

## Description

CPR Series digital servo drives are designed to drive brushed and brushless servo motors, stepper motors and AC induction motors. These all-digital drives operate in torque, speed or position mode and use space vector modulation (SVM) technology. Compared with traditional PWM, it can improve bus voltage utilization and reduce heat dissipation. The drive can be configured to use various external command signals, or the drive's built-in motion engine (internal motion controller for distributed motion applications) can be used to configure commands. In addition to motor control, these drives also have dedicated programmable digital and analog inputs and outputs to enhance the interface with external controllers and devices.

CPR series drives have added a built-in shunt regulator module, which can consume the energy feedback generated during the regeneration process in the system, and maintain the DC bus voltage at a fixed voltage to prevent the drive from overvoltage shutdown.

CPR series drives have the network communication function of RS485/Modbus RTU, and can be connected to DriveWare®7 software through RS232 to complete drive debugging and configuration.



Peak Current	25A(17.7Arms)
Continuos Current	12.5A(12.5Arms)
Supply Voltage	40-175 VDC

## Features

- Four Quadrant Regenerative Operation
- Space Vector Modulation (SVM) Technology
- Built-in shunt regulator module
- The clamping voltage of the built-in shunt regulator is configurable
- Fully Digital State-of-the-art Design
- Programmable Gain Settings
- Fully Configurable Current, Voltage, Velocity and Position Limits
- 12-bit Analog to Digital Hardware
- On-the-Fly Mode Switching
- On-the-Fly Gain Set Switching
- UL
- cUL
- CE Class A(LVD)
- CE Class A(EMDS)
- RoSH

Note: The certifications and approvals included in the above features are applicable to the internal core drive assembly.

MODES OF OPERATION	COMMAND SOURCE	FEEDBACK SUPPORTED	INPUTS/OUTPUTS
<ul style="list-style-type: none"> <li>● Current</li> <li>● Velocity</li> <li>● Position</li> <li>● Hall Velocity</li> </ul>	<ul style="list-style-type: none"> <li>● ±10 V Analog</li> <li>● PWM and Direction</li> <li>● Encoder Following</li> <li>● 5V Step and Direction</li> <li>● Over the Network</li> <li>● Sequencing</li> <li>● Indexing</li> <li>● Jogging</li> </ul>	<ul style="list-style-type: none"> <li>● ±10 VDC Position</li> <li>● Halls</li> <li>● Incremental Encoder</li> <li>● Auxiliary Incremental Encoder</li> <li>● Tachometer (±10 VDC)</li> </ul>	<ul style="list-style-type: none"> <li>● 2 High Speed Captures</li> <li>● 1 Programmable Analog Input (12-bit Resolution)</li> <li>● 2 Programmable Digital Inputs (Differential)</li> <li>● 3 Programmable Digital Inputs (Single-Ended)</li> <li>● 3 Programmable Digital Outputs (Single-Ended)</li> </ul>

### SPECIFICATIONS

Power Specifications		
Description	Units	Value
DC Supply Voltage Range	VDC	40-175
DC Bus Over Voltage Limit	VDC	193
DC Bus Under Voltage Limit	VDC	36
Logic Supply Voltage(Must be supplied )	VDC	20-80
Maximum Peak Output Current <sup>1</sup>	A(Arms)	25 (17.7)
Maximum Continuous Output Current <sup>2</sup>	A(Arms)	12.5 (12.5)
Maximum Continuous Output Power	W	2078
Maximum Power Dissipation at Continuous Current	W	109
Internal Bus Capacitance	μF	500
Minimum Load Inductance (Line-To-Line) <sup>3</sup>	μH	250(80 V supply); 150(48 V supply); 75(24 V supply); 40(12 V supply)
Switching Frequency	KHZ	20
Maximum Output PWM Duty Cycle	%	92
Control Specifications		
Description	Units	Value
Communication Interfaces	-	RS-485/232 / Modbus RTU
Command Sources	-	±10 V Analog, 5V Step and Direction,Encoder Following, Over the Network, PWM and Direction, Sequencing, Indexing, Jogging

Feedback Supported	-	±10 VDC Position, Auxiliary Incremental Encoder, Halls, Incremental Encoder, Tachometer (±10 VDC)
Commutation Methods	-	Sinusoidal, Trapezoidal
Modes of Operation	-	Current, Hall Velocity, Position, Velocity
Motors Supported <sup>4</sup>	-	Three Phase (Brushless Servo), Single Phase (Brushed Servo, Voice Coil, Inductive Load), Stepper (2- or 3-Phase Closed Loop), AC Induction (Closed Loop Vector)
Hardware Protection	-	40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage
Programmable Digital Inputs/Outputs (PDIs/PDOs)	-	5/3
Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	1/0
Primary I/O Logic Level	-	5V TTL
Current Loop Sample Time	μs	50
Velocity Loop Sample Time	μs	100
Position Loop Sample Time	μs	100
Maximum Encoder Frequency	MHz	20(5 pre-quadrature)
Mechanical Specifications		
Description	Units	Value
Size (H x W x D)	mm(in)	158×111×60
Weight	g	900
Temperature Range <sup>5</sup>	°C	0-75
Storage Temperature Range	°C	-40-85
Cooling System	-	Natural Convection

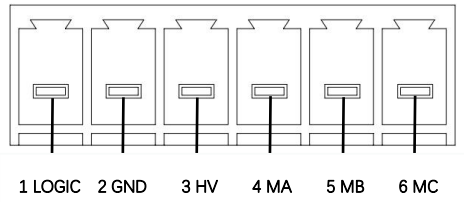
**Note:**

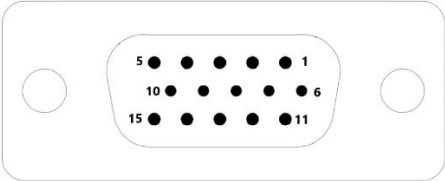
1. Capable of supplying drive rated peak current for 2 seconds with 10 second foldback to continuous value. Longer times are possible with lower current limits.
2. Continuous Arms value attainable when RMS Charge-Based Limiting is used.
3. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
4. Maximum motor speed for stepper motors is 600 RPM. Consult the hardware installation manual for 2-phase stepper wiring configuration.
5. Thermal shutdown when PCB temperature reaches 75°C. The base plate temperature at this point may be between 60°C and 75°C depending on rate of base plate cooling (additional heat sinking), ambient temperature, and output current.

**PIN FUNCTIONS**

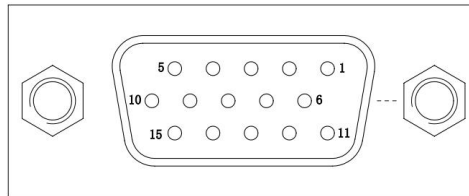
**POWER AND MOTOR POWER - Power Connector**

Pin	Name	Description / Notes
1	LOGIC	Logic Supply Input
2	GND	Logic Supply Ground (Common With Signal Ground)
3	HV	DC Power Input
4	MA	Motor Phase A
5	MB	Motor Phase B
6	MC	Motor Phase C
Connector Information		6-pin, 7.62 mm spaced , enclosed, friction lock header
Mating Connector	Model	Phoenix Contact : P/N 1804946
	Included with Drive	Yes



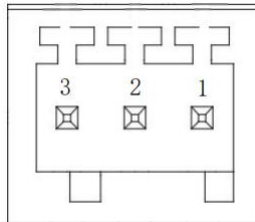
Feedback- Feedback Connector		
Pin	Name	Description / Notes
1	HALL A	Commutation Sensor Inputs (Corresponding to Hall's U+, V+, W+)
2	HALL B	
3	HALL C	
4	MOT ENC A+	Differential Encoder A Channel Input(For Single Ended Signals Use Only The Positive Input)
5	MOT ENC A-	
6	MOT ENC B+	Differential Encoder B Channel Input(For Single Ended Signals Use Only The Positive Input)
7	MOT ENC B-	
8	MOT ENC I+	Differential Encoder Index Input(For Single Ended Signals Use Only The Positive Input)
9	MOT ENC I-	
10	RESERVED	-
11	RESERVED	-
12	SGN GND	Signal Ground
13	+5V OUTPUT	+5V Encoder Supply Output
14	RESERVED	-
15	RESERVED	-
Connector Information		15-pin, high-density, female D-sub
Mating Connector	Model	3-row 15-pin male D-sub plug (TYCO: Plug P/N 748364-1; Housing P/N 5748677-1; Terminals P/N 1658670-2 (loose) or 1658670-1 (strip))
	Included with Drive	No
		
I/O- Signal Connector		
Pin	Name	Description / Notes
1	PAI-1 + (REF+)	Differential Programmable Analog Input or Reference Signal Input (12-bit Resolution)
2	PAI-1 - (REF-)	
3	PDO-1	Programmable Digital Output
4	PDO-2	Programmable Digital Output
5	PDO-3	Programmable Digital Output
6	PDI-1	Programmable Digital Input
7	PDI-2	Programmable Digital Input
8	PDI-3	Programmable Digital Input
9	PDI-4 + (PWM+ / AUX ENC A+ / CAP-B+)	Programmable Digital Input or PWM or Auxiliary Encoder or High Speed Capture
10	PDI-4 - (PWM- / AUX ENC A- / CAP-B-)	

11	PDI-5 + (DIR+ / AUX ENC B+ / CAP-C+)	Programmable Digital Input or Direction or Auxiliary Encoder or High Speed
12	PDI-5 - (DIR- / AUX ENC B- / CAP-C-)	
13	GND	Ground
14	GND	
15	GND	
Connector Information		15-pin, high-density, male D-sub
Mating Connector	Model	3-row 15-pin female D-sub plug
	Included with Drive	No



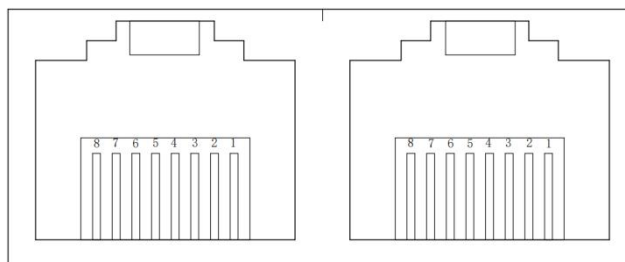
**AUX COMM - RS232 Communication Connector**

1	RS232 RX	Receive Line (RS-232)
2	RS232 TX	Transmit Line (RS-232)
3	GND	RS232 GND
Connector Information		3-pin, 2.5 mm spaced, enclosed, friction lock header
Mating Connector	Model	Phoenix Contact:P/N 1881338
	Included with Drive	Yes



**COMM - -RS485/Modbus RTU**

COMM1		COMM2	
1	-	1	-
2	-	2	-
3	-	3	-
4	RS485 RX+	4	RS485 RX+
5	RS232 RX / RS485 RX-	5	RS232 RX / RS485 RX-
6	RS232 RX / RS485 RX-	6	RS232 RX / RS485 RX-
7	RS232 TX / RS485 TX-	7	RS232 TX / RS485 TX-
8	GND	8	GND
Connector Information		Shielded RJ45 socket	
Mating Connector	Model	AMP:P/N 5-569552-3	
	Included with Drive	No	



## HARDWARE SETTINGS

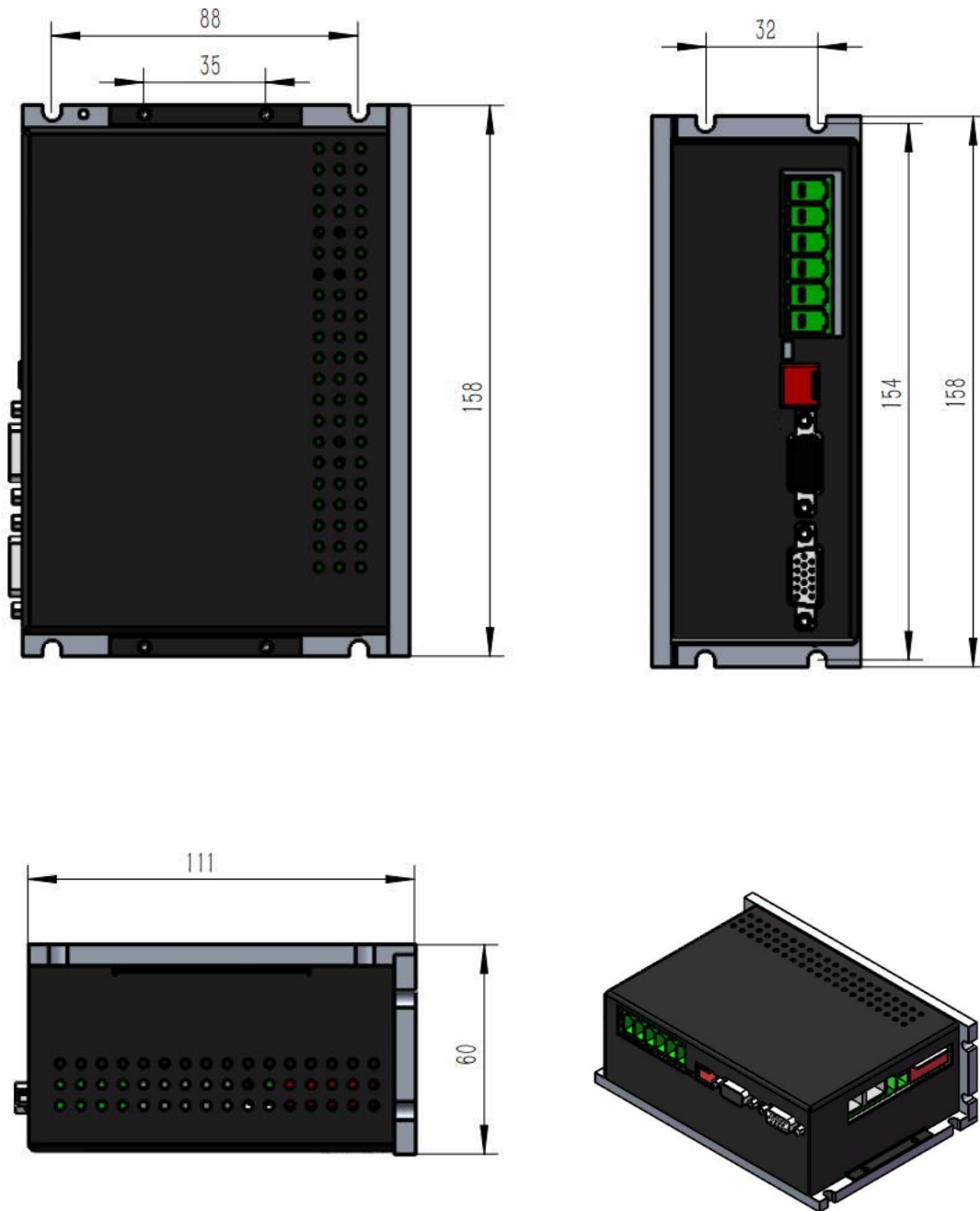
Clamping Voltage setting				
DIP Switch				Clamping voltage <sup>2</sup>
Switch_1	Switch_2	Switch_3	Switch_4	
ON <sup>1</sup>	OFF	OFF	OFF	55VDC (at 48 V supply)
OFF	ON	OFF	OFF	86VDC (at 72V supply)
OFF	OFF	ON	OFF	130VDC((at 110 V supply)
OFF	OFF	OFF	ON	185VDC(at 170 V supply)
8 Switch Functions(ADD/BAUD)				
Switch	Description	ON	OFF	
1	RS485 baud rate setting	9.6kbits/sec	Load from non-volatile memory	
2	RS485 2-wire and 4-wire system selection	2-wire	4-wire	
3	Bit 0 of binary RS-485 drive address <sup>3</sup> . Does not affect RS-232 settings.	1	0	
4	Bit 1 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0	
5	Bit 2 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0	
6	Bit 3 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0	
7	Bit 4 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0	
8	Bit 05 of binary RS-485 drive address. Does not affect RS-232 settings.	1	0	
9 <sup>4</sup>	RS485 communication TX channel 120 $\Omega$ terminal resistance .	120 $\Omega$	None	
10	RS485 communication RX channel 120 $\Omega$ terminal resistance .	120 $\Omega$	None	
1-Digit DIP switch (J1)				
Switch	Description	ON	OFF	
J1 <sup>5</sup>	RS232 and RS485 switch	RS485	RS2332	

**Note:**

- The DIP switch is down to "ON".
- The DIP switch setting of the clamping voltage is particularly important. Please choose strictly according to the power supply voltage of the system. Setting errors will cause the braking resistor to not release the energy when it is required to release the energy, consume the power supply energy when the energy is not required to release the energy, and cause the internal brake clamp part of the drive to be burned in severe cases. If you need a special clamping voltage, please contact your local dealer for customization.
- If all bits of the control RS485 ID are OFF, the ID is subject to the setting in the DriveWare software.
- When you need to set the terminal resistance in the RS485 two-wire communication system, you only need to set Switch-9 to "ON" and keep Switch-10 to "OFF".
- J1 is "ON" when facing the inside of the drive, and "OFF" when facing outwards. The default is "OFF".



**MOUNTING DIMENSIONS**



**PART NUMBERING INFORMATION**

Example: C P R A L T E - 025 B 200-

Drive Series	
CP	Built-in shunt regulator module

Communication	
C	CANopen
E	EtherCAT
S	EtherCAT Sub-node
p	POWERLINK / Modbus
R	RS485 / Modbus RTU

Command Inputs	
AN	Analog (±10V)
	No Step & Direction (5V)
AL	Analog (±10V)
	Low Voltage Step & Direction (5V)

Digital I/O	
I	Isolated (24V)
T	TTL(5V) Non-Isolated

Motor Feedback	
E	Incremental Encoder
R	Resolver
A	Absolute sin/cos (Hiperface & Endat)
S	Sin/cos and/or Halls
U	Universal (Halls, Inc. Enc., Abs. Enc, 1Vp-p Sin/Cos Enc.)

Customization \*

Max DC Bus Voltage	
080	80
200	175

Power and Logic Supply	
B	DC Input
	Both Logic Supply Options (Internal or User)

Peak Current (A)	
008	8
012	12
015	15
020	20
025	25
040	40
060	60

\*:AMC China provides customized services for extended environment , please contact local distributors.