IRD Mechanalysis® Limited

The Vibration People®

Machinery Protection Transmitter
IRD7100 Series

Operation & Maintenance Manual

V2.2 Mar12

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Customer Details	
Date Purchased:	
IRD Serial Number (s):	
P.O. ref:	
Organisation:	
End User:	
Next Calibration Due:	

IRD Mechanalysis Limited

www.irdmechanalysis.com

IRD Mechanalysis® Limited continues to be the leading provider of condition management solutions to industries in India and abroad. With 35 years' experience in machinery vibration and associated condition monitoring technologies, the company designs, manufactures and supplies proven instrumentation suitable for rugged industrial environments. A comprehensive range of products and services are available from the offices below.

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1. INTRODUCTION

1.1 Purpose & Scope of Manual

This Instruction Manual describes the IRD Mechanalysis® Limited (IRD) Machinery Protection Transmitter (MPT) model **IRD7100 Series** and includes instruction on installation, setup and operation. This manual is divided into eight chapters, as explained in the following paragraphs.

Chapter 1: Introduction elaborates the contents of all the chapters in the manual and the purpose and capability and description of the Machinery Protection Transmitter system.

Chapter 2: Description contains descriptions of the panel controls and indicators, the terminal block connectors and the standard and optional accessories of the Transmitter. Specifications are included in this chapter for the Machinery Protection Transmitter and the Vibration Sensor.

Chapter 3: Installation contains instructions on installing the Transmitter mounting the vibration sensor, connection of the power line, signal line conductors, and instruction on checking the instrument operation.

Chapter 4: Operation Contains instructions on interpreting the output indications, and the ALARM & TRIP indicator lights, Instructions are also included on resetting the Machinery Protection Transmitter and readjusting the set point controls.

Chapter 5: Calibration contains instructions on calibration procedure of the transmitter and sensor calibration.

Chapter 6: Specifications list the specifications of the single channel and dual channel transmitters along with the IRD544M inductive velocity sensor and IRD521 accelerometer that are standard with an online Vibration Monitoring System (VMS) installation.

Chapter 7: Support Services describe the product support, service and repairs undertaken at IRD National Service Centre how these add value to customers.

Chapter 8: Vibration based Condition Monitoring Solutions list down the complete condition monitoring solutions of IRD for adding value to customer's investments.

1.2 PURPOSE & CAPABILITY OF THE MACHINERY PROTECTION TRANSMITTER:

The Machinery Protection Transmitter (MPT) unit provides two types of continuous and automatic protection for critical machinery.

First: It can activate an audible warning device if mechanical fault is gradually developing in the machines, which causes the vibrations to increase to a pre-established set-point level. If this happens, vibration analysis and other checks could be performed to determine the exact nature of the problem, and convenient time for shutdown and repair of the machine can be scheduled.

Second: Should mechanical fault develop rapidly in the machine to the point where extensive machine damage could result if operations were continued, the MPT could also be used to activate controls to shutdown the machine immediately.

In addition to the above two functions, the MPT also provides an Electrical Output (4-20mA DC), which is proportional to the machine vibration amplitude. This indication provides an additional advanced warning of impending machine faults and could be transmitted to the Central Control Room or Distributed Control System (DCS) for trending and display. The transmitter can be located near to the measurement point and used for warning and alarm at local switch panels.

Getting You Started

2. DESCRIPTION

2.1 General

Thank you for investing in **IRD Mechanalysis Machinery Protection Transmitters**. We trust that like many thousands of users before you will continue to enjoy optimum value from your wise investment. IRD Mechanalysis Limited (IRD) is an independent System Integration Company that designs, manufactures and supplies condition monitoring system solutions.

IRD is based in Mumbai India with Regional Offices in the North, East, West and South of India as well as Independent Sales Organisations (ISOs) and overseas distributors to better support you. Our business philosophy is as follows:

Getting you Started

Keeping you Going

Taking you Further

All rotating machines vibrate, a change in level indicates a machine status change, and this can lead to unscheduled shutdown or even catastrophic failure. Machine Condition Monitoring (MCM) is an accepted practice throughout industry and encompasses a variety of measurement types to assist identifying the cause of impending problems.

The primary reason for which strategic machines in industry are monitored is that unacceptable levels of vibration are symptomatic of a variety of machine problems. Unbalance, misalignment, mechanical looseness, bearing instability, gear faults, rubbing and many other faults that cause machinery vibration to increase. Under normal operating conditions, the vibration from these parameters is very small or non-existent.

When a fault occurs or simply gets worse, it will result in an increase in vibration amplitude. The Machinery Protection Transmitter detects such an increase and will indicate the vibration amplitude on a display. This will also enable the operating personnel to observe trends. Amplitude of vibration may also be recorded on a strip chart recorder to provide a permanent log.

Detection of vibration is accomplished by the vibration sensor, which generates signals proportional to amplitude of vibration and at the frequency of vibration.

A rotating machine will always produce some vibration regardless of its condition. This vibration is utilized by the vibration sensor to generate a vibration input signal voltage. This vibration signal is connected to the Machinery Protection Transmitter, which converts this signal into proportional electrical output (4-20mA DC) that can be used with Strip Chart Recorders, Data Loggers or data acquisition systems (DASs). As mechanical faults develop in the rotating machine a corresponding increase occurs in the vibration level and in the amplitude of the vibration input signal voltage.

2.2 Physical description

The basic Machinery Protection System, as shown in Figure 1, consists of a vibration sensor, sensor cable and a Machine Protection Transmitter (MPT).

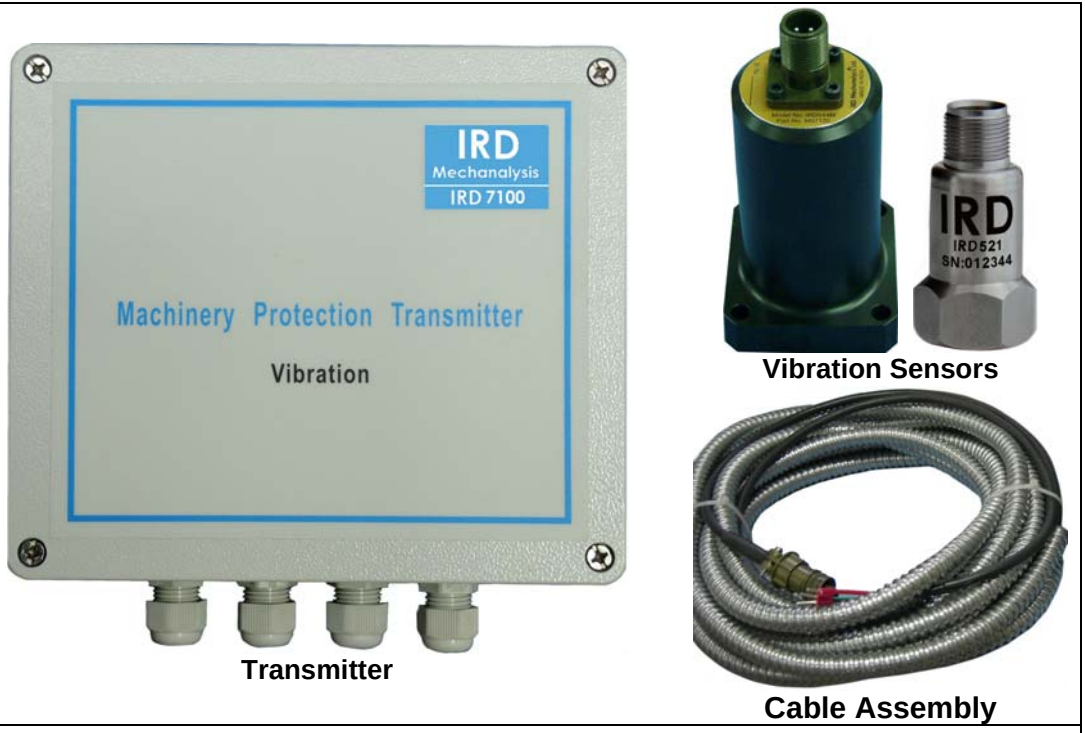


Figure 1 Machinery Protection Transmitter System

The MPT Circuit Boards and Electronic components are housed inside a die-cast aluminum box and measures approximately 230mm length, 200 mm width and 110mm depth. Blown out views of the single channel and dual channel MPTs are depicted in Figure 2 and Figure 3 respectively. The enclosure is suitable for wall mounting and is conforming to IP 65 degree of protection. Four PG11 cable glands are provided for power, signal input and signal output cables.

Figure 2 Blown out view of Machinery protection transmitter 1-ch IRD 7110

The top cover of the enclosure provides access to the two Terminal Block connectors, one for Power Cable and the other for Signal Input Cable Connections. A mounting hardware kit is supplied along with IRD7100 series MPTs.

Figure 3 Blown out view of the machinery protection transmitter dual-channel (IRD 7120)

The MPT is used for monitoring online signal and provides protection to rotating machines through predetermined set levels of alarm and trip. Alarm and Trip levels can be set separately with the help of switch S1 and S2 on the module. Please refer to Figures 12 & 13 in this manual for the terminal configuration of IRD7100.

The MPT continuously checks the healthiness of the vibration sensor and connecting cable from sensor. This is indicated visually by ON condition of an LED marked **O.K.** The contacts of circuit OK; Relays are available for connecting to computers or other such systems.

2.3 TRANSDUCER & MACHINERY PROTECTION TRANSMITTER DESCRIPTION

The MPT can be used with a range of vibration sensors for effective online machine condition monitoring viz. IRD544M inductive velocity sensor, IRD521 accelerometer, Eddy Current Probes (ECPs) etc.

The IRD Mechanalysis® model IRD544M vibration sensor is a rugged industrial vibration measuring sensor ideal for continuous machinery protection. In production for over 35 years, it continues to be the World's most widely used velocity sensor. The sensor can be mounted horizontally or vertically permanently on a flat surface at the bearing housing or other critical points on a machine. It provides reliable continuous performance under a variety of adverse environmental conditions. India alone has more than 6000 in daily use. The geometric details of the sensor are depicted in Figure 4.

This velocity sensor operates with a moving coil in a permanent magnetic field with eddy-current damping. Its high output and low impedance, good frequency response makes the IRD544M suitable for all types of machinery protection. The sensor's case insulates the signal coil from the housing to eliminate false monitor alarms often encountered from ground loops and power surges. The sensor's hard anodized aluminium housing is IP65 sealed, approved for use in Class 1 Division 2 hazardous areas and operates up to 260^{o}C.

The IRD Mechanalysis model IRD521 standard accelerometer is a rugged industrial vibration sensor with Mil 2-Pin top connector; primarily meant for on-line measuring vibration measurements. The geometric details of the sensor are shown in Figure 5.

The MPT converts rotating machinery vibration measurements to industry standard 4-20mA or 0-5 Volt DC as a low cost solution for process management systems. Signal data is transmitted to the Central Control Room or DCS for trending and display. The Transmitter can be located near to the measurement point and used for local warning and alarm with integral relay contacts at local switch panels.

MPT is calibrated to give both 0-5 V DC and 4-20 mA DC output proportional to vibration velocity (mm/sec Pk) or displacement when used with an inductive velocity sensor like IRD544M but could also be configured to measure vibration displacement (0-250/0-500 microns Pk-Pk) when used with Eddy Current Probes (ECPs) and acceleration (0-25 g Pk) or velocity (0-25 mm/s Pk/RMS) when connected to an accelerometer.

NOTE:

At the time of manufacture, the user needs to specify the required measurement parameter and measurement range.

The MPT is proven for continuous reliable operation in a tough industrial environment. Standard instrumentation volt and mA signal data could be transmitted to the Central Control Room or Distributed Control System (DCS) for trending and display. The MPT could be located near to the measurement point and used for warning and alarm at local switch panels.

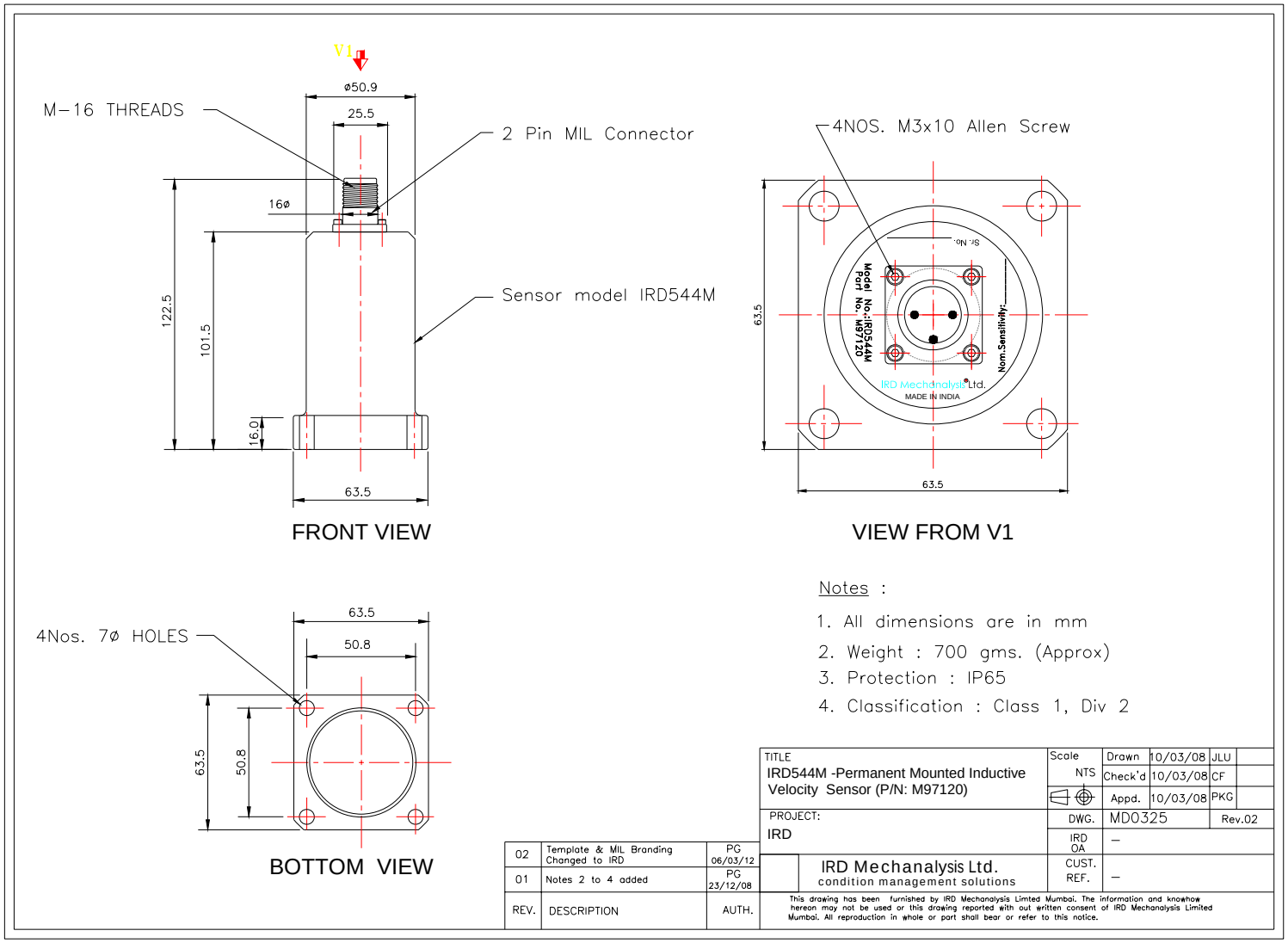


Figure 4 The geometric details of IRD544M Inductive Velocity Sensor details

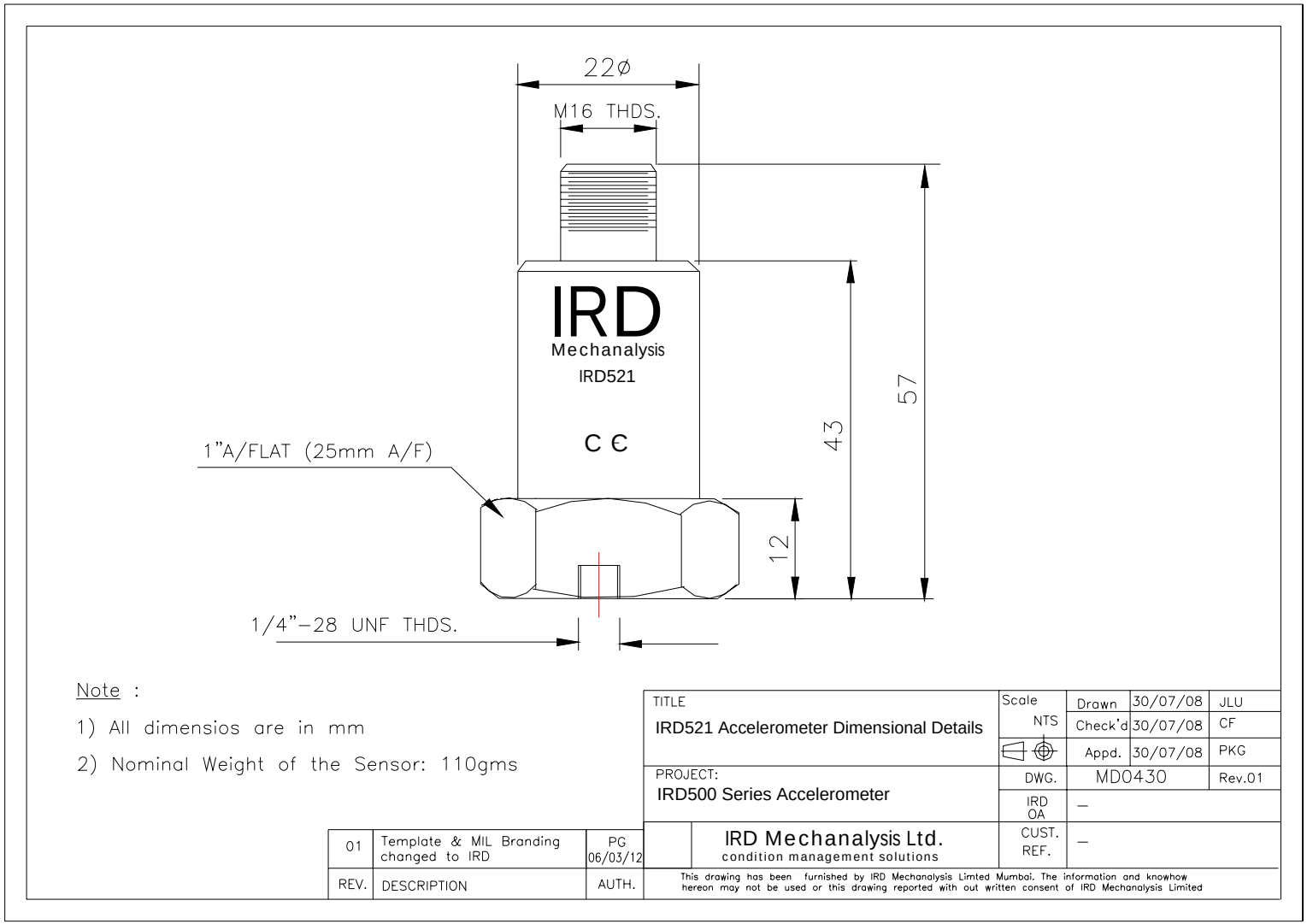


Figure 5 The geometric details of IRD521 accelerometer

3. INSTALLATION

3.1 General

This chapter consists of instructions on receiving inspection, layout of the various monitor units and external components, mounting the monitor enclosures and external components, details of the vibration sensor, cable installation of the power and signal line conductors, and performance testing of the overall installation.

3.2 Receiving Inspection

Visually inspect the exterior of the monitor, vibration sensor accessories and other optional components to make certain that no shipping damage has occurred. In addition, check that all units and components listed on the shipping papers are received. If any of the units or components has been damaged, file a claim with the insurer and send information to IRD. Include the model and serial number of the damaged unit in all correspondence. IRD will provide all support regarding repair of the damaged unit in accordance with the warranty.

3.3 Vibration Sensor Mounting

Proper mounting of the vibration sensor ensures reliability and success of the measurement system thus avoiding false alarms. The selection of the measurement point should be done by a vibration engineer. If an existing machine, it is useful to take a vibration measurement with a portable meter or even produce a vibration spectrum to ascertain the appropriate sensor type and measured unit.

Sensors are mounted in the different planes which are more sensitive to certain faults than others but there is a certain degree of signal cross over. A guide to the primary and secondary indications is as follows:

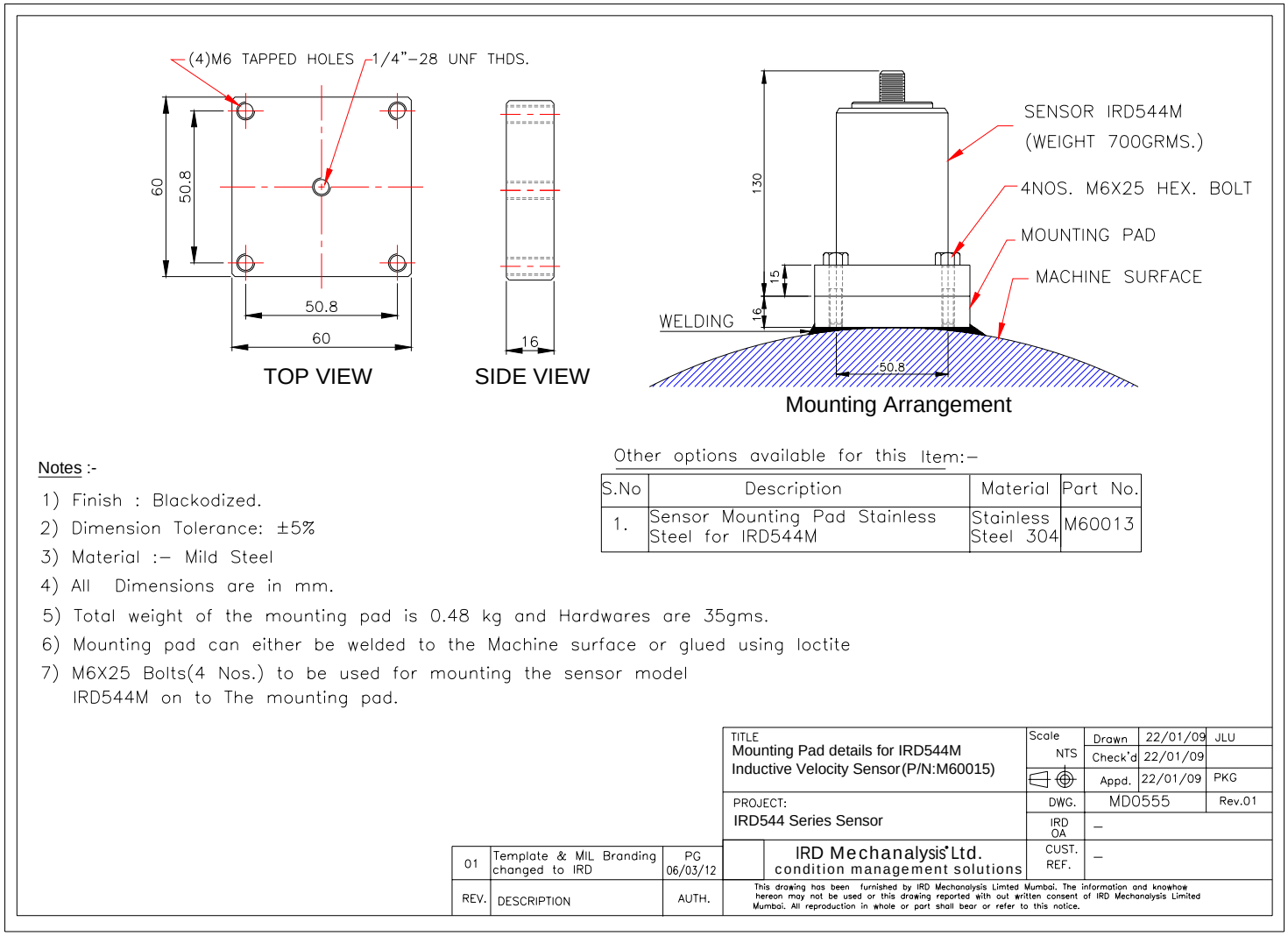
Orientation / Plane	Primary Indication	Secondary Indication
Horizontal 90 ^{o} /270^{o}	Unbalance	Alignment, Looseness, Gear Meshing
Vertical 0^{o}/180^{o}	Looseness	Unbalance, Alignment
Axial	Alignment	Unbalance, Gear Meshing
Dual Sensors 45^{o} to centreline	Unbalance, Shaft Position	Looseness, Alignment

The purpose of the sensor mounting pads is twofold:

1. To provide a 100% smooth surface contact between the sensor and pad without creating ‘base strain’ on the sensor due to a distorted surface.

2. To optimise the contact between the pad and bearing surface since the latter is seldom smooth or presented in the appropriate plane.

Some pads will need profiling on one surface to match the curvature of the bearing housing. Careful attention to this detail is required. The pad can either be welded or glued onto to the machine surface or bearing housing. The dimensional details of IRD544M and IRD accelerometers mounting pads are depicted in Figures 6 and 7 respectively. Incomplete contact that is not secure can cause resonance (hence false alarms) or poor signal transmission and loss of important data.



Notes :-

1) Finish : Blackodized.
2) Dimension Tolerance: ±5%
3) Material :- Mild Steel
4) All Dimensions are in mm.
5) Total weight of the mounting pad is 0.48 kg and Hardwares are 35gms.
6) Mounting pad can either be welded to the Machine surface or glued using loctite
7) M6X25 Bolts(4 Nos.) to be used for mounting the sensor model IRD544M on to The mounting pad.

Other options available for this Item:-

S.No	Description	Material	Part No.
1.	Sensor Mounting Pad Stainless Steel for IRD544M	Stainless Steel 304	M60013

TITLE: Mounting Pad details for IRD544M Inductive Velocity Sensor(P/N:M60015)		Scale	NTS	Drawn	22/01/09	JLU
				Check'd	22/01/09	
				Appd.	22/01/09	PKG
PROJECT: IRD544 Series Sensor		DWG.	MD0555			Rev.01
		IRD QA	–			
	IRD Mechanalysis Ltd. condition management solutions	CUST. REF.	–			

REV.	DESCRIPTION	AUTH.
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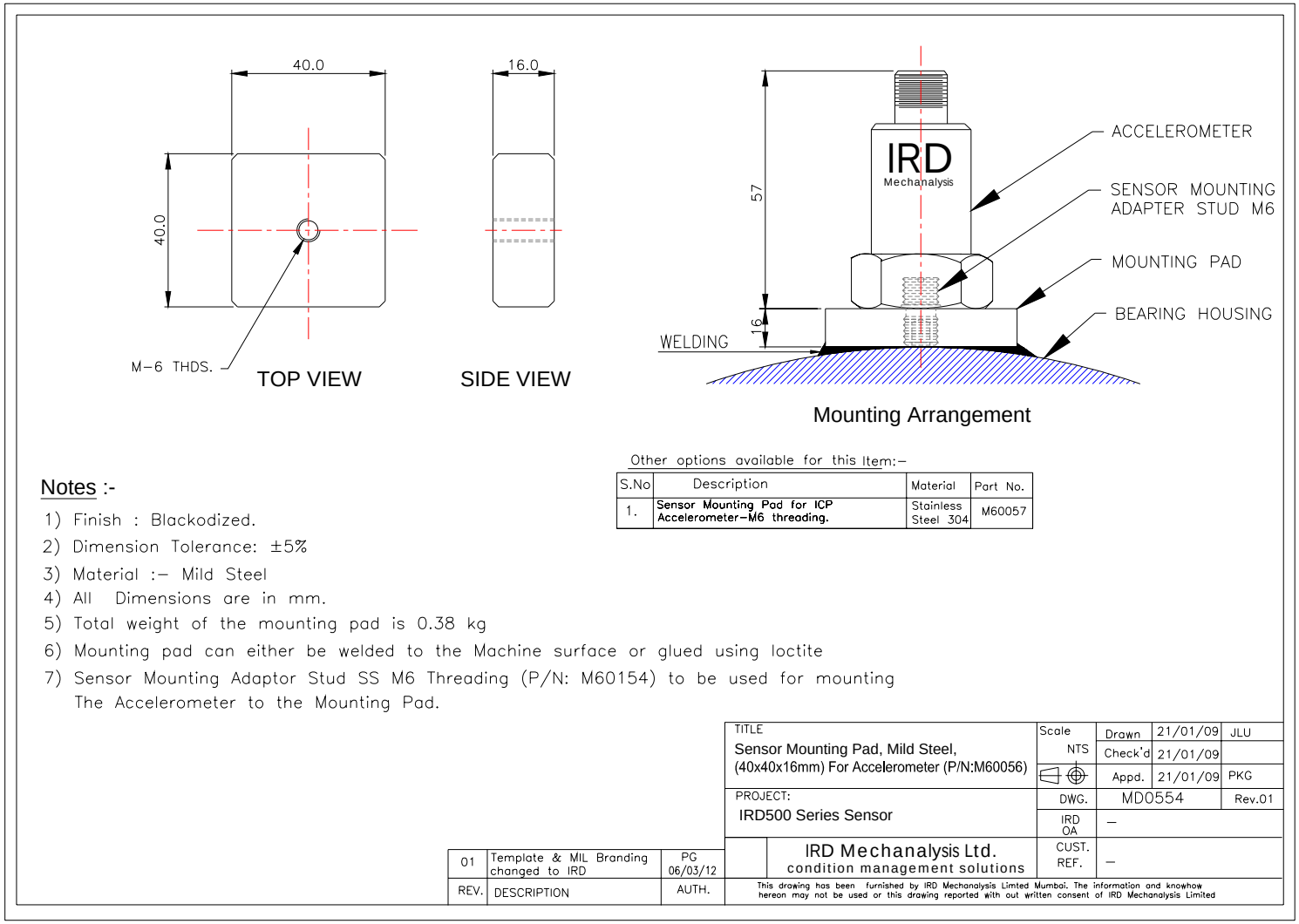
Figure 6 Sensor Mounting Pad Details for IRD544M



Other options available for this Item:–

S.No	Description	Material	Part No.
1.	Sensor Mounting Pad for ICP Accelerometer–M6 threading.	Stainless Steel 304	M60057

Notes :-

1) Finish : Blackodized.
2) Dimension Tolerance: ±5%
3) Material :– Mild Steel
4) All Dimensions are in mm.
5) Total weight of the mounting pad is 0.38 kg
6) Mounting pad can either be welded to the Machine surface or glued using loctite
7) Sensor Mounting Adaptor Stud SS M6 Threading (P/N: M60154) to be used for mounting The Accelerometer to the Mounting Pad.

01	Template & MIL Branding changed to IRD	PG 06/03/12
REV.	DESCRIPTION	AUTH.

TITLE: Sensor Mounting Pad, Mild Steel, (40x40x16mm) For Accelerometer (P/N:M60056)	Scale NTS	Drawn	21/01/09	JLU
		Check'd	21/01/09	
		Appd.	21/01/09	PKG
PROJECT: IRD500 Series Sensor	DWG.	MD0554		Rev.01
	IRD OA	–		
IRD Mechanalysis Ltd. condition management solutions	CUST. REF.	–		

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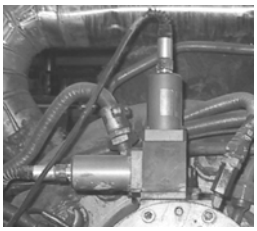
Figure 7 Sensor Mounting pad details for IRD521 accelerometer

Sensor H and V Block Positions



Where the ideal horizontal (90º) and Vertical 0º or 180º position is practical, optimal signals will be obtained. Where a combined block is only possible, mounting sensors, one in horizontal axis and the vertical axis is recommended.

Each mounting block should be fixed on a flat-smooth machine bearing housing surface using lock Washers.

Mounting Pads

3.4 Vibration sensor cable installation

All conduit and cabling should be installed in accordance with electrical code and standard installation practices for electronic instruments should be followed. All conduits should be physically located in well ventilated areas free of hot spots caused by steam lines, machinery, vessels, etc. No conduit should be buried in insulation or obstructed by machinery covers, piping etc.

Conduit should be installed so that the process equipment, etc. can be dismantled or repaired without removing or damaging the conduit. Signal and power lines should be separated from one another in accordance with industrial standards and cables should not be routed through conduits or cable trays carrying voltage in excess of 30 volts A.C. or D.C

Details of assembling the threaded cable connectors to the sensor cable and preparation of the cable end for connection to the Monitor are illustrated in Figure 8, the components required for sensor cable are listed below:

A. Bulk Cable stock temperature -10° C to + 60° C
B. Cable Connector straight, P/N 43660

3.5 Grounding and Shielding

Electrical signals from the vibration sensors are quite low amplitude signals and therefore are susceptible to interference from electrical 'NOISE'. Noise may be generated by power cables that pass near the transducers or wiring, by walkie-talkies, by electrical static discharge or by large electrical equipment (motors, transformers, controllers) in the vicinity.

To minimize the possibility of interference that may cause erroneous vibration readings, it is essential to follow the recommendation related to grounding and shielding wiring.

If walkie-talkies are used in the plant, it is strongly recommended that all wiring be run in thin-wall metallic conduit. Conduit fittings and junction boxes should be electrically bonded to a good earth ground.

3.6 Mounting – Machinery Protection Transmitter

The Machinery Protection Transmitter being supplied with this system is suitable for surface or rack mounting

3.7 Mounting – Alarm & Trip Protection Devices

The Alarm & Trip protection devices are to be provided by IRD Mechanalysis during commissioning of the system and their mounting locations would be decided in consultation with the user. However, the operative current required for the ALARM & TRIP devices must be within the current limits of the Alarm & Trip relay contacts. The Contact Rating for the above relays in 5A RES@ 230V AC.

3.8 Electrical Connection

The Machinery Protection Transmitter is designed for connection to 230VAC, 50 Hz, Single Phase power supply. A circuit breaker must be provided for the protection of the system.

All the external power line wiring of the system should be installed inside thin wall electrical conduits.

3.9 External Alarm & Trip protection circuit line connections

Typical functional schematic depicting the operation of the single-channel MPT (IRD7110) and dual-channel MPT (IRD7120) with IRD544M sensors are shown respectively in Figure 9 and Figure 10.

3.10 Checking Installation

The entire Installation block should be inspected, particularly the external wiring. Each wire should be checked for connection to the required terminals, and all terminals, and all screws must be tight. If possible, an ohmmeter or voltmeter should be used to check the external wiring. Make certain that all components are mounted securely. Instructions on checking the system operation are included in chapter 4, Operation.

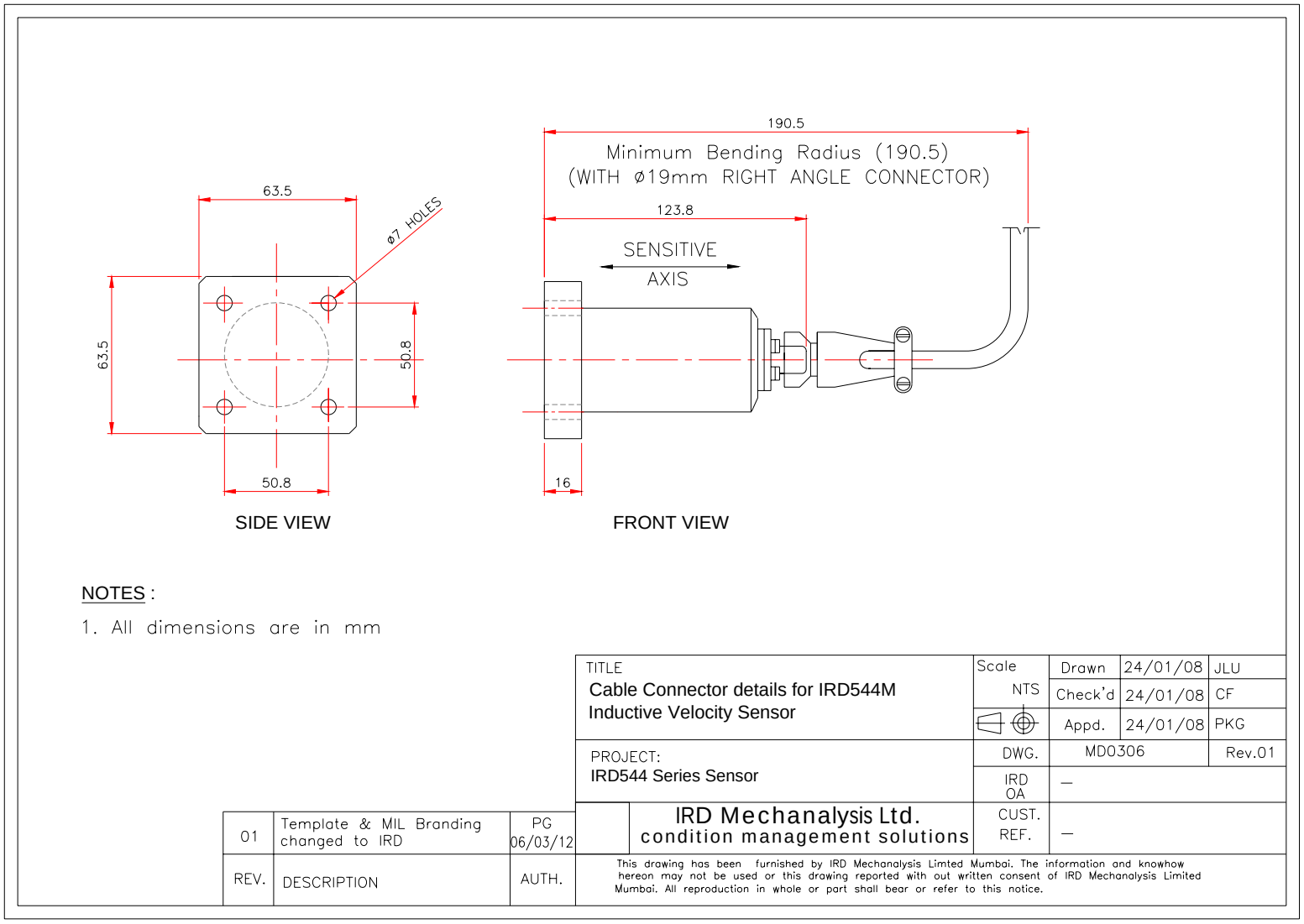
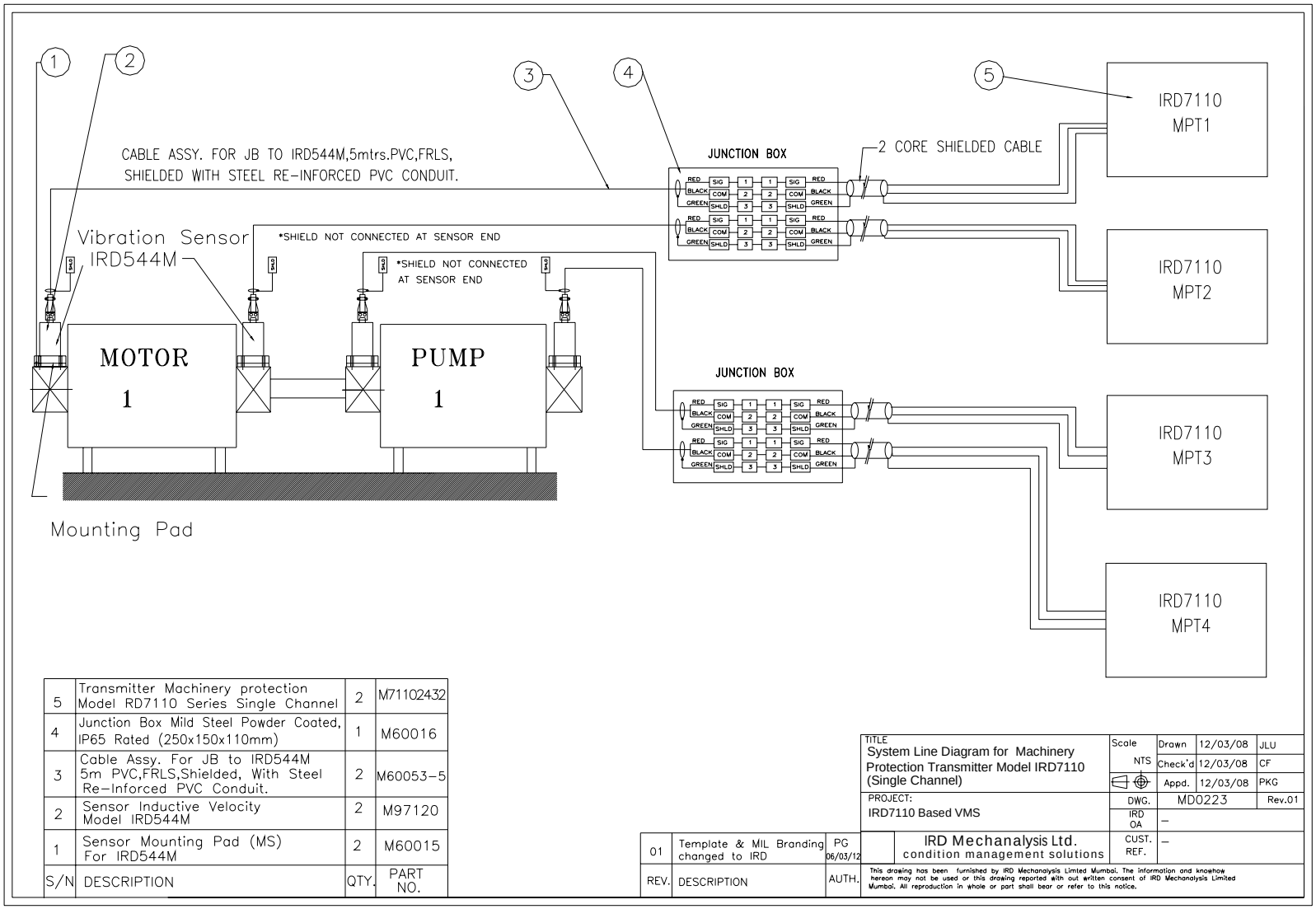


Figure 8 IRD544M sensor cable and connector details



S/N	DESCRIPTION	QTY.	PART NO.
5	Transmitter Machinery protection Model RD7110 Series Single Channel	2	M71102432
4	Junction Box Mild Steel Powder Coated, IP65 Rated (250x150x110mm)	1	M60016
3	Cable Assy. For JB to IRD544M 5m PVC,FRLS,Shielded, With Steel Re-Inforced PVC Conduit.	2	M60053-5
2	Sensor Inductive Velocity Model IRD544M	2	M97120
1	Sensor Mounting Pad (MS) For IRD544M	2	M60015

REV.	DESCRIPTION	AUTH.
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TITLE: System Line Diagram for Machinery Protection Transmitter Model IRD7110 (Single Channel)

PROJECT: IRD7110 Based VMS

IRD Mechanalysis Ltd. condition management solutions

Scale	NTS	Drawn	12/03/08 JLU
		Check'd	12/03/08 CF
		Appd.	12/03/08 PKG
DWG.	MD0223		Rev.01
IRD OA	–		
CUST. REF.	–		

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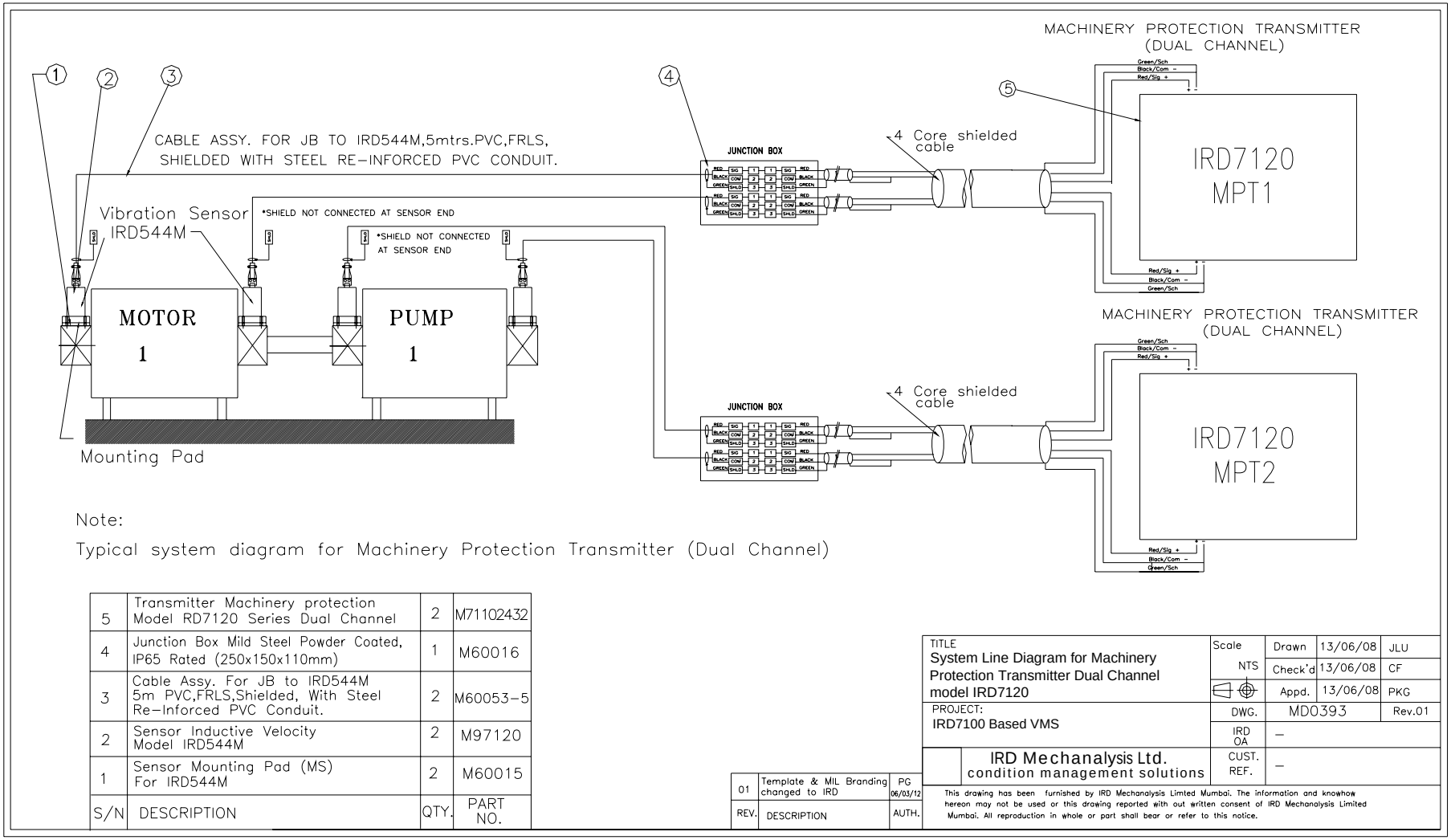
Figure 9 Functional diagram of a single channel machine protection transmitter (IRD 7110) system



5	Transmitter Machinery protection Model RD7120 Series Dual Channel	2	M71102432
4	Junction Box Mild Steel Powder Coated, IP65 Rated (250x150x110mm)	1	M60016
3	Cable Assy. For JB to IRD544M 5m PVC,FRLS,Shielded, With Steel Re-Inforced PVC Conduit.	2	M60053-5
2	Sensor Inductive Velocity Model IRD544M	2	M97120
1	Sensor Mounting Pad (MS) For IRD544M	2	M60015
S/N	DESCRIPTION	QTY.	PART NO.

01	Template & MIL Branding changed to IRD	PG 06/03/12
REV.	DESCRIPTION	AUTH.

TITLE: System Line Diagram for Machinery Protection Transmitter Dual Channel model IRD7120	Scale NTS	Drawn	13/06/08	JLU
		Check'd	13/06/08	CF
		Appd.	13/06/08	PKG
PROJECT: IRD7100 Based VMS	DWG.	MD0393		Rev.01
	IRD OA	–		
IRD Mechanalysis Ltd. condition management solutions	CUST. REF.	–		

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Figure 10 Functional diagram of a dual-channel machine protection transmitter (IRD 7120) system

4. OPERATION

4.1. General

This chapter contains instructions on checking operation of Machinery Protection Transmitter and of determining the Alarm & Trip set points.

4.2 System checkout

Open the cover of the IRD7100 enclosure box. Connect the AC power 230V AC to the terminals marked L & N, Grounding wire to be connected to terminal 'E'. Fix the sensor to the point on the machine of which vibration is to be monitored. Connect the sensor to module through sensor cable. It is to be connected to the terminals marked SIG INPUT. Switch on the power to the module and check for 'ON' – condition of OK LED (Green). Run the machine and check for signal level at the 4-20 mA terminal. The default position of switches S1 & S2 is for normal operation.

4.3 Determining Alarm Trip Set points

Three methods can be used for determining Alarm and Trip set points level:

A) The manufacturers recommended vibration levels.
B) Generic machinery vibration severity charts (A typical machinery vibration severity chart is depicted in figure 11)
C) The normal vibration or the base line level of the rotating machine.

Before attempting to select the set points, an analysis of the machine vibration should be done. This analysis will accurately show the machine condition and machine faults indicated could be corrected. If the true condition of machine operating is known, the Alarm and Trip Set-points could be selected more intelligently than when machine condition is not known.

The alarm and trip set-points levels recommended by the machine manufacturer should always be used, if available. If these are not available, indicative values from the vibration severity charts could be used. Still worse, if instruction cannot be determined from the vibration severity charts, or from the vibration levels existing in the machine, following empirical relationships of the alarm and trip levels could be followed:

Alarm Set point = 2/3 RD of Trip Set point

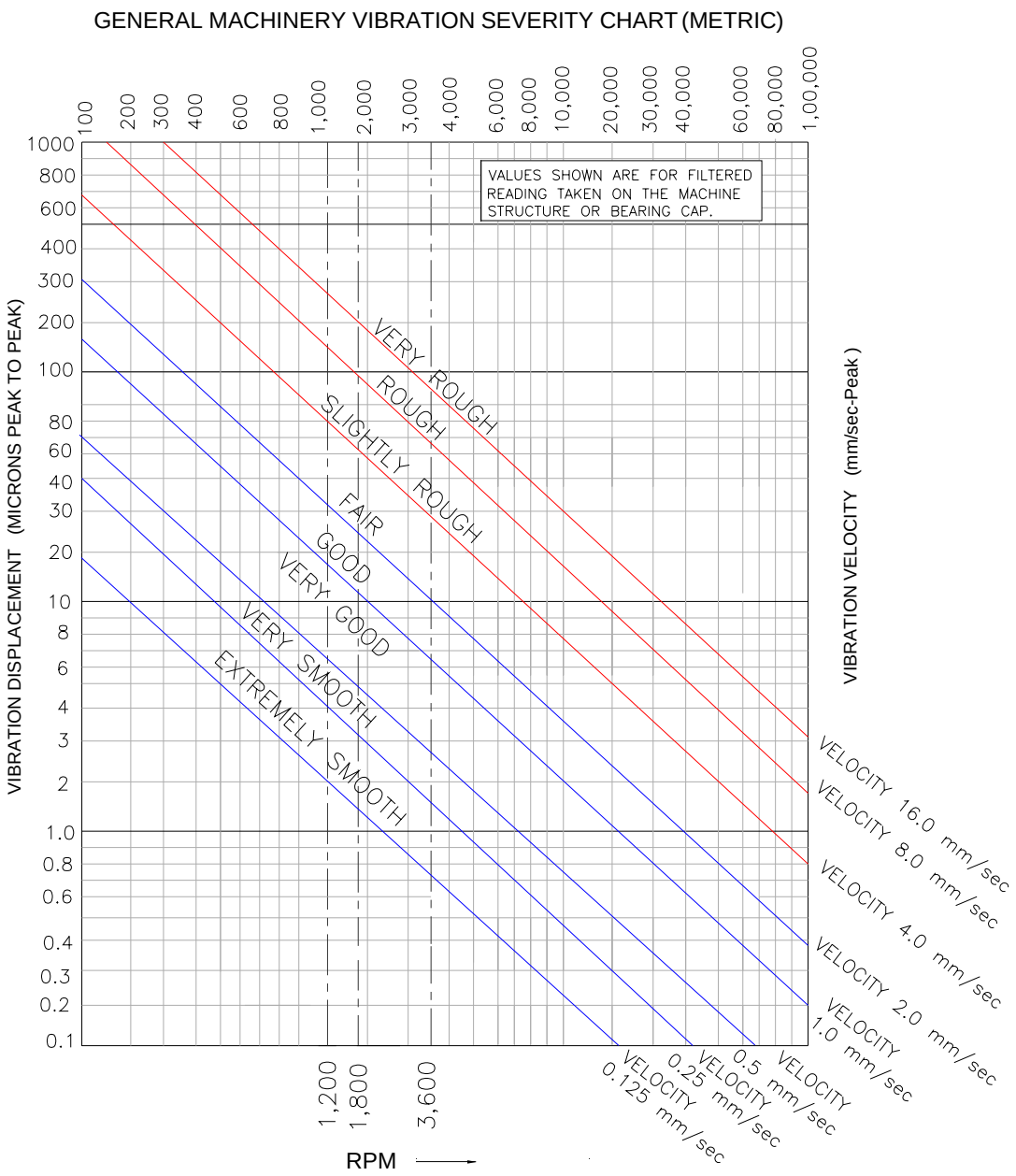

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Figure 11 A general machinery vibration severity chart (Metric)

5. CALIBRATION PROCEDURE FOR MACHINERY PROTECTION TRANSMITTER

5.1 CALIBRATION EQUIPMENT

The Machinery Protection Transmitter is calibrated for nominal sensitivity of the sensor used. Standard calibration procedure consists of applying a precise (calculated) signal to the Machinery Protection Transmitter input terminals (to simulate the sensor output signal) and adjusting the potentiometers on the respective circuit boards to obtain the expected voltage (0-5 VDC) and recorder output (4-20mA) at output terminals.

Equipment required for calibration:

1. Function Generator
2. Digital Multi-meter

NOTE:

It is ensured that the test instruments used for calibration are calibrated with references traceable to National / International Standards.

5.2 CALIBRATION PROCEDURE

1) Ensure that power to the Machinery Protection Transmitter is switched 'OFF'

2) Open the top cover of the Machinery Protection Transmitter by removing the four top screws.

3) Disconnect the sensor' input cable, 4-20mA current output cable and other output cables from the terminal strips CH1 AND CH2.

NOTE:

Refer Figure 12 and Figure 13 respectively for position of terminal strips in single channel and dual channel Machine Protection Transmitters.

4) To calibrate channel 1, connect the output wires from the Function Generator across terminals 1 (SIGINPUT) and Terminal 2 (SIGGND), connect the voltmeter across Terminals 6 (+) and Terminal 7 (-) and mille-ampere meter across Terminal 4 (+) and Terminal 5 (-) of the lower terminal strip 'CH 1'.

5) To calibrate channel 2, connect the output wires from the function generator across Terminal 1 (SIGINPUT) and Terminal 2 (SIGGND), connect the voltmeter across Terminal 6 (+) and Terminal 7(-) and mille-ampere meter across Terminal 4 (+) and Terminal 5(-) of the upper terminal strip 'CH 2'.

6) Switch ON the power to the Machinery Protection Transmitter.

7) Set the Frequency on the Function Generator to 100 Hz and the AC Volts output corresponding to the desired full-scale reading (typically 30 mV RMS / mm/sec PK to simulate IRD544M Vibration Sensor). To calibrate a Machinery Protection Transmitter for a Full Scale reading of 250 microns Pk-Pk, set the output of the Function Generator to 2366 mV AC RMS.

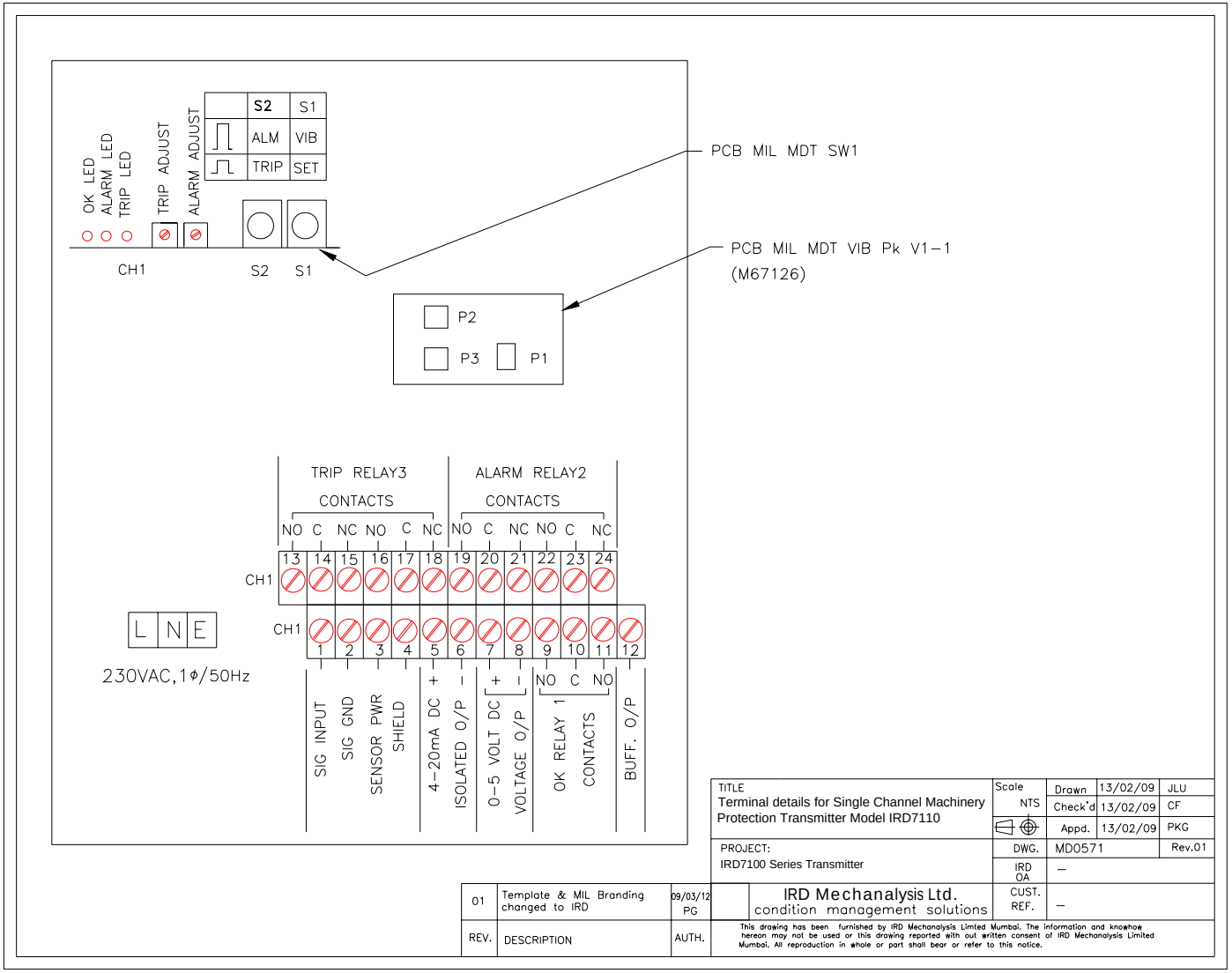

Figure 12 Termination details for single-channel Machinery Protection Transmitter (IRD 7110)

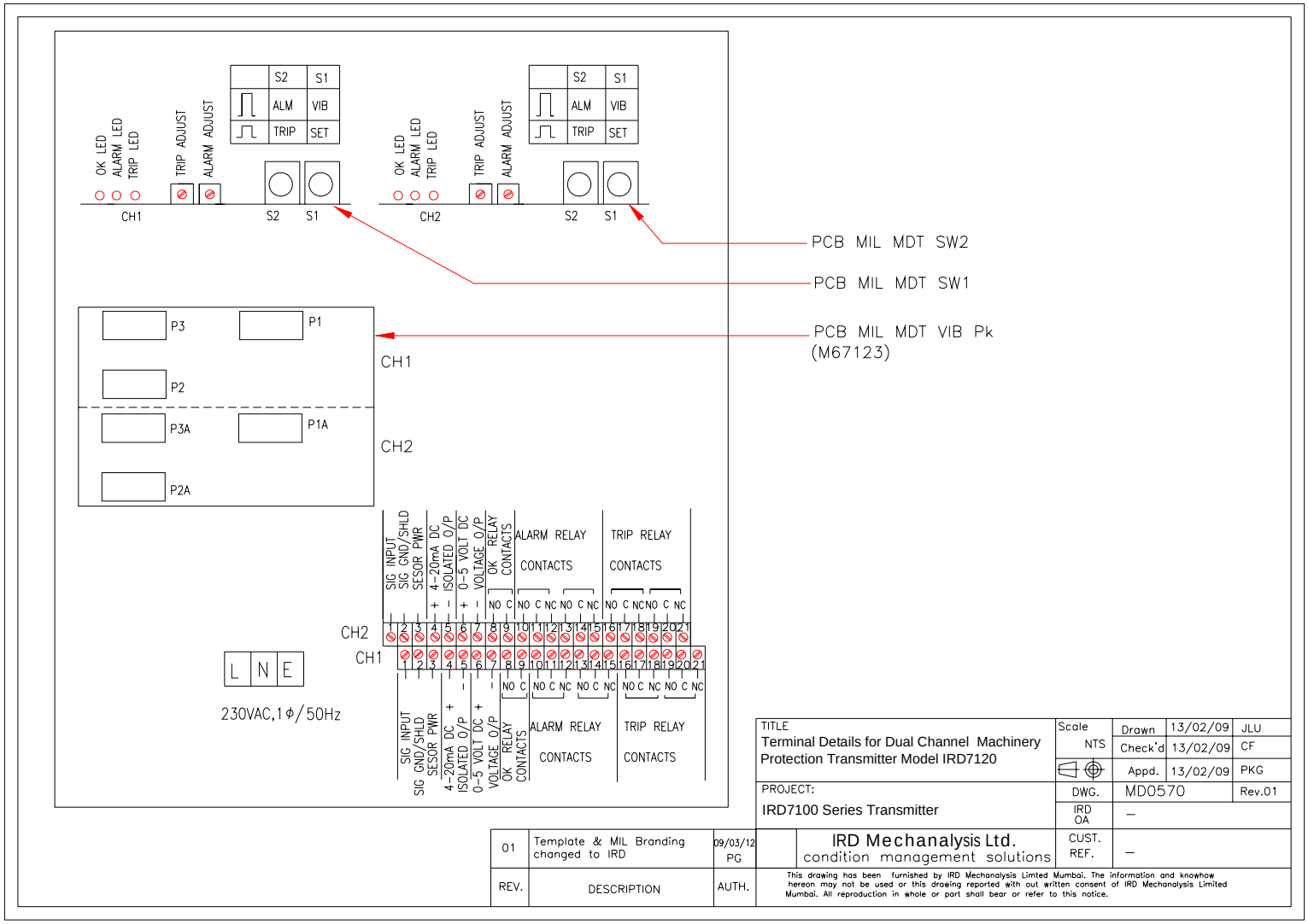

Figure 13 Termination details for the dual-channel Machinery Protection Transmitter (IRD7120)

To calibrate channel 1 (Refer Figure 12)

8) Set the Function Generator AC output to 2366 mV and frequency to 100 Hz. Connect the output of Function Generator to terminals as detailed in point 5 above. Adjust Pot (P1) on circuit board (MIL MDT VIB PK V1-1) to obtain 5.00 Volts DC across terminal 6 (+) and Terminal 7 (-).

9) With the input conditions maintained as in step 9, ensure that voltage across Terminals 6 and Terminal 7 is 5.00 Volts DC.

10) Adjust SPAN POT (P3) on the circuit board (MIL MDT VIB PK V1-1) to read 20.00mA.

11) Disconnect the output from the Function Generator and short the input terminals of the Machinery Protection Transmitter.

12) Adjust ZERO POT (P2) on circuit board (MIL MDT VIB PK V1-1) to read 4.00 mA current.

13) Repeat steps 8 to 12 until no further adjustment is necessary.

14) To Calibrate Channel 2, disconnect the wires terminated on terminal strip 'CH 1' and make connections as detailed in point 6 above

15) Repeat steps 8 to 12 until no further adjustment is required.

NOTE:

Potentiometers to be adjusted for calibration of channel 2 are P1A, P3A and P2A respectively on PCB MIL MDT VIB Pk as shown in Figure 13.

5.3 SENSOR CALIBRATION

The calibration and recalibration of the vibration sensors supplied with the MPT system could be done at the state of the art Calibration Lab at IRD Works, Mumbai (Figure 14).

This Lab has a state of the art TransCal system from Beran Instruments UK. It is an automatic digital sensor calibration system. It undertakes calibration of a sensor throughout its frequency range. The master reference sensor is traceable to National Standards. Calibration Certificates are generated and stored for each sensor tested. IRD has constructed an environmentally controlled Lab environment for all sensor calibration tests. This service could be availed by all users irrespective of sensor manufacturer. Further details could be obtained from our regional offices in the four metros, Works or National Service Centre, Mumbai. The addresses and contact details are given at the start of this manual.

Figure 14 State of the art IRD Calibration Lab, Mumbai

5.4 ALARM AND TRIP LEVEL SETTING

Before attempting to select the set points, an analysis of the machine vibration should be done. This would accurately show the machine condition and machine faults indicated could be corrected. When the real operating condition of machine is known, the Alarm and Trip level set points can be selected more intelligently as against when the real operating conditions of the machine are not known.

Machinery Protection Transmitter displays the set levels for ALARM and TRIP as a voltage level varying between 0-5 Volts DC, where 0 V DC corresponds to 0 microns Pk - Pk and 5 V DC correspond to 250 microns Pk - Pk. To adjust the ALARM and TRIP set points in a Vibration Transmitter calibrated for Full Scale Reading of 0-250 microns Pk - Pk., perform the following steps.

NOTE:

Please refer to Figure 12 & 13 for the terminal configuration of IRD7100 transmitter, 1-Ch & 2-Ch versions

a. Connect the Voltmeter across terminal 6 (+) and terminal 7 (-) of terminal strip CH 1 for Channel 1 (CH 2 for channel 2).

b. Depress, switch (S1) on circuit board MIL MDT SW1 to put channel 1 (Switch (S1) on circuit board MIL MDT SW2 for channel 2) of Machinery Protection Transmitter (MPT) into SET mode.

c. The set ALARM level can be measured in Volts DC across terminal 6 (+) and Terminal 7(-) of terminal strip CH 1 (CH 2 for channel 2), where 5 Volts DC corresponding to Full Scale Range.

d. Adjust 'ALARM ADJUST' trim-pot on circuit board MIL MDT SW1 ('ALARM ADJUST' trim-pot on circuit board MIL MDT SW2 for channel 2) to set the desired ALARM level.

e. Depress Switch (S2) on circuit board MIL MDT SW1 (Switch (S2) on circuit board MIL MDT SW2 for channel 2) of Machinery Protection Transmitter to measure TRIP LEVEL.

f. The set TRIP level can be measured in Volts DC across terminal 6(+) and terminal 7(-) of terminal strip CH 1 (CH 2 for channel 2), where 5 Volts DC corresponds to Full Scale Range.

g. Adjust 'TRIP ADJUST' trim-pot on circuit board MIL MDT SW1 for channel 1 ('TRIP ADJUST' trim-pot on circuit board MIL MDT SW2 for channel 2) to set the desired TRIP level

h. Release switch (S1) on circuit board MIL MDT SW1 to return channel 1 (Switch (S1) on circuit board MIL MDT SW2 for channel 2) of Machinery Protection Transmitter (MPT) into VIB mode.

i. Disconnect the wires terminated on terminal strip 'CH 2' and reconnect the sensor' input cable, 4-20mA current output cable and other output cables to the terminal strip CH 1 and CH 2.

j. Switch OFF the power to the Machinery Protection Transmitter.

k. Close the top cover of the machinery protection transmitter by tightening the four top screws.

6. SPECIFICATIONS

6.1 IRD7100 Machinery Protection Transmitter- (Vibration)

The model IRD7100 series are available as Single / Dual or Four channel Machinery Protection Transmitter in a variety of configurations. They are a cost effective solution for measuring up to four vibration points simultaneously in a rugged industrial environment. The transmitter converts rotating machinery vibration measurements into industry standard 4-20mA or 0-5Volt. Signal data can be transmitted to the Central Control Room or DCS for trending or is available for separate or integrated local display in the transmitter. These high integrity machinery vibration protection transmitters are proven throughout industry providing warning and trip signals suitable for rotating machines such as: ID, FD, PA Fans, Mill Motors, Boiler Feed Pumps, Blowers, Compressors etc.

The IRD7100 series can be installed near to the machinery measurement point thus reducing the length of sensor signal cables. Low cost standard instrumentation cabling suitable for 4-20mA signal can be used with IRD7100. Enclosure options are aluminium die-cast powder coated or polycarbonate certified to IP65. The latter come with digital displays and Time Wave Form buffered output BNC sockets for on-site FFT analysis.

IRD Machinery Protection Transmitters measure any one of three vibration parameters depending on the sensor selected. Below is a self selection part number chart to enable the user to customise the transmitter to any machinery vibration application. At the time of placing the order, the client must specify the required scale and range or listed part number since the unit is calibrated to Traceable National Standards before despatch.

IRD Part Number Selector System

IRD Mechanalysis

Product Series
IRD7100 Machinery Protection Transmitter

Channels
10 – 1 Chl
20 – 2 Chl
40 – 4 Chl

Unit Range
1 - 0-1g
2 - 0-2.5g
3 - 0-10 mm/s
4 - 0-20 mm/s
5 - 0-50 mm/s
6 - 0-250 microns
7 - 0-500 microns
8 – Customised
9 - Not Stated

Parameter
1 - 0-Peak
2 - Peak-Peak
3 - RMS
9 - Not Stated

Voltage
1 - 110VAC
2 - 240VAC
3- 24VDC
4- SMPS

M	7	1	2	0	3	7	2	2	2

NOTES:

* For Shaft vibrations with ECP, only measure in microns.
For Case vibration in microns use velocity sensors models IRD544M or Piezo Velocity Series IRD531/2/3/4
Contact IRD for its wide range of vibration sensors

Sensor Input
1 - Accelerometer
2 – Inductive Velocity
3 - Piezo Velocity
4 - ECP *
9 - Not Stated

Display & Enclosure
1 - Blind - Al Die-Cast IP65
2 - Digital - POLY IP65 & TWFBNC Sockets

SAMPLE DESCRIPTION WHEN ORDERING – (Alter variables in BOLD)	PART NO.
Transmitter, Machinery Protection, model IRD7100 series (4-20mA with 2 relays/Chl): **Dual** Channel. Suitable for Vibration Sensor **IRD532**, Range **0-500 microns**, Parameter **P-P**, Enclosure **Polycarbonate** IP65 Sealing, **Digital Display** with **TWF BNC Sockets**, 240VAC Supply.	M712037222

SPECIFICATION

Construction:	- Ruggedly packaged in die cast Aluminium or Polycarbonate IP65 enclosures
Mounting:	- Surface on Site or Panel mounted
Channels:	- Single / Dual or Four Channel Input and Output options.
Signal Input:	- Inductive or Piezo Velocity Sensors for Absolute Casing Vibration - Accelerometers, wide selection available for Absolute Casing Vibration - Eddy Current Probes (Non Contact, Relative Shaft Vibration)
Frequency Response:	- 5–2,500 Hz within ± 5 %
Display:	- Blind with Al Enclosure - Four Digital Polycarbonate - LED: Sensor OK, Alarm and Trip visible with Polycarbonate Enclosure, otherwise internal.
Alarm & Trip Set points:	- Independent and adjustable over full scale range (5% - 100% is recommended) by trim pot inside the enclosure.
Alarm Relays:	- One Independent Relay per channel, 1 C/O contacts rated at 5A resistive @ 230V AC Normally de-energised (non fail safe). Automatically resets when signal level falls below the set point.
Trip Relays:	- One Independent Relay per channel, 2 C/O contacts rated at 5A resistive @ 230V AC Normally de-energised (non fail safe)
Circuit Fault Relay:	- Independent Reed relay. Contact rating 0.25A resistive @ 28V DC.
Signal Output:	- Buffered TWF output per channel from BNC Sockets in Polycarbonate option only - 4-20 mA recorder / DCS isolated with max load of 250 ohms. - 0-5 V DC with 1K ohm impedance optional for Communications.
Accuracy:	- 1% @ full scale
Power:	- 115 / 230VAC/90 – 270V AC (SMPS), 50/60Hz, Single Phase, 15VA or +24VDC, 5VA
Environmental	
Operating temp:	- 0 °C to 65°C ambient
Storage temp:	- -18 °C to 65°C ambient
Humidity	- 95% non-condensing
Weight:	- AL:5Kg or Poly 4.6Kg
Dimensions mm:	- AL 230(L)x200(W)x110(H). Polycarbonate 300(L)x3000(W)x170

The Vibration People of IRD Mechanalysis can be contacted at the following branches or your local distributor:

Mumbai	Delhi	Kolkata	Chennai	International
1/5, Marol Co-op. Industrial Estate Ltd, Off. Mathuradas Vasanji Rd. Marol, Andheri (East), Mumbai 400 059	Sagar Deep, Plot No.11 LSC Saini Enclave, Vikas Marg New Delhi 110 092	153/A, 2nd Floor VIP Road Kolkata 700 054	7-C, Chesney Nilgiri Apts 65, Commander-In-Chief Rd Chennai 600 105	1/5, Marol Co-op. Industrial Est. Ltd, Off. Mathuradas Vasanji Rd. Marol, Andheri (E) Mumbai 400 059, INDIA
Tel: +91(0)22-2852-0178 Fax: +91(0)22-2852-1814 sales@irdmech.com Service@irdmech.com	Tel: + 91(0)11-2237-3916 Fax: +91(0)11-2237-0778 salesNR@irdmech.com	Tel: +91(0)33-2355-2062 Fax: +91(0)33-2355-9214 salesER@irdmech.com	Tel: +91(0)44-2823-0726 Fax: +91(0)44-2823-4702 salesSR@irdmech.com	Tel: +91-22-2852-0178 Fax: +91-22-2852-1814 sales@irdmech.com

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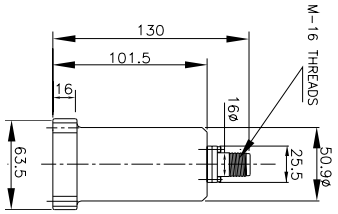
6.2 IRD544M Inductive Velocity Sensor Specifications

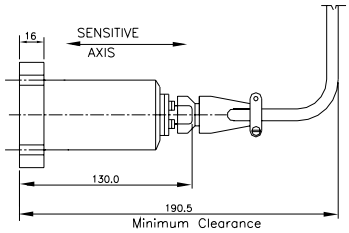
The model IRD544M inductive velocity sensor is an industrial vibration measuring device for continuous on-line machinery protection, especially at the steam end of turbines (<260ºC) and generator bearings. In production for over 55 years it continues to be the world's most widely used velocity sensor. It can be mounted horizontal or vertical at the bearing housing or other critical points on a machine.

The IRD544M is environmental friendly, generating its own power. It's high output, low impedance and frequency response suits most types of machinery protection. The sensor's case insulates the signal from the housing to eliminate false alarms often encountered from ground loops and power surges. The sensor's hard anodized aluminium housing is IP65, waterproof, dustproof and approved for use in Class1 Division 2 hazardous areas. Calibrated to traceable National Standards, the sensor is supplied with a full frequency calibration test certificate. It can only be serviced at an IRD National Service Centre.

BILL OF MATERIALS	Qty	Part Number
IRD544M Inductive Velocity Vibration Sensor, Square Base – On-Line		M97120
Optional Accessories:		
Magnetic deflecting shroud (reduces AC magnetic field by 100:1)	1	M24825
Cable Assembly 10m, Teflon 3.5mm Dia (<260Degs C) Stainless Steel Conduit.. Mil 2 Pin connector with spade lugs at free end.	1	M60101
Right-angle connector rated for continuous operation at 121°C	1	M14797
Mounting Pad MS 60x60x16mm with M6 thread tapped Blackodised	1	M60015
Mounting Block MS (XY) 60x60x60mm with M6 thread tapped Blackodised	1	M60014
Mounting Bracket MS (XY) for Sensor	1	M60019

Mounting





Technical Performance

Frequency Response:	14 to 1,000 Hz within <8% 10Hz - 20% (average) at 21°C
Sensitivity:	42.52 mV/mm/sec ± 10%
Impedance:	R=2k ohms, L = 0.7 H at 21°C
Maximum Amplitude:	3175 microns Pk - Pk to 70 Hz; 30 g above 70 Hz
Transverse Response:	Less than 5% (average) 10 to 1,000 Hz
Isolation:	Signal insulated from case

Mounting

Orientation:	Any (horizontal & vertical best)
Mounting:	(4) holes 7.15mm Dia. on 2 × 2 centres
Grounding:	Case and signal ground isolated
Connector:	2-pin Mil Spec

Environmental

Operating range:	-40°C to 260°C
Housing:	IP65
Classification:	Class1, Div2

Weight & Dimensions

Weight:	700 grams
Dimensions:	63.5mm (W) x 63.5mm (L) x 130.0 (H) overall
Construction:	Aluminium, Hard Anodised

The Vibration People of IRD Mechanalysis can be contacted at the following branches or your local distributor:

Mumbai	Delhi	Kolkata	Chennai	International
Tel: +91(0)22-2852-0178 Fax: +91(0)22-2852-1814 sales@irdmech.com Service@irdmech.com	Tel: + 91(0)11-2237-3916 Fax: +91(0)11-2237-0778 salesNR@irdmech.com	Tel: +91(0)33-2355-2062 Fax: +91(0)33-2355-9214 salesER@irdmech.com	Tel: +91(0)44-2823-0726 Fax: +91(0)44-2823-4702 salesSR@irdmech.com	Tel: +91-22-2852-0178 Fax: +91-22-2852-1814 sales@irdmech.com Service@irdmech.com

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CE

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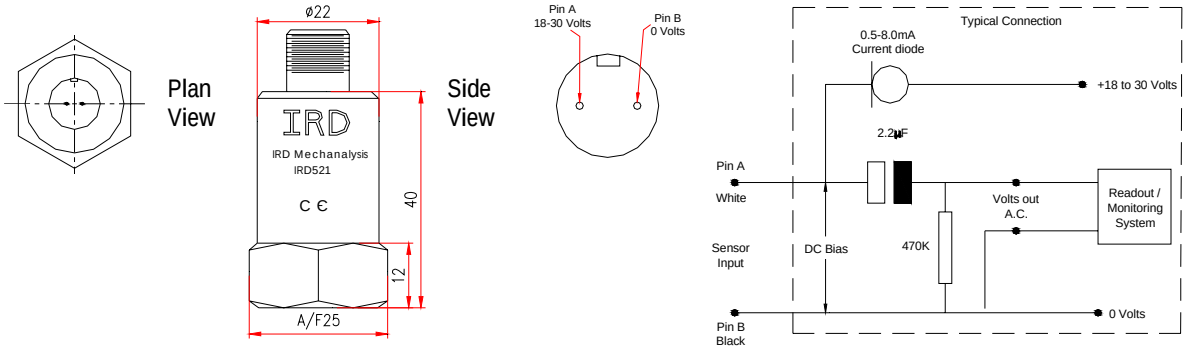
6.3 IRD521 Accelerometer Specifications

The IRD Mechanalysis model IRD521 is a standard top exit accelerometer for measuring vibration on industrial rotating machinery. It has a top Mil 2-Pin Connector. This industrial grade sensor is primarily used with online installations. An option is available with a machined QuickFit mount when associated pads are mounted on machinery measurement points. This offers a superior frequency range compared to magnetic mounts and achieves consistent data collection for fixed machine check points.

Applications: Applies to most Process Plants using Compressors, Blowers, Conveyors, Cooling Tower Fans, ID, FD, PA Fans, CW Pumps, Gear Boxes, Motors, Paper Machinery, Turbines etc.

Supplied Accessories	Qty	Part Number	Optional Accessories	Qty	Part No.
Sensor Mounting Adaptor Stud, M6	1	M60154	Cable 15 m Length with Mil 2-Pin connector		M60048
Nationa Traceable Calibration Certificate	1	CCIRD521	Sensor Pad SS for Accel. Stud QuickFit to M8 Male		M60118

Dimensions & Connections



Technical Performance

Mounted Base Resonance	22 kHz (nominal)
Sensitivity	100 mVg ± 10% Nominal 80 Hz at 22°C
Frequency Response	2 Hz to 10 kHz ± 5% 0.8 Hz to 15 kHz ± 3 dB
Isolation	Base isolated
Measurement Range	± 80g
Transverse Sensitivity	Less than 5%

Electrical

Electrical Noise	0.1 mg max
Current Range	0.5 mA to 8 mA
Bias Voltage	10 – 12 Volts DC
Settling Time	2 seconds
Output Impedance	200 Ohms max
Case Isolation	$>10^8$ Ohms at 500 Volts

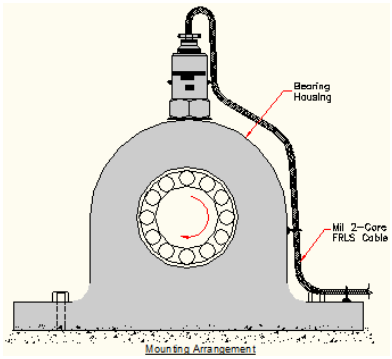
Environmental

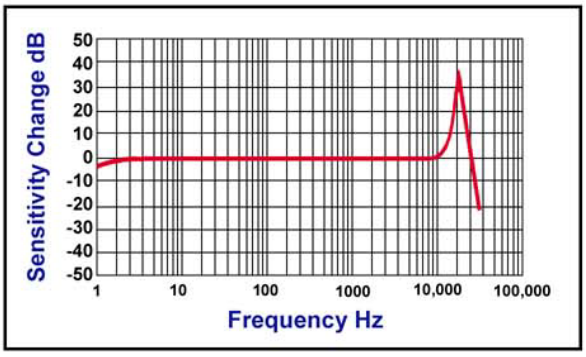
Operating Temperature Range	-55 to 140°C
Sealing	IP67
Maximum Shock	5000 g
Emissions	EN61000-6-4:2001
Immunity	EN61000-6-2:1999

Mechanical

Case Material	Stainless Steel
Sensing Element /Construction	PZT / Compression
Mounting Torque	8 Nm
Weight	110 gms (nom)
Maximum Cable length	1000 meters
Connector	2-pin Mil-C-5015
Mounting	¼" – 28 UNF Female
Options	Filters, Other sensitivities, Various connector assemblies Other Mountings

Mounting & Frequency Response





Part Number Selector

M = IRD Mechanalysis Product Prefix

Product Series

Cable/Conn Type
- 08 – Fire Retardant connector
- 50 – Mil 2 Pin Connector
- 54 – M12 Connector

Integrated Cable Length
- 000 – not applicable

M	5	2	1	1	0	0	5	0	0	1	0	0	0

Sensor Output
- 010 – 10 mV/g
- 030- 30 mV/g
- 050 – 50 mV/g
- 100 – 100 mV/g
- 250 – 250 mV/g
- 500 – 500 mV/g

Mounting Threads
- 01 – ¼"-28 UNF Female
- 02 – ¼"-28 UNF Male
- 05 – Quick Fit Female
- 06 – M6X1mm Male
- 08 – M8X1.25mm Male
- 10 – M10X1.5mm Male
- 12 – M12X1.75mm Male

Note on Sensor Output

- Most machinery applications are suitably covered by a sensor with a sensitivity of 100mV/g. However, you may wish specify different sensitivities because of the unique dynamic range of the particular machine to be monitored.
- A high sensitivity sensor, 500mV/g or 1V/g would be used for those machines operating at low speeds (say below 600 rpm) with high mass structures where vibration levels signals will inherently be of a low amplitude .
- For high dynamic ranges such as a high speed gearbox, you would use a lower sensitivity e.g. as low as 10mV/g, 50mVg etc.
- To ensure sensors are matched to specialised applications we recommend a detailed vibration analysis is undertaken first
- IRD Mechanalysis Consultancy Services can assist you in the best sensor solution.

The Vibration People of IRD Mechanalysis can be contacted at the following branches or your local distributor:

Mumbai	Delhi	Kolkata	Chennai	International
1/5, Marol Co-op. Industrial Estate Ltd, Off. Mathuradas Vasanji Rd. Marol, Andheri (East), Mumbai 400 059	Sagar Deep, Plot No.11 LSC Saini Enclave, Vikas Marg New Delhi 110 092	153/A, 2nd Floor VIP Road Kolkata 700 054	7-C, Chesney Nilgiri Apts 65, Commander-In-Chief Rd Chennai 600 105	1/5, Marol Co-op. Industrial Estate Ltd, Off. Mathuradas Vasanji Rd. Marol, Andheri (East), Mumbai 400 059
Tel: +91(0)22-2852-0178 Fax: +91(0)22-2852-1814 sales@irdmech.com Service@irdmech.com	Tel: + 91(0)11-2237-3916 Fax: +91(0)11-2237-0778 salesNR@irdmech.com	Tel: +91(0)33-2355-2062 Fax: +91(0)33-2355-9214 salesER@irdmech.com	Tel: +91(0)44-2823-0726 Fax: +91(0)44-2823-4702 salesSR@irdmech.com	Tel: +91-22-2852-0178 Fax: +91-22-2852-1814 sales@irdmech.com Service@irdmech.com

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Keeping you Going

7. Support Services

Keeping you Going is an IRD Mechanalysis® commitment. Product support is an essential aspect of any progressive business. IRD Mechanalysis® Limited (IRD) is no exception; the company has been supporting former IRD, then Entek well as IRD's products for the past 25 years. Indeed the acceptance and usage of these products by Indian industry is directly attributed to the dedicated support IRD has provided. IRD continues to invest in Customer Support. Just 'keeping you going' is not enough; we have facilities to ensure systems match world standards. Our instruments and systems are calibrated to National Standards.

National Service Centre, Mumbai

The very nature of industrial electronic instruments, both portable and permanent, demands regular calibration. From time to time it becomes necessary to repair of damaged items such as cables, sensors, power supplies and occasionally electronic circuitry etc. IRD Mechanalysis® is well equipped for such eventualities

When equipment is in need of repair, a reliable repair centre that is responsive, convenient, and cost effective is required. IRD Mechanalysis® Ltd offers in-house as well as site calibration (traceable to National Standards) and repair services. This also covers our partner's product range; IRD also supports many obsolete products where components are still available or have been indigenised.

As the original equipment manufacturer (OEM), we are the most knowledgeable and the qualified to service our products. Supported by more than 50 combined years of technical service experience, our repair technicians provide the highest quality service for your IRD products. At our **National Service Centre** in Mumbai we stock a comprehensive supply of spare parts to ensure a quick turnaround.

BENEFITS and FEATURES

For IRD Mechanalysis® Ltd's customers, the **National Service Centre** offers the following:

- Fast in-house turnaround options
- Expert factory technical assistance
- Industry competitive repair charges
- In-house calibration of vibration sensors (traceable to National Standards)
- Regular cleaning and calibration to extend product life and reliability
- Instrument hire during repair period to minimize programme interruption
- 1 Year warranty on Product Exchange Programme
- Fixed Price Repair – Whole Product 3 months warranty
- 90-day parts warranty on all repair and calibration services

PRODUCTS SUPPORTED

The **National Service Centre** has the capability to support the following products:

- Data Collectors: IRD817, IRD818, IRD890, IRD Fast Track®, dataPAC®1000, dP1250, dP1500; Enpac® series. Also Commtest VB series of vibration analysers and profiler
- Portable Instruments: IRD306, MIL306, MIL306C, MIL306D, MIL306DD, IRD308, IRD350, IRD355, IRD360, IRD810, IRD811, MIL811, MIL811D, IRD820, IRD838, IRD870, IRD880, IRD885
- Protection Monitors: 5802, 5806, 5815, 5915, 5800 Cards, 6100, 6600 Series, MIL8700 Series, MIL8800 Monitor
- Machinery Diagnostic Systems: Beran 766, 767, 768
- Machinery Protection Transmitters: IRD7100 Series, IRD7200 Series, IRD7300 Series
- Balancing Systems: 245, 246, MILB50 and MILB150

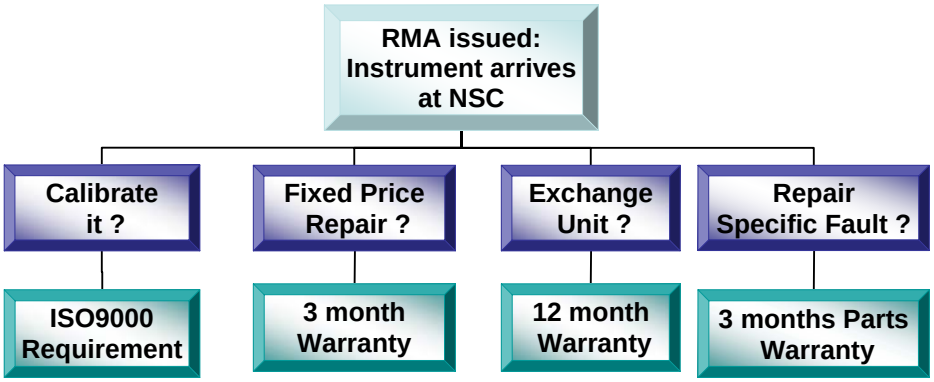
™ dataPAC, Enpac, and Fast Track are trademarks or registered trademarks of IRD Mechanalysis

Turnaround time and repair capabilities are dependent upon condition of equipment and spare parts availability at the time of the product assessment.

How the National Service Centre Optimises Clients Investments

- Annual Maintenance and Calibration ensures years of trouble free operation to maximize the investment in your condition monitoring equipment.
- A complete in-house supply of spare parts assures quick turnaround for product repairs.
- State of the art Sensor Calibration automatically over the full frequency range traceable and up to date to National Standards of the UK.
- IRD Mechanalysis® Ltd's ISO 9001 certification guarantees quality repairs and service.
- Our highly qualified Repair Centre technicians, supported by more than 50 combined years of technical service experience, give you the best available service and results.
- As the only authorized service centre for IRD Mechanalysis Ltd Products, our **National Service Centre** provide the most knowledgeable, experienced and committed support for all of our products.
- We offer a IRD Product Exchange Programme, Fixed Price Repair or Standard Repair and Calibration Only Services: the applicable warranty benefits are given below:

Service Options & Process



HOW TO GET SERVICE?

1. Before dispatching any instrument, cable, sensor etc it must be given an RMA number issued by the **NSC,** see below
2. For a Return Material Authorization number (RMA) this can be downloaded from our web site: www.irdmechanalysis.com
3. To discuss any instrument servicing issues please call Tel: +91(0)22-2852-0178 or one of our Regional Offices
4. Alternatively Email us at : service@irdmech.com
5. Complete the RMA and fax back to IRD Mechanalysis® at Fax: +91(0)22-2832-1814
6. When the RMA has been issued, the Client sends the instrument with all accessories together with the Purchase Order making reference to the RMA Number.
7. Upon receipt, IRD will evaluate the instrument and make a recommendation to the Client (if no instructions on type of service have been received earlier).
8. Only when the repair has been completed and payment has been received, will the instrument be returned to the Client.
9. Warranties will apply depending on the Repair Category option

LOCATIONS

National Service Centre
1/5, Marol Co-op. Industrial Estate Ltd,
Off. Mathuradas Vasanji Rd,
Marol
Andheri (East)
Mumbai
400 059
INDIA
Tel: +91(0)22-2852-0178
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400 021
INDIA
Tel: + 91(0)22-2202-7430
Fax: +91(0)22-2285-0480
Email: ceo@irdmech.com
www.irdmechanalysis.com

RMA (Return Materials Advisory) Form

ATTN: IRD Mechanalysis Ltd, National Service Centre, 1/5 Marol Co-op, Industrial Estate Ltd, Off Mathurdas Vasanji Road, Marol, Andheri (E), Mumbai 400 059, India. +91(0)22-2852 0178 / 2906

FAX BACK RMA FORM: +91(0)22-2852 1814 or Email to : service@irdmech.com

Product Model:	Serial No:
Fault details (if applicable): Please tick appropriate box	

Warranty		Calibration		Fixed Price Repair		Exchange Units		Standard Repair	

This is to advise that we are planning to dispatch the above instrument for Calibration / Repair, as detailed above, on (date):_____

Customer's Purchase Order No:		**Date:**	
P.O. Value: Rs. (if agreed)			
AMC Contract No (if applicable)**:**			

A purchase order must be provided before inspection will commence unless an AMC Contract is in place.

When NSC receives the Return Material Authorisation it will issue an RMA number. Only then send in the instrument with its RMA Nos tagged on the instrument for tracking purposes. A PO must accompany the instrument referencing the RMA Nos.

Please complete the details below to enable us to process your requirements as quickly as possible.

MUST BE COMPLETED IN ALL CASES			
Invoice Address		**Delivery Address**	
Company:		Company:	
Department		Department	
Address:		Address:	
City		City	
State		State	
PIN		PIN	
Contact Name:		**Contact Name:**	
Telephone:		Telephone:	
Mobile:		Mobile:	
Fax:		Fax:	
Email		Email	
		Users Name:	
		Designation	
		Signature	
		Date	

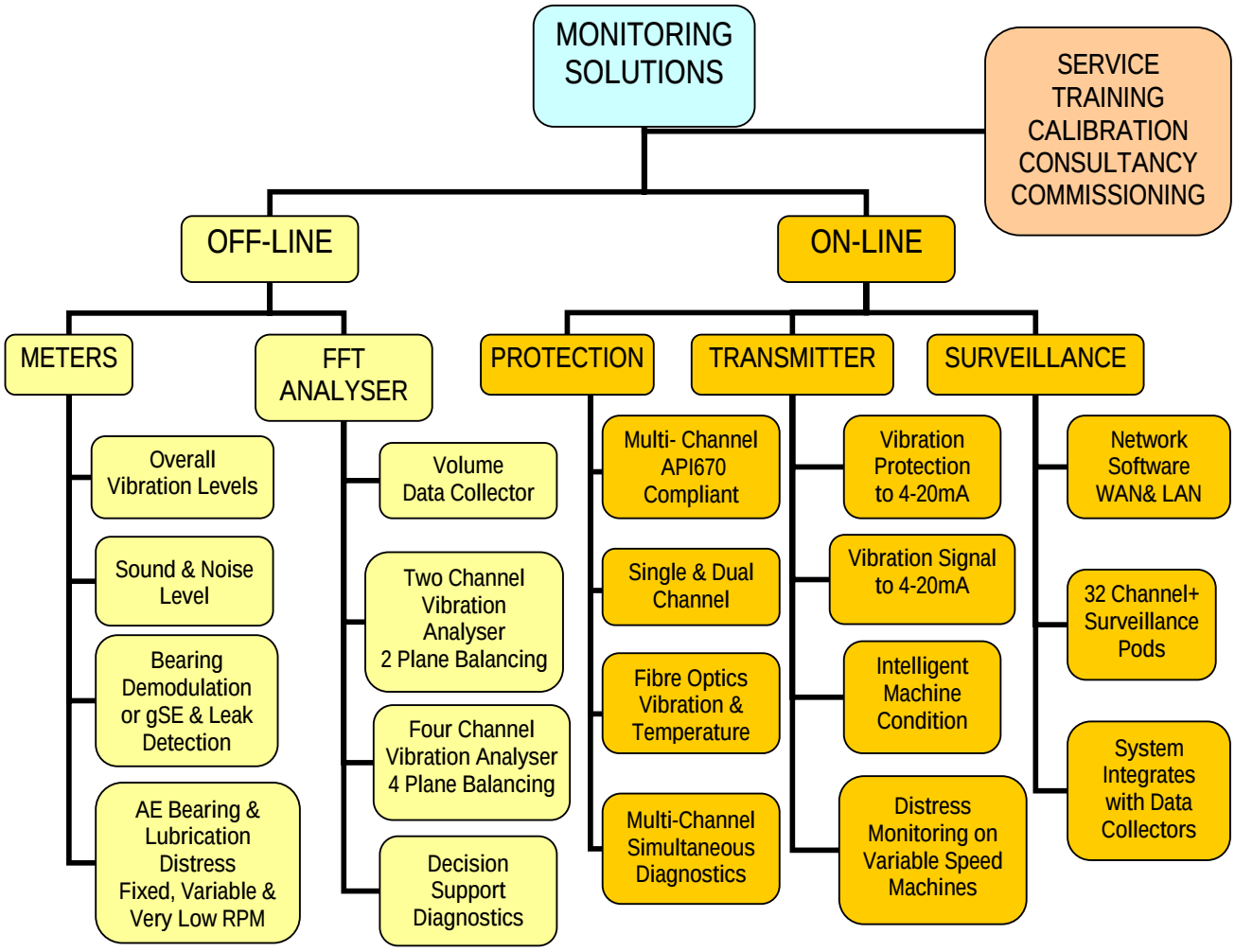
NSC RMA NUMBER ISSUED: RMA/

Taking you Further

8. Vibration Based Condition Monitoring Solutions

IRD Mechanalysis® Ltd (IRD) is a leading provider of condition management solutions with over 35 years' experience in machinery vibration measurement. IRD is credited with pioneering the concept of vibration based condition monitoring programmes in India. With the advent of computerization, IRD has established and maintained over 250 automated vibration based CM systems and has a user base of over 2200 major Producers and OEMs in India. IRD will continue to introduce new technologies to match your needs and reduce the cost of Condition Management. IRD is now rapidly expanding its International Export Division globally.

We take you further by providing reliable, easy to use, rugged and a comprehensive range of vibration monitoring products & solutions (as depicted in the chart given below) and enable you to enhance your productivity and investment. We look forward to your continued support and patronage.



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