Parsmega
industrial automation

User Manual

Dual Channel Vibration Controller

PM-VC12



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1 Introduction

1.1 The purpose of the manual

This manual contains all the information needed to set up, install, wiring and communicate with the PM-VC12 module.

1.2 Technical knowledge required

In order to understand this booklet, a basic acquaintance with electrical topics is required.

1.3 Manual validation

This booklet is valid for this specification.

MODEL	Hardware	Software
PM-VC12	V1.3	V3.0

1.4 Technical Support

To get technical support through the following contact:

- Email: **info@parsmega.com**
- Phone: **+98 21 91009955**
- WhatsApp: **+98 9981122566**

2 safety tips

- Starting the module by non-experts and ignoring the commands may cause serious damage to the module.
- This module does not directly pose a risk to human life.

3 Description

3.1 Basic description

PM-VC12 is a vibration controller that has the ability to control the vibration intensity of induced vibrations.
This module has the ability to connect to a computer and control equipment such as (HMI and PLC).

3.2 Module Use

This module is a very suitable option for applications that require vibration control. Such as:

- Food packaging machines
- Batching devices
- And all devices that need vibration power control.

3.3 Technical Specifications

- RS485 serial communication with MODBUS protocol support
- Wide range of port 485 baud rate (from 2400 to 230400)
- Has a display (LED) of the serial communication status
- Vibration control with high accuracy of 0.1%
- It has 3 isolated digital inputs for each channel
- Ability to control vibration power by digital inputs
- Ability to control vibration power by MODBUS serial
- Ability to control vibration power by analog input (custom)
- No need for external power tools
- The working temperature range is -30 ~ +50 degrees Celsius

4 Installation

4.1 Observe EMC items

This product is designed and manufactured to work in industrial environments. However, for proper operation, you should check and eliminate the issues that cause the module to malfunction.

4.2 Cases that cause system malfunctions

- Direct exposure to strong electromagnetic field
- high humidity

4.3 Things to consider

4.3.1 Convenient ground connection

• When installing the module on the panel body, make sure that the panel body is connected to the ground.

• All ineffective metal parts are (firmly) grounded.

• When connecting varnished wires to ground connection, remove the varnish from that part.

4.3.2 Appropriate wiring method

• Divide your system cables into different groups (high voltage, power supply, and signal, analog).

• Always transfer the power cable from another duct.

• Always place your analog cables close to the body of the panel and rails (which are grounded).

4.3.3 Cable shield connection

• Make sure the shields are properly grounded.

• Try to keep a small part of the cable without a shield.

5 connections

All connections of this module are screws

5.1 Grouping of connections

The connections of this module include 5 main groups:

- Power
- Digital inputs
- RS485 serial
- Analog input
- Vibrations output

5.2 Power connection

The suitable power supply for this module is24V DC .

Terminal 1: 0V

Terminal 2: +24V

5.3 Connecting digital inputs

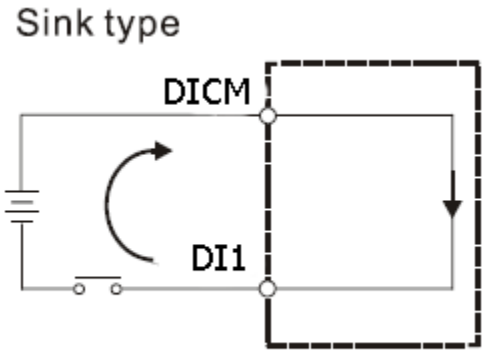
This module has four digital inputs as follows

Label	Application
DI11	Digital input 1 channel 1
DI12	Digital input 2 channels 1
DI21	Digital input 1 channel 2
DI22	Digital input 2 channels 2
COM	Common digital inputs

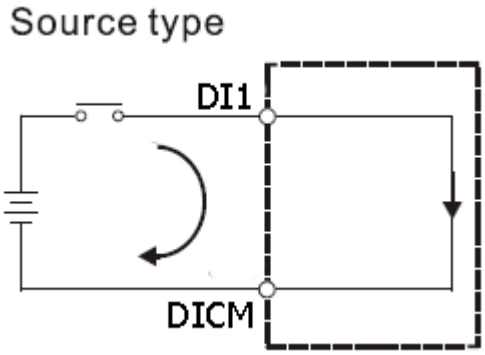
- To activate the digital inputs, a voltage level of 8 to 24 volts is required.
- Digital inputs have different functions in different working modes, which will be discussed further.
- To activate an input, a pulse with a minimum time of 100 milliseconds is required.

wiring is as follows:

Sink mode(low active)



❖ Source mode(High Active)



5.4 Vibration connection and AC voltage input

Label	Function
Ph.D	Phase input
N	Null input
Vib1	Vibration output 1
Vib2	Vibration output 2

5.5 Isolated RS485 connection

This module is equipped with an RS485 serial port on which the MODBUS RTU protocol is implemented.

Label	Function
D+	Positive data
D-	Negative data

5.6 Analog input connection

Analog inputs are used to control the power of vibrations. Input analogs are 0~10V.

Label	Function
AI1	Analog input channel 1
AI2	Analog input channel 2
GND	Common analog inputs

6 parameters

- All parameters are set with default values at the time of purchase.
- You can also do this with the command (Reset to factory setting).
- For ease of work, the parameters are divided into different groups.
- The length of all variables is word
- If the save command is not sent after making changes to the parameters, the previous values will be valid after the device is turned off and on.
- Some parameters need to be restarted to apply the changes.

6.1 Communication parameter

Title	Variable Type	the length	Read/write	Address		Description	Default
ID	Unsigned int	1	R/W	40001	0D 0H	1~247	1
Baud Rate	Unsigned int	1	R/W	40002	1D 1H	0=2400 1=4800 2=9600 3=14400 4=19200 5=28800 6=38400 7=57600 8=76800 9=115200 10=230400	2
parity	Unsigned int	1	R/W	40003	2D 2H	0=none 1=odd 2=even	2
Stop bit	Unsigned int	1	R/W	40004	3D 3H	0=1 1=2	0

Note that to apply the above parameters a The system should be reset .

6.2 Module information parameter

- All the following parameters are read only .

Title	Variable Type	the length	Read/write	Address		Description	Default
Firmware ver	Float	2	R	40007	6D 6H	-	-
Hardware ver	Float	2	R	40009	8D 8H	-	-
Model	Unsigned int	1	R	40011	10D 10H	-	-
Serial number	Unsigned long	2	R	40012	11D 11H	-	-

6.3 Input status parameter and outputs

Title	Variable Type	the length	Read/write	Address		Description	Default
CH1 Digital Inputs	Unsigned int	1	R	40016	15D FH	-	-
CH2 Digital Inputs	Unsigned int	1	R	40017	16D 10H	-	-

- The first input is inthe LSB .

6.4 Vibration control parameters

Channel parameters 1

Title	Variable Type	the length	Read/write	Address		Description	Default
Control Mode	Unsigned int	1	R/W	40026	25D 19H	0~2 0=Digital Input 1=Serial Value 2=Analog Input	0
DI1 Power	Unsigned int	1	R/W	40027	26D 1AH	0~100% 0~1000	30
DI2 Power	Unsigned int	1	R/W	40028	27D 1BH	0~100% 0~1000	60
Reserved	Unsigned int	1	R/W	40029	28D 1CH	-	-
Serial Power	Unsigned int	1	R/W	40030	29D 1DH	0~100% 0~1000	0
Output power	Unsigned int	1	R	40031	30D 1EH	0~100% 0~1000	-
Range Select	Unsigned int	1	R/W	40032	31D 1FH	0~1 0 = Range 0~100 1 = Range 0~1000	0
Reserved	Unsigned int	1	-	40033	32D 20H	-	-
Analog Input	Unsigned int	1	R	40034	33D 21H	0~100%	-

Channel 2 parameters

Title	Variable Type	the length	Read/write	Address		Description	Default
Control Mode	Unsigned int	1	R/W	40036	35D 23H	0~2 0=Digital Input 1=Serial Value 2=Analog Input	0
DI1 Power	Unsigned int	1	R/W	40037	36D 24H	0~100% 0~1000	30
DI2 Power	Unsigned int	1	R/W	40038	37D 25H	0~100% 0~1000	60
Reserved	Unsigned int	1	R/W	40039	38D 26H	-	-
Serial Power	Unsigned int	1	R/W	40040	39D 27H	0~100% 0~1000	0
Output power	Unsigned int	1	R	40041	40D 28H	0~100% 0~1000	-
Range Select	Unsigned int	1	R/W	40032	41D 29H	0~1 0 = Range 0~100 1 = Range 0~1000	0
Reserved	Unsigned int	1	-	40043	42D 2AH	-	-
Analog Input	Unsigned int	1	R	40044	43D 2BH	0~100%	-

Description:

- **Control Mode**: By choosing different working modes, you can determine the way to control the vibrations and the source of setting the power of the vibrations.
- **Dix Power:**
  Using this register, you can determine the desired power for each digital input.
  Note: Digital Input working mode must be selected to apply the power of digital inputs.
  Example: if Digital Input working mode is selected (Control Mode = 0)
  And the power of digital input 1 is equal to 50, it will work with 50% power by stimulating digital input 1.
  And if the power of digital input 2 is 30, it will work with 30% power by stimulating digital input 2.
  Note: If several digital inputs are activated at the same time, priority will be given to the smaller digital input.
- **Serial Power:**
  By setting the Control Mode register = 1, the serial working mode is selected. In this mode, by writing the desired percentage (between 0 and 100) of each vibration in the Serial Power register, the vibration starts with the specified value.
  Note 1: Serial Mode registers cannot be saved and are loaded with zero value when turned on.
  Note 2: To activate the vibration in this mode, the first digital input of the corresponding channel must be activated.
- **Analog Power:**
  By setting Control Mode = 2, analog working mode is selected. In this mode, by applying a voltage of 0 to 10 volts to the analog input of each channel, the vibration output will change between 0 and 100 percent.
  Note: To activate the vibration in this mode, the first digital input of the corresponding channel must be activated.
- **Range Select**: When higher precision is needed in vibration control, by setting the value of Range Select = 1, the output power range can be changed from 0~1000.

6.5 List of commands

All commands are written in a register, the specifications of that register are as follows.

All commands will be executed after 500 milliseconds at most.

Title	Variable type	the length	Ability to write	Address		Description	Default
Command Register	Unsigned int	1	W	40015	14D EH	Save Setting = 1 Reset Factory = 2 Reset = 20	-

All values are in decimal.

Save Settings

Note that all your settings on the parameters are on the temporary memory of the module, and in order to transfer these settings to the retentive memory, you must use the Save Setting command. For this purpose, you must enter 1 decimal number to send address 40015.

Reset Factory Settings

With this command, all values of the device settings (vibration settings and RS485 communication) will return to the factory default state. For this purpose, you must send 2 decimal numbers to the address 40015.

To save the values, the Save Setting command must be used. Otherwise, after turning off the device, the values will be returned to the previous state.

Reset

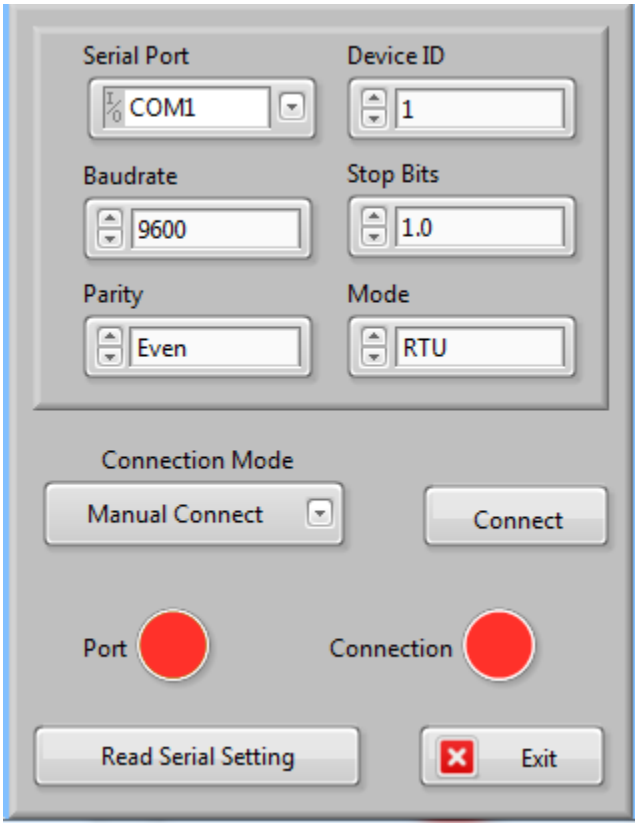
When you need to reset the module, you can send this command to the instruction register. After sending this command, a complete reset will be done 2 seconds later, during these 2 seconds the system will not perform any operation.

7 Controller module settings software

In order to configure and monitor the controller, a computer program has been prepared by Pars Mega Company, which includes all the features of the controller.

7.1 Introduction

By running the program, the following page will open at first:



Serial Port: The number of the serial port to which the controller module is connected.

When the correct port is selected, the Port indicator will turn green.

Device ID: is the ID of the controller, which is 1 by default.

Baudrate: The serial communication speed is 9600 by default.

Stop Bits: The stop bit specifier is in serial communication and is 1 bit by default.

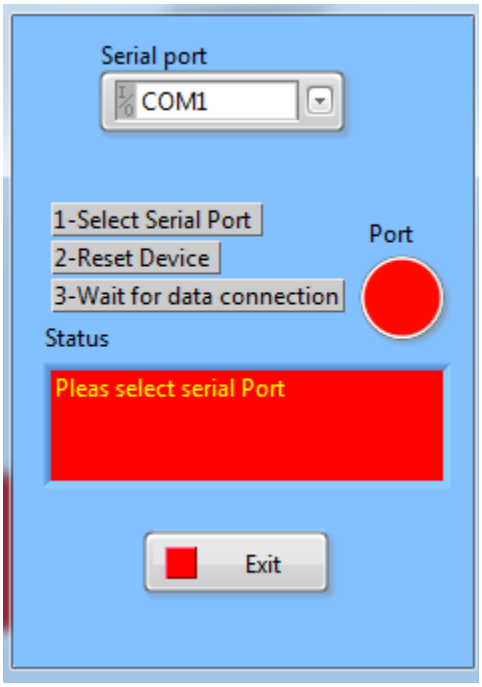
Parity: specifies the parity of the serial connection and is even by default.

Connection: When the connection is established, this indicator turns green and this page is automatically closed and the main page of the program is opened.

Port: indicates the status of the selected port: red color for error and green color for no error

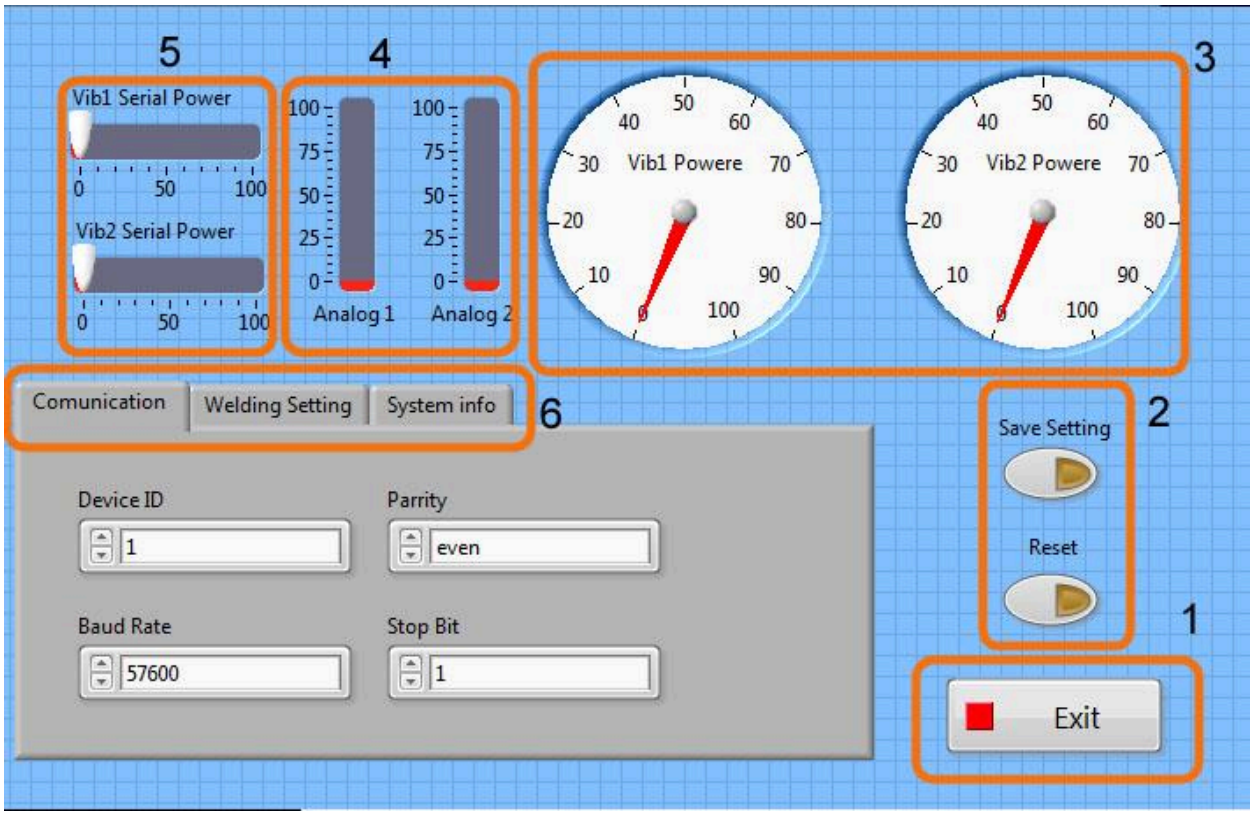
Read Serial Setting: If you do not know what settings are on the device and communication is not established, press this button to go to another page where it is possible to read these parameters.

7.2 Serial parameters automatic reading screen



If you have pressed the "Read Serial Setting" button on the previous page, the above page will open. After this page opens, first select the port (if selected correctly, the port will turn green) and then turn the device off and on once. After reading these values, this page is closed and the main page is opened.

7.3 Program main page



1- Use this button to close the program.

2- The Save Setting button is for saving the settings.
The Reset button is for restarting.

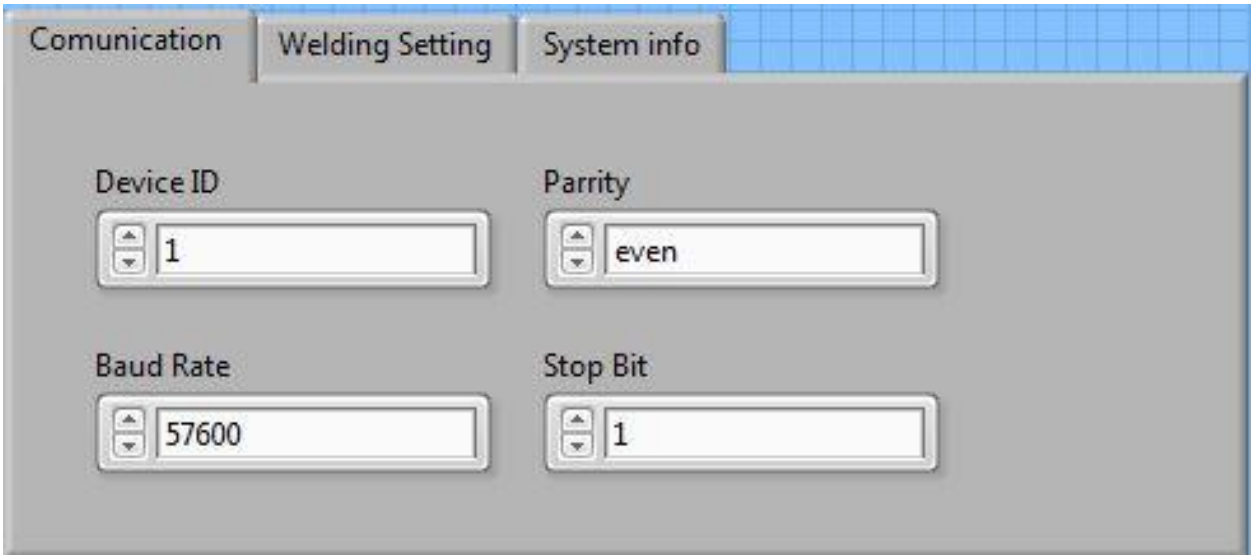
3- It displays the current output power percentage.

4- Displays the input analog value in percentage.

5- These tools are used to set the serial power values.

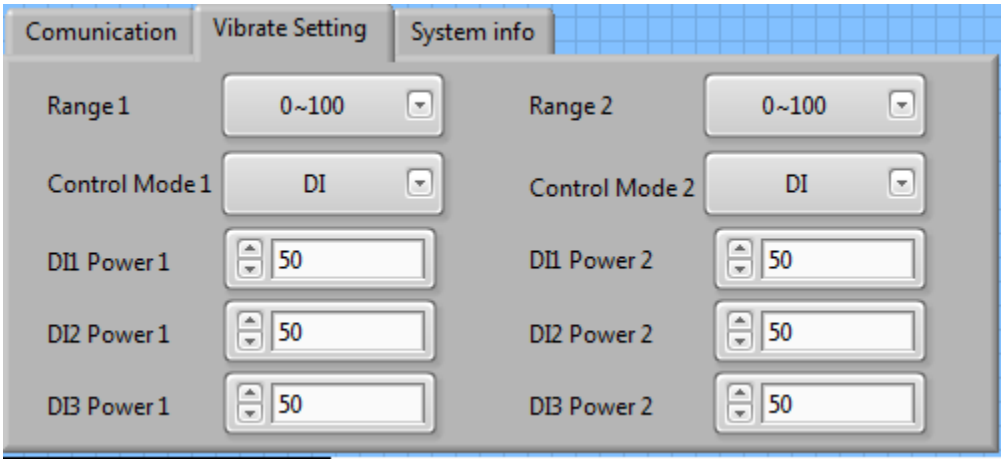
6- Different program tabs for settings

7.3.1 Setting related to RS 485 serial communication



*Please note that the transmitter needs to be reset once to apply the changes related to the serial communication settings.

7.3.2 Vibration settings



Control Mode: The working mode of each channel can be selected between DI, Serial and Analog.

Dix Power: The power applied by each digital input can be adjusted.

Range x: determining the range of power changes.