IMI SENSORS
A PCB DIVISION

Model 600A35

USB Programming Kit for 649A01, 649A03 and 649A04

Installation and Operating Manual

For assistance with the operation of this product,
contact the PCB Piezotronics, Inc.

Toll-free: 800-959-4464
24-hour SensorLine: 716-684-0001
Fax: 716-684-3823
E-mail: imi@pcb.com
Web: www.imi-sensors.com

IMI SENSORS
A PCB PIEZOTRONICS DIV.

SENSORS AND INSTRUMENTATION FOR MACHINE CONDITION MONITORING

600A35 USB Programming Kit for (EX)649AX1-Series Reciprocating Machinery Protector (RMP)

Operating Guide with Enclosed Warranty Information

3425 Walden Avenue, Depew, New York 14043-2495

Phone (716) 684-0003

Fax (716) 684-3823

Toll Free Line 1-800-959-4IMI

MANUAL NUMBER: 74536
MANUAL REVISION: NR
ECO NUMBER: 51575

Table of Contents

Introduction ..... *Page 3*
- *General Features*

Programming Software ..... *Page 4*
- *Program Installation*
- *Running the Software*
- *Programming Sections*
- *Reading and Writing Parameters*
- *Parameter Options*
- *Examples*

Equipment-Specific Usage Programming Guidelines ..... Page 12
- *Determine Baseline Vibration Using the RMP*
- *Usage with Gas Compressors*
- *Usage with Piston Pumps and Other Types of Reciprocating Machinery*

Portable 4-20 mA Loop Calibrator ..... *Page 15*

ESD Sensitivity ..... *Page 16*

Warranty, Service & Return Procedure ..... *Page 17*

Customer Service ..... *Page 17*

Introduction

The (EX)649AX1-Series Reciprocating Machinery Protector (RMP) comes factory-programmed. The RMP parameters are user-adjustable with Model 600A35 USB Programming Kit. The kit includes a USB programmer cable/dongle (Model 070A103 cable), software (Model EE225) and terminal block/integral cable adapter (Model 042M17).

The parameter adjustments are based on two modes:

- Dependent Mode: All parameters automatically calculated based on specified machine speed (RPM).
- Independent Mode: All parameters programmed by the user to tailor the analysis to a particular machine.

General Features

- Programmable features
  - RPM
  - Time window
  - Vibration threshold levels
  - Weighting factors
  - Trending range

Programming Software

The software includes both the drivers and user interface needed for programming the RMP. The provided software (Model EE225) must be installed prior to connecting the RMP to the computer using the USB programmer cable. During initial installation, you may need administrative rights for the computer in order to install the drivers. Once installed, administrative rights are not required for use. Model EE225 is also available online at www.pcb.com.

Program Installation

Installing the Software and USB Driver: Insert the software CD provided into the CD drive. The software will start the installation automatically if your PC is set to auto-install applications. If not, browse the CD and click on Setup.exe to start the installation process. The default installation directory is C:\PCB\EE225. It is recommended to use the default setting.

The installer will first install the software and then the WinUSB device driver. This device driver is required for the programmer software to communicate with the 070A89 or 070A103 USB programmer cable.

The following screens will be displayed when the installer starts. Click the Next button to proceed from step to step.

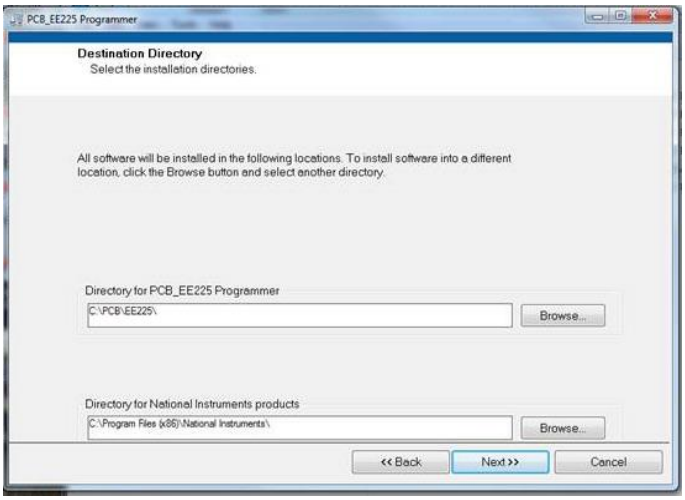


Figure 1 – Install Location Screen

Figure 2 - National Instruments Software License Agreement

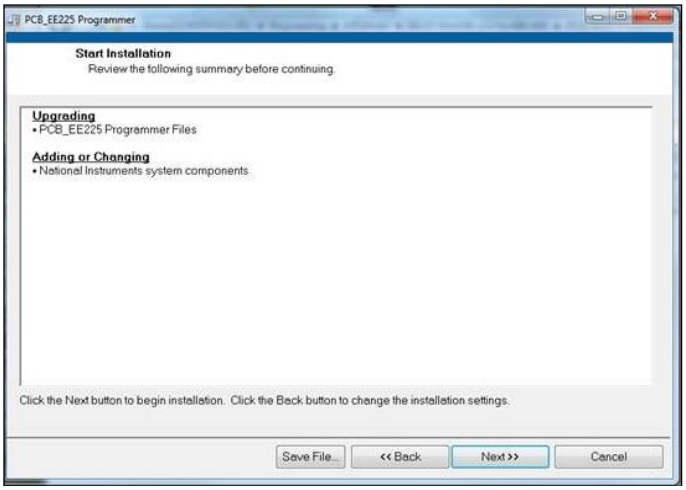


Figure 3 – Installation Verification Screen

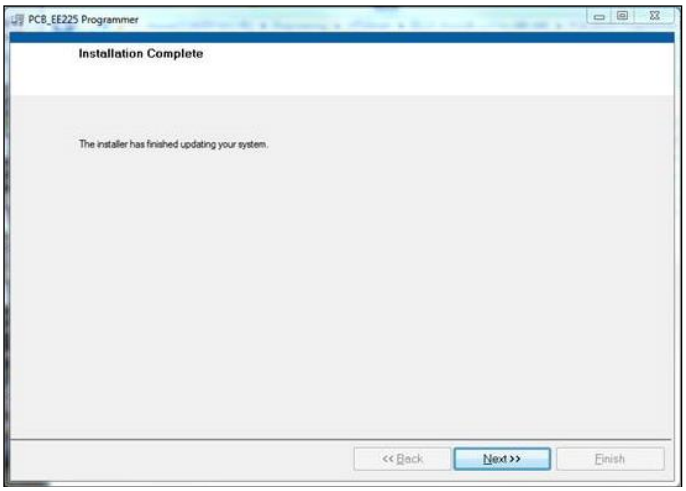


Figure 4 – Installation Complete Screen

After the software completes, the USB driver installer will start automatically. The initial USB installer will look similar to the one below.

Figure 5 – WinUSB Driver Installation Screen

The drivers will now be properly installed and you should get the following screen. Click “Finish”. The software is now ready to use.

Figure 6 – WinUSB Driver Installation Complete Screen

Running the Software

Connect the USB programmer cable to a USB port on the PC and then run the software from the Start | All Programs | PCB EE225 menu item

Initially the screen will appear as in **Error! Reference source not found.** with a yellow bar and status indicating 'Initializing…' followed by the message: "Connecting to USB Dongle…".

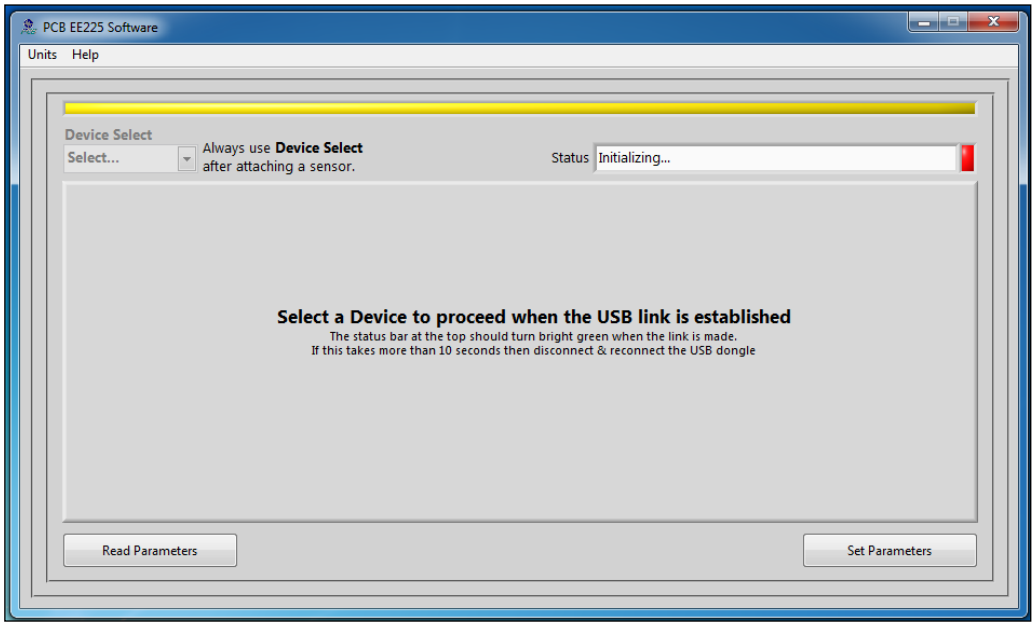


Figure 7 – Software While Connecting to USB Programmer Cable

Once the connection is made the bar at the top of the screen will turn green and the status will indicate "USB Connection Success - Select a device". If the software and USB programmer cable fail to connect, remove and reinsert the USB programmer cable.

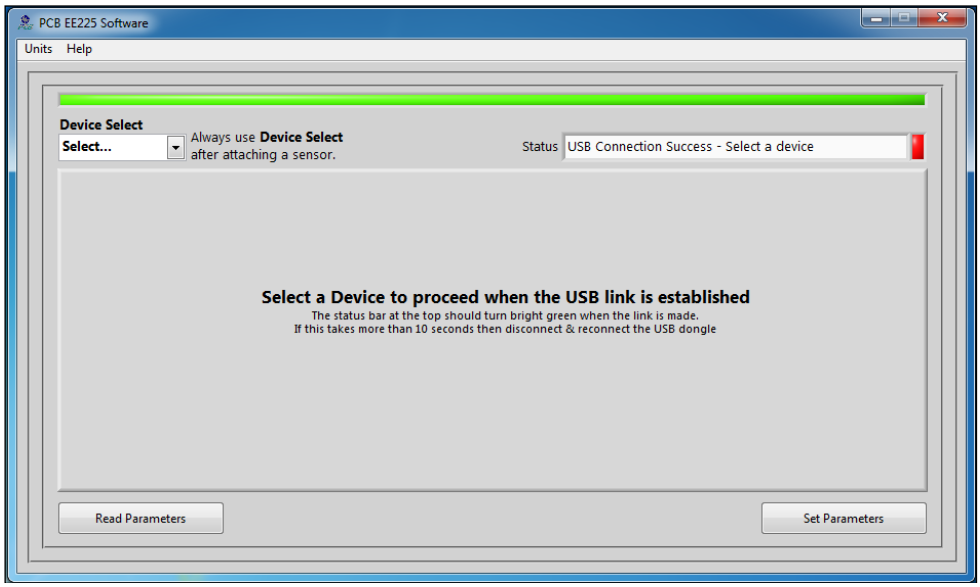


Figure 8 – Software After Connecting to USB Programmer Cable

To select a device, click on the Device Select pull down menu and select the device you'd like to program. In this case, select 649A01.

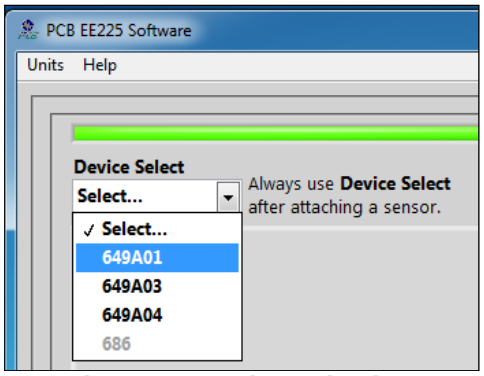


Figure 9 – Device Selection

Once a product is selected, the software will prompt you to confirm connection of the sensor to the PC using the USB programmer cable. Click OK to proceed.

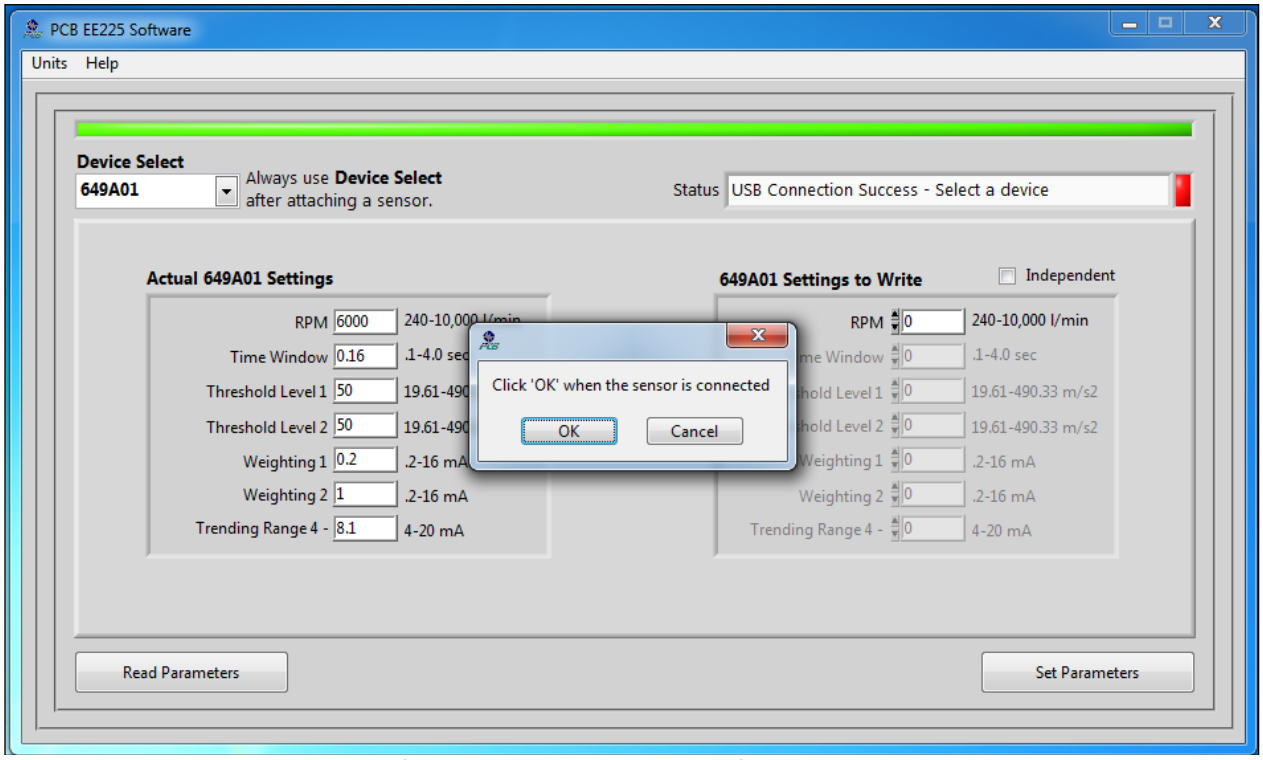


Figure 10 – Sensor Connection Screen

While the software is establishing communication with the sensor, the status will display 'Checking Status…' and the colored indicator box next to the status will alternate between red and yellow. This will take approximately 15 seconds. Once communication is established, the indicator box will turn green and the software will read the sensor's current settings and data. The fields presented in the main body of the screen will be specific to the selected sensor.

Programming Sections

The screen has two sections:

- Actual 649A01 Settings – This section shows the settings currently programed in the sensor.
- 649A01 Settings to Write – This section shows the options for programming the sensor.

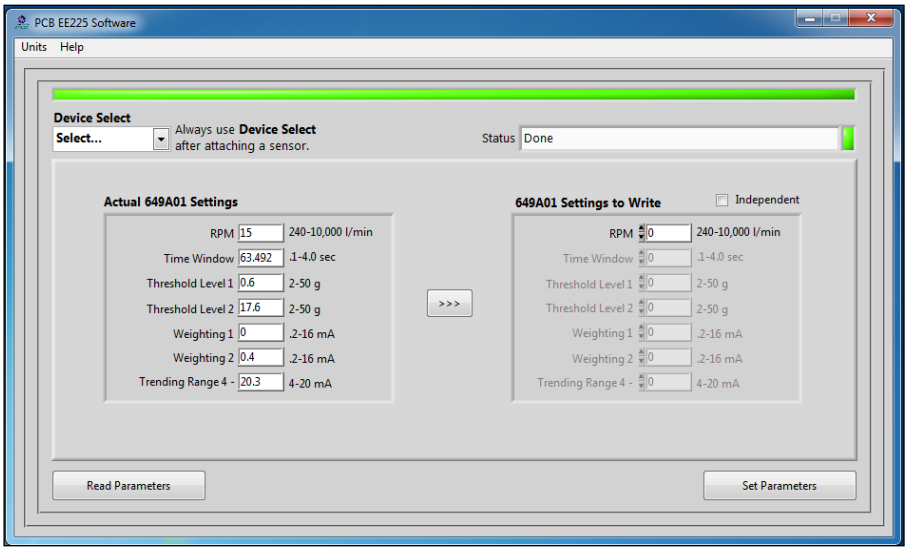


Figure 11 – Typical RMP Screen After Successful Parameter Read

Reading and Writing Parameters

- Reading Parameters - To read the current sensor settings, click the Read Parameters button. This operation takes approximately 45 seconds to complete.
- Transferring Actual Settings to Settings to Write Field - Use the '>>>' button to transfer all Actual Settings to the Settings to Write fields.
- Writing Parameters- Select the appropriate mode and enter any pertinent parameter information. Click the Set Parameters button. This causes the settings to be sent to the sensor and then read back and displayed in the Actual 649A01 Settings.

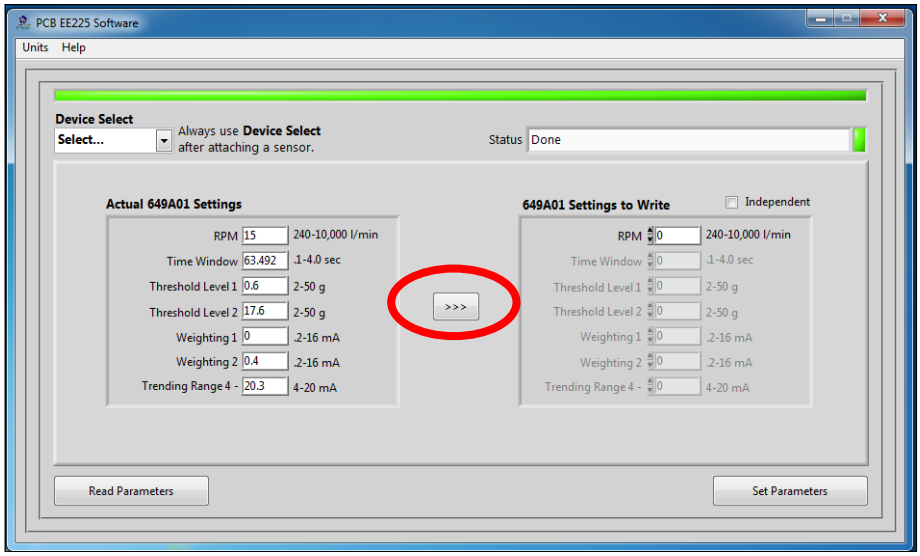


Figure 12 – Transferring Actual Settings to Settings to Write Field

Parameter Options

There are seven parameters that can be programmed to optimize performance of the RMP. At any point during the programming process, the values can be changed between imperial and metric measurements by clicking the Units dropdown in the top navigation menu and then selecting the appropriate measurement type.

- **Dependent Mode** – If the Independent Mode checkbox is NOT selected, then the parameters will be based on Dependent Mode. When Dependent Mode is used, the user only needs enter the compressor RPM. The remaining six parameters (Time Window, Threshold Level 1, Threshold Level 2, Weighting 1, Weighting 2 and Trending Range) will be automatically calculated based on the compressor rotational speed. Calculation formulas are in table below. The formulas used assume use on reciprocating gas compressor. If RMP is being used on a piston pump or some other type of reciprocating machinery, see the section titled "Using the RMP with Piston Pumps Other Type of Reciprocating Machinery".
- **Independent Mode** – If the Independent Mode checkbox is selected, then the parameters will be based on Independent Mode. When Independent Mode is used the user does NOT enter the RMP of the compressor and instead manually enters values for the Time Window, Threshold Level 1, Threshold Level 2, Weighting 1, Weighting 2 and Trending Range parameters. Value entered for each parameter must be within the software's acceptable range for that parameter. Acceptable ranges are in table below as well as some guidelines for Independent Mode programming.

Parameter	Description	Dependent Mode	Independent Mode	
		Range or Formula	Acceptable Range	Guidelines for Typical Values
RPM	Rotational speed of equipment	240 - 10,000	N/A	N/A
Time Window	Time span (in seconds) during which data is collected for an analysis cycle; based on number of rotations of the shaft.	TW = (60 / RPM) x 16	0.1-4.0 sec	Time span for 12-16 shaft rotations
Threshold Level 1	Cutoff levels (in g of acceleration) above which impacts are counted and weighted. When all vibration is below Threshold Level 1, sensor monitors peak acceleration within trending range.	A_L = RPM / 80	2-50 g 19.61-490.33 m/s^2	2-4 times of baseline acceleration
Threshold Level 2		A_H = RPM / 50	2-50 g 19.61-490.33 m/s^2	1.5-1.6 times of Threshold Level 1
Weighting 1	Factor (in mA of current) applied to impacts that exceed Threshold Level 1.	W_L = 0.1 + (100 / RPM)	0.2-16.0 mA (0.2 mA increments)	Less than Weighting 2 value
Weighting 2	Factor (in mA of current) applied to impacts that exceed Threshold Level 2.	W_H = 0.9 - (100 / RPM)	0.2-16.0 mA (0.2 mA increments)	Greater than Weighting 1 value
Trending Range	Maximum value (in mA of current) dedicated to trending peak acceleration when all impacts are below either threshold level. If impacts exceed either threshold level, trending range current maxes out.	I_L = 8 + (6 x (100/RPM))	4-20 mA	If set at 20 mA, RMP will operate like vibration transmitter.

Figure 13 – parameters that can be programmed to optimize performance of the RMP

Examples

Example 1: Connect the RMP to computer with the USB programmer cable. Run the program. Be sure the Independent box is NOT checked and type 780 in the RPM box. Note that all of the other parameters are set automatically. Click Set Parameters to program the RMP with these settings. The RMP will be programmed, the status read, and the screen in Figure 14 displayed.

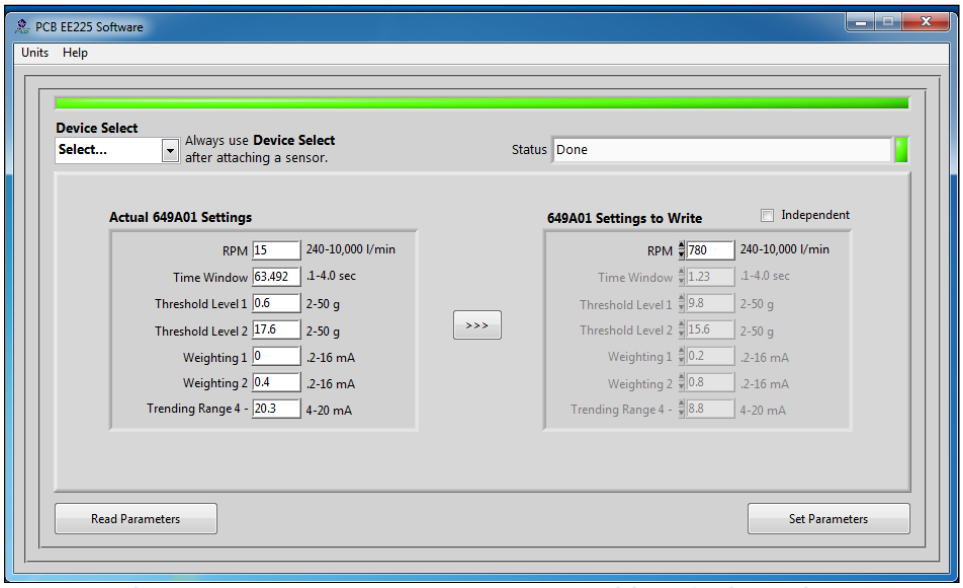


Figure 14 – RMP Programmer Screen with Default Setting

Example 2: Connect the RMP to computer with the USB programmer cable. Run the program. Check the Independent box. Note that the RPM field disappears. Type in the following values: Time Window = 1.2, Threshold Level 1 = 5, Threshold Level 2 = 7, Weighting 1 = 0.6, Weighting 2 = 0.8, and Trending Range = 10. Click Setup to program the RMP with these settings. The RMP will be programmed with the custom setting, the status read, and the screen in Figure 15 below displayed.

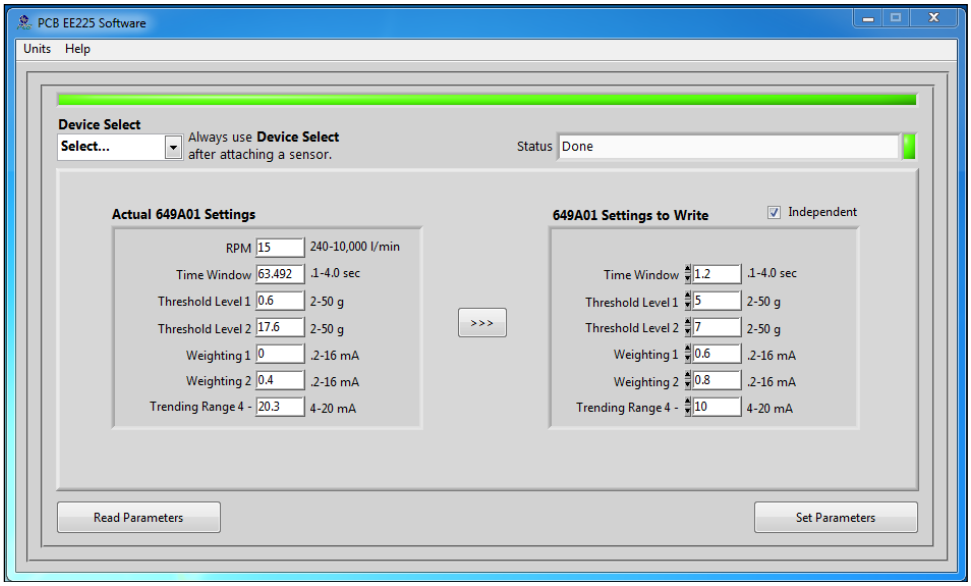


Figure 15 – RMP Programmer Screen with Independent Settings

Determine Baseline Vibration using the RMP

When impacts occur in a machine, peak acceleration rises well above the vibration baseline. The default shock threshold values (Threshold Level 1 & Threshold Level 2) that are automatically inserted in the Programmer Screen based on the specified RPM assume a typical gas compressor with the sensor mounted as recommended in this manual. For some machine types and measurement locations, the default values for Threshold Level 1 and Threshold Level 2 may need to be adjusted. This would be the case if the machinery type or selected measurement location has a higher base vibration than normal.

If you want to measure the baseline peak vibration and do not have appropriate vibration analysis equipment, it can be done using the RMP. To determine the baseline level using the RMP, install the RMP programmed with the following settings and measure the output in mA. This can be done using the same system that will be used for monitoring the RMP.

Threshold Level 1 = 8 g (or 16 g)
Trending Range = 20 mA

Since the RMP outputs a 4-20 mA signal proportional to peak acceleration, 4 mA is zero and each mA over the 4 mA is equal to 0.5g (or 1g) of peak vibration. Example, if Threshold Level 1 is set to 8 g, the Trending Range to 20 mA, and the reading is 12.7 mA, then the actual peak vibration level is (12.7 – 4) x 0.5 = 4.35 g. For more details see “Using the RMP with Piston Pumps Other Types of Reciprocating Machinery”.

Usage with Gas Compressors

Unless otherwise specified, the RMP comes from the factory with default settings for a 1200 RPM reciprocating gas compressor.

- RPM: 1200 RPM
- Time Window: 0.8 sec
- Threshold Level 1: 15 g
- Threshold Level 2: 24 g
- Weighting 1: 0.2 mA
- Weighting 2: 0.8 mA
- Trending Range: 8.5 mA

When field programming a unit in Dependent mode, the default parameters that are automatically inserted in Programmer Screen based on the RPM entry are intended for use with reciprocating gas compressors. If you are using the RMP with a piston pump or any other type of reciprocating machinery, see the section in this manual titled “Using the RMP with Piston Pumps Other Types of Reciprocating Machinery”.

Usage with Piston Pumps and Other Types of Reciprocating Machinery

Although the RMP software has the ability to calculate suggested parameters based on rotational speed for gas compressors, these values may not be appropriate for use when monitoring piston pumps and other types of reciprocating machinery. Due to the nature of their operation, other mechanisms contribute to the maximum acceleration levels seen during normal pump operation. Therefore, it is important to determine what levels exist during normal operation before configuring the software. The following procedure will allow you use the RMP to measure the highest acceleration level occurring during normal operation. Based on this measurement, the RMP parameters can be calculated.

This procedure sets the parameters in the RMP such that 1 mA of incremental output equals 1 g of incremental vibration (i.e., 4 mA = 0 and 20 mA = 16 g pk). The Trending Range is set to 20 mA, which disables the alarm threshold feature of the unit; and thus outputs only the peak acceleration value. Follow these steps to properly set up the unit for this reading.

1. Connect the RMP to the computer using the USB Programmer and run the RMP software.

2. Check the Independent box at the top of the screen. This allows manual configuration of the parameters.

3. Type the following values into the appropriate boxes on the Programmer Screen. When these values have been entered, click the Setup button to download the configuration to the RMP.
    a. Time Window: 1 s
    b. Threshold Level 1: 16 g
    c. Threshold Level 2: 20 g
    d. Weighting 1: 0.2 mA
    e. Weighting 2: 0.8 mA
    f. Trending Range: 20 mA

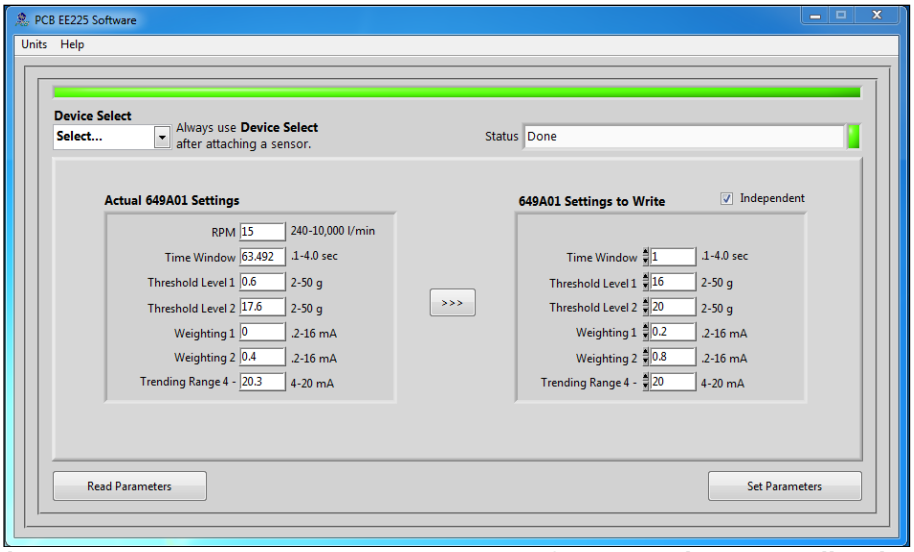


Figure 16 – RMP Programmer Screen Setup for Measuring Base Vibration

4. Disconnect the RMP from the computer and mount it on the pump. Wire it into a PLC or other 4-20 mA compatible system. Optionally, it can be used with a 4-20 mA loop calibrator such as the IMI Model 699A05 (see page 15 for more information). Record the output of the RMP in mA. Subtract 4 from that value to get the peak baseline acceleration. For example, if 10 mA is displayed, the peak level is 10 – 4 = 6 g.

5. Based on the peak acceleration level determined in step 4, the RMP can now be programmed appropriately. Disconnect the RMP from the 4-20 mA compatible device, reconnect it to the computer and run the RMP Software. Use the following guideline to calculate Threshold Level 1 and Threshold Level 2 values.
    a. If the peak acceleration value measured in step 4 is less than or equal to 10 g, multiply it by 3 and set the Threshold Level 1 equal to it. Then, multiply the Threshold Level 1 value by 1.6 and set the Threshold Level 2 value equal to it. For example, if the measured peak acceleration in step 4 is 6 g, set Threshold Level 1 to 18 g and Threshold 2 to 28.8 g.
    b. If the peak acceleration value determined in step 4 is greater than 10 g, set Threshold Level 1 to 30 g and Threshold Level 2 to 50 g.
    c. Set the remaining parameters as follows.
        i. If the peak acceleration value measured in step 4 is less than or equal to 10 g, use the default values that are set automatically by the program based on machine RPM.
        ii. If the peak acceleration value determined in step 4 is greater than 10 g, use the following parameters
            1. Time Window: 1 s
            2. Weighting 1: 0.5 mA
            3. Weighting 2: 0.5 mA
            4. Trending Range 10 mA

6. Using the example of 6 g peak acceleration from step 4, enter the parameters in the Programmer Screen, and click Setup to program the RMP. The following Programmer Screen should be displayed.

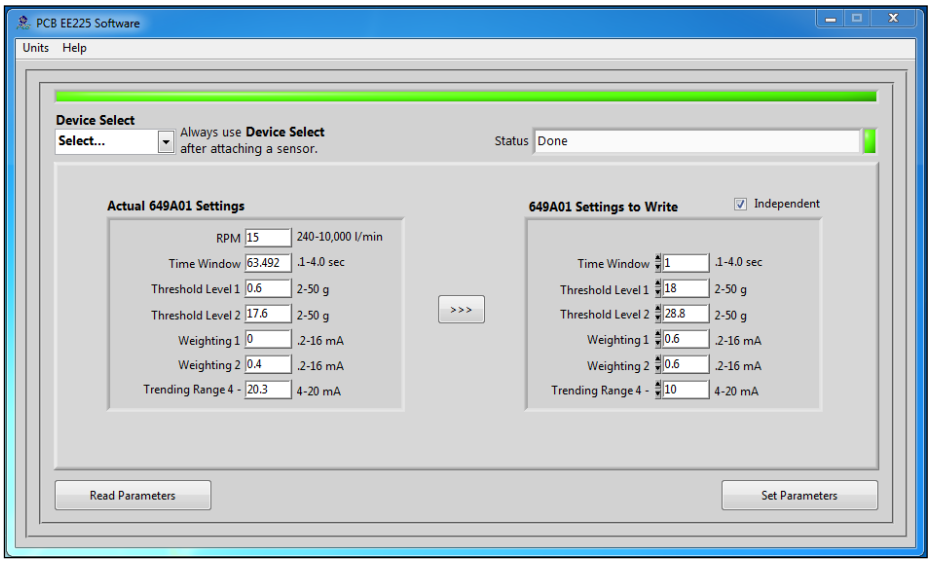


Figure 17 – RMP Programmer Screen for 6 g Peak Acceleration on a Piston Pump

The loop calibrator (Model 699A05) provides 24V loop power and displays the transmitters electrical current output. This can be used with the sensor for measuring the baseline peak acceleration as described in “Determine Baseline Vibration using the RMP” on page 12. Visit www.pcb.com for more information on the loop calibrator.

Figure 18 – Loop Calibrator

Warning 1 – ESD sensitivity

The power supply/signal conditioner should not be opened by anyone other than qualified service personnel. This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid injury.

Warning 2 – ESD sensitivity

This equipment is designed with user safety in mind; however, the protection provided by the equipment may be impaired if the equipment is used in a manner not specified by PCB Piezotronics, Inc.

Caution 1 – ESD sensitivity

Cables can kill your equipment. High voltage electrostatic discharge (ESD) can damage electrical devices. Similar to a capacitor, a cable can hold a charge caused by triboelectric transfer, such as that which occurs in the following:

- *Laying on and moving across a rug,*
- *Any movement through air,*
- *The action of rolling out a cable, and/or*
- *Contact with a non-grounded person.*

The PCB solution for product safety:

- *Connect the cables only with the AC power off.*
- *Temporarily "short" the end of the cable before attaching it to any signal input or output.*

Caution 2 – ESD sensitivity

ESD considerations should be made prior to performing any internal adjustments on the equipment. Any piece of electronic equipment is vulnerable to ESD when opened for adjustments. Internal adjustments should therefore be done ONLY at an ESD-safe work area. Many products have ESD protection, but the level of protection may be exceeded by extremely high voltage.

Warranty

IMI instrumentation is warranted against defective material and workmanship for 1 year unless otherwise expressly specified. Damage to instruments caused by incorrect power or misapplication, is not covered by warranty. *If there are any questions regarding power, intended application, or general usage, please consult with your local sales contact or distributor.* Batteries and other expendable hardware items are not covered by warranty.

Service

Because of the sophisticated nature of IMI instrumentation, field repair is typically **NOT** recommended and may void any warranty. If factory service is required, return the instrumentation according to the "Return Procedure" stated below. *A repair and/or replacement quotation will be provided prior to servicing at no charge.* Before returning the unit, please consult a factory IMI applications engineer concerning the situation as certain problems can often be corrected with simple on-site procedures.

Return procedure

To expedite returned instrumentation, contact a factory IMI applications engineer for a RETURN MATERIAL AUTHORIZATION (RMA) NUMBER. Please have information available such as model and serial number. Also, to insure efficient service, *provide a written description of the symptoms and problems with the equipment to a local sales representative or distributor, or contact IMI if none are located in your area.*

Customers outside the U.S. should consult their local IMI distributor for information on returning equipment. For exceptions, please contact the International Sales department at IMI to request shipping instructions and an RMA. For assistance, please call (716) 684-0003, or fax us at (716) 684-3823. You may also receive assistance via e-mail at **imi@pcb.com** or visit our web site at **www.pcb.com**.

Customer Service

IMI, a division of PCB Piezotronics, guarantees **Total Customer Satisfaction**. If, at any time, for any reason, you are not completely satisfied with any IMI product, IMI will repair, replace, or exchange it at no charge. You may also choose to have your purchase price refunded.

IMI offers to all customers, at no charge, 24-hour phone support. This service makes product or application support available to our customers, day or night, seven days a week. When unforeseen problems or emergency situations arise, call the **IMI Hot Line at (716) 684-0003**, and an application specialist will assist you.

Model Number	649 SERIES USB PROGRAMMER	Revision: NR
070A103		ECN #: 46457

Performance	**ENGLISH**	**SI**
Cable Style	Multi Conductor - Shielded	Multi Conductor - Shielded
Number of Conductors	2	2
Connector Model(sensor side)	AE	AE
Connector Style(sensor side)	MIL-C-5015	MIL-C-5015
Connection Type(sensor side)	2-socket	2-socket
Coupling Method(sensor side)	Push-on	Push-on
Connector Style(termination)	USB 2.0 - 5VDC	USB 2.0 - 5VDC
Connection Type(termination)	USB Series A	USB Series A
Coupling Method(termination)	Push-on	Push-on
Physical		
Size (Length x Height x Width)(termination)	2.0 in x 0.5 in x 1.0 in	50.8 mm x 12.7 mm x 25.4 mm
Cable Jacket Diameter	0.16 in	4.1 mm
Cable Jacket Material	Polyurethane	Polyurethane
Cable Jacket Color	Black	Black
Weight	0.15 lb	70 g
Size (Length)(Cable Assembly)	3 ft	0.91 m

CE[1]

All specifications are at room temperature unless otherwise specified.
In the interest of constant product improvement, we reserve the right to change specifications without notice.

OPTIONAL VERSIONS

Optional versions have identical specifications and accessories as listed for the standard model except where noted below. More than one option may be used.

NOTES:

[1] See PCB Declaration of Conformance PS039 for details.

Entered: LK	Engineer: gs	Sales: MC	Approved: BAM	Spec Number:
Date: 8/24/2017	Date: 8/24/2017	Date: 8/24/2017	Date: 8/24/2017	**66518**

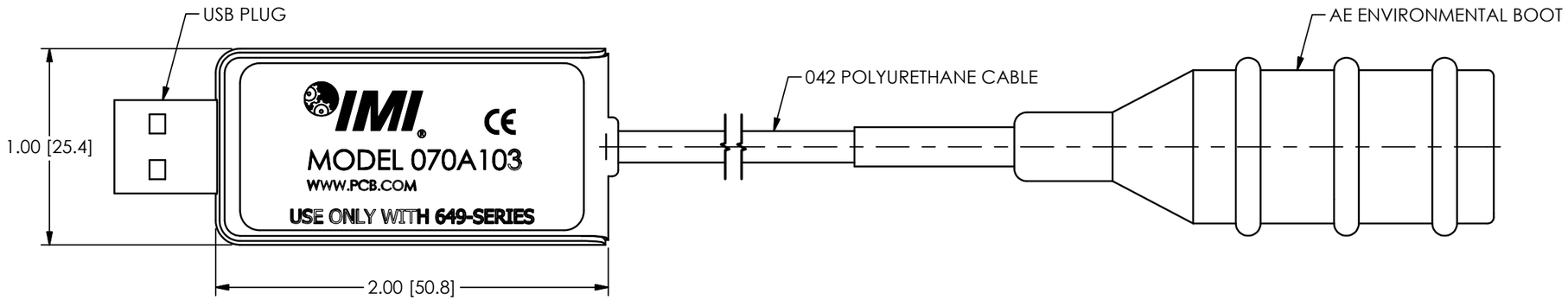
PCB PIEZOTRONICS
3425 Walden Avenue, Depew, NY 14043

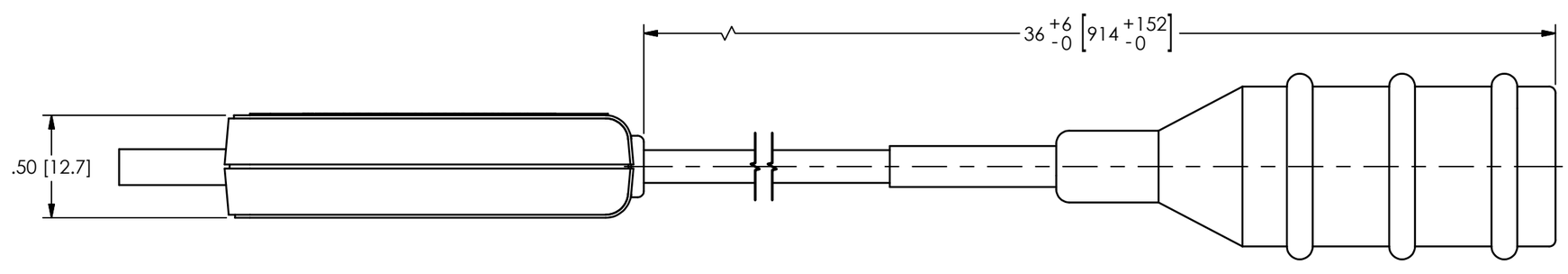
Phone: 716-684-0001
Fax: 716-684-0987
E-Mail: info@pcb.com

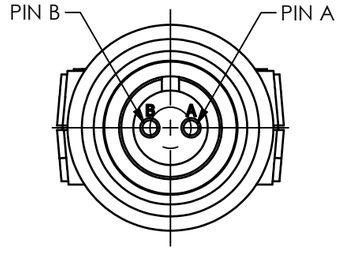
PCB Piezotronics Inc. claims proprietary rights in the information disclosed hereon. Neither it nor any reproduction thereof will be disclosed to others without the written consent of PCB Piezotronics Inc.

66517

REVISIONS		
REV	DESCRIPTION	DIN
A	UPDATED LABEL	47195







UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:		DRAWN		CHECKED		ENGINEER	
DIMENSIONS IN INCHES DECIMALS XX ±.03 XXX ±.010 ANGLES ± 2 DEGREES	DIMENSIONS IN MILLIMETERS [IN BRACKETS] DECIMALS X ±0.8 XX ±0.25 ANGLES ± 2 DEGREES	ECB	10/10/17	ECB	10/10/17	GGS	10/10/17
FILLETS AND RADII .003 - .005	FILLETS AND RADII 0.07 - 0.13						

TITLE

OUTLINE DRAWING
MODEL 070A103
PROGRAMER

PCB PIEZOTRONICS
3425 WALDEN AVE. DEPEW, NY 14043
(716) 684-0001 E-MAIL: sales@pcb.com

CODE IDENT. NO.	DWG. NO.
52681	66517
SCALE: 1.5X	SHEET 1 OF 1

Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its "Lifetime Warranty Plus" on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty**.

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

Contact Information

PCB Piezotronics, Inc.
3425 Walden Ave.
Depew, NY14043 USA
Toll-free: (800) 828-8840
24-hour SensorLine: (716) 684-0001
General inquiries: info@pcb.com
Repair inquiries: rma@pcb.com

For a complete list of distributors, global offices and sales representatives, visit our website, www.pcb.com.

Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

Definition of Terms and Symbols

The following symbols may be used in this manual:

DANGER
Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

CAUTION
Refers to hazards that could damage the instrument.

NOTE
Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

The following symbols may be found on the equipment described in this manual:

This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.

This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.

This symbol indicates safety, earth ground.

PCB- PCB工业监测和测量设备 - 中国RoHS 公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS Disclosure Table

部件名称 Part Name	有毒和危险品 Toxic and Hazardous Substances or Elements									
Part	铅 (Pb)	水银 (Hg)	镉 (Cd)	六价 铬 (Cr(VI)	多溴化 苯 (PBB)	多溴化二苯 醚 (PBDE)	邻苯二甲酸 二(2-乙基) 己酯 (DEHP)	邻苯二甲丁 基苄酯 (BBP)	邻苯二甲酸 二酸正丁酯 (DBP)	邻苯二甲酸 二异丁酯 (DIBP)
电气外壳 (Electrical Enclosures)	X	O	O	O	O	O	O	O	O	O
紧固件和弹簧 (Fasteners)	X	O	O	O	O	O	O	O	O	O
电缆组件 (Cable Assembly)	X	O	O	O	O	O	O	O	O	O
印刷电路板组装 (PCBAs)	X	O	O	O	O	O	O	O	O	O
机械零件(Mechanical Parts)	O	O	O	O	O	O	O	O	O	O
塑料和橡胶零件 (Plastic & Rubber Parts)	O	O	O	O	O	O	O	O	O	O
金属零件 (Metal Parts)	X	O	O	O	O	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制

O =表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下 (indicates that the content of the toxic and hazardous substance in all the Homogeneous Materials of the part is below the concentration limit requirement as described in GB/T 26572).

X =表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求 (indicates that the content of the toxic and hazardous substance in at least one Homogeneous Material of the part exceeds the concentration limit requirement as described in GB/T 26572).