CONTROL TECHNIQUES

COMMANDER C

5 YEAR FREE WARRANTY

SIMPLE, RELIABLE MOTOR CONTROL

0.25kW - 132kW (0.33 hp to 200hp)
100V | 200V | 400V | 575V | 690V

Commander C Highlights

- Set just 4 parameters to get your drive started
- Plug-in options for advanced control
- Dual Safe Torque Off (STO)
- Up to 180% overload for high torque applications
- On board PLC
- Straight forward installation and commissioning
- Easy motor pairing and performance control
- Robust and reliable design

COMMANDER C DRIVE SPECIFICATIONS

Power & Control	
Supply Requirements	100 V drive: 100 V to 120 V ±10 % 200 V drive: 200 V to 240 V ±10 % 400 V drive: 380 V to 480 V ±10 % 575 V drive: 500 V to 575 V ±10 % 690 V drive: 500 V to 690 V ±10 % Maximum supply imbalance: 2 % negative phase sequence (equivalent to 3 % voltage imbalance between phases)
Input Displacement Power Factor	0.97
Phase	1 and 3 (model dependent)
Power Range	0.25 to 132 kW / 0.33 to 200 hp
Input Frequency Range	45 to 66 Hz
Output Frequency/Speed Range	0 to 550 Hz
Switching Frequency	Size 1 - 4: 0.667, 1, 2, 3, 4, 6, 8 12 & 16 kHz Size 5 - 9: 2, 3, 4, 6, 8 12 & 16 kHz (Factory default = 3kHz)
Heavy Duty Overload Capability	150 % for 60 s (open loop mode), 180 % for 3 s (RFC-A mode)
Operating Modes	Linear V to F Square V to F Dynamic V to F Set Point V to F Stator Resistance Compensation RFC-A (enhanced open-loop performance)
Stopping Modes	Coast, Ramp, Ramp & DC Injection Braking, DC Injection Braking with 0 Hz detect, Timed DC Injection Braking Built-in braking transistor, external resistor required
Communication & Interfaces	
Communications	Modbus RTU, EtherCAT, PROFIBUS, Ethernet, DeviceNET, CANopen, PROFINET, POWERLINK (all available with AI/SI-options)
Keypads	Fixed LED keypad Remote IP66 Keypad (available as an accessory) Remote IP66 RTC Keypad (available as an accessory) HMI (available as an accessory)
User Software Tools (Free To Download)	Connect (PC commissioning & cloning tool) Machine Control Studio for on-board PLC programming
Inputs & Outputs	
Analogue	2 x Analogue input Possible settings: 0-10 V, 0-20 mA, 4-20 mA (No Alarm), 4-20 mA (Alarm), 4-20 mA (Error) 1 x Analogue output Possible settings: 0-10 V
Digital	3 x Digital inputs (1 frequency input) 1 x Digital input / output programmable 1 x Digital input / output programmable (can be used as a frequency or PWM output to represent analogue value)
Digital Input Logic	Positive
Relay	1 x Relay (single pole, double throw relay)
Accuracy	Frequency 0.02%, Analogue input 1: 11 bit plus sign, Analogue input 2: 11 bit. Current typical 2%.
Extra I/O with SI-I/O Option Module (Available as an Accessory)	3 x Analogue inputs (default) / Digital inputs programmable 4 x Digital input / output programmable 1 x Digital input 2 x Relays

Mounting & Environment	
IP Rating	IP20 Conduit Box UL Type 1 ingress protection (available as an accessory)
Storage Temperature	-40 °C to 60 °C (-4 °F to 140 °F)
Operating Temperature Without De-Rate	-20 °C to 40 °C (-4 °F to 104 °F)
Operating Temperature with De-Rate	-20 °C to 60 °C (-4 °F to 140 °F) Frames 1 to 4 -20 °C to 55 °C (-4 °F to 131 °F) Frames 5 to 9
Cooling	Integral cooling fan
Altitude	≤3000 m (≤1000 m no de-rate; 1000 m to 3000 m derate 1 % every 100 m)
Humidity	95 % non-condensing at 40 °C / 104 °F - EN61800-2(3k3)
Pollution	Pollution degree 2 - dry, non-conducting pollution only
Vibration	Reference standard IEC60068-2-27, IEC60068-2-29 bump test, IEC60068-2-64 random vibration test, IEC60068-2-6, EN61800-5-1 sinusoidal vibration test. Tested to Environmental Category ENV3
Mechanical Shock	Tested in accordance with IEC 60068-2-27 and IEC 60068-2-29
Mounting Methods	Frame 1 to 4 – Surface mount via mounting holes or DIN Rail mount Frame 5 to 9 – Surface mount via mounting brackets or through-panel mount via through-panel mounting kit
Mounting Clearance	0 mm either side, 100 mm above and below
Overvoltage Category	Category III (IEC/EN/KN/UL 61800-5-1)
Corrosive Environments	EN 60721-3-3 ISO9223 Class C3
Maximum Motor Cable Length	75 m Frame 1 100 m Frames 2 to 4 200 m Frames 5 to 6 250 m Frames 7 to 9
Standards	
Approvals	CE (European Union), cUL Listed (USA and Canada), DNV (marine applications), KC (Korea), RCM (Australia/ New Zealand), EAC (Russian Customs Union), UKCA (United Kingdom), C-Tick (Australia)
Product Safety Standards	IEC/EN/KN/UL 61800-5-1, CSA C22.2 No.274, GB12668.501-2013
TÜV	C300 models only: The Safe Torque Off (STO) function may be used as a safety component of a machine. Type examination certificates by TÜV Rheinland: Frame sizes 1 - 4: No. 01/205/5383.03/18 Frame sizes 5 - 9: No. 01/205/5387.02/18 Functional safety parameters: EN ISO 13849-1 - Cat 4, PLe EN61800-5-2/EN62061/IEC 61508 - SIL 3 UL functional safety approval: FSPC E171230
Product EMC Standards	IEC/ EN 61800-3 Immunity and Emissions EN 61000-6-2: Immunity for industrial environments EN 61000-6-4: Emissions for industrial environments EN 61000-3-2: Harmonic current emissions An EMC data sheet is available on request
RoHS	Complies with the Restriction of Hazardous Substances Directive (2011/65/EU)
Immunity Compliance	Second environment (Industrial)
ISO	Manufacturing facilities comply with ISO 9001:2015 and ISO 14001
Warranty	
Warranty	5 Years (warranty terms and conditions apply)
Accessories	
Remote Interfaces	Remote keypad IP66, Remote keypad RTC, HMI
Filters & Cables	External EMC filters, CT communications cable
Communication & Feedback, SI-Options	AI-485 24 V Adaptor, SI-EtherCAT, SI-PROFIBUS, SI-Ethernet , SI-DeviceNET, SI-CANopen, SI-PROFINET , SI-POWERLINK, SI-Encoder

Back-up & Cloning	AI-Back-up Adaptor AI-Smart Adaptor
Conduit Box	For UL Type 1 ingress protection
Protection	
Conformal Coating	100 % Coverage
DC Bus Undervoltage Error Level	100 V models: 175 Vdc 200 V models: 175 Vdc 400 V models: 330 Vdc 575 V models: 435 Vdc 690 V models: 435 Vdc
DC Bus Overvoltage Error Level	Frame sizes 1 - 4: 100 V models: 510 Vdc 200 V models: 510 Vdc 400V models: 870 Vdc Frame size 5 - 9: 200V models: 415 Vdc 400 V models: 830 Vdc 575 V models: 990 Vdc 690 V models: 1190 Vdc
Drive Overload Error	Programmable: Default settings: 180% for 3s, 150% for 60s
Instantaneous Overcurrent Error/Limit	220% of rated motor current
Phase Loss Error	DC Bus Ripple Threshold Exceeded
Overtemperature Error	Control Board Over Temperature, Inverter Model Temperature, Inverter Thermistor Temperature, Drive heatsink temperature exceeds 95°C (203°F)
Short Circuit Error	Protection against output phase-to-phase fault
Ground Fault Error	Protection against output phase-to-ground fault
Motor Thermal Protection	Electronically protects the motor from over-heating due to loading conditions
Keep Running	Parameter set to avoid errors and machine downtime (needs to be configured)
Dedicated Thermistor Input	Avoid downtime or machine damage due to overheated motor
General	
Items supplied with the drive	Step-By-Step Guide, Safety Information, Grounding bracket (Frames 1 to 4), Surface mounting brackets (frame 5 to 9)

FUNCTIONALITY

Modbus RTU Communications (available with AI-485 Adaptor)	
Control Word Control	✓
Cloning	✓
Serial Baud Rate	600 to 115000 bps
Modbus RTU Protocol	8.2NP, 8.1NP, 8.1EP, 8.1OP
On Board PLC	
User Memory Space	30 KB
User Software Tools (Free to Download)	Machine Control Studio • CODESYS based • Included programming languages: ladder diagram, structure text, function block diagram, instruction list, sequential function chart, continuous function chart • Function block libraries • On-line monitoring of program variables with user defined watch windows • Support for on-line change of program
Pre-set Programs (Available on Request)	Unbalanced Load Detection (Laundry Application)
Reference	
Selectable References	4 (Selectable: Analogue Ref. 1, Analogue Ref. 2, Pre-set Frequency Ref., Keypad Ref.)
Jog Reference	✓
Up / Down % Reference (Motorised Pot)	✓
Bi-Polar Reference	✓
Pre-set Speeds	8
Pre-set Timer	✓
Skip Frequencies	3
Skip Frequencies Dead Band	✓
Local/Remote	✓
S-Ramp	✓
Acceleration Rates	8
Deceleration Rates	8
Frequency Input Reference (Pulse Train)	0 Hz to 100 kHz
Run Reverse	✓
Torque Reference	✓
Application Specific	
PID Controller	PI Control
PID Feedforward	✓
PID Threshold Detector	✓
PID Slew Rate	✓

Reference Configuration	✓
Run/Stop Configuration	✓
Input Scaling	✓
Run Permit (Latching Run)	✓
Limit Switches	✓
Additional Application Parameters	64
Control	
Control Mode: Linear V to F	✓ (Definable Boost)
Control Mode: Square V to F	✓ (Definable Boost)
Control Mode: Low Energy Mode (Dynamic V to F)	✓
Control Mode: Set Point V to F	✓
Control Mode: Stator Resistance Compensation	✓
Control Mode: RFC-A (Enhanced Open-Loop Performance)	✓
Motor Stability Optimiser	✓
Slip Compensation	✓
Auto-tune: Static	✓
Auto-tune: Rotating	✓
Switching Frequency	Size 1 - 4: 0.667, 1, 2, 3, 4, 6, 8 12 & 16 kHz Size 5 - 9: 2, 3, 4, 6, 8 12 & 16 kHz (Factory default = 3kHz)
Catch an Already Spinning Motor	✓
Speed Feedback via SI-Encoder Option	✓
Second Motor Set-up	✓
Motor Pre-Heat Control	✓
Stop Mode: Ramp	✓
Stop Mode: Coast	✓
Stop Mode: Ramp & DC Injection	✓
Stop Mode: DC Injection Braking with 0 Hz detect	✓
Stop Mode: Timed DC Injection Braking	✓
Built-in Braking Transistor (External Resistor Required)	✓
Brake Settings (DC bus)	✓
Programmable Braking in RFC-A Mode	✓
Mechanical Brake Controller	✓
Supply Loss Detection	✓
Low DC Link Operation	✓

Analogue Input Control	✓
Analogue Output Control	✓
Digital Input Control	✓
Digital Output Control	✓
Relay Control	✓
Logic Function Control	✓
Timer Function Control	✓
Limit Switch Control	✓
Variable Selector	✓
Temperature Monitoring	✓
Keypad Button Assignment	✓
Programmable Output Current Limit	✓
General	
Diagnostics	✓
Error History Log	10
Auto-Reset After Error	✓
Error Time Stamping	✓
Power Loss Ride Through	✓
Run Time Log	✓
Cloning	Via: Modbus RTU, SD Card, Connect
Energy Meter	✓
Security	4-digit PIN protectionw

DIMENSIONS

Commander C200/C300 Dimensions

Frame Size	Overall Dimensions						Mounting Dimensions				Mounting Hole Dia.		Weight	
	mm			in			mm		in		mm	in	kg	lb
	H	W	D	H	W	D	H	W	H	W				
1	160	75	130	6.30	2.95	5.1	143	53	5.7	2.08	5.0	0.20	0.75	1.65
2	205	75	150	8.07	2.95	5.9	194	55	7.63	2.17	5.0	0.20	1.3	3.0
3	226	90	160	8.90	3.54	6.3	215	70.7	8.46	2.80	5.0	0.20	1.5	3.3
4	277	115	175	10.90	4.50	6.9	265	86	10.43	3.40	6.0	0.23	3.13	6.9
5	391	143	200	15.39	5.63	7.87	375	106	14.76	4.17	6.5	0.26	7.4	16.3
6	291	210	227	15.39	8.27	8.94	378	196	14.88	7.72	7.0	0.28	14.0	30.9
7	557	270	280	21.93	10.63	11.02	538	220	21.18	8.66	9.0	0.35	28.0	61.7
8	804	310	290	31.65	12.21	11.42	884	259	30.87	10.20	9.0	0.35	52.0	114.6
9A	1069	310	290	42.09	12.21	11.42	1051	259	41.38	10.20	9.0	0.35	46.0	101.4
9E	1108	310	290	43.62	12.21	11.42	1090	259	42.91	10.20	9.0	0.35	66.5	146.6

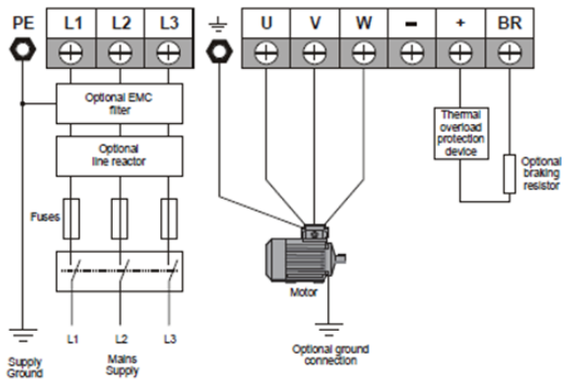
Documentation & Downloads

Product documentation and PC tools available for download from:

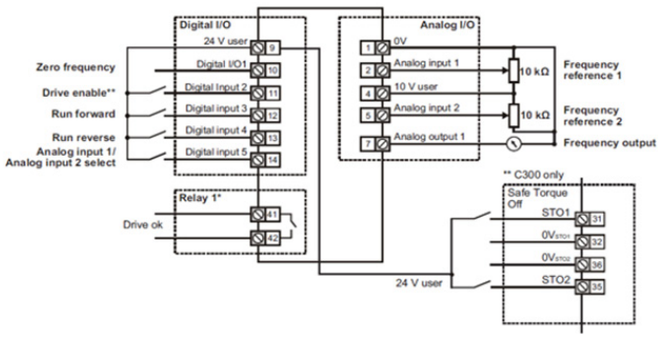
www.controltechniques.com/support

CONNECTIONS

Typical Power Connetions



Default Control Connections



PRODUCT CODES

C200-	03	4	00073	A	-	101	00	AB100
Model:	Frame Size	Voltage Rating:	Current Rating:	Drive Format:		CT Reserved	Regional Default Setting:	Product Variant:

Model:

C200 – The lead product for Commander C range

C300 – As C200 + dual STO

Frame Size

1 to 9

Voltage Rating:

1: 100 V drive (100 V to 120 V ±10 %)

2: 200 V drive (200 V to 240 V ±10 %)

4: 400 V drive (380 V to 480 V ±10 %)

5: 575 V drive (500 V to 575 V ±10 %)

6: 690 V drive (500 V to 690 V ±10 %)

Current Rating:

Heavy Duty current rating x 10

Drive Format:

A – AC in AC out

*E – AC in AC out, External line reactor

CT Reserved

Regional Default Setting:

00 – 50 Hz

01 – 60 Hz

Product Variant:

AB100- Standard

MODEL NUMBER AND RATINGS

Variants with C3 built-in EMC filter

Product Code	Input Phases	Frame Size	Heavy Duty			Normal Duty		
			Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
100/120 Vac +/-10%								
C200-01100017A10100AB100	1	01	1.7	0.25	0.33	For Normal Duty applications, use Heavy Duty ratings.		
C200-01100024A10100AB100	1	01	2.4	0.37	0.5			
C200-02100042A10100AB100	1	02	4.2	0.75	1			
C200-02100056A10100AB100	1	02	5.6	1.1	1.5			
200/240 Vac +/-10%								
C200-01200017A10100AB100	1	01	1.7	0.25	0.33	For Normal Duty applications, use Heavy Duty ratings.		
C200-01200024A10100AB100	1	01	2.4	0.37	0.5			
C200-01200033A10100AB100	1	01	3.3	0.55	0.75			
C200-01200042A10100AB100	1	01	4.2	0.75	1			
C200-02200024A10100AB100	1 | 3	02	2.4	0.37	0.5			
C200-02200033A10100AB100	1 | 3	02	3.3	0.55	0.75			
C200-02200042A10100AB100	1 | 3	02	4.2	0.75	1			
C200-02200056A10100AB100	1 | 3	02	5.6	1.1	1.5			
C200-02200075A10100AB100	1 | 3	02	7.5	1.5	2			
C200-03200100A10100AB100	1 | 3	03	10	2.2	3			
C200-04200133A10100AB100	1 | 3	04	13.3	3	3			
C200-04200176A10100AB100	3	04	17.6	4	5			
C200-05200250A10100AB100	3	05	25	5.5	7.5	30	7.5	10
C200-06200330A10100AB100	3	06	33	7.5	10	50	11	15
C200-06200440A10100AB100	3	06	44	11	15	58	15	20
C200-07200610A10100AB100	3	07	61	15	20	75	18.5	25
C200-07200750A10100AB100	3	07	75	18.5	25	94	22	30
C200-07200830A10100AB100	3	07	83	22	30	117	30	40
C200-08201160A10100AB100	3	08	116	30	40	149	37	50
C200-08201320A10100AB100	3	08	132	37	50	180	45	60
C200-09201760A10100AB100	3	09	176	45	60	216	55	75
C200-09202190A10100AB100	3	09	219	55	75	266	75	100
C200-09201760E10100AB100	3	09	176	45	60	216	55	75
C200-09202190E10100AB100	3	09	219	55	75	266	75	100
380/480 Vac +/-10%								
C200-02400013A10100AB100	3	02	1.3	0.37	0.5	For Normal Duty applications, use Heavy Duty ratings.		
C200-02400018A10100AB100	3	02	1.8	0.55	0.75			
C200-02400023A10100AB100	3	02	2.3	0.75	1			
C200-02400032A10100AB100	3	02	3.2	1.1	1.5			
C200-02400041A10100AB100	3	02	4.1	1.5	2			
C200-03400056A10100AB100	3	03	5.6	2.2	3			
C200-03400073A10100AB100	3	03	7.3	3	3			
C200-03400094A10100AB100	3	03	9.4	4	5			

C200-04400135A10100AB100	3	04	13.5	5.5	7.5			
C200-04400170A10100AB100	3	04	17	7.5	10			
C200-05400270A10100AB100	3	05	27	11	20	30	15	20
C200-05400300A10100AB100	3	05	30	15	20	30	15	20
C200-06400350A10100AB100	3	06	35	15	25	38	18.5	25
C200-06400420A10100AB100	3	06	42	18.5	30	48	22	30
C200-06400470A10100AB100	3	06	47	22	30	63	30	40
C200-07400660A10100AB100	3	07	66	30	50	79	37	50
C200-07400770A10100AB100	3	07	77	37	60	94	45	60
C200-07401000A10100AB100	3	07	100	45	75	112	55	75
C200-08401340A10100AB100	3	08	134	55	100	155	75	100
C200-08401570A10100AB100	3	09	157	75	125	184	90	125
C200-09402000A10100AB100	3	09	200	90	150	221	110	150
C200-09402240A10100AB100	3	09	224	110	150	266	132	200
C200-09402000E10100AB100	3	09	200	90	150	221	110	150
C200-09402240E10100AB100	3	09	224	110	150	266	132	200
500/575 Vac +/-10%								
C200-05500030A10100AB100	3	05	3	1.5	2	3.9	2.2	3
C200-05500040A10100AB100	3	05	4	2.2	3	6.1	4	5
C200-05500069A10100AB100	3	05	6.9	4	5	10	5.5	7.5
C200-06500100A10100AB100	3	06	10	5.5	7.5	12	7.5	10
C200-06500150A10100AB100	3	06	15	7.5	10	17	11	15
C200-06500190A10100AB100	3	06	19	11	15	22	15	20
C200-06500230A10100AB100	3	06	23	15	20	27	18.5	25
C200-06500290A10100AB100	3	06	29	18.5	25	34	22	30
C200-06500350A10100AB100	3	06	35	22	30	43	30	40
C200-07500440A10100AB100	3	07	44	30	40	53	37	50
C200-07500550A10100AB100	3	07	55	37	50	73	45	60
C200-08500630A10100AB100	3	08	63	45	60	86	55	75
C200-08500860A10100AB100	3	08	86	55	75	108	75	100
C200-09501040A10100AB100	3	09	104	75	100	125	90	125
C200-09501310A10100AB100	3	09	131	90	125	150	110	150
C200-09501040E10100AB100	3	09	104	75	100	125	90	125
C200-09501310E10100AB100	3	09	131	90	125	150	110	150
500/690 Vac +/-10%								
C200-07600190A10100AB100	3	07	19	15	20	23	18.5	25
C200-07600240A10100AB100	3	07	24	18.5	25	30	22	30
C200-07600290A10100AB100	3	07	29	22	30	36	30	40
C200-07600380A10100AB100	3	07	38	30	40	46	37	50
C200-07600440A10100AB100	3	07	44	37	50	52	45	60
C200-07600540A10100AB100	3	07	54	45	60	73	55	75

C200-08600630A10100AB100	3	08	63	55	75	86	75	100
C200-08600860A10100AB100	3	08	86	75	100	108	90	125
C200-09601040A10100AB100	3	09	104	90	125	125	110	150
C200-09601310A10100AB100	3	09	131	110	150	150	132	175
C200-09601040E10100AB100	3	09	104	90	125	125	110	150
C200-09601310E10100AB100	3	09	132	110	150	150	132	175

Note: The listed ordering codes are for C200, 50 Hz default setting.

For C300 change the model digits **(C200-xxxxxxxxxxxxxxxxxxx)** from C200 to C300.

For 60 Hz change the Regional Default Setting digits **(xxxx-xxxxxxxxxxxx00xxxxx)** from 00 to 01.

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