DUAL OUTPUT PROPORTIONAL CONTROLLER OPERATING INSTRUCTION

SY-DPCA-C-2 : Case with DIN-35 Rail Clamps
SY-DPCA-P-2 : PCB Only

MODEL SPEC.

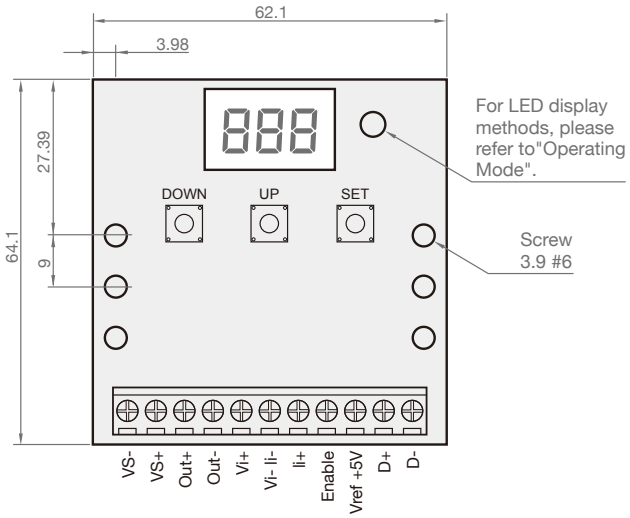
Model	SY-DPCA-C-2, SY-DPCA-P-2
Operating Voltage	9 ~ 32VDC
Voltage Tolerance	5%
Input Signal Options	0~5V, 0~10V, 4~20mA, RS485
Output Current	3A max. for each output
PWM Frequency	70~1000Hz
Dither Frequency	70~500Hz

Model	SY-DPCA-C-2, SY-DPCA-P-2
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

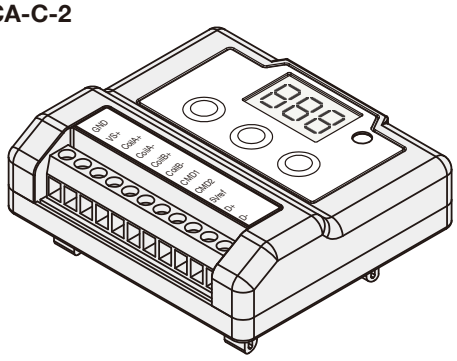
CONNECTIONS AND DIMENSIONS

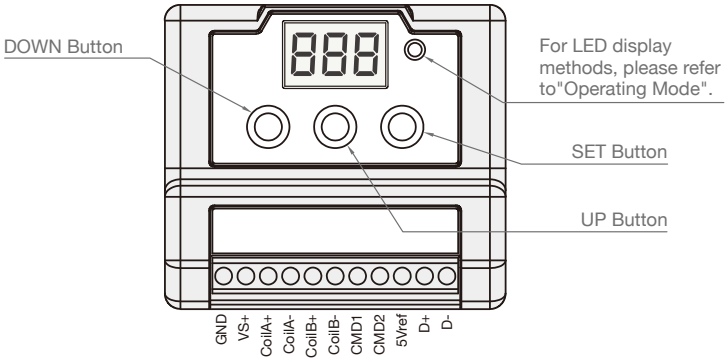
Wiring Instruction		
1	GND	Ground (VS+ / CMD)
2	VS+	Power source
3	CoilA+	Coil A output+
4	CoilA-	Coil A output-
5	CoilB+	Coil B output+
6	CoilB-	Coil B output-
7	CMD1	Command signal 1
8	CMD2	Command signal 2
9	5Vref	5V reference voltage
10	D+	RS485+
11	D-	RS485-

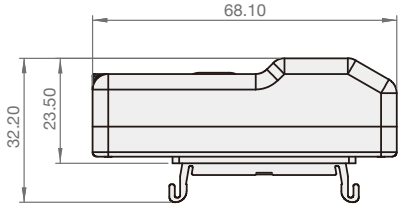
▸ **SY-DPCA-P-2**

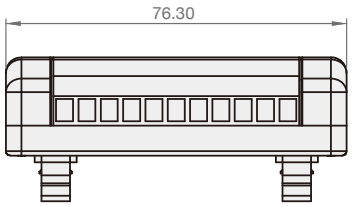


▸ **SY-DPCA-C-2**









(Unit : mm)

OPERATING MODE

	MODE 1	MODE 2	MODE 3
LED Color	Orange	Green	Red
Description	Single Command vs. Single Output	Dual Indep. Command vs. Dual Indep. Output	Single Command vs. Dual Linked Output

SETTING THE PARAMETERS

1. At main screen, long press SET to open function menu.
2. Use UP and DOWN to select function, then press SET .
3. Use UP and DOWN to adjust function value, then press SET to setup and return to function menu.
4. After setup, long press SET to return main screen.
5. Return to main screen by pushing SET button for 2s manually or idling for 60s.

⚠ Save : After setup, select PSA function and adjust the value to "5" to save changes.

⚠ Default : Select PrF function and adjust the value to "5" to factory reset.

FUNCTION TABLE

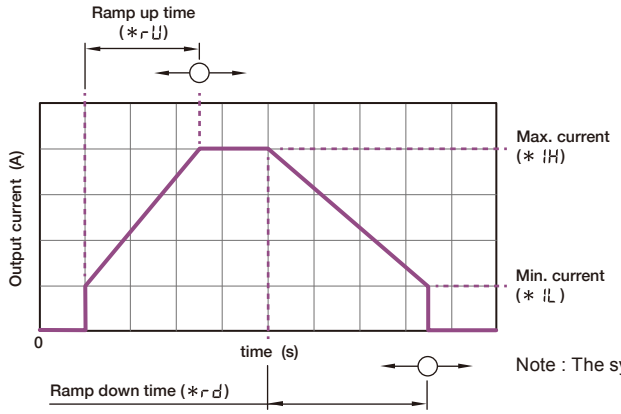
No.	Function	Display	Default Value	Adjustment Range	Unit	Description
				Coil A		
1	Max. output current	A 1H	1.00	0.20~3.00	A	adj. unit 0.01A
2	Min. output current	A 1L	0.00	0.00~1.00	A	adj. unit 0.01A
3	Ramp up time	ArU	0.1	0.1~5.0	s	adj. unit 0.1s
4	Ramp down time	Ard	0.1	0.1~5.0	s	adj. unit 0.1s
5	Command deadband	Acd	2	0~5	%	adj. unit 1%
6	Command source	A 1n	PA1	PA1/481		PA1:CMD1 ; 481:485 control-1
7	PWM frequency	APF	140	70~1000	Hz	adj. unit 10Hz
8	Dither frequency	AdF	140	70~500	Hz	adj. unit 10Hz
9	Dither Amptitude	AdA	0	0~25	%	adj. unit 1%
				Coil B		
10	Max. output current	b 1H	1.00	0.20~3.00	A	adj. unit 0.01A
11	Min. output current	b 1L	0.00	0.00~1.00	A	adj. unit 0.01A
12	Ramp up time	brU	0.1	0.1~5.0	s	adj. unit 0.1s
13	Ramp down time	brd	0.1	0.1~5.0	s	adj. unit 0.1s
14	Command deadband	bcd	2	0~5	%	adj. unit 1%
15	Command source	b 1n	PA2	non/PA1/ PA2/481/482		non:disable Coil B Output ; PA1:CMD1 ; PA2:CMD2 ; 481:485 control-1 ; 482:485 control-2
16	PWM frequency	bPF	140	70~1000	Hz	adj. unit 10Hz
17	Dither frequency	bdF	140	70~500	Hz	adj. unit 10Hz
18	Dither Amptitude	bdA	0	0~25	%	adj. unit 1%

No.	Function	Display	Default Value	Adjustment Range	Unit	Description
			Others			
19	CMD1 selection	PA1	10	10/5/420		10:0~10V ; 5:0~5V ; 420:4~20mA
20	CMD2 selection	PA2	10	10/5/420		10:0~10V ; 5:0~5V ; 420:4~20mA
21	Display type	PdS	0	0~4		0: Coil A current ; 1: Coil A command ; 2: Coil B current ; 3: Coil B command ; 4: display off
22	Save setup	PSA	0	0~5		When adjusting to 5, save all changes to controller
23	Factory reset	PrF	0	0~5		When adjusting to 5, factory reset the controller
24	Clear error code	PcL	0	0~5		When adjusting to 5, clear the E31 error code
			RS485 *1			
25	Device address	Adr	001	001~247		Changes to the device address and baud rate will take effect only after saving (PSA) and rebooting the device.
26	Baud rate	bdr	19.2	4.8/9.6/19.2/ 38.4/57.6	K	

*1. The controller interfaces directly with RS485 MODBUS RTU compliant devices via Terminals 10 and 11. To use our PC software for setup and monitoring, a USB-to-RS485 converter is required (sold separately).
Using a USB-RS485 converter, you can operate and configure parameters via the PC software provided by our company. Please mail us to get the PC software : info@steedmachinery.com.tw.

FUNCTION CHART & WIRING EXAMPLE

1. Ramp up/down Time settings

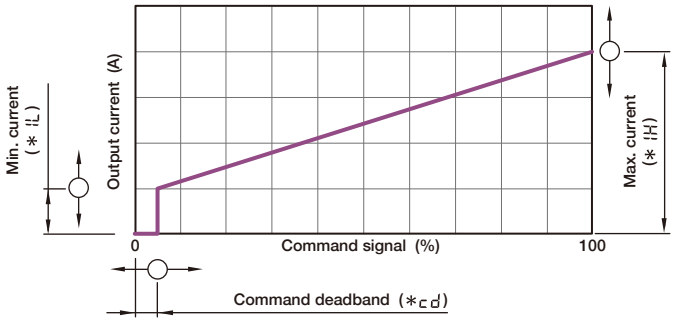


Note : The symbol (*) represents A or b in the diagram.

1. Output Current and Command deadband settings

MODE 1 / MODE 2 :

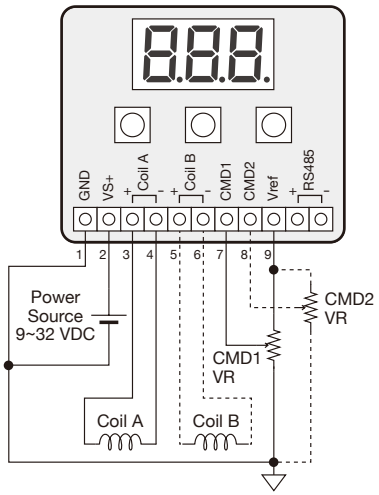
Singal Output vs. Signle Command / Dual Indep. Output vs. Dual Indep. Command Source



Note : The symbol (*) represents A or b in the diagram.

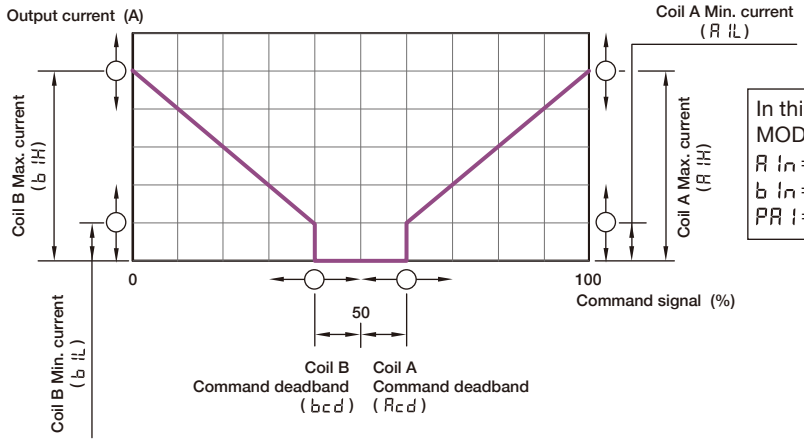
In this example:
MODE 1:
A in = PR 1
b in = non
PR 1 = 5

MODE 2:
A in = PR 1
b in = PR2
PR 1 = 5
PR2 = 5

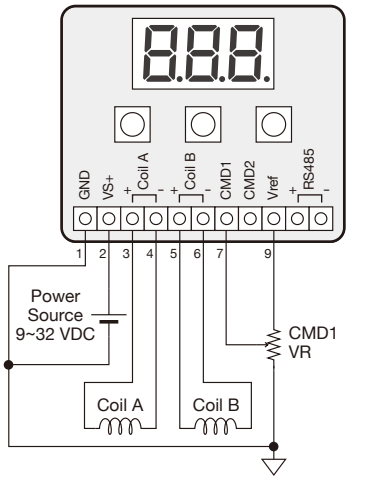


MODE 3 :

Single Command vs. Dual Linked Output



In this example:
MODE 3:
A in = PR 1
b in = PR 1
PR 1 = 5



ERROR CODE

Error Code	Error Description	Clear Error Code
		Coil A
E 10	4-20mA signal open	For error code E 10, E 11, E 12, controller will detect troubleshooting and clear the error code automatically.
E 11	4-20mA signal overload	
E 12	Coil open	
E 13	Coil short	For error code E 13 , after troubleshooting, it is necessary to adjust function PcL or reboot to clear the error code.
		Coil B
E20	4-20mA signal open	For error code E20, E21, E22, controller will detect troubleshooting and clear the error code automatically.
E21	4-20mA signal overload	
E22	Coil open	
E23	Coil short	For error code E23, 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
Real-time Monitor					
0000H	Coil A Output Current	R	Unit: 0.01A (e.g., 67 → 0.67A)	67	0043h
0001H	Coil A Input Command	R	Unit: 0.1% (e.g., 356 → 35.6%)	356	0164h
0002H	Coil A Status	R	0: Normal; 1: Current Signal Broken; 2: Overload; 3: Coil Open; 4: Coil Short	0	0000h
0003H	Coil B Output Current	R	Unit: 0.01A (e.g., 67 → 0.67A)	67	0043h
0004H	Coil B Input Command	R	Unit: 0.1% (e.g., 356 → 35.6%)	356	0164h
0005H	Coil B Status	R	0: Normal; 1: Current Signal Broken; 2: Overload; 3: Coil Open; 4: Coil Short	0	0000h
Common Parameters					
0006H	Command(1) Selection	R/W	0: 0~10V (Default); 1: 0~5V; 2: 4~20mA	2	0002h
0007H	Command(2) Selection	R/W	0: 0~10V (Default); 1: 0~5V; 2: 4~20mA	2	0002h
0008H	Panel Display Mode	R/W	0: Coil A Current(Default); 1: Coil A Command; 2: Coil B Current; 3: Coil A Command; 4: No Display	0	0000h
0009H	485 Command(1)	R/W	0~100%, Unit: 1% (e.g., 80 → 80%)	80	0050h
000AH	485 Command(2)	R/W	0~100%, Unit: 1% (e.g., 80 → 80%)	80	0050h
000BH	Device Address	R/W	1(01h)~247(F7h) **(Change will be applied after reboot)**	1	0001h
000CH	Baud Rate	R/W	0: 4800; 1: 9600; 2: 19200; 3: 38400; 4: 57600 **(Change will be applied after reboot)**	2	0002h
000DH	Factory Reset	R/W	Write 5 to factory reset addresses 0003H~0027H **(Change will be applied after reboot)**	5	0005h

Register Address	Name	R/W	Description	Example	
				Decimal	HEX
Coil A Section					
000EH	Input Selection	R/W	0: Command(1); 1: 485 Command(1)	0	0000h
000FH	Feedback Command	R/W	0: off; 1: Command(1); 2: Command(2)	0	0000h
0010H	Max. Output Current	R/W	0.2~3.00A, Unit: 0.01A (e.g., 300 → 3.00A)	300	012Ch
0011H	Min. Output Current	R/W	0.2~3.00A, Unit: 0.01A (e.g., 300 → 3.00A)	100	0064h
0012H	Ramp Up Time	R/W	0.1~5.0s, Unit: 0.1s (e.g., 50 → 5.0s)	50	0032h
0013H	Ramp Down Time	R/W	0.1~5.0s, Unit: 0.1s (e.g., 10 → 1.0s)	10	000Ah
0014H	Command Deadband	R/W	0~5%, Unit: 1% (e.g., 5 → 5%)	5	0005h
0015H	PWM Frequency	R/W	70~1000Hz, Unit: 10Hz (e.g., 35 → 350Hz)	35	0023h
0016H	Dither Frequency	R/W	70~500Hz, Unit: 10Hz (e.g., 35 → 350Hz)	35	0023h
0017H	Dither Amplitude	R/W	0~25%, Unit: 1% (e.g., 10 → 10%)	10	000Ah
Coil B Section					
0018H	Input Selection	R/W	0: No Output; 1: Command(1); 2: Command(2); 3: 485 Command(1); 4: 485 Command(2)	2	0002h
0019H	Feedback Command	R/W	0: off; 1: Command(1); 2: Command(2)	0	0000h
001AH	Max. Output Current	R/W	0.2~3.00A, Unit: 0.01A (e.g., 300 → 3.00A)	300	012Ch
001BH	Min. Output Current	R/W	0.2~3.00A, Unit: 0.01A (e.g., 300 → 3.00A)	100	0064h
001CH	Ramp Up Time	R/W	0.1~5.0s, Unit: 0.1s (e.g., 50 → 5.0s)	50	0032h
001DH	Ramp Down Time	R/W	0.1~5.0s, Unit: 0.1s (e.g., 10 → 1.0s)	10	000Ah
001EH	Command Deadband	R/W	0~5%, Unit: 1% (e.g., 5 → 5%)	5	0005h
001FH	PWM Frequency	R/W	70~1000Hz, Unit: 10Hz (e.g., 35 → 350Hz)	35	0023h
0020H	Dither Frequency	R/W	70~500Hz, Unit: 10Hz (e.g., 35 → 350Hz)	35	0023h
0021H	Dither Amplitude	R/W	0~25%, Unit: 1% (e.g., 10 → 10%)	10	000Ah
PID Parameters					
0022H	FB Command(A) P	R/W	0~1000	80	0050h
0023H	FB Command(A) I	R/W	0~1000	80	0050h
0024H	FB Command(A) D	R/W	0~1000	80	0050h
0025H	FB Command(B) P	R/W	0~1000	80	0050h
0026H	FB Command(B) I	R/W	0~1000	80	0050h
0027H	FB Command(B) D	R/W	0~1000	80	0050h

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 "Coil A Output Current (0000H)" and "Coil A Input Command (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 "Coil A PWM Frequency (0014H)" to 250Hz for device address 0Eh.

Host Request

0E 06 0014 0019 2607

- 0E: Device address
- 06: Function code (Write)
- 0014: Target address (0014H))
- 0019: Value (0x0019 = 25 → 250Hz)
- 2607: CRC checksum

Controller Response

0E 06 0014 0019 2607

- 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.