MULTI CHANNEL MODBUS VIBRATOR CONTROLLER

230Vac, 50Hz, 3A Output Current per Channel, DIN Rail, MODBUS control

SPARKDNA ECVIB12 series of phase angle controllers are specially designed for controlling upto Twelve Electromagnetic Vibratory Feeders from a single unit. This unit is of high use for multi head weighing or sorting machine applications. The controller functions as a MODBUS RTU Slave, which receives vibration set point over MODBUS and controls the vibrators accordingly. Due to MODBUS Control, PLC doesn't requires Analog output or DAC card for controlling the Vibrators. This module has a RS232 and a RS485 ports. Module configuration (Slave ID, Baud Rate, etc.,) can be done using RS232 and outputs can be controlled via RS232/RS485. It has a dedicated register for controlling each Vibrator's output. For example, if the CH1 Register is written with a value of 0x0040, then the vibrator-01's output would be 64%.

This comes as 2 individual cards, one for controller and another for power driver which can be easily connected using 1:1 FRC Cable provided along with the product. The Controller card has a capability to control upto Twelve Vibrators and each driver card is capable of handling up to 4 vibrators. In case of eight vibrator control, user requires one controller card and two driver cards to accomplish it.

ECVIB12 produce a highly stable output voltage that is adjustable in from 1% to 99%. Thanks to the soft-start output, the feeder starts quietly and ensures gentle product handling. An on-board fuse provides over current protection for the feeder coil as well as for the internal semiconductors. Power LED indication available.

sales@sparkdna.in, +91 99428 66766

#44, Marvel Parambariam, Kalapatti Road, Saravanampatti,
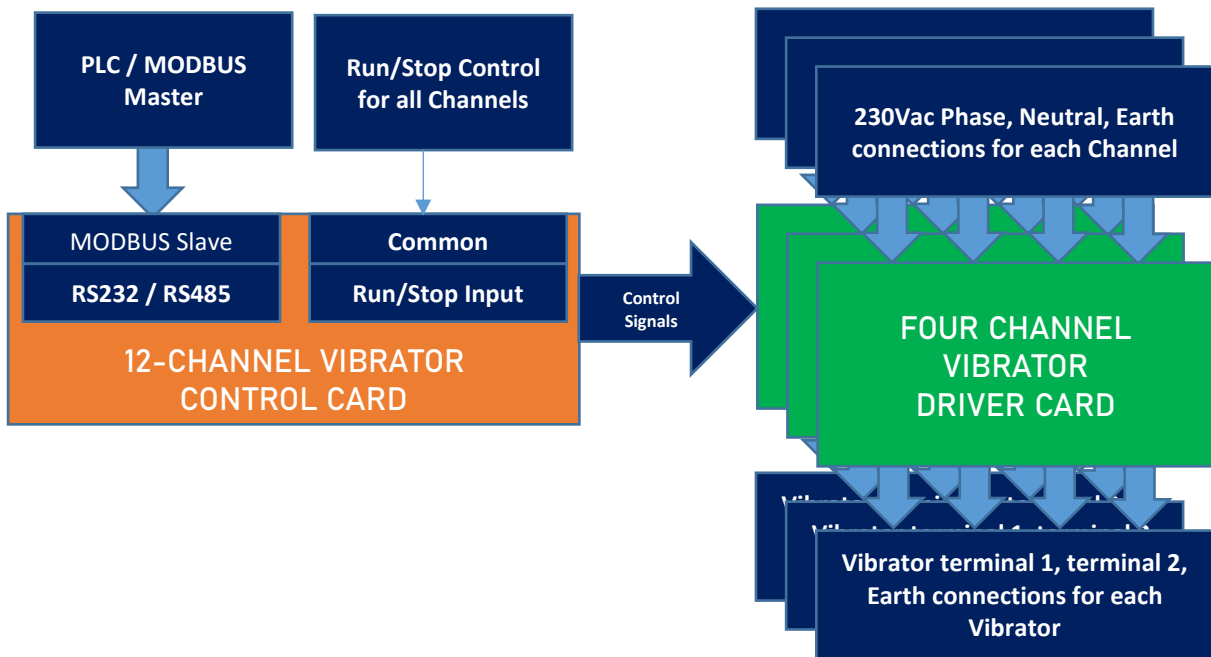Coimbatore, Tamilnadu, India 641035.

Ordering Info

The number channels depends on the model selected by the user.

S.no	Model No	Number of Channel	Control Input type	Remarks
1	ECVIB12-01	4	MODBUS	1 Control card + 1 Driver card
2	ECVIB12-02	8	MODBUS	1 Control card + 2 Driver cards
3	ECVIB12-03	12	MODBUS	1 Control card + 3 Driver cards

Block Diagram

Electrical Characteristics

Supply Voltage	:	230Vac ± 5%
Frequency	:	50Hz
Output Current	:	3A RMS for each Channel.
Ramp time	:	500 msec
Run/Stop control	:	Connect CHx and Com pins to stop the controller.

Mechanical Characteristics

Operating temperature	:	0...+65 (°C)
Dimensions Vibrator Controller	:	$100*105*54 \text{ mm}^3$
Dimensions Vibrator Driver	:	$130*105*54 \text{ mm}^3$
Housing	:	DIN Rail ABS Plastic Enclosure
Weight	:	300 gms (combined)

Connector Info – Controller Card

Pin numbers mentioned are from left to right.

TOP SIDE CONNECTOR

PIN#	CONNECTION
TRIGGER GROUP1	
TRIG	To be connected with Driver card containing Vibrator 01 to 04 using 6 pin 1:1 FRC cable.
TRIGGER GROUP2	
TRIG	To be connected with Driver card containing Vibrator 05 to 08 using 6 pin 1:1 FRC cable.
TRIGGER GROUP3	
TRIG	To be connected with Driver card containing Vibrator 09 to 12 using 6 pin 1:1 FRC cable.

BOTTOM SIDE CONNECTOR

PIN#	CONNECTION
SUPPLY CONNECTION	
P	230Vac Phase
N	230Vac Neutral
RS232 INTERFACE	
Tx	RS232 Tx
Rx	RS232 Rx
GND	Ground – 0V
RS485 INTERFACE	
D+	RS485 D+
D-	RS485 D-
RUN/STOP CONTROL PINS **	
S1	Run/Stop Pin-1
S2	Run/Stop Pin-2

**By default, all Vibrators are in RUN Mode if Run/Stop Control Pins S1 and S2 are left open. If S1 and S2 pins are connected together, then all 12-Vibrators will be in STOP mode.

Connector Info – Driver Card

Pin numbers mentioned are from left to right.

TOP SIDE CONNECTOR

PIN#	CONNECTION
VIBRATOR 1 CONNECTION	
Ch1-L1	VIB1 – Terminal 1
Ch1-L2	VIB1 – Terminal 2
Ch1-E	VIB1 – Earth
VIBRATOR 2 CONNECTION	
Ch2-L1	VIB2 – Terminal 1
Ch2-L2	VIB2 – Terminal 2
Ch2-E	VIB2 – Earth
TRIGGER CONNECTOR	
TRIG	To be connected with Driver card using 6 pin 1:1 FRC cable
VIBRATOR 3 CONNECTION	
Ch3-L1	VIB3 – Terminal 1
Ch3-L2	VIB3 – Terminal 2
Ch3-E	VIB3 – Earth
VIBRATOR 4 CONNECTION	
Ch4-L1	VIB4 – Terminal 1
Ch4-L2	VIB4 – Terminal 2
Ch4-E	VIB4 – Earth

BOTTOM SIDE CONNECTOR

PIN#	CONNECTION
CHANNEL1 SUPPLY CONNECTIONS	
P	CH1 - 230Vac Phase
N	CH1 – 230Vac Neutral
E	CH1 – Earth
CHANNEL2 SUPPLY CONNECTIONS	
P	CH2 - 230Vac Phase
N	CH2 – 230Vac Neutral
E	CH2 – Earth
CHANNEL3 SUPPLY CONNECTIONS	
P	CH3 - 230Vac Phase
N	CH3 – 230Vac Neutral
E	CH3 – Earth
CHANNEL4 SUPPLY CONNECTIONS	
P	CH4 - 230Vac Phase
N	CH4 – 230Vac Neutral
E	CH4 – Earth

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Communication Parameters for RS-485 & RS-232:

Parameter	RS232	RS485	
		Default	Configurable
Protocol	MODBUS – RTU Slave (Hex)	MODBUS – RTU Slave (Hex)	No
Slave Number	1	1	Yes
Baud Rate	9600	9600	Yes
Data bits	8	8	No
Parity	None	None	No
Stop Bits	2	2	Yes
Retry Count	2	2	No
Time Out	1000ms	1000ms	No

NOTE: The Slave Number for RS232 is always "1", cannot be changed. To change Slave number for RS485 refer the Register Section below.

Register Set

Data Register:

Hex Address	Function	Type	Port
0001H	CH1 Control Register	Read / Write	
0002H	CH2 Control Register	Read / Write	
0003H	CH3 Control Register	Read / Write	
0004H	CH4 Control Register	Read / Write	
0005H	CH5 Control Register	Read / Write	
0006H	CH6 Control Register	Read / Write	RS232 & RS485
0007H	CH7 Control Register	Read / Write	
0008H	CH8 Control Register	Read / Write	
0009H	CH9 Control Register	Read / Write	
000AH	CH10 Control Register	Read / Write	
000BH	CH11 Control Register	Read / Write	
000CH	CH12 Control Register	Read / Write	

Control Registers:

Hex Address	Function	Type	Port
000DH	Run Control Register	Write	
000EH	Stop Control Register	Write	RS232 & RS485
000FH	Status Register	Read	

Configuration Registers:

Hex Address	Function	Type	Port
07D0H	Slave Address of RS485	Read / Write	
07D1H	Baud Rate of RS485	Read / Write	RS232 only
07D2H	Stop Bits of RS485	Read / Write	

Changing the Slave Address of Module:

ECVIB12 has two communication ports RS232 and RS485. The Slave address for RS232 is fixed as 01 and cannot be changed. For updating the slave address for RS485, the New Slave address can be written to address (07D0H) via RS232 port. The last changed Slave address will be retained until next change.

Functions of Data Registers:

- 0001H – CH1 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH1. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH1 works accordingly.
  Eg: If PLC writes 000FH in this register, then output of CH1 is 15%.

- 0002H – CH2 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH2. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH2 works accordingly.
  Eg: If PLC writes 0014H in this register, then output of CH2 is 20%.

- 0003H – CH3 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH3. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH3 works accordingly.
  Eg: If PLC writes 0019H in this register, then output of CH3 is 25%.

- 0004H – CH4 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH4. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH4 works accordingly.
  Eg: If PLC writes 001EH in this register, then output of CH4 is 30%.

- 0005H – CH5 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH5. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH5 works accordingly.
  Eg: If PLC writes 0023H in this register, then output of CH5 is 35%.

- 0006H – CH6 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH6. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH6 works accordingly.
  Eg: If PLC writes 0028H in this register, then output of CH6 is 40%.

- 0007H – CH7 Control Register: This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH7. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH7 works accordingly.
  Eg: If PLC writes 002DH in this register, then output of CH7 is 45%.

- **0008H – CH8 Control Register:** This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH8. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH8 works accordingly.
  Eg: If PLC writes 0032H in this register, then output of CH8 is 50%.

- **0009H – CH9 Control Register:** This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH9. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH9 works accordingly.
  Eg: If PLC writes 003CH in this register, then output of CH9 is 60%.

- **000AH – CH10 Control Register:** This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH10. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH10 works accordingly.
  Eg: If PLC writes 004BH in this register, then output of CH10 is 75%.

- **000BH – CH11 Control Register:** This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH11. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH11 works accordingly.
  Eg: If PLC writes 0055H in this register, then output of CH11 is 85%.

- **000CH – CH12 Control Register:** This is a 16-bit Read / Write register, used for controlling the vibration rate of the Vibrator connected to CH12. PLC or any MODBUS master can write a value between 0% and 100% in this register, so that the Vibrator connected in CH12 works accordingly.
  Eg: If PLC writes 0063H in this register, then output of CH12 is 99%.

Functions of Control Registers:

- **0005H - Run Control Register:** This is a 16-bit Write only register, used for turning ON the output of CH1 to CH4.
  Eg: If PLC writes 0005H in this register, then CH1 and CH3 are turned ON.
  Eg: If PLC writes 0002H in this register, then CH2 is turned ON.

- **0006H - Stop Control Register:** This is a 16-bit Write only register, used for turning OFF the output of CH1 to CH4.
  Eg: If PLC writes 0005H in this register, then CH1 and CH3 are turned OFF.
  Eg: If PLC writes 000FH in this register, then all the Vibrators from CH1 to CH4 are turned OFF.

- **0007H – Status Register:** This is a 16-bit Read only register, indicates the status of CH1 to CH4.
  Eg: If the value of this register is 0005H, it indicates CH1 and CH3 are in ON State and CH2 and CH4 are in OFF state.

Functions of Configuration Registers:

- **07D0H (42001) – Slave Address of RS485:** This register has default '1'. The values written to this register will change the Slave Address of RS485 com-port and this will retained until next change. This register can read by either RS232 & RS485 and write by RS232 only.

- **07D1H (42002) – Baud Rate of RS485:** This register has default '0'. The values written to this register with the corresponding Baud Rate of RS485 which is shown in below and this will retained until next change. This register can read by either RS232 & RS485 and write by RS232 only.
  - ➔ '0' – 9600 bps(Default)
  - ➔ '1' – 14400 bps
  - ➔ '2' – 19200 bps
  - ➔ '3' – 38400 bps
  - ➔ '4' – 56000 bps
  - ➔ '5' – 57600 bps
  - ➔ '6' – 115200 bps

- **07D2H (42003) – Stop Bits of RS485:** This register has default '0'. The values written to this register with the corresponding Stop Bits of RS485 which is shown in below and this will retained until next change. This register can read by either RS232 & RS485 and write by RS232 only.
  - ➔ '0' – 2 Stop Bits(Default)
  - ➔ '1' – 1 Stop Bit

Configurator Tool for MODBUS Multi Channel Vibrator Controller:

Configurator tool is available for Module configuration (Salve ID, Baud rate, Stop bits etc.,).

Each Vibrator can be controlled from independently using it.

This greatly reduces the initial testing efforts and time.