

Digital Servo Drive

For Brushless Motor or Brushed Motor

MCDS4805 / MCDS4810 / MCDS4830 / MCDS4850

Datasheet V1.1

Jun 2, 2017



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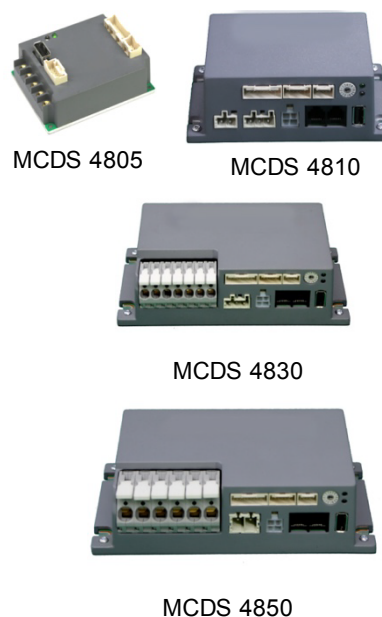
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FEATURES

- For **BLDC Motor** or **Brushed Motor**
- **Command Inputs:** RS232, CAN2.0B, Pulses, PWM, Analog
- **Feedback:** Quad A/B digital and Hall sensor
- **Position Mode, Velocity Mode, Torque Mode**
- **Hardware / Software Position Limit**
- **Home-seeking**
- **IIT Current Limit**
- **Protection:** Over Current, Over Voltage, Under Voltage, etc.
- **Programmable Digital I/O**
- **Space Vector Arithmetic, Sine-wave Control** (for BLDC Motor)
- **Electromagnetic brake control**
- **Dynamic Braking Resistor Input**
- **Ambient Temperature:** -10~70°C, -40~85°C for Industrial Level.



ELECTRICAL CHARACTERISTIC

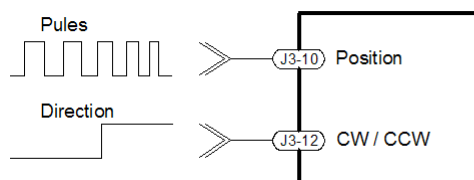
ITEMS	MCDS 4805 (E)	MCDS 4810 (E)	MCDS 4830 (E)	MCDS 4850 (E)
Power Supply (Vdc)	24-65	24-65	24-65	24-65
I_{continuous} (A)	5	10	30	50
I_{peak} (A)	10	20	60	100
RS232	●	●	●	●
CAN2.0B	●	●	●	●
USB	●	●	●	●
Feedback	Quad A/B digital	Quad A/B digital	Quad A/B digital	Quad A/B digital
Encoder Output	○	●	●	●
Programmable inputs	7	5	5	5
Programmable outputs	3 (OC)	1	1	1
Programmable I/O	–	4	4	4
Pulses Frequency	1MHz	1MHz	1MHz	1MHz
Digital Inputs Voltage	5-24 V	5-24 V	5-24 V	5-24 V
Under-voltage threshold	20 V	20 V	20 V	20 V
Over-voltage threshold	71 V	71 V	71 V	71 V
10V analog	●	●	●	●
Potentiometer input	●	●	●	●
Electromagnetic brake control	–	●	●	●
Dynamic Braking Resistor Input	–	–	●	●
Address Setting	–	●	●	●
Ambient Temperature	Standard: -10~70°C E: -40~85°C	Standard: -10~70°C E: -40~85°C	Standard: -10~70°C E: -40~85°C	Standard: -10~70°C E: -40~85°C
Dimensions (mm)	74 x 57 x 25.2	117 x 75 x 43	162 x 89 x 47	170 x 92.6 x 48

CONTROL MODE

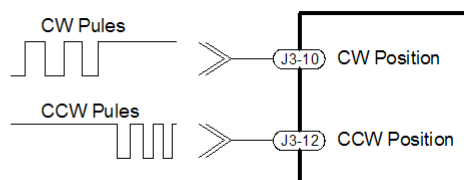
MODES	COMMAND INPUTS	MOTOR	FEEDBACK
Amplifier Mode	RS232, CAN2.0B, PWM, Analog	Brushed Motor	--
Torque Mode	RS232, CAN2.0B, PWM, Analog	Brushed Motor	--
		BLDC Motor	Quad A/B digital With or Without Hall
Velocity Mode	RS232, CAN2.0B, Pulses, PWM, Analog	Brushed Motor	Quad A/B digital
		BLDC Motor	Quad A/B digital With or Without Hall
Position Mode	RS232, CAN2.0B, Pulses	Brushed Motor	Quad A/B digital
		BLDC Motor	Quad A/B digital With or Without Hall

COMMAND INPUTS

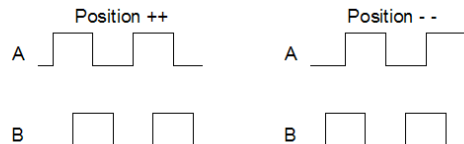
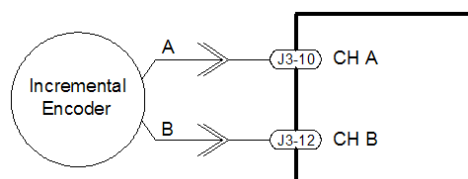
1. Pulses / Direction Inputs



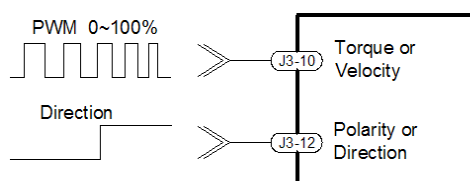
2. Count-up / Count-down Inputs



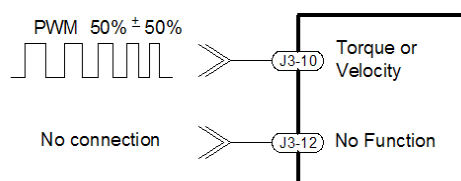
3. Quad A/B Encoder Inputs



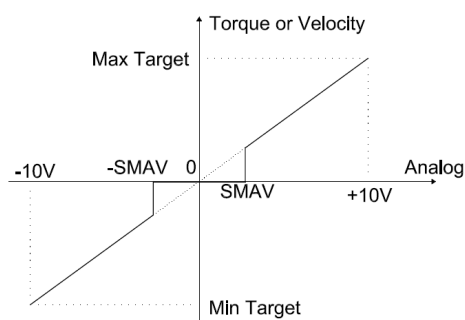
4. PWM / Direction Inputs



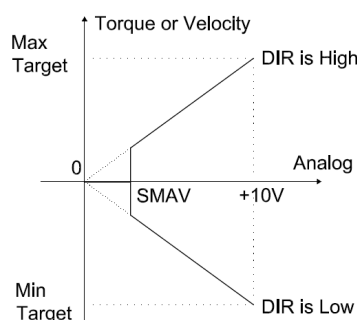
5. PWM 50% Inputs



6. Analog ($\pm 10V$) Inputs

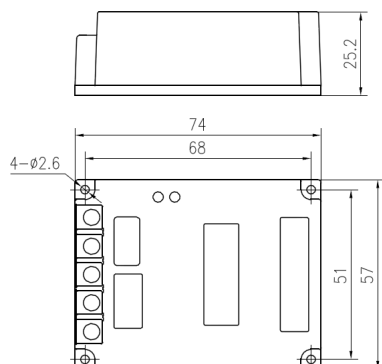
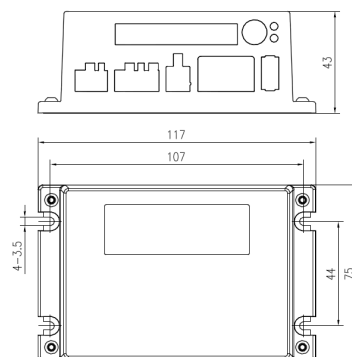
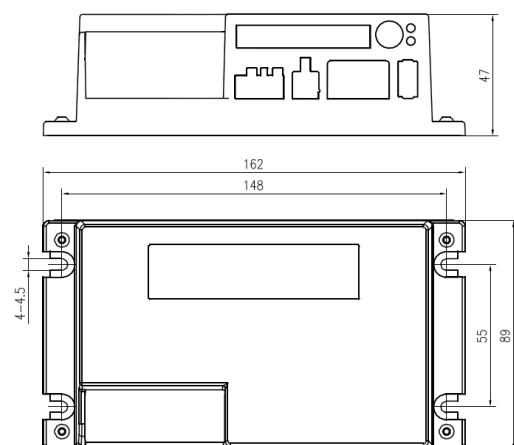
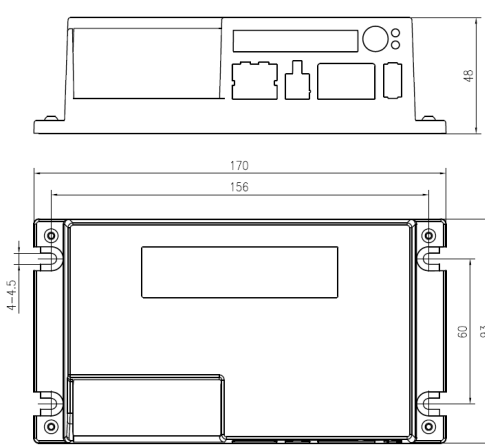


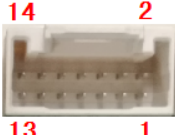
7. Analog (0~10V) / Direction Inputs



8. Communication Commands Inputs (Please see the specific communication protocol)

DIMENSIONS (unit: mm)

1. MCDS 4805 (E)

2. MCDS 4810 (E)

3. MCDS 4830 (E)

4. MCDS 4850 (E)

INTERFACES
1. J1 – Encoder Input

Pins Order	Symbol	Pins		Symbol
 14 2 13 1	GND	1	2	+5Vout
	A-	3	4	A+
	B-	5	6	B+
	Z-	7	8	Z+
	U-	9	10	U+
	V-	11	12	V+
	W-	13	14	W+

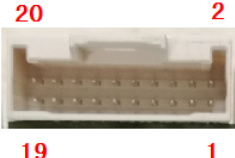
2. J2 – Encoder Output or 2nd Encoder Input

Pins Order	Symbol	Pins		Symbol
 10 2 9 1	+5Vout	1	2	+5Vout
	A2-	3	4	A2+
	B2-	5	6	B2+
	Z2-	7	8	Z2+

	GND	9	10	GND
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This interface can be set as encoder output or 2nd encoder input. *(Please see the specific communication protocol).*

3. J3 – Command Input

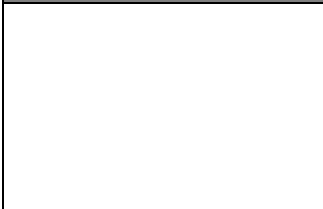
Pins Order	Symbol	Pins		Symbol
	AIN-	1	2	AIN+
	POT	3	4	AGND
	GND	5	6	+5Vout
	RX	7	8	TX
	VC+	9	10	Pulse1 / CU
	ENABLE	11	12	Pulse2 / CD / DIR
	RIGHT	13	14	LEFT
	IO1	15	16	FAULT
	IO3	17	18	IO2
	GND	19	20	IO4

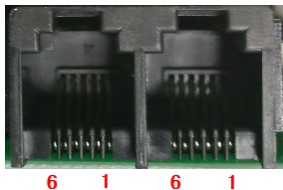
- a) **AIN+**, **AIN-**: $\pm 10V$ analog inputs.
- b) **+5Vout**, **POT**, **AGND**: 0~5V Potentiometer inputs.
- c) **TX**, **RX**, **GND**: RS232 interfaces.
- d) **VC+**: Power supply for PNP output. *(Please see the details in **PROGRAMMABLE OUTPUTS**).*
- e) **Pulse1**: High speed Input. Pulse input or CU, Encoder CH.A input. The detail functions show as following '**COMMAND INPUTS**'.
- f) **Pulse2**: High speed Input. Direction input or CD, Encoder CH.B input. The detail functions show as following '**COMMAND INPUTS**'.
- g) **Enable**: Enable or Disable input.
- h) **Left**: CW running limit.
- i) **Right**: CCW running limit.
- j) **Fault**: Error output.
- k) **IO1~4**: Programmable inputs or outputs.

4. J4 – Address Setting

Picture	Setting	Drive Address
	0	Set by software. Stored in the drive's EEPROM. Range from 0~127.
	1~9,	1~9
	A~F	10~15

5. J5 – CAN-bus and RS232

Picture	Pins	Symbol	Description
	1	CAN-H	CAN-H
	2	CAN-L	CAN-L
	3	TX	TX of RS232
	4	GND	GND of RS232
	5	RX	RX of RS232

 MCDS 4810 / 30 / 50	J5-A-6	120 / Resistor	If use inner 120 Termination resistance, this pin should connect to CAN-H
	J5-B-6	+5Vout	For debugging. Should be open.

Pins Order	Symbol	Pins		Symbol
 MCDS 4805	CAN-L	1	2	CAN-H
	GND	3	4	TX
	NC	5	6	RX
	NC	7	8	120 / Resistor
	CAN-L	9	10	CAN-H

6. J6 – USB

This is a standard slave USB port.

7. J7 – Power Supply

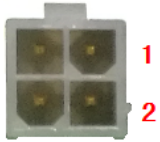
Symbol	Description
VDD	Power supply
VSS	Power GND

The power supply ranges from 24 to 65VDC. Out of this range, the drive may be damaged.

8. J8 – Motor

Symbol	Brushless Motor	Brushed Motor
U	Motor U	--
V	Motor V	Motor +
W	Motor W	Motor -

9. J9 – Auxiliary Power and Brake

Pins Order	Pins	Symbol	Description
	1	Brake +	Brake coil +
	2	Brake -	Brake coil -
	3	Auxiliary Power	Power for Brake. 24VDC is recommended. If don't use brake, this pin should be open.
	4	Power GND	Power GND

10. J10 – Dynamic Braking Resistor

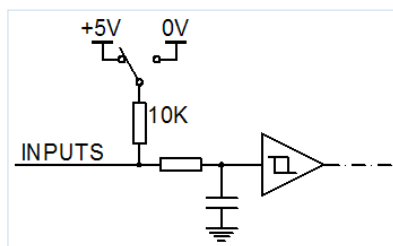
In all the high-power drives, there is a port for the dynamic braking resistor. The 2 pins don't have any polarity. When choosing the value of resistor, please make sure that the port can provide a maximum current of **10A**.

MATCHED SOCKET

Socket	Plug	Pin	Manufacturer
J1 Encoder	501646-1400	501647	Molex
J2 2nd Encoder	501646-1000	501647	Molex

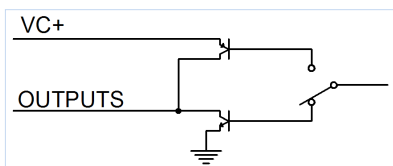
J3 Command		501646-2000	501647	Molex
J5 CAN-Bus and RS232	MCDS 4805	501646-1000	501647	Molex
J7 Power Supply	MCDS 4810	721-102 / 026-000	--	WAGO
J8 Motor	MCDS 4810	721-103 / 026-000	--	WAGO
J9 Auxiliary Power and Brake		3901-2040	3900-0038	Molex
J10 Consumption Resistor	MCDS 4850	831-3102	--	WAGO
	MCDS 4830	721-103 / 026-000	--	WAGO

PROGRAMMABLE INPUTS



1. The inputs can be programmable to **pull up** or **pull down**. The default is pull up.
2. The functions can be programmable.
3. Some specific functions should be on the **fixed** pins. (For example, pulses input, ENABLE input, etc.)
4. The inputs allow **5~24Vdc** high level.

PROGRAMMABLE OUTPUTS



1. All the programmable outputs can be set as **NPN** output or **PNP** output. Then the functions can be programmable.
2. NPN output is open collector. It can be pull up to **30Vdc**.
3. PNP output is also open collector. The Emitter (**VC+**) can connect to **30Vdc**.

PROGRAMMABLE INPUTS AND OUTPUTS

All the programmable IO should be set as input or output firstly. Then the input pins or the output pins are as the same as the above.

INDICATOR LIGHT

INDICATOR LIGHT	STATE	MEANING
POWER	Green On	Power Supplied
	Off	No Power
STATE	Green Flashes	Disable
	Green On	Enable
	Red On	Error

PARAMETERS SETUP

User can configure the drive parameters according to the motor and load. Power-off will lose user's parameters configuration in the drive. To avoid that, use command "ESA" to save drive configuration to EEPROM memory.

DYNAMIC BRAKING RESISTOR

1. Resistor Value and Power

Firstly, the current passing through the resistor should not more than the drive's maximum continuous current. So the resistor value can be calculated, then calculate the power of the resistor.

2. Parameters Setting

When powered on, drive will automatically calculated the threshold voltage according to the power supplied. Then the threshold voltage can be modified through parameters. But anyway, the threshold voltage should not be less than the power supplied 1.1 times.

For example, If the power supplied is 48Vdc, drive will calculated the threshold voltage to $[48 * (1+20\%) = 57.6 \text{ V}]$. Then users can modified this parameter, but it should be more than $[48 * (1+10\%) = 53\text{V}]$.

ORDER INFORMATION

TYPE	Max. Continuous Current	Max. Peak Current	AMBIENT TEMPERATURE
MCDS 4805	5A	10A	-10~70℃
MCDS 4805 E	5A	10A	-40~85℃
MCDS 4810	10A	20A	-10~70℃
MCDS 4810 E	10A	20A	-40~85℃
MCDS 4830	30A	60A	-10~70℃
MCDS 4830 E	30A	60A	-40~85℃
MCDS 4850	50A	100A	-10~70℃
MCDS 4850 E	50A	100A	-40~85℃

OPTIONAL PARTS

TYPE	Name	Specifications	Pictures
HS50-A	Heatsink		
HS50-B	Heatsink		
HS30-A	Heatsink		
HS30-B	Heatsink		
HS10-A	Heatsink		
HS10-B	Heatsink		
USB-C-1	USB Cable	1000 mm	
RS232-RJ11-1	RS232 to RJ11 Cable	1000 mm	