User's Manual

VMS-R

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1. INTRODUCTION:

Foreword

Thank you for purchasing VMS-R. This manual describes the basic functions and operation methods of Rack based vibration Monitoring system. Please read this user's manual carefully before using the product.

Overview

This product provides a wide variety of features in a data acquisition and control application. It includes 10 Vibration slots. They are remotely controlled by the host computer through a set of commands and transmitted in a RS-485/RS232/Ethernet (Optional) network. The modular design also provides more flexibility in the system configuration. The following is a summary of the major Monitoring system VMS-R system components. The Monitoring System VMS-R system architecture includes a SMPS Card, CPU card with a built-in RS-232/RS-485 communication port, one built-in RS-422 communication,10 I/O – slot backplane and Ethernet option for Modbus TCP/IP communication. There are some software utilities available to the Monitoring system VMS-R systems. The Windows utility software helps you to configure your Monitoring system VMS-R Model. One can either configure the Monitoring system from operator terminal or through host computer via RS232/RS485port.

Notice

The contents of this manual are subject to change without notice as a result of continuing improvements to the instrument's performance and functions. Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform MASIBUS Sales office or sales representative. Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission.

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Checking the contents of the package

Unpack the box and check the contents before using the product. If the product is different from that which you have ordered, if any parts or accessories are missing, or if the product appears to be damaged, contact your sales representative.

2. SAFETY AND WARNING PRECAUTIONS:

2.1 Safety Precautions:

- ✓ ⚠ Before installation or beginning of any troubleshooting procedures power to all equipments must be switched off and isolated. Units suspected of being faulty must be disconnected and removed first and brought to a properly equipped workshop for testing and repair. Component replacement and interval adjustments must be done by a Masibus authorized or trained person only.

2.2 Warning Precautions:

- ✓ It is recommended that power of these units to be protected by fuses, circuit breakers or external over current rated at the minimum value possible.
- ✓ All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current, and temperature rating of the system.
- ✓ Unused control terminals should not be used as jumper points as they may be internally connected, causing damage to the unit.
- ✓ Verify the ratings of the output devices and the inputs are as specified in Chapter 4 are not exceeded.
- ✓ Do not use this instrument in areas such as excessive shock, dirt, moisture, corrosive gases or rain. The ambient temperature of the areas should not exceed the maximum rating specified.
- ✓ Provide Power from a single-phase instrument power supply. If there is a lot of noise in the power line, insert an insulating transformer into the primary side of the line and use a line filter on the secondary side. As counter measures against noise, do not place the primary and secondary power cables close to each other.

Note*:*

Information in this manual is subject to change without prior notice or permission due to continuous improvement.

Printer Output and RS485-232 software selection is not available in this version so please do not consider any parameter for configuration

CAUTION:

High voltage transients may occur when switching inductive loads such as some contactors or solenoid valves. Through the internal contacts, these transients may introduce disturbances which could affect the performance of the instrument.

For this type of load it is highly recommended that a “snubber” is connected across the normally open contact of the relay switching though load. The snubber recommended consists of a series connected resistor/capacitor (typically **15nF/100 Ohms**). A snubber will also prolong the life of the relay contacts. A snubber should also be connected across the output of a trip output to prevent false triggering under line transient conditions.

3. HARDWARE SPECIFICATIONS

3.1 Proximity Input Specification (Optional):

- No of Input : 2 Channel per Card x -2 to -22V (Programmable)
- Supply Voltage Output to Proximity Transducer : -24 VDC, @30mA max
- Input Impedance : 10kΩ
- Measure Parameter : Displacement peak to peak
- Relay Connector : Screw Type Plug-in Connector

3.2 Output Relay Specification (Optional):

- No of Relays : 8 nos per card
- Purpose : Alarm or trip or control
- Output Signal : 1 Form C Configuration
- Relay Response Time : 03 sec MAX.
- Relay contact Rating : 2A @250VAC/30VDC & 5A @250VAC (optional)
- Relay Set Point : Two or Four
- Relay Set Point Type : L – VL, L – H, H – VH, VL – L – H – VH
- Relay Connector : 25 Pin D-Type Connector

3.3 Output Open Collector Specification (Optional):

- No of Output : 16 nos per card
- Response Time : 03 sec MAX.
- Contact Rating : 100 mA @30VDC max
- Relay Connector : 25 Pin D-Type Connector

3.4 Analog Output Specification (For Vibration Input):

- No. of Analog Output : Two per Card (One per Channel)
- Output Signal : 0-20 mA, 4-20 mA or 0-5 V, 1-5 V, 0-10 V DC (Voltage or current outputs are factory settable)
- Load Resistance : For current output, 500 ohms Max. For Voltage output, 3000 ohms Minimum.
- Output Accuracy : ±0.25 % of Full Range(Display to output)

3.5 Buffer output Specification (For Vibration Input):

- No. of output : Two per Card (One per Channel)
- Output Impedance : <100 Ohms
- Frequency Range : 0.5 Hz to 10KHz
- Accuracy : 0.25% of Full Range

3.6 RS-485/ RS-232 Communication Specification (Switch Selectable):

- No. of Communication Port : 2- RS485
- Protocol : Modbus RTU Slave.
- Baud Rate : 9600,19.2K
- Interface : 2 Wire, EIA 485

3.7 Ethernet Communication Specification (Optional):

- No. of Communication Port : One
- Protocol : Modbus TCP/IP (Modnet) Slave.
- Speed : 10/100 Mbps
- Interface : RJ45

3.8 Data Logging Specification:

- Data Logging Memory Type : Flash Nonvolatile Memory
- Logged Data Retrieval : Through Configuration Software
- Periodic Memory Size : 25 MB
- RTC Time Format : DD/MM/YY – HH:MM:SS
- Periodic Logging Sampling Time : 1 Second minimum

3.9 LED Status Indication:

- Status LED :Power ON,
  Main Controller Module: Status, Communication
  Accelerometer, RPM Module: Status
  Relay and OC Module: Channel Status and Module Status
- Switch : Power ON/OFF Switch

3.10 Power Supply Specification:

- Rated Voltage **:** 85 - 265VAC 50/60 Hz or 120 – 370VDC
- Power Consumption **:** ≤ 35VA

3.11 Mechanical Specification:

- Mounting **:** 19” Sub-Rack Mount
- Dimensions (mm) **:** 132.5(H) X 482(W) X 260 (D)
- Weight **:** 4.5 Kg

3.12 Environmental Specification:

- Ambient Temperature : 0 to 55 °C
- Humidity : 30 to 95% RH non-condensing
- Storage Temperature : 0-85°C
- Warm-Up Time of Instrument : 15 Min.

3.13 Signal Isolations And Insulation Specification:

- Isolation Rating : Withstanding Voltage:
  1) Between primary terminals(1) and secondary terminals(2) 1500VAC for 1 minute
  2) Between secondary terminals 500V AC for 1 minute
- Insulation Register : > 20 MΩ at 500V DC
- Signal Isolation : As Specified below **Error! Reference source not found.**

Sr No	Signals	Signal Isolation
1	Power Input	Isolated from other input/output terminals and internal circuit
2	Vibration Inputs	Not isolated from other Vibration input terminals and

		from the internal circuit. But isolated from other input/output terminals.
3	RS-485 Communication	Isolated from other input/output terminals and internal circuit
4	Relay contacts	Isolated between contact output terminals and from other Input/output terminals and internal circuit
5	Analog Output	Isolated from other input/output terminals and internal circuit

Table 1 : Signal Isolation Specification

(1) Primary terminals indicate power terminals and relay output terminals
(2) Secondary terminals indicate Vibration input signals, Digital Contact output terminals, communication Terminal.

Proximity Input Type	Range	Accuracy	Resolution
Radial Vibration	0 - 2000	± 2% of instrument range ± 1 digit	1 um
Thrust Position	-2000 - 2000	± 2% of instrument range ± 1 digit	1 um

Table 2 : Input Type, range, resolution table

4. SYSTEM CONFIGURATION

4.1 VMS-R with full 19” chassis:

The following Diagram shows the System Configuration possible with VMS-R.

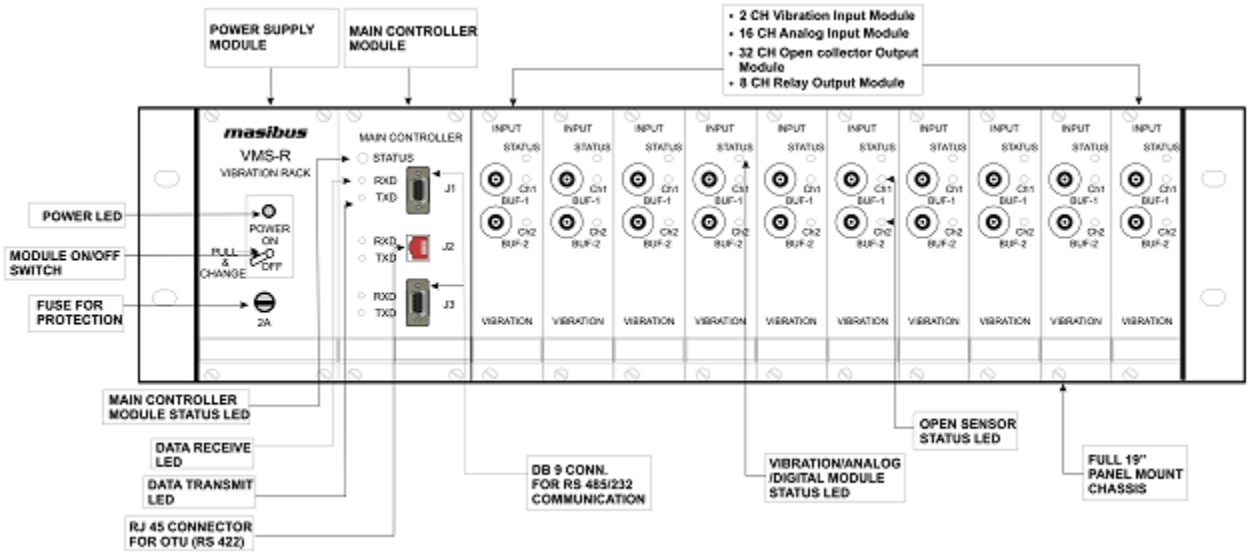


Figure 1 : Standard System setup for VMS-R (Full 19”)

4.2 VMS-R with full 19” chassis (with Ethernet option):

The following Diagram shows the System Configuration possible with Vibration Monitoring Rack VMS-R (with Ethernet communication).

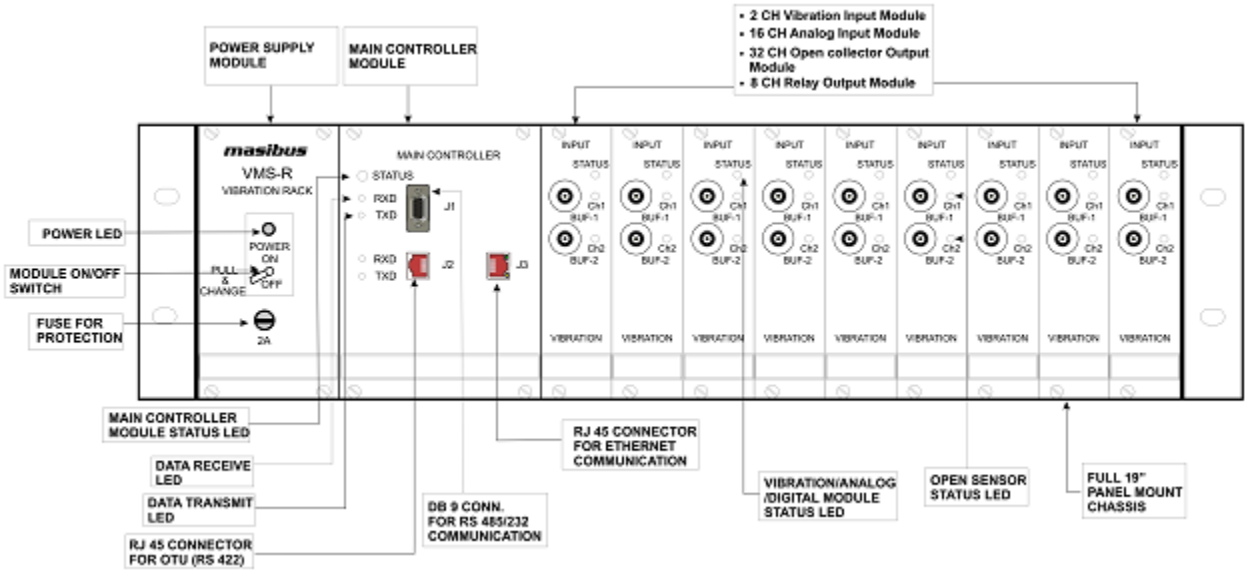


Figure 2 : System setup for VMS-R with Ethernet communication (Full 19”)

5. MECHANICAL GUIDELINES:

5.1 Mounting details:

Mounting method: Panel Mounting

Mounting Dimensions:

- ✓ For Full 19” Chassis: 482 mm(W) * 132.5 mm(H) * 260 mm(D)

5.2 19” VMS-R Chassis Panel Cutouts:

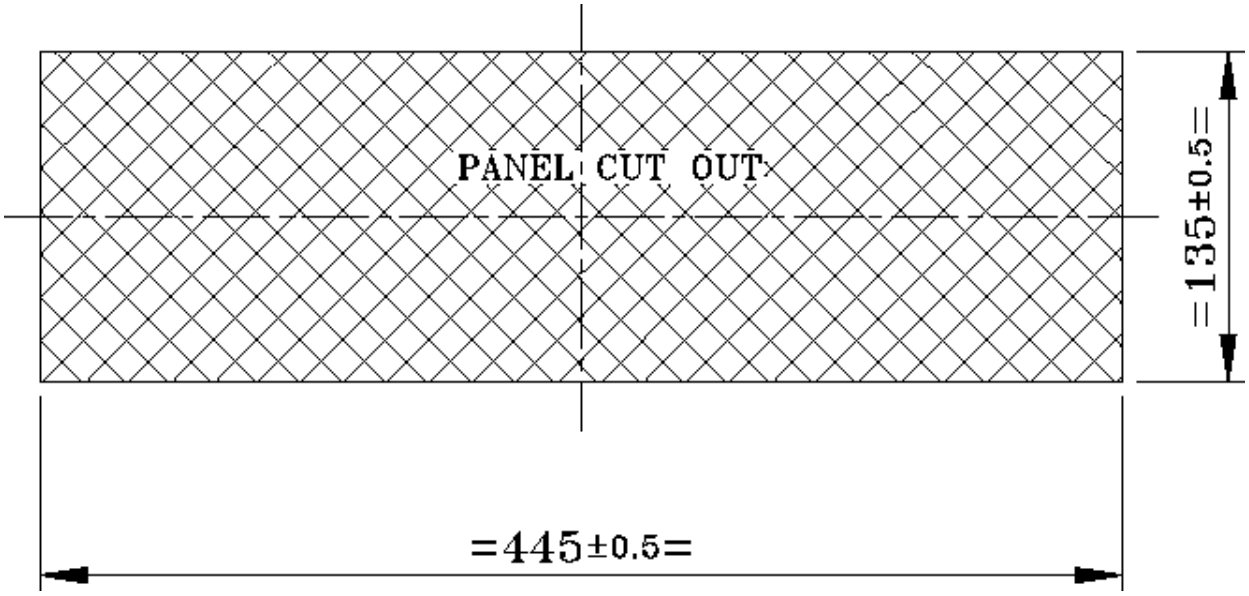


Figure 3 : Full 19”VMS-R Chassis Panel Cutout

5.3 Dimensions Detail:

5.3.1 Full 19” VMS-R Chassis front view dimensions:

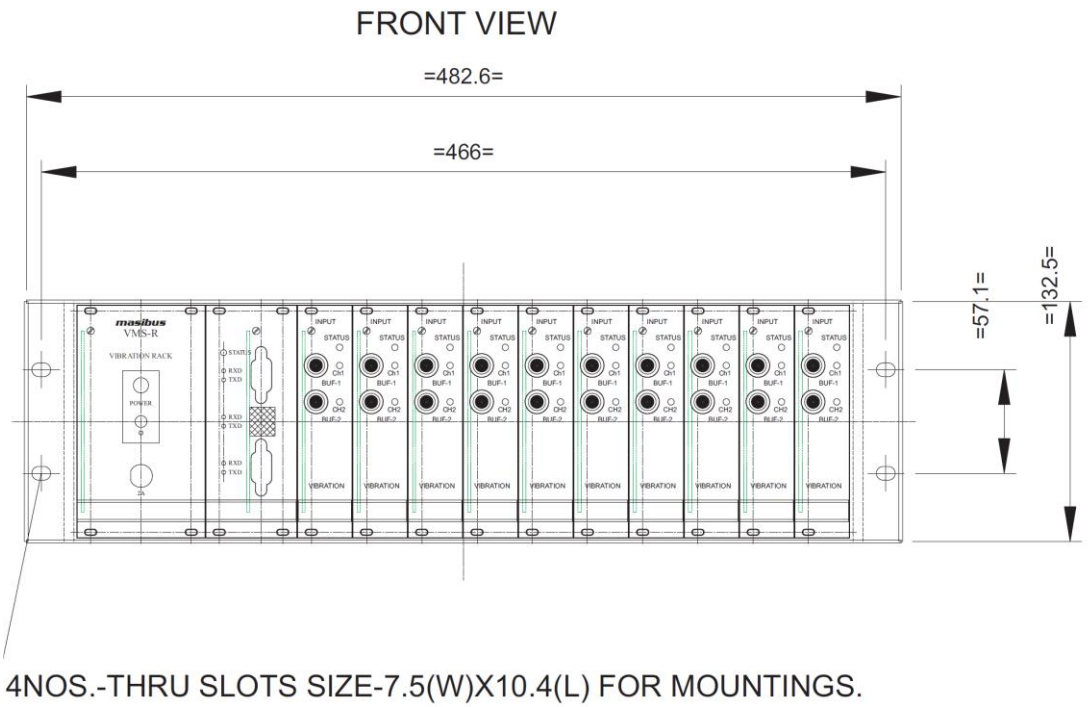


Figure 4 : Full 19”VMS-R Dimension front view

5.3.2 VMS-R Chassis Side view dimensions:

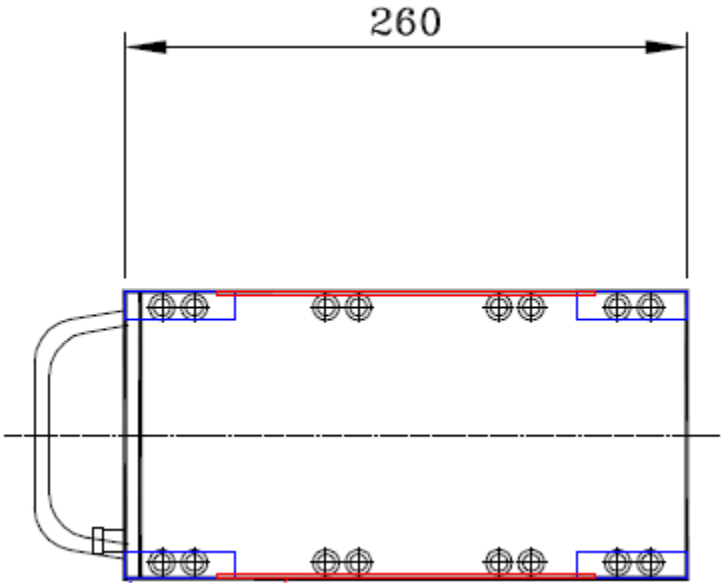


Figure 5 : VMS-R chassis side view dimensions

6. WIRING GUIDELINES:

This section provides basic information on wiring the power supply and I/O units, and on connecting the network.

6.1 Power Supply Module Wiring:

Be sure that the power supply voltage remains within the allowed fluctuation between range of 90 to 260 VAC. Terminals L, N and E are for power supply wiring.
***Note*:** The wire(s) used should be at least 2mm.

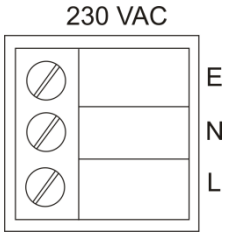


Figure 6 : Power Supply Connections

6.2 Proximity input Module Wiring:

The system uses 12 pin screw type plug-in Male connector for the interface between Input module and field devices. The following information must be considered when connecting electrical devices to Input modules.

- ✓ Always use a continuous length of wire, do not combine wires to attain needed length
- ✓ Use the shortest possible wire length
- ✓ Use the wire trays for routing where possible.
- ✓ Avoid running wires near high energy wiring
- ✓ Avoid running input wiring in close proximity to output wiring where possible
- ✓ Avoid creating sharp bends in the wires

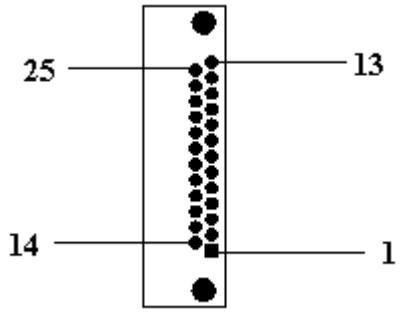
Pin No.	Description	Pin No.	Description
1	AO1+	7	CH-1 Shield
2	AO1-	8	CH-1 -24VDC
3	AO2+	9	CH-2+
4	AO2-	10	CH-2-
5	CH-1+	11	CH-2 Shield
6	CH-1-	12	CH-2 -24VDC

Figure 7 : Proximity Input Module wiring detail

6.3 Relay Output Module Wiring:

The system uses 25 pin 'D' type Female connector for the interface between Relay module and field devices. The Relay Output Module has eight relays any output could be mapped to any channel for the alarm configuration or for fault or on-off through PC as shown in the flow chart of relay configuration. The following information must be considered when connecting electrical devices to relay modules.

- ✓ Always use a continuous length of wire, do not combine wires to attain needed length
- ✓ Use the shortest possible wire length
- ✓ Use the wire trays for routing where possible.
- ✓ Avoid running wires near high energy wiring
- ✓ Avoid running input wiring in close proximity to output wiring where possible
- ✓ Avoid creating sharp bends in the wires



Pin No.	Description	Pin No.	Description
1	Relay 8 NC	14	Relay 4 NC
2	Relay 8 C	15	Relay 4 C
3	Relay 8 NO	16	Relay 4 NO
4	Relay 7 NC	17	Relay 3 NC
5	Relay 7 C	18	Relay 3 C
6	Relay 7 NO	19	Relay 3 NO
7	Not Used	20	Relay 2 NC
8	Relay 6 NC	21	Relay 2 C
9	Relay 6 C	22	Relay 2 NO
10	Relay 6 NO	23	Relay 1 NC
11	Relay 5 NC	24	Relay 1 C
12	Relay 5 C	25	Relay 1 NO
13	Relay 5 NO		

Figure 8 : Relay output Module Wiring and cable detail

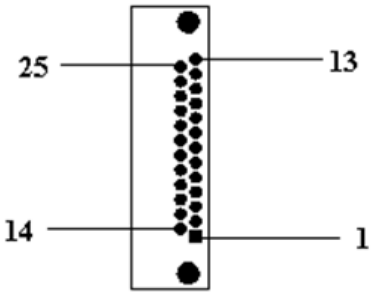
Note :

- ✓ A Prefab 1 is to 1 cable is provided for connection from 50 pin D type connector to the Extension Connector. Wiring to be done as shown in figure: 15.

6.4 Open collector output Module Wiring:

The system uses 25 pin 'D' type Female connector for the interface between Open Collector Output module and field devices. The Open Collector Output Module has sixteen Open Collector Outputs. Any output can be mapped to any channel for the alarm configuration or for fault or on-off through PC as shown in the flow chart of relay configuration. The following information must be considered when connecting electrical devices to Output Collector modules

- ✓ Always use a continuous length of wire, do not combine wires to attain needed length
- ✓ Use the shortest possible wire length
- ✓ Use the wire trays for routing where possible.
- ✓ Avoid running wires near high energy wiring
- ✓ Avoid running input wiring in close proximity to output wiring where possible
- ✓ Avoid creating sharp bends in the wires



Pin. No.	Description	Pin. No.	Description
1	OpenCollector Output -1	14	OpenCollector Output -14
2	OpenCollector Output -2	15	OpenCollector Output -15
3	OpenCollector Output -3	16	OpenCollector Output -16
4	OpenCollector Output -4	17	NC
5	OpenCollector Output -5	18	Ground
6	OpenCollector Output -6	19	NC
7	OpenCollector Output -7	20	NC
8	OpenCollector Output -8	21	NC
9	OpenCollector Output -9	22	NC
10	OpenCollector Output -10	23	NC
11	OpenCollector Output -11	24	NC
12	OpenCollector Output -12	25	NC
13	OpenCollector Output -13		

NC - Not Connect

Figure 9 : Open Collector output Module Wiring and cable detail

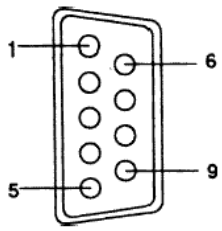
Note :

- ✓ A Prefab 1 is to 1 cable is provided for connection from 50 pin D type connector to the Extension Connector. Wiring to be done as shown in figure: 16.

6.5 RS 485 communication Port Wiring (J1 and J3 both):

There is a DB9 port in VMS-R system. The port is designed to link the RS-485 through a cable to a network in a system. The pin assignment of the port is as follows:

Pin No.	Description
Pin 1	Not Used
Pin 2	RS-485 Data -
Pin 3	RS-485 Data +
Pin 4	Not Used
Pin 5	RS-485 Signal Ground
Pin 6	Not Used
Pin 7	Not Used
Pin 8	Not Used
Pin 9	Not Used



Note: *The wiring of the RS-485 should be through a **twisted** pair. To reduce electrical noise, it should be twisted as tightly as possible*

Figure 11 : Port J1 and J3 RS 485 communication wiring and cable detail

6.6 RS 232 communication Port Wiring (J1 and J3 both):

The RS-232 port is designed for field configuration and diagnostics. The VMS-R is used as Data Communication Equipment (DCE). Users may connect a notebook PC to the RS-232 port to configure or troubleshoot your system in the field. Further, the VMS-R system can also be configured as the slave of the host computer through this port connection. The pin assignment of the port is as follows:

Pin No.	Description
Pin 1	Not Used
Pin 2	Data Send (TXD)
Pin 3	Data Received (RXD)
Pin 4	Not Used
Pin 5	RS-232 Signal Ground (GND)
Pin 6	Not Used
Pin 7	Not Used
Pin 8	Not Used
Pin 9	Not Used

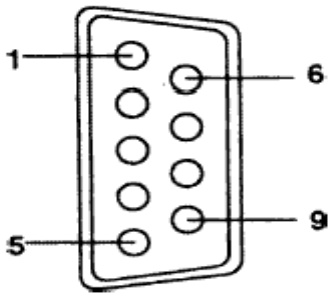


Figure 12 : Port J1 and J3 RS 232 communication wiring and cable detail

7. MONITORING RACK VMS-R SYSTEM:

7.1 Overview:

The Monitoring Rack VMS-R series is a data acquisition and control system, which can control, monitor and acquire data through multichannel I/O modules. Encased in rugged industrial housing, the system provides intelligent signal conditioning, vibration I/O, analog I/O, digital I/O, RS-232 and RS-485 communication. The system communicates with the controlling host over a multi-drop RS-485 network.

7.2 Major Features:

The Monitoring Rack VMS-R system consists of two major parts: the system architecture and I/O modules. The system includes a SMPS Card, CPU card with a built-in RS-232/RS-485 communication port RS-422 port and 10 I/O – Slot backplane. It also offers the following major features:

7.2.1 The CPU's basic functions:

The CPU is the heart of the system and has the following basic functions:

- ✓ Data acquisition and control for all I/O modules in the system
- ✓ Communication software and command set
- ✓ Alarm monitoring
- ✓ Management of the EEPROM device that holds the system parameters
- ✓ Data transformation
- ✓ Diagnosis
- ✓ Data-logging

7.2.2 Three-Way isolation and watchdog reset:

Electrical noise can enter a system in many different ways. It may enter through an I/O module, a power supply connection or the communication ground connection. The Data – Logger system provides isolation between analog ground and System ground**.** Isolation is also provided between the Serial Communication Port and the System ground. The 3-way isolation design prevents ground loops and reduces the effect of electrical noise to the system. It also offers better surge protection to prevent dangerous voltages or spikes from harming your system. The system also provides Watchdog reset to monitor the micro – controller. It will automatically reset the micro – controller in VMS-R system if the software is affected due to spikes and brown outs.

7.2.3 Remote software configuration and calibration:

The Monitoring Rack system merely issues a command from the host computer, you can change a vibration input module to accept several ranges of input. All the parameters including speed, parity, HI and LO alarm, ZERO and SPAN setting, Decimal position and calibration parameters setting may be set remotely. Remote configuration

can be done by using either the provided menu-based software or the command set's configuration and calibration commands. By storing configuration and calibration parameters in a nonvolatile EEPROM, the systems are able to retain these parameters in case of power failure.

7.2.4 Connectivity and Programming:

The Monitoring Rack VMS-R systems can connect to and communicate with all computers and terminals. They RS-232 or RS-485 or Ethernet transmission (Optional) standards and communicate with MODBUS RTU format or MODNET format (Optional) commands. However, users can only select and use one communication port at any time. All communications to and from the system are performed in MODBUS RTU or in MODNET (Optional), which means that the Monitoring Rack systems can be interfaced with any SCADA and DCS system

7.3 System Setup:

7.3.1 A single system setup through RS 232 communication:

If users would like to use a PC to locally control and monitor a simple application, the Monitoring Rack system provides up to 48 points or 160 points and front-end wiring through the RS-232 port to the host computer

7.3.2 A Distributed I/O setup through RS485 Network:

Up to 32 Monitoring Rack VMS-R systems may be connected to an RS-485 multi-drop network extendable up to 100 by using RS-485 repeaters, extending the maximum communication distance to 2,000 ft. The host computer is connected to the RS-485 network from one of its COM ports through the RS-232/RS-485 converter. Only two wires are needed for the RS-485 network: DATA+ and DATA-. Inexpensive shielded twisted-pair wiring is employed.

7.4 Vibration Monitoring Rack VMS-R block diagram:

The below figure shows the system block diagram for vibration monitoring rack VMS-R:

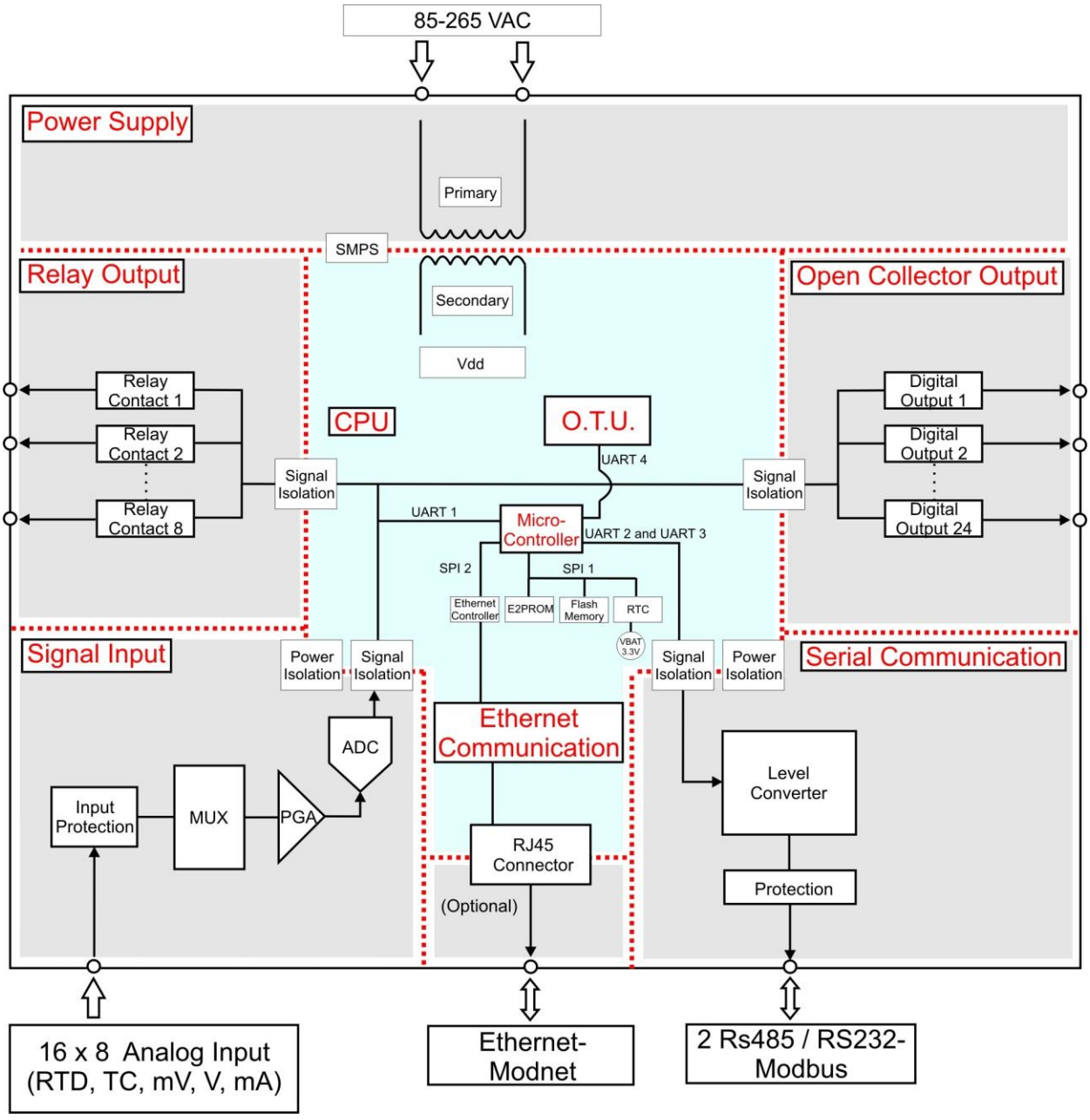


Figure 13 : VMS-R system block diagram

Note:- For VMS-R Analog Input is as Vibration Input(2 Input per Card).

8. CHANNEL CONFIGURATION PARAMETERS:

10.1 Radial Vibration / Thrust Position Channel Configuration Parameter:

1) Radial Vibration / Thrust Position Gap Voltage:

The physical distance between the face of a proximity probe tip and the observed surface. The distance can be expressed in terms of voltage. Standard polarity convention dictates that a decreasing gap results in an increasing (less negative) output signal.

2) Zero Position for Thrust Position Channel:

Represents the transducer DC voltage corresponding to the zero indication on the channel's meter scale for the direct proportional value. The amount of adjustment allowed is dependent upon the Direct Full Scale Range and the transducer OK limits. For maximum amount of zero adjustment, gap the transducer as close as possible to the ideal zero position voltage based on the full-scale range, the transducer scale factor, and the Upscale Direction. For a mid-scale zero the ideal gap is the center of the range.

3) Normal Thrust Direction:

Towards the active thrust bearing (for example towards or away from the probe mounting). This field defines whether rotor movement toward or away from the thrust probe corresponds to a more positive thrust reading (for example upscale on a bar graph). If this field is set to "Toward Probe", then as the rotor moves toward the thrust probe the thrust position direct proportional value will increase and go upscale on a bar graph.

9. MODBUS COMMUNICATION DETAIL:

When controllers are setup to communicate on a Modbus network using RTU (Remote Terminal Unit) mode, each 8–bit byte in a message contains two 4–bit Hexadecimal characters. The main advantage of this mode is that it's greater Character density allows better data throughput than ASCII for the same baud rate.

- ✓ Use only following function codes for data read/write purpose

Function Code	Description
01	NA
02	NA
03	Read Holding Registers
04	Read Input Registers
05	NA
06	Force Single Register
15	NA
16	Force Multiple Registers

Table 3 : Modbus Function codes

1	Relay Output cards	0x81
2	Non isolated Analog Input cards	0x7f
3	Isolated Analog Input cards	0x7f
4	Digital Output cards	0x82
5	Vibration Input Cards	0x7D

Table 4 : I/O card ID for Report slave ID

9.1 Modbus Address for configuration parameters:

Sr. No	Parameter	Absolute Address	Type	Min value	Max Value	Access Type
1	Channel Skip Status	00001	Bit	0	1	R/W
2	Channel Print Status	00257	Bit	0	1	R/W
3	Channel Log Status	00513	Bit	0	1	R/W
4	Open Sensor	00769	Bit	0	1	R
5	Alarm 1 status	01025	Bit	0	1	R
6	Alarm 2 Status	01281	Bit	0	1	R
7	Alarm 3 Status	01537	Bit	0	1	R
8	Alarm 4 Status	01793	Bit	0	1	R

9	Relay Acknowledge	02561	Bit	0	1	R
10	DO Status – 32bit	10897	Bit	0	1	R
11	Channel – 1 PV	40001	Integer			R
12	Channel – 2 PV	40002	Integer			
13	Channel – 3 PV	40016	Integer			
14	Channel – 4 PV	40017	Integer			
15	Channel – 5 PV	40033	Integer			
16	Channel – 6 PV	40034	Integer			
17	Channel – 7 PV	40049	Integer			
18	Channel – 8 PV	40050	Integer			
19	Channel – 9 PV	40065	Integer			
20	Channel – 10 PV	40066	Integer			
21	Channel – 11 PV	40081	Integer			
22	Channel – 12 PV	40082	Integer			
23	Channel – 13 PV	40097	Integer			
24	Channel – 14 PV	40098	Integer			
25	Channel – 15 PV	40113	Integer			
26	Channel – 16 PV	40114	Integer			
27	Channel – 1 Input type	40257	Integer	Ref. Table 7	Ref. Table 7	R/W
28	Channel – 2 Input type	40258	Integer			
29	Channel – 3 Input type	40273	Integer			
30	Channel – 4 Input type	40274	Integer			
31	Channel – 5 Input type	40289	Integer			
32	Channel – 6 Input type	40290	Integer			
33	Channel – 7 Input type	40305	Integer			
34	Channel – 8 Input type	40306	Integer			
35	Channel – 9 Input type	40321	Integer			
36	Channel – 10 Input type	40322	Integer			
37	Channel – 11 Input type	40337	Integer			
38	Channel – 12 Input type	40338	Integer			
39	Channel – 13 Input type	40353	Integer			
40	Channel – 14 Input type	40354	Integer			
41	Channel – 15 Input type	40369	Integer			
42	Channel – 16 Input type	40370	Integer			
43	Channel – 1 Set Alarm 4	40513	Integer	Ref. Table 7	Ref. Table 7	R/W
44	Channel – 2 Set Alarm 4	40514	Integer			
45	Channel – 3 Set Alarm 4	40529	Integer			
46	Channel – 4 Set Alarm 4	40530	Integer			
47	Channel – 5 Set Alarm 4	40545	Integer			
48	Channel – 6 Set Alarm 4	40546	Integer			
49	Channel – 7 Set Alarm 4	40561	Integer			
50	Channel – 8 Set Alarm 4	40562	Integer			
51	Channel – 9 Set Alarm 4	40577	Integer			
52	Channel – 10 Set Alarm 4	40578	Integer			
53	Channel – 11 Set Alarm 4	40593	Integer			

54	Channel – 12 Set Alarm 4	40594	Integer			
55	Channel – 13 Set Alarm 4	40609	Integer			
56	Channel – 14 Set Alarm 4	40610	Integer			
57	Channel – 15 Set Alarm 4	40625	Integer			
58	Channel – 16 Set Alarm 4	40626	Integer			
59	Channel – 1 Set Alarm 3	40769	Integer	Ref. Table 7	Ref. Table 7	R/W
60	Channel – 2 Set Alarm 3	40770	Integer			
61	Channel – 3 Set Alarm 3	40785	Integer			
62	Channel – 4 Set Alarm 3	40786	Integer			
63	Channel – 5 Set Alarm 3	40801	Integer			
64	Channel – 6 Set Alarm 3	40802	Integer			
65	Channel – 7 Set Alarm 3	40817	Integer			
66	Channel – 8 Set Alarm 3	40818	Integer			
67	Channel – 9 Set Alarm 3	40833	Integer			
68	Channel – 10 Set Alarm 3	40834	Integer			
69	Channel – 11 Set Alarm 3	40849	Integer			
70	Channel – 12 Set Alarm 3	40850	Integer			
71	Channel – 13 Set Alarm 3	40865	Integer			
72	Channel – 14 Set Alarm 3	40866	Integer			
73	Channel – 15 Set Alarm 3	40881	Integer			
74	Channel – 16 Set Alarm 3	40882	Integer			
75	Channel – 1 Set Alarm 3	40769	Integer			
76	Channel – 1 Set Alarm 2	41025	Integer	Ref. Table 7	Ref. Table 7	R/W
77	Channel – 2 Set Alarm 2	41026	Integer			
78	Channel – 3 Set Alarm 2	41041	Integer			
79	Channel – 4 Set Alarm 2	41042	Integer			
80	Channel – 5 Set Alarm 2	41057	Integer			
81	Channel – 6 Set Alarm 2	41058	Integer			
82	Channel – 7 Set Alarm 2	41073	Integer			
83	Channel – 8 Set Alarm 2	41074	Integer			
84	Channel – 9 Set Alarm 2	41089	Integer			
85	Channel – 10 Set Alarm 2	41090	Integer			
86	Channel – 11 Set Alarm 2	41105	Integer			
87	Channel – 12 Set Alarm 2	41106	Integer			
88	Channel – 13 Set Alarm 2	41121	Integer			
89	Channel – 14 Set Alarm 2	41122	Integer			
90	Channel – 15 Set Alarm 2	41137	Integer			
91	Channel – 16 Set Alarm 2	41138	Integer			
92	Channel – 1 Set Alarm 1	41281	Integer	Ref. Table 7	Ref. Table 7	R/W
93	Channel – 2 Set Alarm 1	41282	Integer			
94	Channel – 3 Set Alarm 1	41297	Integer			
95	Channel – 4 Set Alarm 1	41298	Integer			
96	Channel – 5 Set Alarm 1	41313	Integer			
97	Channel – 6 Set Alarm 1	41314	Integer			
98	Channel – 7 Set Alarm 1	41329	Integer			

99	Channel – 8 Set Alarm 1	41330	Integer			
100	Channel – 9 Set Alarm 1	41345	Integer			
101	Channel – 10 Set Alarm 1	41346	Integer			
102	Channel – 11 Set Alarm 1	41361	Integer			
103	Channel – 12 Set Alarm 1	41362	Integer			
104	Channel – 13 Set Alarm 1	41377	Integer			
105	Channel – 14 Set Alarm 1	41378	Integer			
106	Channel – 15 Set Alarm 1	41393	Integer			
107	Channel – 16 Set Alarm 1	41393	Integer			
108	Channel – 1 Zero	41537	Integer	Ref. Table 7	Ref. Table 7	R/W
109	Channel – 2 Zero	41538	Integer			
110	Channel – 3 Zero	41553	Integer			
111	Channel – 4 Zero	41554	Integer			
112	Channel – 5 Zero	41569	Integer			
113	Channel – 6 Zero	41570	Integer			
114	Channel – 7 Zero	41585	Integer			
115	Channel – 8 Zero	41586	Integer			
116	Channel – 9 Zero	41601	Integer			
117	Channel – 10 Zero	41602	Integer			
118	Channel – 11 Zero	41617	Integer			
119	Channel – 12 Zero	41618	Integer			
120	Channel – 13 Zero	41633	Integer			
121	Channel – 14 Zero	41634	Integer			
122	Channel – 15 Zero	41649	Integer			
123	Channel – 16 Zero	41650	Integer			
124	Channel – 1 Span	41793	Integer	Ref. Table 7	Ref. Table 7	R/W
125	Channel – 2 Span	41794	Integer			
126	Channel – 3 Span	41809	Integer			
127	Channel – 4 Span	41810	Integer			
128	Channel – 5 Span	41825	Integer			
129	Channel – 6 Span	41826	Integer			
130	Channel – 7 Span	41841	Integer			
131	Channel – 8 Span	41842	Integer			
132	Channel – 9 Span	41857	Integer			
133	Channel – 10 Span	41858	Integer			
134	Channel – 11 Span	41873	Integer			
135	Channel – 12 Span	41874	Integer			
136	Channel – 13 Span	41889	Integer			
137	Channel – 14 Span	41890	Integer			
138	Channel – 15 Span	41905	Integer			
139	Channel – 16 Span	41906	Integer			
140	Channel – 1 Hysteresis	42049	Integer	0.0%	9.9%	R/W
141	Channel – 2 Hysteresis	42050	Integer			
142	Channel – 3 Hysteresis	42065	Integer			
143	Channel – 4 Hysteresis	42066	Integer			

144	Channel – 5 Hysteresis	42081	Integer			
145	Channel – 6 Hysteresis	42082	Integer			
146	Channel – 7 Hysteresis	42097	Integer			
147	Channel – 8 Hysteresis	42098	Integer			
148	Channel – 9 Hysteresis	42113	Integer			
149	Channel – 10 Hysteresis	42114	Integer			
150	Channel – 11 Hysteresis	42129	Integer			
151	Channel – 12 Hysteresis	42130	Integer			
152	Channel – 13 Hysteresis	42145	Integer			
153	Channel – 14 Hysteresis	42146	Integer			
154	Channel – 15 Hysteresis	42161	Integer			
155	Channel – 16 Hysteresis	42162	Integer			
156	Channel – 1 Decimal Position	42305	Integer	0	1	R/W
157	Channel – 2 Decimal Position	42306	Integer			
158	Channel – 3 Decimal Position	42321	Integer			
159	Channel – 4 Decimal Position	42322	Integer			
160	Channel – 5 Decimal Position	42337	Integer			
161	Channel – 6 Decimal Position	42338	Integer			
162	Channel – 7 Decimal Position	42353	Integer			
163	Channel – 8 Decimal Position	42354	Integer			
164	Channel – 9 Decimal Position	42369	Integer			
165	Channel – 10 Decimal Position	42370	Integer			
166	Channel – 11 Decimal Position	42385	Integer			
167	Channel – 12 Decimal Position	42386	Integer			
168	Channel – 13 Decimal Position	42401	Integer			
169	Channel – 14 Decimal Position	42402	Integer			
170	Channel – 15 Decimal Position	42417	Integer			
171	Channel – 16 Decimal Position	42418	Integer			
172	Unit	42561	Integer	0	58	R/W
173	Scan Time	42817	Integer	1 Sec	99 Sec	R/W
174	*Open sensor Modbus (Alarm Status)	42818	Integer	0	1	R/W
175	Log Time(R)	42819	Integer	0 Sec 0 Min, 0 Hours	59 Sec, 59 Min, 23 Hours	R
176	Log Time(W)	44353	Integer	0 Sec 0 Min, 0 Hours	59 Sec, 59 Min, 23 Hours	W
177	Logging Status	42820	Integer	0	1	R/W
178	Log mode	42821	Integer	0	2	R/W
179	Slave ID	42822	Integer	1	99	R/W
180	Baud Rate	42823	Integer	2	4	R/W
181	Password	42824	Integer	0	65535	R/W

182	Alarm Configuration	42825	Integer	*Ref. Note2*	*Ref. Note2*	R/W
183	Sec	42827	Integer	0	59	R/W
184	Min	42828	Integer	0	59	R/W
185	Hour	42829	Integer	0	23	R/W
186	Date	42830	Integer	1	31	R/W
187	Month	42831	Integer	1	12	R/W
188	Year	42832	Integer	0	100	R/W
189	Log memory percentage	42834 (Higher Byte)	Integer	0	100	R
190	DO type	42835-42866	Integer	0	3 / 7 (Refer Note 3)	R/W
191	Ambient	43073	Integer	-	-	R
192	Ethernet IP Address 1	43241	Integer	0 (Refer Note 4)	255 (Refer Note 4)	R/W
193	Ethernet IP Address 2	43242	Integer			R/W
194	Ethernet IP Address 1	43243	Integer			R/W
195	Ethernet IP Address 1	43244	Integer			R/W
196	Ethernet Subnet Mask 1	43245	Integer			R/W
197	Ethernet Subnet Mask 2	43246	Integer			R/W
198	Ethernet Subnet Mask 3	43247	Integer			R/W
199	Ethernet Subnet Mask 4	43248	Integer			R/W
200	Ethernet Gateway 1	43249	Integer			R/W
201	Ethernet Gateway 2	43250	Integer			R/W
202	Ethernet Gateway 3	43251	Integer			R/W
203	Ethernet Gateway 4	43252	Integer			R/W
204	Ethernet MAC ID 1	43253	Integer	-	-	R
205	Ethernet MAC ID 2	43254	Integer	-	-	R
206	Ethernet MAC ID 3	43255	Integer	-	-	R
207	Ethernet MAC ID 4	43256	Integer	-	-	R
208	Ethernet MAC ID 5	43257	Integer	-	-	R
209	Ethernet MAC ID 6	43258	Integer	-	-	R
210	Card Identification Information	43341-43350	Integer	-	-	R
211	Open sensor Indication	43585	Integer	0	1	R
212	Alarm 1 Status	44353	Integer	0	1	R
213	Alarm 2 Status	44609	Integer	0	1	R
214	Alarm 3 Status	44865	Integer	0	1	R
215	Alarm 4 Status	45121	Integer	0	1	R
216	Total Number of Channels	48001	Integer	16	160	R/W
217	Watchdog Output Status	48004	Integer	(Refer Appendix D)	(Refer Appendix D)	R

218	Baud Rate for Display Terminal	48005	Integer	0	1	R/W
219	Analog Output Type 1 - 2	48006	Integer	Ref. Table 7	Ref. Table 7	R/W
220	Analog Output Type 3 - 4	48010	Integer			
221	Analog Output Type 5 - 6	48014	Integer			
222	Analog Output Type 7 - 8	48018	Integer			
223	Analog Output Type 9 - 10	48022	Integer			
224	Analog Output Type 11 - 12	48026	Integer			
225	Analog Output Type 13 - 14	48030	Integer			
226	Analog Output Type 15 - 16	48034	Integer			
227	Retransmission Direction 2 -1 (MSB- LSB)	48046	Bitwise	Ref. Table 8	Ref. Table 8	R/W
228	Retransmission Direction 4 -3 (MSB- LSB)	48047	Bitwise			
229	Retransmission Direction 6 -5 (MSB- LSB)	48048	Bitwise			
230	Retransmission Direction 8 -7 (MSB- LSB)	48049	Bitwise			
231	Retransmission Direction 10 -9 (MSB- LSB)	48050	Bitwise			
232	Retransmission Direction 12 -11 (MSB- LSB)	48051	Bitwise			
233	Retransmission Direction 14 -13 (MSB- LSB)	48052	Bitwise			
234	Retransmission Direction 16 -15 (MSB- LSB)	48053	Bitwise			
235	Retransmission Value 2 -1 (MSB- LSB)	48176	Bitwise	Ref. Table 9	Ref. Table 9	R/W
236	Retransmission Value 4 -3 (MSB- LSB)	48177	Bitwise			
237	Retransmission Value 6 -5 (MSB- LSB)	48178	Bitwise			
238	Retransmission Value 8 -7 (MSB- LSB)	48179	Bitwise			
239	Retransmission Value 10 -9 (MSB- LSB)	48180	Bitwise			
240	Retransmission Value 12 -11 (MSB- LSB)	48181	Bitwise			
241	Retransmission Value 14 -13 (MSB- LSB)	48182	Bitwise			
242	Retransmission Value 16 -15 (MSB- LSB)	48183	Bitwise			
243	Retransmission Value 18 -17 (MSB- LSB)	48184	Bitwise			
244	Retransmission Open Sensor	48186	Bitwise			R/W

	2 -1 (MSB- LSB)			Ref. Table 10	Ref. Table 10	
245	Retransmission Open Sensor 4 -3 (MSB- LSB)	48187	Bitwise			
246	Retransmission Open Sensor 6 -5 (MSB- LSB)	48188	Bitwise			
247	Retransmission Open Sensor 8 -7 (MSB- LSB)	48189	Bitwise			
248	Retransmission Open Sensor 10 -9 (MSB- LSB)	48190	Bitwise			
249	Retransmission Open Sensor 12 -11 (MSB- LSB)	48191	Bitwise			
250	Retransmission Open Sensor 14 -13 (MSB- LSB)	48192	Bitwise			
251	Retransmission Open Sensor 16 -15 (MSB- LSB)	48193	Bitwise			
252	Retransmission Open Sensor 18 -17 (MSB- LSB)	48194	Bitwise			
253	Proximity Sensor Type Channel 1 - 2	48371	Integer	0	14	R/W
254	Proximity Sensor Type Channel 3 - 4	58372	Integer			
255	Proximity Sensor Type Channel 5 - 6	48373	Integer			
256	Proximity Sensor Type Channel 7 – 8	48374	Integer			
257	Proximity Sensor Type Channel 9 - 10	48375	Integer			
258	Proximity Sensor Type Channel 11 - 12	48376	Integer			
259	Proximity Sensor Type Channel 13 – 14	48377	Integer			
260	Proximity Sensor Type Channel 15 - 16	48378	Integer			
261	Proximity Sensor Upper Voltage Channel - 1	48381	Integer	-10000	-23000	R/W
262	Proximity Sensor Upper Voltage Channel – 2	48382	Integer			
263	Proximity Sensor Upper Voltage Channel – 3	48383	Integer			
264	Proximity Sensor Upper Voltage Channel – 4	48384	Integer			
265	Proximity Sensor Upper Voltage Channel – 5	48385	Integer			
266	Proximity Sensor Upper	48386	Integer			

	Voltage Channel – 6					
267	Proximity Sensor Upper Voltage Channel – 7	48387	Integer			
268	Proximity Sensor Upper Voltage Channel – 8	48388	Integer			
269	Proximity Sensor Upper Voltage Channel – 9	48389	Integer			
270	Proximity Sensor Upper Voltage Channel – 10	48390	Integer			
271	Proximity Sensor Upper Voltage Channel – 11	48391	Integer			
272	Proximity Sensor Upper Voltage Channel – 12	48392	Integer			
273	Proximity Sensor Upper Voltage Channel – 13	48393	Integer			
274	Proximity Sensor Upper Voltage Channel – 14	48394	Integer			
275	Proximity Sensor Upper Voltage Channel – 15	48395	Integer			
276	Proximity Sensor Upper Voltage Channel – 16	48396	Integer			
277	Proximity Sensor Lower Voltage Channel - 1	48401	Integer	-1000	-5000	R/W
278	Proximity Sensor Lower Voltage Channel - 2	48402	Integer			
279	Proximity Sensor Lower Voltage Channel - 3	48403	Integer			
280	Proximity Sensor Lower Voltage Channel - 4	48404	Integer			
281	Proximity Sensor Lower Voltage Channel - 5	48405	Integer			
282	Proximity Sensor Lower Voltage Channel - 6	48406	Integer			
283	Proximity Sensor Lower Voltage Channel - 7	48407	Integer			
284	Proximity Sensor Lower Voltage Channel - 8	48408	Integer			
285	Proximity Sensor Lower Voltage Channel - 9	48409	Integer			
286	Proximity Sensor Lower Voltage Channel - 10	48410	Integer			
287	Proximity Sensor Lower Voltage Channel - 11	48411	Integer			
288	Proximity Sensor Lower Voltage Channel - 12	48412	Integer			

289	Proximity Sensor Lower Voltage Channel - 13	48413	Integer			
290	Proximity Sensor Lower Voltage Channel – 14	48414	Integer			
291	Proximity Sensor Lower Voltage Channel - 15	48415	Integer			
292	Proximity Sensor Lower Voltage Channel - 16	48416	Integer			
293	Proximity Sensor Voltage Channel - 1	48421	Integer	3346	12904	R/W
294	Proximity Sensor Voltage Channel – 2	48422	Integer			
295	Proximity Sensor Voltage Channel – 3	48423	Integer			
296	Proximity Sensor Voltage Channel – 4	48424	Integer			
297	Proximity Sensor Voltage Channel – 5	48425	Integer			
298	Proximity Sensor Voltage Channel – 6	48426	Integer			
299	Proximity Sensor Voltage Channel – 7	48427	Integer			
300	Proximity Sensor Voltage Channel – 8	48428	Integer			
301	Proximity Sensor Voltage Channel – 9	48429	Integer			
302	Proximity Sensor Voltage Channel – 10	48430	Integer			
303	Proximity Sensor Voltage Channel – 11	48431	Integer			
304	Proximity Sensor Voltage Channel – 12	48432	Integer			
305	Proximity Sensor Voltage Channel – 13	48433	Integer			
306	Proximity Sensor Voltage Channel – 14	48434	Integer			
307	Proximity Sensor Voltage Channel – 15	48435	Integer			
308	Proximity Sensor Voltage Channel – 16	48436	Integer			
309	Proximity Sensor Voltage Direction For Thrust Input 2 - 1	48441	Bitwise	0	1	R/W
310	Proximity Sensor Voltage Direction For Thrust Input 4 - 3	48442	Bitwise			
311	Proximity Sensor Voltage Direction For Thrust Input 6 - 5	48443	Bitwise			

312	Proximity Sensor Voltage Direction For Thrust Input 8 - 7	48444	Bitwise			
313	Proximity Sensor Voltage Direction For Thrust Input 10 – 9	48445	Bitwise			
314	Proximity Sensor Voltage Direction For Thrust Input 12 – 11	48446	Bitwise			
315	Proximity Sensor Voltage Direction For Thrust Input 14 - 13	48447	Bitwise			
316	Proximity Sensor Voltage Direction For Thrust Input 16 - 15	48448	Bitwise			
317	Proximity Sensor Zero Voltage For Thrust Input Channel - 1	48451	Integer	-6330	-13990	R/W
318	Proximity Sensor Zero Voltage For Thrust Input Channel – 2	48452	Integer			
319	Proximity Sensor Zero Voltage For Thrust Input Channel – 3	48453	Integer			
320	Proximity Sensor Zero Voltage For Thrust Input Channel – 4	48454	Integer			
321	Proximity Sensor Zero Voltage For Thrust Input Channel – 5	48455	Integer			
322	Proximity Sensor Zero Voltage For Thrust Input Channel – 6	48456	Integer			
323	Proximity Sensor Zero Voltage For Thrust Input Channel – 7	48457	Integer			
324	Proximity Sensor Zero Voltage For Thrust Input Channel – 8	48458	Integer			
325	Proximity Sensor Zero Voltage For Thrust Input Channel – 9	48459	Integer			
326	Proximity Sensor Zero Voltage For Thrust Input Channel – 10	48460	Integer			
327	Proximity Sensor Zero Voltage For Thrust Input Channel – 11	48461	Integer			
328	Proximity Sensor Zero Voltage For Thrust Input Channel – 12	48462	Integer			
329	Proximity Sensor Zero Voltage For Thrust Input Channel – 13	48463	Integer			
330	Proximity Sensor Zero Voltage For Thrust Input Channel – 14	48464	Integer			
331	Proximity Sensor Zero Voltage For Thrust Input Channel – 15	48465	Integer			
332	Proximity Sensor Zero Voltage For Thrust Input Channel - 16	48466	Integer			

333	Alarm inhibits	48471	Integer	0	1	W
334	Relay Logic 16 – 1 (MSB - LSB)	48472	Bitwise	0	1	R/W
335	Relay Logic 32 – 17 (MSB - LSB)	48473	Bitwise	0	1	R/W
336	DO - 1 Delay	48474	Integer	0	255	R/W
337	DO - 2 Delay	48475	Integer	0	255	R/W
338	DO - 3 Delay	48476	Integer	0	255	R/W
339	DO – 4 Delay	48477	Integer	0	255	R/W
340	DO - 5 Delay	48478	Integer	0	255	R/W
341	DO - 6 Delay	48479	Integer	0	255	R/W
342	DO - 7 Delay	48480	Integer	0	255	R/W
343	DO - 8 Delay	48481	Integer	0	255	R/W
344	DO - 9 Delay	48482	Integer	0	255	R/W
345	DO - 10 Delay	48483	Integer	0	255	R/W
346	DO - 11 Delay	48484	Integer	0	255	R/W
347	DO - 12 Delay	48485	Integer	0	255	R/W
348	DO - 13 Delay	48486	Integer	0	255	R/W
349	DO - 14 Delay	48487	Integer	0	255	R/W
350	DO – 15 Delay	48488	Integer	0	255	R/W
351	DO - 16 Delay	48489	Integer	0	255	R/W
352	DO - 17 Delay	48490	Integer	0	255	R/W
353	DO - 18 Delay	48491	Integer	0	255	R/W
354	DO - 19 Delay	48492	Integer	0	255	R/W
355	DO - 20 Delay	48493	Integer	0	255	R/W
356	DO - 21 Delay	48494	Integer	0	255	R/W
357	DO - 22 Delay	48495	Integer	0	255	R/W
358	DO - 23 Delay	48496	Integer	0	255	R/W
359	DO - 24 Delay	48497	Integer	0	255	R/W
360	DO - 25 Delay	48498	Integer	0	255	R/W
361	DO - 26 Delay	48499	Integer	0	255	R/W
362	DO - 27 Delay	48500	Integer	0	255	R/W
363	DO - 28 Delay	48501	Integer	0	255	R/W
364	DO - 29 Delay	48502	Integer	0	255	R/W
365	DO - 30 Delay	48503	Integer	0	255	R/W
366	DO - 31 Delay	48504	Integer	0	255	R/W
367	DO - 32 Delay	48505	Integer	0	255	R/W
368	PV unit 1 -2	48506	Integer	0	2	R/W
369	PV unit 3 -4	48507	Integer	0	2	R/W
370	PV unit 5 - 6	48508	Integer	0	2	R/W
371	PV unit 7 - 8	48509	Integer	0	2	R/W
372	PV unit 9 – 10	48510	Integer	0	2	R/W
373	PV unit 11 - 12	48511	Integer	0	2	R/W
374	PV unit 13 – 14	48512	Integer	0	2	R/W
375	PV unit 15 - 16	48513	Integer	0	2	R/W

376	Trip 1 Status	48516	Bitwise	0	1	R
377	Trip 2 Status	48526	Bitwise	0	1	R
378	Trip 3 Status	48536	Bitwise	0	1	R
379	Trip 4 Status	48546	Bitwise	0	1	R

Table 5 : Modbus Address for configuration parameters

Note:- Remaining Modbus Address are NOT APPICABLE.

Input Type	I/P No (Decimal)	I/P No (Hex)	Zero	Span	Resolution
Radial Vibration	21	0 X 15	0	2000	1 um
Thrust Position	22	0 X 16	-2000	2000	1 um

Table 6 : Input Type Selection Table

Table 7 Retransmission Type Selection

Modbus Index	Parameter value
0	0 - 20 mA
1	4 - 20 mA
2	0-5 V
3	1- 5 v
4	0 - 10 V

Table 8 Retransmission Direction Selection

Modbus Index	Parameter value
0	REVERSE
1	DIRECT

Table 9 Retransmission Value Selection

Modbus Index	Parameter value
0	MINIMUM
1	MAXIMUM

Table 10 Open Sensor Selection

Modbus Index	Parameter value
0	DOWN
1	UP

Transducer	Transducer no. (Decimal)	Upper ok voltage (Volt)	Lower ok voltage (volt)	Scale Factor (V/mm)
Bently 3300 – 5mm proximitor	00	-16.750	-2.750	7.874
Bently 3300XL – 5mm proximitor	01	-16.750	-2.750	7.874
Bently 3300XL – 11mm proximitor	02	-16.750	-2.750	3.937
Bently 3300XL – NSV proximitor	03	-13.160	-1.160	7.874
Bently 3300 – 8mm proximitor	04	-16.750	-2.750	7.874
Bently 3300 – 16mm HTPS proximitor	05	-16.750	-2.750	3.937
Bently 7200 – 5mm proximitor	06	-16.750	-2.750	7.874
Bently 7200 – 8mm proximitor	07	-16.750	-2.750	7.874
Bently 7200 – 11mm proximitor	08	-19.650	-3.550	3.937
Bently 7200 – 14mm proximitor	09	-16.750	-2.750	3.937
Bently 3000 – -18VDC proximitor	10	-12.050	-2.450	7.874
Bently 3000 – -24VDC proximitor	11	-15.750	-3.250	11.220
Bently 3300 RAM proximitor	12	-12.550	-2.450	7.874
Nonstand	13	0 to -23.000		3.346 to 12.904

Table 11 : Radial Transducer ok voltage limit

Transducer	Transducer no. (Decimal)	Upper ok voltage (Volt)	Lower ok voltage (Volt)	Scale Factor (V/mm)	Zero Voltage (Volt)
Bently 3300 – 5mm proximitor	00	-19.040	-1.280	7.874	-9.75
Bently 3300XL – 5mm proximitor	01	-19.040	-1.280	7.874	-9.75
Bently 3300XL – 11mm proximitor	02	-19.040	-1.280	3.937	-9.75
Bently 3300XL – NSV proximitor	03	-13.160	-1.160	7.874	-7.16
Bently 3300 – 8mm proximitor	04	-19.040	-1.280	7.874	-7.16
Bently 3300 – 16mm HTPS proximitor	05	-18.050	-1.650	3.937	-7.16
Bently 7200 – 5mm proximitor	06	-19.040	-1.280	7.874	-7.16
Bently 7200 – 8mm proximitor	07	-19.040	-1.280	7.874	-7.16
Bently 7200 – 11mm proximitor	08	-20.390	-3.550	3.937	-7.16
Bently 7200 – 14mm proximitor	09	-18.050	-1.650	3.937	-7.16
Bently 3000 – -18VDC proximitor	10	-13.140	-1.160	7.874	-7.16
Bently 3000 – -24VDC proximitor	11	-16.850	-2.250	11.220	-9.55
Bently 3300 RAM proximitor	12	-13.140	-1.160	7.874	-7.15
Nonstand	13	0 to -23.000		3.346 to 12.904	-6.33 to -13.99

Table 12 : Thrust Transducer ok voltage limit

Note 1:

- ✓ All above address are starting address for that particular group. End address will be starting address + 160.
- ✓ for e.g. starting add [channel 1]for open sensor indication is 43585, end add.

[160th channel] is 43585 + 160 = 43745 and from 43746 to 44353 will be reserved address for modbus.

- ✓ *Open sensor [Modbus] is not available in this version

Note 2:

- ✓ 42825 register is of 16 bit. There are some bit wise parameters configuration in this register.

1. 42825 – BIT0 and BIT 1 : **Set Point Configuration**

   00 - H-VH
   01 - L- H
   10 - VL - L.
   11 - VL - L - H - VH.

2. 42825 – BIT8: **Open sensor PV Upscale/ Downscale**
   0 - Down scale.
   1 - Upscale.

3. 42825 – BIT12: **Latch Alarm**
   0 - Alarm Latch No
   1 - Alarm Latch Yes.

4. 42825 – BIT14: **Relay control**
   0 -Normal relay off.
   1 - Normal Relay On.

5. Other BITs are **reserved** for future Use.

Note 3:

- ✓ 42835 - 42866 registers stores DO type of maximum 32 DOs. DO types depend on following Set Point Configuration.

  - If BIT1 and BIT 0 of 42825 is 00, it represents H-VH type set points and DO types which can be assigned as following table.

DO Type Number	DO Type Description
0	High Alarm
1	Very High Alarm
2	High Trip
3	Very High Trip

Table 13 : DO Type and its description for H-VH type Set Point

  - If BIT1 and BIT 0 of 42825 is 01, it represents L-H type set points and DO types which can be assigned as following table.

DO Type Number	DO Type Description
0	Low Alarm

1	High Alarm
2	Low Trip
3	High Trip

Table 14 : DO Type and its description for L-H type Set Point

- If BIT1 and BIT 0 of 42825 is 10, it represents VL-L type set points and DO types which can be assigned as following table.

DO Type Number	DO Type Description
0	Very Low Alarm
1	Low Alarm
2	Very Low Trip
3	Low Trip

Table 15 : DO Type and its description for VL-L type Set Point

- If BIT1 and BIT 0 of 42825 is 11, it represents VL-L-H-VH type set points and DO types which can be assigned as following table.

DO Type Number	DO Type Description
0	Very Low Alarm
1	Low Alarm
2	Very Low Trip
3	Low Trip
4	High Alarm
5	Very High Alarm
6	High Trip
7	Very High Trip

Table 16 : DO Type and its description for VL-L-H-VH type Set Point

Note 4:

- ✓ Ethernet IP 1 , Ethernet IP 2, Ethernet IP 3 and Ethernet IP 4 is for setting Ethernet IP address. Value should be entered sequencially. i.e. if Ethernet IP address of 192.168.100.190 needs to be configured , then set value 192 to Ethernet IP 1, set value 168 to Ethernet IP 2, set value 100 to Ethernet IP 3 and then set value 190 to Ethernet IP 4.
- ✓ Ethernet mask is for setting Ethernet mask address and Ethernet Gateway is for setting Ethernet Gateway address . Both settings must be set as explained in above note.

Note 5:

48005 is single register to set baud rate for Display Terminal.

Value	Baud Rate
0	9600
1	19200

Table 17 : Value and Baud Rate for Display Terminal

9.2 Modbus Address for diagnostics parameters:

Sr. No	Parameter	Absolute Address	Type	Minimum value	Maximum Value	Access Type
1	IO card failure$	43329	Integer	0	1	R
2	IO card memory failure$	43330	Integer	0	1	R
3	IO card ADC failure$	43331	Integer	0	1	R

Table 18 : Modbus Address for Diagnostics parameters

Note:

- ✓ Here value ‘1’ means fault or N/C and ‘0’ means ok.
- ✓ $ marked parameters are bit wise for parameters. For E.g. BIT 0 for card 1, BIT 1 for card 2…

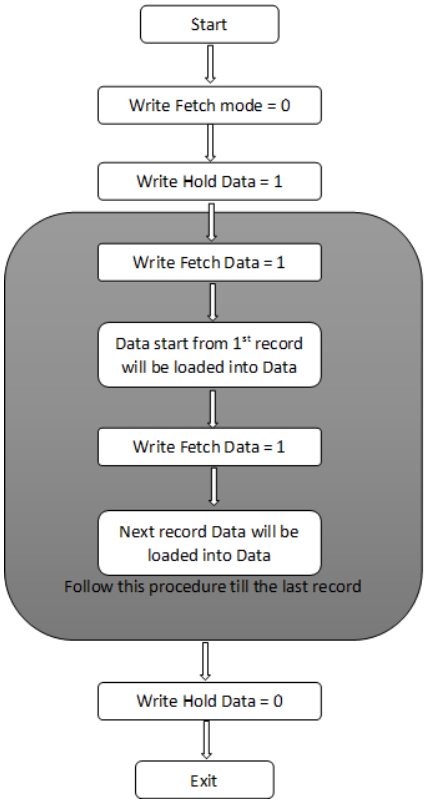
APPENDIX A: HOW TO FETCH HYSTORICAL DATA THROUGH MODBUS?

- **HOW TO FETCH HISTORICAL DATA :**

Parameter Detail	Bytes
Log Frame start bytes(101,102)(in decimal)	2
Record Number	4
Time Stamp	6
No of Bytes for PV	(2* Channels Selected for logging)
Log Frame end bytes(103,104) (in decimal)	2
Total Bytes in 1 record =	14 + (2* Channels Selected for logging)

Table 19 : Periodic Data logging Record Frame Detail

Data Fetching Method:



Sr. No	Parameter Description	Modbus Address	Parameter Type	Access	Remarks
1	Fetched Data Buffer	45889-45952	Integer	R	-
2	Hold Data	45801	Integer	R/W	-
3	Fetch Data	45802	Integer	R/W	-
4	Fetch mode	45803	Integer	R/W	
5	Total Periodic Records	45806-45807	Integer	R	45806 [Higher Word] 45807[Lower Word]
6	Log Roll Over counter for Overlap Mode	45808	Integer	R	-

Table 20 : Modbus Address for Periodic Data fetching

Description :

- For Data logging, 25 MB Flash memory is used . So data will be fetched in the form of multiple records / bytes. Flash page size is of 256 bytes and 1 sector size is 65536 bytes. For 25 MB flash memory, 398 sectors , each sector size of 65536 bytes, are used.
- The record length is based on total number of Channels which are enabled for logging.
- By using below equation we can get total number of records i.e.

Total Records = ((Integer) (26083328 / Length of 1 record)) - 1

- Example for Fetching data :

Example 1 :

If we have selected 8 channels for periodic data logging so that
Total Bytes in 1 record = 14 + (2 * 8) = 30
Total records = (26083328 / 30) – 1 = 869444 – 1 = 869443

In this case for fetching data, follow below procedure:

1. Write Hold Data = 1
2. Write Fetch Data = 1
3. Data of first 128 bytes of 1st page will be loaded into data registers
4. Write Fetch Data = 1
5. Data of next 128 bytes of 1st page will be loaded into data registers
6. Write Fetch data = 1
7. Data of first 128 bytes of 2nd page will be loaded into data registers
8. Write Fetch data = 1
9. Data of next 128 bytes of 2nd page will be loaded into data registers
10. In same manner, data registers will be filled.

11. After fetching all data, Write Hold Data = 0.

Note that, after Fetching page data, extract the data as per record frame detail.

Example 2 :

If we have selected 128 channels for periodic data logging,

Total Bytes in 1 record = 14 + (2 * 128) = 270
Total records = (26083328 / 270) – 1 = 96604 – 1 = 96603

So, in this case whole record can't be stored on one page. Thus for retrieving one record data, user has to fetch two pages.

Follow below procedure for fetching.

1. Write Hold Data = 1
2. Write Fetch Data = 1
3. Data of first 128 bytes of 1st page will be loaded into data registers
4. Write Fetch Data = 1
5. Data of next 128 bytes of 1st page will be loaded into data registers
6. Write Fetch data = 1
7. Data of first 128 bytes of 2nd page will be loaded into data registers
8. Write Fetch data = 1
9. Data of next 128 bytes of 2nd page will be loaded into data registers
10. In same manner, data registers will be filled.
11. After fetching all data, Write Hold Data = 0.

In this case, one record contains 270 bytes, thus 256 bytes will be stored on 1 page and remaining 14 bytes will be stored on next page. So, user has to fetch two pages for fetching one record data. Fetch the data until Frame end bytes are detected.

Note that, after Fetching page data, extract the data as per record frame detail.

APPENDIX B: SWITCH SELECTION FOR PORT J1 AND J3

Communication Port J1	**For RS485**	**For Rs232**
	Switch 1,2 On and 3,4 Off in SW1 & SW2	Switch 3,4 On and 1,2 Off in SW1 & SW2
Communication Port J3	**For RS485**	**For Rs232**
	Switch 1,2 On and 3,4 Off in SW3 & SW4	Switch 3,4 On and 1,2 Off in SW3 & SW4

Table 21 : Switch selection for RS 485 / RS 232 communication

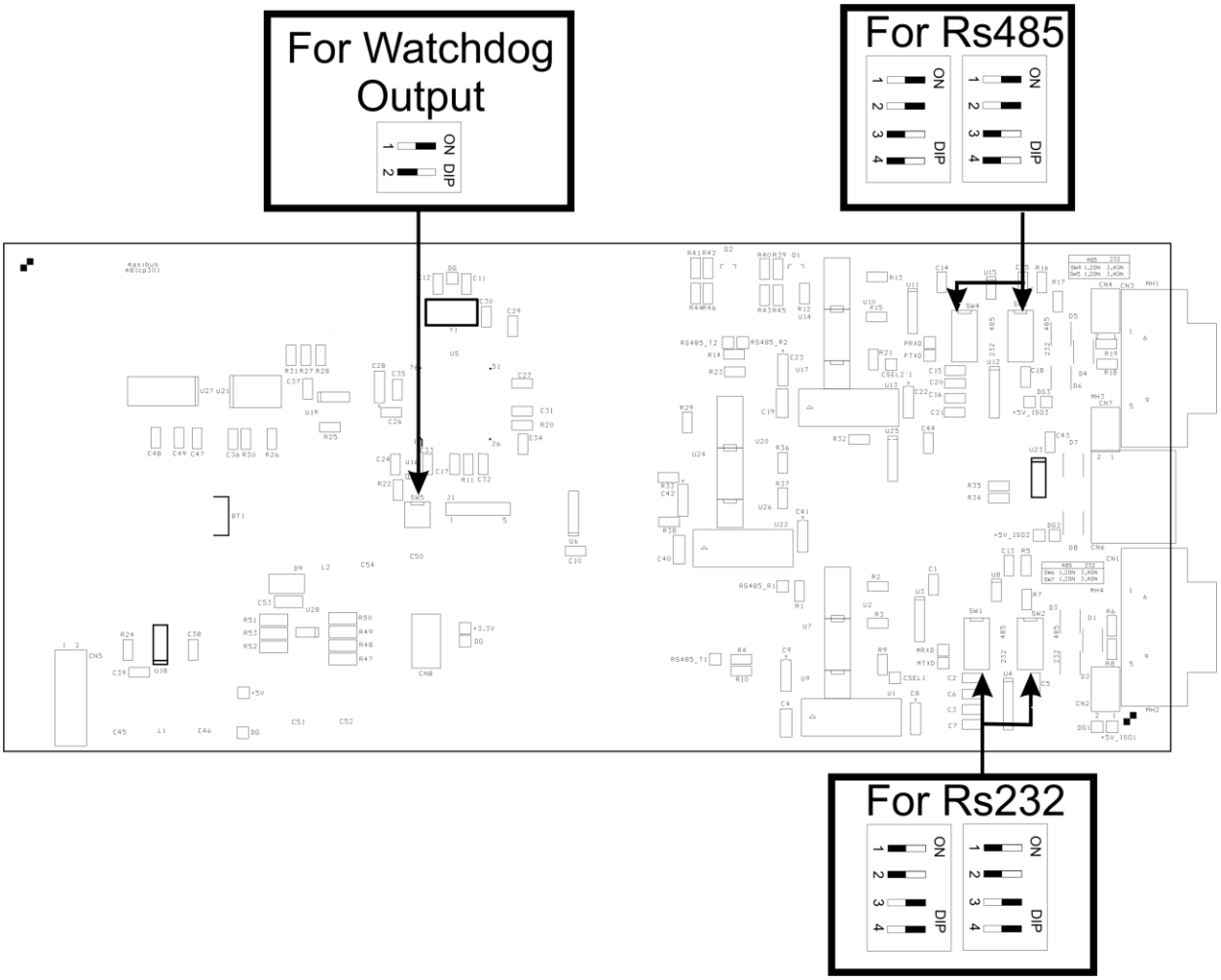


Figure 14 : Switch selection for RS 485 / RS 232 communication and for Watchdog Output

APPENDIX C: HARDWARE(LED) DIAGNOSTICS

Main Controller card Diagnostics:

Status LED Indication	Diagnostic
Red	No I/O card is connected
Red Blink	RTC failure
Green	Working ok as per specification
Green Blink	Log Memory Full (This condition will occur when log mode is set to HOLD)
Red - Green Blank	Flash / EEPROM Memory Error
Red Green	Watchdog Error (Refer Appendix D)

Table 22 : LED diagnostics for CPU

I/O card Diagnostics:

Status LED Indication	Diagnostic
Red Blink	CPU card not connected
Green	Working ok as per specification
Red - Green Blink	Memory Error
Red – Green - Off Blink	ADC Error

Table 23 : LED diagnostics for I/O cards

APPENDIX D: WATCHDOG OUTPUT OPERATION

The Watchdog Output can be enabled by Switch selection as shown in Figure . Switch 1 should be “ON” in **SW5** to enable watchdog output.

The Watchdog output, when enabled, operates by giving reset signal externally by means of hardware. The Watchdog output can be used to detect system software malfunctions by resetting the device, if the Watchdog output is not cleared periodically in software. If malfunctioning of device persists even after watchdog reset, device will go into shutdown mode. Which peripheral caused watchdog reset is shown in Absolute Modbus register 48004 as explained in below table.

Modbus Address 48004 Bit Value	Fault
0000 0000 0011 1110	CONTROLLER TIMER Error
0000 0000 0011 1101	CPU EEPROM Error
0000 0000 0011 1011	COM PORT 1 Error
0000 0000 0011 0111	COM PORT 2 Error
0000 0000 0010 1111	DISPLAY COMMUNICATION Error
0000 0000 0001 1111	BACKPLATE COMMUNICATION Error

Table 24 : Watchdog Error Value and its Description

Note : Any/multiple of the above values will be shown only after watchdog reset occurs.

APPENDIX E: TROUBLESHOOTING

For primary troubleshooting of instrument use following procedure:

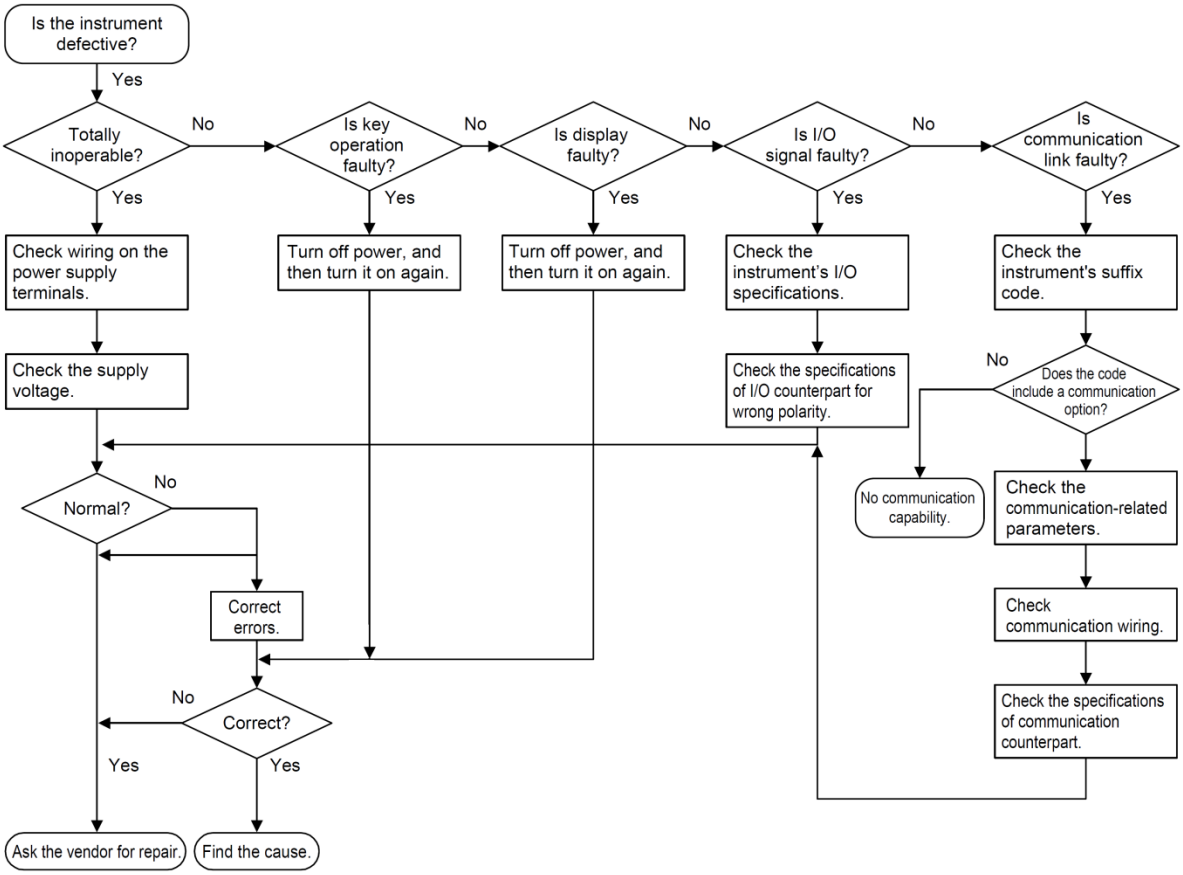


Figure 15: Trouble shooting block diagram

REVISION HISTORY

Changes from Revision 00 to Revision 01

- Input type paremeters are modified

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