DIGITAL PROPORTIONAL VALVE CONTROLLER OPERATING INSTRUCTION

SY-DPCA-C-1 : Case with DIN-35 Rail Clamps
SY-DPCA-P-1 : PCB Only

MODEL SPEC.

Model	SY-DPCA-C-1, SY-DPCA-P-1
Operating Voltage	9 ~ 32VDC
Voltage Tolerance	5%
Input Signal Options	0~5V, 0~10V, 4~20mA, RS485
Output Current	3A max.
Dither Frequency	70 ~ 350Hz

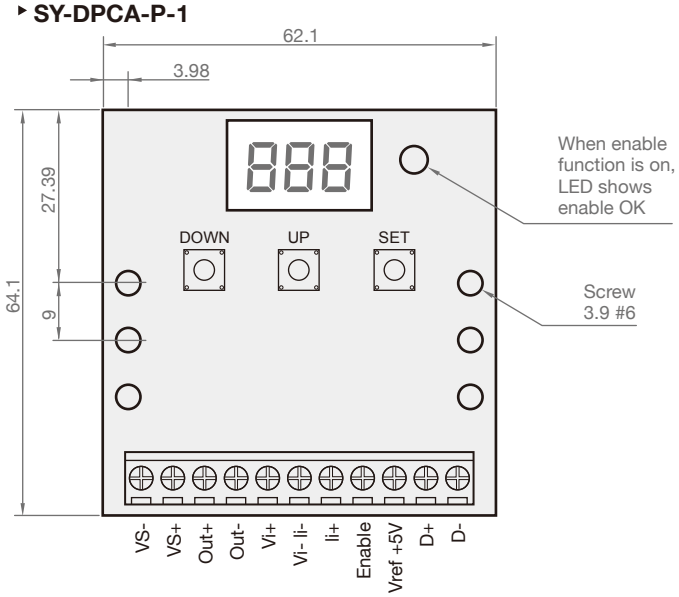
Model	SY-DPCA-C-1, SY-DPCA-P-1
Ramp Up and Down	0.1 ~ 5.0s
Reference Voltage	5V (max. current 5mA)
Communication Interface	RS485
Communication Protocol	Modbus RTU
Operating Conditions	-20 ~ 60°C

CONNECTIONS AND DIMENSIONS

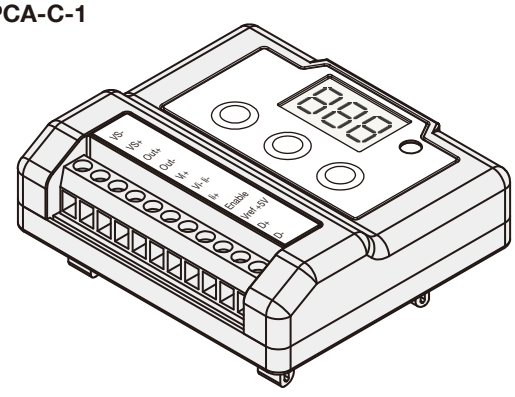
Wiring Instruction		
1	VS-	Power-
2	VS+	Power+
3	Out+	Coil+
4	Out-	Coil-
5	Vi+	Input voltage signal
6	Vi- Ii-	Signal ground
7	Ii+	Input current signal
8	Enable	Enable *
9	Vref +5V	+5V reference voltage
10	D+	RS485+ (optional)
11	D-	RS485- (optional)

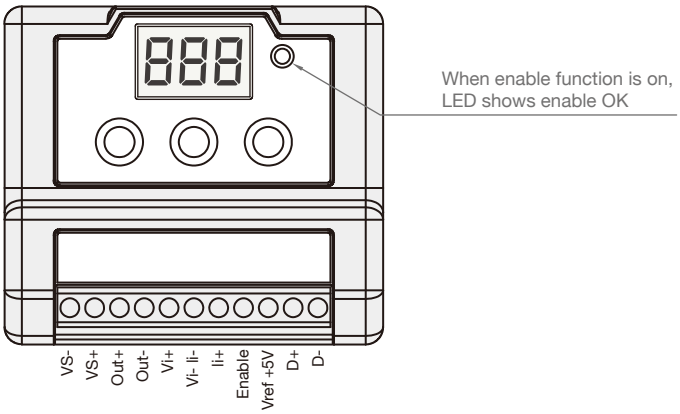
* Default off. Ground this pin to enable controller when PEA function is on.

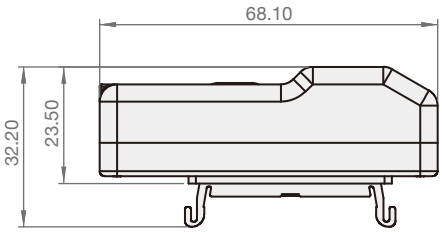
▸ **SY-DPCA-P-1**

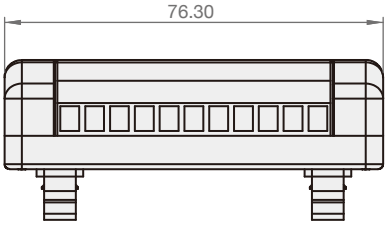


▸ **SY-DPCA-C-1**





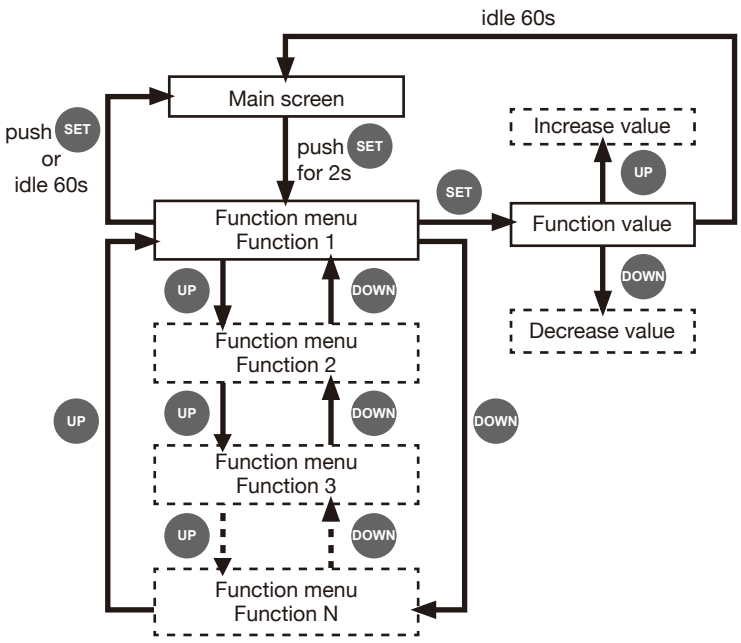




(Unit : mm)

SETTING THE PARAMETERS

1. At main screen, push SET button for 2s and open function menu.
2. At function menu, push UP and DOWN to select function.
3. Push SET button to open function value and push UP and DOWN to adjust it.
4. After adjustment, push SET button to setup function value and return to function menu.
5. Return to main screen by pushing SET button for 2s manually or idling for 60s.
6. Save setup: select PSA function and adjust its value to "5". If no saving all the function value will be reset after reboot.
7. Default setup: select PrF function and adjust its value to "5".

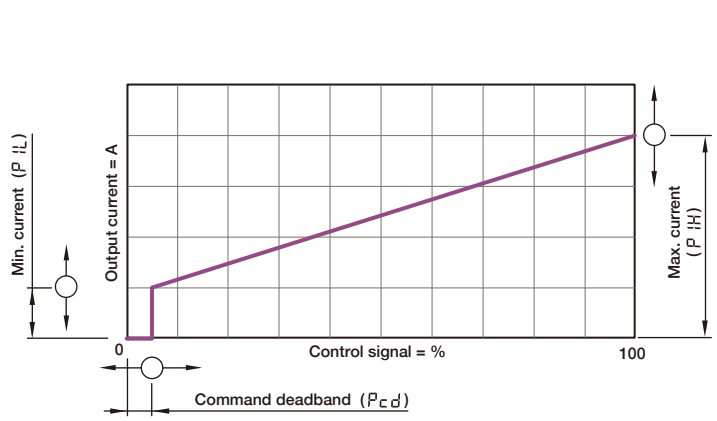


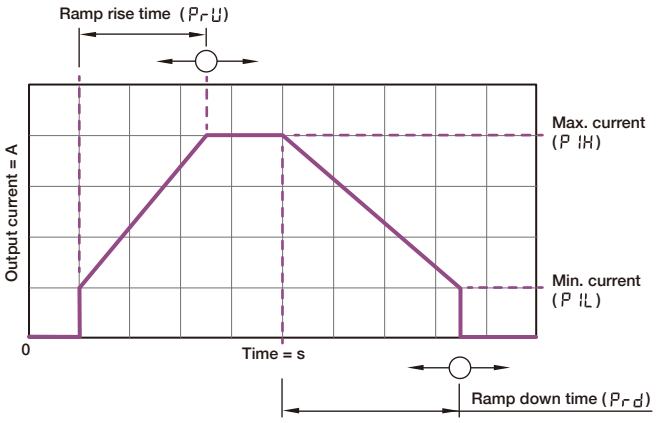
FUNCTION TABLE

No.	Function	Display	Default Value	Adjustment Range	Unit	Description
1	Max. output current	P1H	1.00	0.20~3.00	A	adj. unit 0.01A
2	Min. output current	P1L	0.00	0.00 ~ 1.00	A	adj. unit 0.01A
3	Ramp up time	PrU	0.1	0.1 ~ 5.0	s	adj. unit 0.1s
4	Ramp down time	Prd	0.1	0.1 ~ 5.0	s	adj. unit 0.1s
5	Enable	PEA	0	0 ~ 1		0: function off 1: function on, ground the ENABLE pin to enable controller
6	Input signal type	PA1	10	10/5/420/ 485/PCt		10:0-10V ; 5:0-5V ; 420:4~20mA ; 485:485 control ; PCt:panel control
7	Dither frequency	PdF	140	70 ~ 350	Hz	adj. unit 10Hz
8	Command deadband	Pcd	2	0 ~ 5	%	adj. unit 1%
9	Display type	PdS	0	0 ~ 2		0: output current (A) 1: input instruction (V or mA) 2: display off for power saving
10	Save setup	PSA	0	0 ~ 5		When the value = 5, save the parameters instruction
11	Default setup	PrF	0	0 ~ 5		When the value = 5, restore factory setting
12	Clear error code	PcL	0	0 ~ 5		When the value = 5, delete the error code of current overload
13	Device address	Adr	001	001~247		*1
14	Baud rate	bdr	19.2	4.8/9.6/19.2/ 38.4/57.6	K	*1

*1. Modbus user manual and PC software could be downloaded in below link :

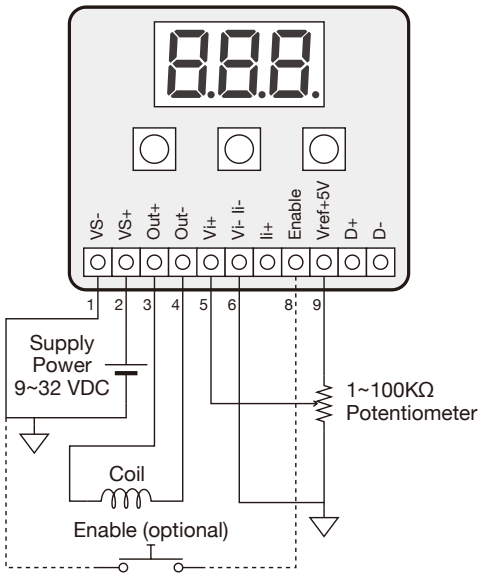
FUNCTION CHART





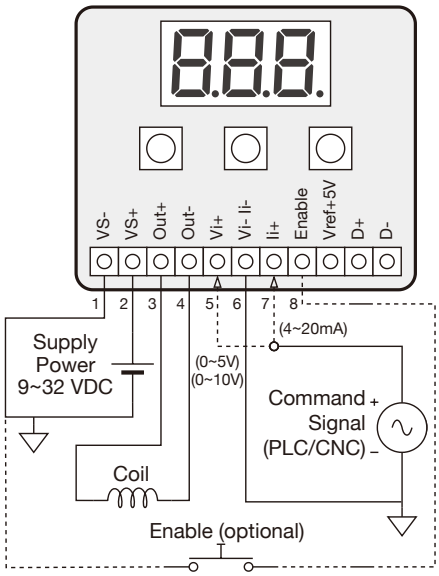
WIRING EXAMPLE

1. Potentiometer control via built-in 5Vref



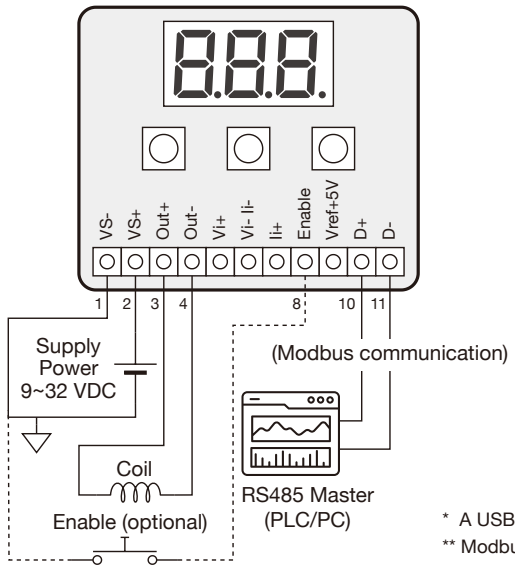
* Adjust PA I function value as "5".

2. External command control



* Adjust PA I function value according to the signal source.

3. Modbus control via RS485



* A USB-RS485 converter (Purchase separately) is necessary to connect PC.

** Modbus user manual and PC software could be downloaded in below link :

ERROR CODE

Error Code	Error Description	Clear Error Code
E 10	4-20mA signal open	For error code E 10, E 11, E30, controller will detect troubleshooting and clear the error code automatically.
E 11	4-20mA signal overload	
E30	Coil open	
E31	Coil short	For error code E31, after troubleshooting, it is necessary to adjust function PcL or reboot to clear the error code.

WARNING

1. Install the controller and Coil only when the power is off.
2. According to European standards EN-982. the electrical output signal of the controller (e.g. reference voltage) must not be directly used to activate safety functions, like to switch-ON/OFF the machine's safety components.

CE

This product has been designed and tested to meet specific standards outlined in the European Electromagnetic Compatibility Directive (EMC)2014/30/EU.
Emission: EN 61000-6-4:2019
Immunity: EN 61000-6-2:2019: EN 61000-4-2:2009, EN 61000-4-3:2020, EN 61000-4-8:2010
Certificate No. NE1105240044

COMMUNICATION PARAMETERS

The default Modbus RS485 communication parameters are as follows (some can be adjusted via the control panel) :

Parameter	Settings	Remarks
Device Address	1(01h) ~ 247(F7h)	Default : **1**
Baud Rate	4800, 9600, 19200, 38400, 57600	Default : **19200**
Data Bits	8	Fixed
Parity	None (N)	Fixed
Stop Bits	1	Fixed
Protocol Mode	RTU	Fixed
Supported Function codes	**03h** (Read), **06h** (Write)	Others not supported

REGISTER ADDRESS TABLE

The following Modbus registers are supported :

Register Address	Name	R/W	Description	Example	
				Decimal	HEX
0000H	Output Current	R	Unit: 0.01A (e.g., 67 → 0.67A)	67	0043h
0001H	Input Signal	R	Unit: 0.1% (e.g., 356 → 35.6%)	356	0164h
0002H	Device Status	R	0: Normal; 1: Current Signal Broken; 2: Overload; 3: Coil Open; 4: Coil Short	0	0000h
0003H	Signal Selection	R/W	0:0~10V (Default); 1:0~5V; 2:4~20mA; 3:RS485; 4: Panel Control	2	0002h
0004H	Enable Mode	R/W	0: Disabled (Default); 1: Enabled	0	0000h
0005H	Display Mode	R/W	0: Show Current (Default); 1: Show Input Signal; 2: No Display	0	0000h
0006H	485 Control Signal	R/W	0~100%, Unit: 1% (e.g., 80 → 80%)	80	0050h
0007H	Factory Reset	R/W	Write **5** to reset addresses 0003H~000DH to default values (Device Address and Baud Rate will be reset)	5	0005h
0008H	Max Current Setting	R/W	0~3.00A, Unit: 0.01A (e.g., 300 → 3.00A)	300	012Ch
0009H	Min Current Setting	R/W	0~1.00A, Unit: 0.01A (e.g., 100 → 1.00A)	100	0064h
000AH	Current Rise Time	R/W	0.1~5.0s, Unit: 0.1s (e.g., 50 → 5.0s)	50	0032h
000BH	Current Fall Time	R/W	0.1~5.0s, Unit: 0.1s (e.g., 10 → 1.0s)	10	000Ah
000CH	Dither Frequency	R/W	70~350Hz, Unit: 10Hz (e.g., 35 → 350Hz)	35	0023h
000DH	Dead Zone Setting	R/W	0~5%, Unit: 1% (e.g., 5 → 5%)	5	0005h

ERROR HANDLING

If an error occurs, the controller responds with:

1. Error Types:
   - Unsupported function code (e.g., 04h)
   - Invalid register address (e.g., 000EH out of range)
   - Data value out of range (e.g., writing 400 to 0008H)
   - For other errors such as CRC or frame length errors, controller will discard the message without responding.
2. Error Response Format:
   - Original function code **+128 (80h)**
   - Error code: **01h** (indicates the error type)
3. Example:

• Host request	01	04	0008	0001	(invalid function code 04h)
• Controller response	01	84	01		(84h = 80h + 04h, 01h = error code)

COMMUNICATION EXAMPLES

Example 1: Reading Data

Read "Output Current (0000H)" and "Input Signal (0001H)" from device address 01h.

Host Request

01 03 0000 0002 C40B

- 01: Device address
- 03: Function code (Read)
- 0000: Start address (0000H)
- 0002: Read 2 registers
- C40B: CRC checksum

Controller Response

01 03 04 006E 0212 1A83

- 01: Device address
- 03: Function code (Read)
- 04: Byte count (4 bytes)
- 006E: 0000H value (0x006E = 110 → 1.10A)
- 0212: 0001H value (0x0212 = 530 → 53.0%)
- 1A83: CRC checksum

Example 2: Writing Data

Set "Vibration Frequency (000CH)" to 250Hz for device address 0Eh.

Host Request

0E 06 000C 0019 88FC

- 0E: Device address
- 06: Function code (Write)
- 0000: Target address (0000H))
- 0019: Value (0x0019 = 25 → 250Hz)
- 88FC: CRC checksum

Controller Response

01 03 04 006E 0212 1A83

- Echoes the request to confirm successful write.

PC COMMUNICATION SOFTWARE

Using a USB-RS485 converter, you can operate and configure parameters via the PC software provided by our company.

Installation Guide

Step 1 : Insert the converter into the USB port on the PC.

Step 2 : Install the converter driver (only required for the first use).

Step 3 : Connect the controller and the converter.

Step 4 : Launch the PC software. Please mail us : info@steedmachinery.com.tw.

Step 5 : Follow the instructions within the software to proceed.

NOTES

1. **Timeout :** Ensure **>10ms** idle time between messages.
2. **CRC Checksum :** Mandatory for all messages (use standard Modbus RTU CRC calculation).
3. **Address Range :** Only 0000H~000DH registers are valid.
4. All parameters configured through Modbus will be saved automatically.