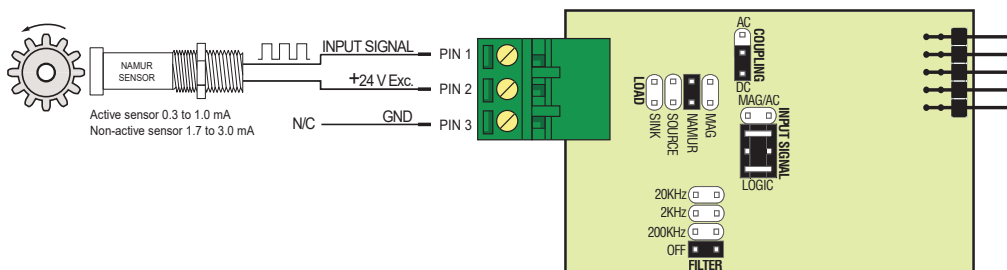Active sensor 0.3 to 1.0 mA
Non-active sensor 1.7 to 3.0 mA

Figure 9 – NAMUR Sensor

Example 8 – Tacho-generator Sensor

Figure 10 shows a tacho-generator. Set the sensor header to SOURCE to ensure the detector has the correct output load (2 k Ω pull-down resistor) and to protect the sensor at +24 V excitation voltage.
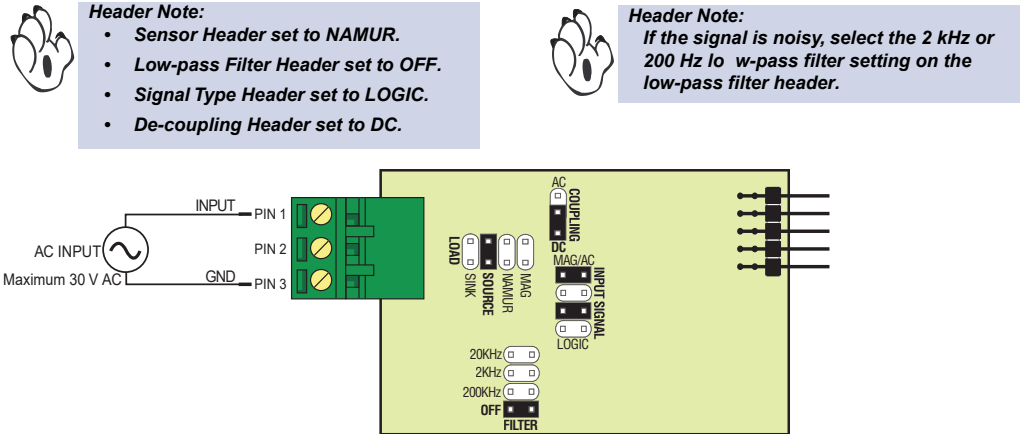
Header Note:
- *Sensor Header set to NAMUR.*
- *Low-pass Filter Header set to OFF.*
- *Signal Type Header set to LOGIC.*
- *De-coupling Header set to DC.*

Header Note:
If the signal is noisy, select the 2 kHz or 200 Hz low-pass filter setting on the low-pass filter header.

Figure 10 – Tacho-generator Sensor

Setting Up IF05 for BL-40F and DL-40F Frequency Meters

To set up the IF05 input module for **frequency** input in a Leopard BL-40F or DL-40F frequency meter, carry out the following procedures:

Step 1 Establish the scale factor for the desired display reading

$$\frac{\text{Maximum Display Range}}{\text{Input Frequency}} \quad \text{x} \quad \text{Required Display Reading} \quad = \quad \text{Scale Factor}$$

Step 2 Set the new scale factor

Step 3 Select the range for the desired display reading

Step 4 Select the decimal point position

Frequency Meter Calibrated

Step 1 – Establish the Scale Factor

Establish the scale factor for the desired display reading. The default scale factor is 9999. If you want the scale factor to be anything other than the input frequency or multiples of 10 of the input frequency, then a new scale factor must be established and set.

For example:

If we had an input frequency of 4 Hz and required a display reading of 400 counts, then the scale factor would not change from 9999.

But, if we had an input frequency of 4 Hz and required a display reading of 120 counts, then the scale factor would be 2999. To establish a new scale factor, carry out the following calculation:

$$\frac{\substack{\text{Maximum Display Range} \\ \text{(Default Scale Factor)}}}{\text{Input Frequency}} \quad \text{x} \quad \text{Required Display Reading} \quad = \quad \text{Scale Factor}$$

Example: $\quad \dfrac{9999}{4} \text{ x } 120 \text{ } = \text{ } \mathbf{2999}$

Step 2 – Set the New Scale Factor

If the scale factor has to change, enter the meter calibration mode and set the new scale factor. See Figure 11 – Calibration Logic Diagram.

Step 3 – Select the Range for the Desired Display Reading

The range multiplier and the decimal point position settings allow you to set the the display resolution to suit the desired display reading. The range multiplier allows you to display the reading using either a x1, x10, or x100 range setting. For example, if you had a 4 Hz frequency input and wanted it to display as 400, you would choose the x100 range multiplier.

But, what if you had a 4 Hz input and wanted it to display as 120. First you would need to establish and set the new scale factor. Then you apply the same prinaiple as you would for 4 Hz to display 400 counts. 4 Hz is a single digit number and you require it to be displayed as 120 counts. 120 counts is a 3-digit number, so you effectively apply the x100 range multiplier, but because of the new scale factor, instead of displaying as 400 it is displayed as 120.

Table 1 shows how to use the range multiplier for a range of frequency inputs where the scale factor has not been changed. If the scale factor is changed, the number of digits shown depends on the range multiplier chosen.

Note, the decimal point shown on the display at this point is not the setting for the decimal point, but merely a means of displaying the range multiplier setting.

Table 1 – Range Multiplier Settings

Input	Multiplier	Display As	Meter Range Setting
4 Hz	x1	4	9999
	x10	40	999.9
	x100	400	99.99
50 Hz	x1	50	9999
	x10	500	999.9
	x100	5000	99.99
600 Hz	x1	600	9999
	x10	6000	999.9
	x100	*60000	99.99

With the scale factor changed to display 120 counts for 4 Hz input, the displayed reading depends on the range multiplier selected.

Input	Multiplier	Display As	Meter Range Setting
4 Hz	x1	1	9999
	x10	12	999.9
	x100	120	99.99

*Note:
The Leopard BL-40F/BL-40RPM and DL-40F/DL-40RPM range has a 4-digit display, therefore, a x100 multiplier cannot be used on a 3-digit reading as this goes overrange.

Operational Display

9999

P ⬆ CAL
oFF ⬆⬇

on

P SCLE
9999 ⬆⬇

2999 **Example**

P oFFS
0 ⬆⬇

P rG
9999 ⬆⬇ [9999]
[99.99]
[999.9]
See Table 1 for details

P .dP ⬆⬇ [x.xxx]
[xx.xx]
[xxx.x]
See Table 2 for details [xxxx]

P br
4 ⬆⬇ [1]
[2]
[3]
Operational Display [4]

P 9999

Step 4 – Select the Decimal Point Position

The decimal point can be set to one of three positions on the display or not displayed at all. This allows you to display a 4-digit reading as a full number (xxxx), a 3-digit reading to one decimal place (xxx.x), a 2-digit reading to two decimal places (xx.xx), or a 1-digit reading to three decimal places (x.xxx).

To complete our example in Step 3 where an input frequency of 4 Hz displays as 120 counts, set the decimal point to the xxxx position. The display reads 120 at 4 Hz input.

Table 2 shows the display readings with a decimal point for a 4 Hz input set to the x100 range multiplier.

Table 2 – Decimal Point Settings			
Input	Multiplier Setting	DP Setting	Display Reading
4 Hz	x100	x.xxx	. 1 2 0
		xx.xx	1 . 2 0
		xxx.x	1 2 . 0
		xxxx	1 2 0

Note:
The Calibration Logic diagram shows the programming logic steps that are available with no analog output board installed. See the BL-40F or DL-40F data sheet for full programming procedures.

Figure 11 – Calibration Logic Diagram

Setting Up IF05 for BL-40RPM and DL-40RPM Meters

To set up the IF05 input module for **rpm** input in a Leopard BL-40RPM or DL-40RPM meter, carry out the following procedures:

Step 1 Establish the pulses per revolution for the sensor

Step 2 Set the pulses per revolution (PPR) in the meter

Step 3 Select the display resolution

RPM Meter Calibrated
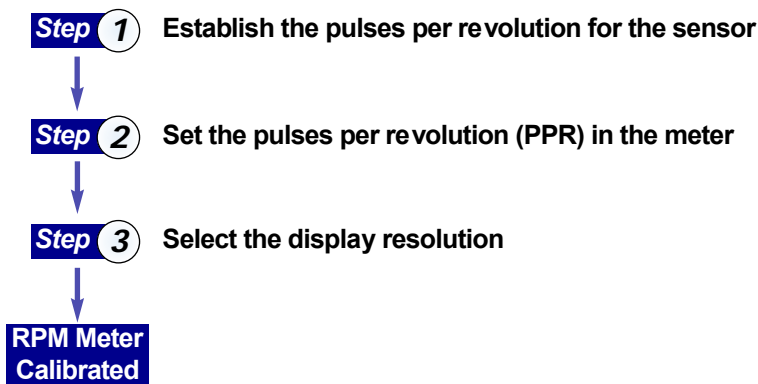
Step 1 – Establish the PPR for the Sensor

The sensor has an output rated in pulses per revolution (PPR). You will need this setting for the next step.

Step 2 – Set the PPR in the Meter

Enter the meter's PPR and range setting mode and set the pulses per revolution you require (PPR output of your sensor). See Figure 12 – PPR & Range Setting Logic Diagram.

Step 3 – Set the Display Resolution

After you have set the PPR setting, enter the range [rG] menu and select the resolution setting you require from one of the three ranges available.

Range Setting 0.1

This setting provides you with a resolution of 1 digit after the decimal point. For example, if your PPR setting is 1, then your display reading would be 1.0. If your PPR setting is 25, then your display reading would be 25.0. The maximum PPR in this range is 999.9 rpm.
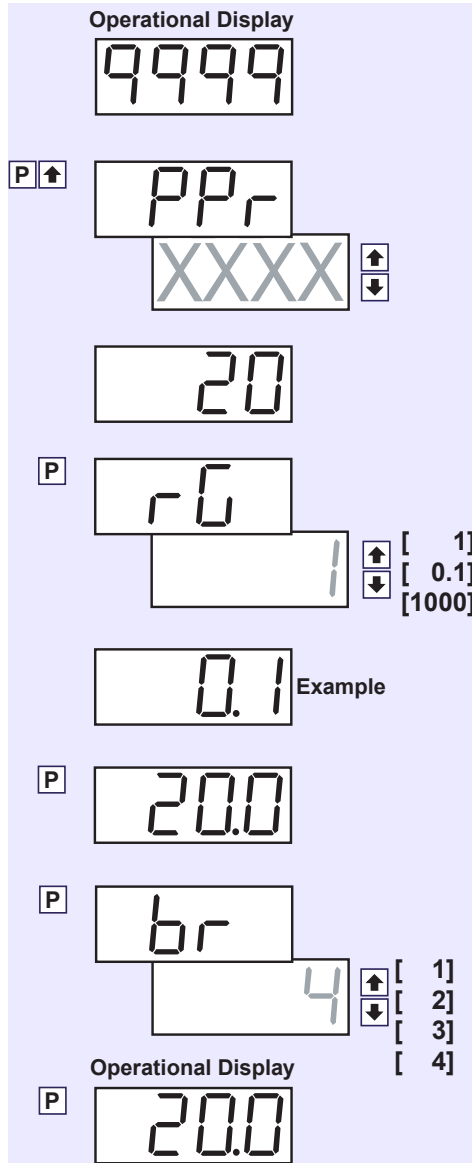
Range Setting 1

This setting provides you with a resolution of 1 to 1. For example, if your PPR setting is 1, then your display reading would be 1. If your PPR setting is 25, then your display reading would be 25. The maximum PPR in this range is 9999 rpm.

Range Setting 1000

This setting provides you with a resolution of 2 digits after the decimal point. For example, if your PPR setting is 1, then your display reading would be 1.00. If your PPR setting is 25, then your display reading would be 25.00. The maximum PPR in this range is 99.99 rpm.

Example

Figure 12 is a logic diagram showing the logic steps involved in setting up the IF05 input module for a BL-40RPM or DL-40RPM meter. The diagram is written as an example showing meter connected to a rotary encoder with an output rate of 100 pulses per revolution, displayed with 1 digit after the decimal point.

Figure 12 – PPR & Range Setting Logic Diagram

Note:
With no analog output board installed, pressing the ↑ P buttons together immediately enters the [PPr] mode.

TEXMATE INC

1934 Kellogg Ave. • Carlsbad, CA 92008
Tel: 1-760-598-9899 • USA 1-800-839-6283 • That's 1-800-TEXMATE
Email: orders@texmate.com • Web: www.texmate.com