Competitor Overview Guide

COMMANDER S100

Comparison guide for Siemens V20, ABB ACS150, Delta VFD-EL, Schneider ATV12 and Rockwell PowerFlex 4M

Issue 1.0

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This document compares the Commander S100 to the following competitor general purpose micro drives:

- Siemens Sinamics V20
- Delta VFD-EL
- Schneider Altivar AV12
- ABB ACS150
- Rockwell Allen-Bradley PowerFlex 4M

Table 1.0 - Drive Ratings

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
Power Ratings						
100 V Drives	0.18 to 1.1 kW	✘	0.2 to 0.75 kW	0.18 to 0.75 kW	✘	0.2 to 1.1 kW
200 V Drives	0.18 to 2.2 kW	0.12 to 3.0 kW (1 Φ only)	0.2 to 3.7 kW	0.18 to 4 kW (1 Φ ≤2.2 kW)	0.37 to 2.2 kW	0.2 to 7.5 kW (1 Φ ≤2.2 kW)
400 V Drives	0.37 to 4 kW	0.37 to 22 kW*	0.4 to 3.7 kW	✘	0.37 to 4 kW	0.4 to 11.0 kW
Voltage Ratings						
100 V Drives	100 V to 120 V ±10 %	N/A	100 V to 120 V ±10 %	100 to 120 V -15% +10 %	N/A	100 V to 120 V ±10 %
200 V Drives	200 V to 240 V ±10 %	200 V to 240 V ±10 %	200 V to 240 V ±10 %	200 to 240 V -15% +10 %	200 to 240 V ±10 %	200 V to 240 V ±10 %
400 V Drives	380 V to 480 V ±10 %	380 V to 480 V -15% +10 %	380 V to 480 V ±10 %	N/A	380 to 480 V ±10 %	380 V to 480 V ±10 %
Max Supply Imbalance	2%	No data given	No data given	No data given	Max. ±3% of nominal phase-to-phase input voltage	No data given
Permissible Supply Configuration	TN-S, TN-C, TT and IT*	TN, TT, IT*	No data given	No data given	No data given	UL listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/347*
Overvoltage Category	Category III (IEC/EN/KN/UL 61800-5-1)	Category III EN60664-1	No data given	No data given	No data given	Not data given
Input Frequency Range	45 to 66 Hz	47 to 63 Hz	47 to 63 Hz	50 / 60 Hz	50 / 60 Hz ±5 %	48 to 63 Hz
Maximum Output Frequency	300 Hz	550 Hz	600 Hz	400 Hz	500 Hz	400 Hz
Switching Frequency	4 kHz or 12 kHz	2 to 16 kHz	2 to 12 kHz	2 to 16 kHz	4 to 16 kHz	2 to 10 kHz
Heavy Duty Overload	150% for 60 s (from cold), 150% for 8s (from hot)	150 % for 60 s *	150 % for 60 s	150 to 170 %	150%	150 % for 60s, 200 % for 3s
Normal Duty Overload	Heavy duty only	110 % for 60 s *	No light duty	No light duty	No light duty	No light duty

**Indicates a caveat – see comparison tool for additional information.*

Table 2.0 - Drive Environment Specifications

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
IP Rating	IP20	IP20	IP20	IP20	IP20	IP20
Storage Temperature	-40 °C to 60 °C (-40 °F to 140 °F)	-40 °C to 70 °C (-40 °F to 158 °F)	-20 °C to 60 °C (-4 °F to 140 °F)	No data given	-40 °C to 70 °C (-40 to 158 °F) ±2%	-40 to +85 °C (-40 to 185 °F)
Operating Temperature	-10 °C to 40 °C (14 °F to 104 °F)	-10 °C to 40 °C (14 °F to 104 °F)	-10 °C to 50 °C (14 °F to 122 °F) *	-10 °C to 50 °C (14 °F to 122 °F) *	-10 to +40 °C (14 to 104 °F)	-10 °C to 50 °C (14 °F to 122 °F)
Operating Temperature with De-Rate	-10 °C to 60 °C (14 °F to 140 °F)	-10 °C to 60 °C (14 °F to 140 °F) *	No other temperatures	-10 °C to 60 °C (14 °F to 140 °F)	-10 °C to 50 °C (14 °F to 122 °F)	No data given
Altitude	≤3000 m (1000 m to 3000 m derate 1 % over 100 m)	≤4000 m (1000 m to 4000 m derate 1 % over 150 m) *	≤1000 m	Installation to meet standards defined by 60721-3-3	0 to 2000 m	0 to 1000 m
Humidity	95 % non-condensing at 40 °C / 104 °F - EN61800-2(3k3)	95 % (Non-condensing) 3K3	Below 90 % RH (Non-condensing)	Installation to meet standards defined by 60721-3-3	0 to 95 % Non-condensing	0 to 95 % Non-condensing
Pollution	Pollution degree 2 - dry, non-conducting pollution only	Pollution degree 2. Solid particles class 3S2	Degree 2	Installation to meet standards defined by 60721-3-3	No data given	No conductive gases
Vibration- Long term storage in packaging	Tested to IEC 60068-2-6	EN60721-3-1 Class 1M2	No data given	Installation to meet standards defined by 60721-3-3	According to ISTA 1A. Max. 100 m/s2 (330 ft/s2), 11 ms.	No data given
Vibration- Transport in packaging	Tested to IEC 60068-2-6	EN60721-3-2 Class 2M3	No data given	Installation to meet standards defined by 60721-3-3	According to ISTA 1A. Max. 100 m/s2 (330 ft/s2), 11 ms	No data given
Vibration- During Operation	Tested to IEC 60068-2-6	EN60721-3-3 Class 3M2	9.80665m/s2 (1G) less than 20Hz, 5.88m/s2 (0.6G) at 20 to 50Hz	Installation to meet standards defined by 60721-3-3	Tested according to IEC 60721-3-3, mechanical conditions: Class 3M4 2...9 Hz, 3.0 mm (0.12 in) 9...200 Hz, 10 m/s2 (33 ft/s2)	Shock: 15g for 11 ms, Vibration: 5 to 2000 Hz
Corrosive Environments	EN 60721-3-3 ISO9223 Class C3	Chemical gases: Class 3C2	Keep from corrosive gases, liquids and dust	Installation to meet standards defined by 60721-3-3	IEC 60721-3-3, chemical gases: Class 3C2 solid particles: Class 3S2	No volatile or corrosive gases
Conformal Coating	100 % Coverage nano-coating	No data given	No data given	No data given	No data given	No data given

*Indicates a caveat – see comparison tool for additional information.

Table 3.0 - Drive Approvals

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
CE	✓	✓	✓		✓	✓
UL	✓	✓	✓	✓	✓	✓
CSA	✓	✓	✓	✓	✓	✓
RCM	✓	✓	✓	✓	✓	✓
EAC	✓	✓	✗	✗	✓	✗
KC	✓	✓	✗	✗	✗	✗
UKCA	✓	✗	✗	✗	✓	✗
roHS	✓	✗	✗	✓	✓	✗
NOM	✗	✓	✗	✓	✗	✗
GOST	✗	✓	✗	✓	✓	✗

Note: ABB ACS150 approvals are inconsistent between the user manual and catalog.

Table 4.0 - Drive Installation Specifications

		Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
Footprint (H x W)	Frame 1	156 x 68 mm (6.14 x 2.70 in)	142 x 68 mm (5.59 x 2.68 in)	174 x 72 mm (6.85 x 2.83 in)	143 x 72 mm (5.63 x 2.83 in)	202 x 70 mm (7.95 x 2.76 in)	174 x 72 mm (6.85 x 2.83 in)
	Frame 2	192 x 68 mm (7.56 x 2.70 in)	160.9 x 90.8 mm (6.33 x 3.57 in)	174 x 100 mm (6.85 x 3.94 in)	143 x 105 mm (5.63 x 4.13 in)	202 x 70 mm (7.95 x 2.76 in)	174 x 100 mm (6.85 x 3.94 in)
	Frame 3	192 x 90 mm (7.56 x 3.54 in)	166 x 90 mm (6.54 x 3.54 in)	N/A	184 x 140 mm (7.24 x 5.51 in)	202 x 105 mm (7.95 x 4.13 in)	260 x 130 mm (10.24 x 5.12 in)
	Frame 4	N/A	160 x 140 mm (6.30 x 5.51 in)		N/A	N/A	N/A
	Frame 5		182 x 184 mm (7.17 x 7.24 in)				
	Frame 6		206.5 x 240 mm (8.13 x 9.45 in)				
	Frame 7		264.5 x 245 mm (10.41 x 9.65 in)				
Mounting Method		Panel, DIN rail	Panel, Push-through (B to E), DIN rail (AA to B)	Panel, DIN Rail (Optional)	Panel, DIN rail (option)	Panel, DIN Rail, Tile, Horizontal	Panel, DIN Rail
Mounting Clearance (Side)		0 mm	0 mm between drives, 15 mm between drive and cabinet	0 mm (50 mm for 40-50°C ambient temperature)	0 mm (Vent cover removed, < 50°C) *	0 mm	25 mm
Mounting Clearance (Above/Below)		45 mm *	100 mm *	120 mm (Frame A) or 150 mm (Frame B)	50 mm	70 mm	76.2 mm (3 in)
Maximum Cable Length		50 m	50 m (100m for 400 V FSE drives) *	20 m (≤3.7 kW), 50 m (≤5.5 kW)	50 m (Shielded), 100 m (Unshielded)	30 m (R0) 50 m (R1 & R2)	No data given
Warranty		5 Years	No data given	No data given	10-year service life	No data given	No data given

**Indicates a caveat – see comparison tool for additional information.*

Table 5.0 - Drive Accessories

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
Interfaces	IP66 Keypad, HMI	External BOP	Remote Controller RC-01, Digital Keypad PU06	Remote Keypad	No data available	Remote and wireless keypad or handheld interfaces
Environmental Protection	Fiber Filter	No data available	No data available	No data available	NEMA 1 enclosure kit	No data available
Cables	Cable Management Bracket, CT Comms Cable	Shield connection kit, DIN Rail and cable screening bracket	MKE-EP Earthing Plate, MKEL-DRA DN Rail Kit	EMC Conformity Kit, +15 V/+24 V voltage converter, MODBUS Serial Link	No data available	RS485 to RS232, Serial Cable, Serial Null Modem Adapter, Universal Serial Bus Converter, DSI Cable
Supply	EMC Filter, Line Reactor,	EMC Filter, Line Reactor, Brake	Zero Phase Reactor, AC Output Reactor, AC Input Reactor, Brake Resistors	EMC Input filters, Motor Chokes, Ferrite rings	Input/Output Chokes, EMC C2 Filters	No data available
User Software	Marshal (Mobile), Connect (PC)	Smart Access,	No data available	SoMove	No data available	DriveTools SP +, DriveExplorer, Pocket Drive Explorer
Option modules	Not supported	I/O extension	CANopen, Profibus, LonWorks, DeviceNet	No data available	No data available	BACnet, ControlNet, DeviceNet, EtherNet/IP, PROFIBUS DP, Compact I/O *
Replacement parts	N/A	Fan	No data available	Fan	Fan	No data available

**Indicates a caveat – see comparison tool for additional information.*

Table 6.0 - Drive Input and Output Specifications

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
Analog Inputs	2	2	1	1	1	2
Minimum Analog Input Resistance	2 kOhm	4.7 kOhm	5 kOhm	2.2 kOhm *	1 kOhm *	1 kOhm (2 Watt)
Analog Input Modes	0-10 V, 0-20 mA, 4-20 mA, Digital *	0-10 V, 0-20 mA, 4-20 mA, Digital	0-10 V, 4-20 mA	0 to 5 V, 0 to 10 V, x to y mA	0 to 20 mA, 0 to 10 V *	0 to 10 V, 4 to 20 mA *
Bipolar Inputs	×	AI1 Only	×	×	×	×
Analog Outputs	1	1	1	1	×	×
User Supply	+24 V, +10 V	+24 V, +10 V	+24 V, +10 V/3mA	+5 V, +24 V	+10 V, +24 V	+10 V, +24 V
Digital IO (Multifunctional)	1	0	0	0	×	×
Digital Inputs	4	4	6	4	5	5 (Not all programmable)
Digital Common	×	✓	1	1	✓	✓
Digital Outputs	0	1	0	1	×	×
Frequency Input	Digital Input 5	×	×	×	Digital Input 5	×
Frequency Output	Digital IO 1	×	×	×	×	×
PWM Output	Digital IO 1	×	×	×	×	×
Digital Input Logic	PNP or NPN (Parameter & wiring)	PNP or NPN (Wiring)	PNP or NPN (DIP switch)	Source or Sink (Parameter & wiring)	PNP or NPN (Wiring)	PNP or NPN (DIP Switch)
Relays	1 (SPDT)	1 (SPDT)	1 (SPDT)	1 (SPDT)	1 (SPDT)	1 (SPDT)
I/O Expansion	×	✓	×	×	×	✓
STO	×	×	×	×	×	×

**Indicates a caveat – see comparison tool for additional information.*

Table 7.0 – Drive Functionality

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
References						
Configurable References	4	2	2	1	2	1
Jog	✓	✓	✓	✓	✓	✓
Bi-polar reference	✓	✓	×	×	✓	✓
Preset speeds	4	16	15	8	7	4
Preset timer	**Commander C**	×	×	×	×	×
Skip frequencies	1	4	3	✓	3	✓
Skip frequencies dead band	✓	✓	✓	×	✓	✓
Local/Remote	✓	×	✓	✓	✓	✓
Pulse Train Frequency Reference	0 to 100 kHz	×	×	×	✓	×
Up/Down Reference (MOP)	✓	✓	✓	×	✓	×
Run Reverse	✓	✓	✓	✓	✓	✓
Torque reference	**Commander C**	✓	×	×	×	×
Keypad reference	✓	✓	✓	✓	✓	✓
Ramps						
Ramp Hold	**Commander C**	×	✓	×	×	×
S-Ramp	✓	✓	✓	✓	✓	✓
U-Ramp	**Commander C**	✓	×	✓	×	×
Acceleration Rates	2	1	2	2	2	2
Deceleration Rates	2	2	2	2	2	2
Jog Accel Rate	Selected Accel Rate	✓	✓	Fixed at 0.1s	×	✓
Jog Decel Rate	Selected Decel Rate	✓	✓	Fixed at 0.1s	×	✓
Stop mode: Ramp	✓	✓	✓	✓	✓	✓
Stop mode: Coast	✓	✓	✓	✓	✓	✓
Stop mode: Fast Ramp	✓	✓	✓	✓	✓	×
Stop Mode: Distance	✓	×	×	×	×	×
Error/Trip Stop Mode	Coast to Stop	✓	✓	✓	×	×
Dual Ramp	✓	✓	×	×	×	×
DC Injection Braking	✓	✓	✓	✓	✓	✓
Brake settings (DC bus)	✓	✓	✓	✓	✓	✓
Braking IGBT	**Commander C**	✓	✓	✓	✓	✓
Control						
Control Mode: Linear V/f	✓	✓	×	✓	✓	✓
Control Mode: Quadratic V/f	✓	✓	×	✓	✓	×
Control Mode: Dynamic V/f	✓	✓	×	×	×	×
Control Mode: Set Point V/f	**Commander C**	✓	✓	×	×	✓
Super Torque Start	×	✓	×	×	×	×
Hammer Start	×	✓	×	×	×	×

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
Blockage Clearing Start	Pump Drive F600	✓	×	×	×	×
RFA-C	Commander C	✓	×	✓	×	×
Speed Feedback	Unidrive M600	×	×	×	×	×
Position Counter	Unidrive M600	×	✓	×	×	×
Stator Resistance Compensation	✓	✓	×	✓	✓	×
Slip Compensation	✓	✓	✓	✓	✓	✓
Auto-tune: Static	✓	✓	×	✓	×	×
Auto-tune: Rotating	Commander C	✓	×	✓	×	×
Switching Frequency	4 or 12 kHz	2 to 16 kHz	2 to 12 kHz	2 to 16 kHz	4 to 16 kHz	2 to 10 kHz
Frequency Modulation to reduce noise	Commander C			✓	✓	×
Catch a spinning motor	✓	✓	✓	✓	✓	✓
PID control	✓ (PI Control)	✓	✓	✓	✓	×
Cooling fan control	Commander C	✓	✓	×	×	×
Motor pre-heat control	Commander C	✓	×	×	×	×
Condensation Protection	×	✓	×	×	×	×
Supply loss detection	✓	✓	✓	✓	✓	×
Low DC link operation	Commander C	×	×	×	×	×
Motor Staging	×	✓	×	×	×	×
I/O Functions						
Analogue input control	✓	✓	×	×	✓	×
Analogue output control	✓	✓	✓	✓	×	×
Temperature monitoring	✓ (No thermistor input type)	✓	✓	✓	✓	×
Digital input control	✓	✓	✓	✓	✓	✓
Digital input debouncing	×	✓	✓	×	×	v
Digital output control	✓	✓	×	✓	×	×
Relay control	✓	✓	✓	✓	✓	✓
Mechanical brake controller	Commander C	✓	✓	×	✓	×
Keypad button assignment	✓ (Run or Jog Only)	×	×	×	×	×
Logic function control	Commander C	✓	×	×	×	×
Timer function control	Commander C	4	×	×	×	×
Limit switch control	✓	×	✓	×	×	×
Threshold detection	✓	✓	✓	✓	×	×
Sleep Mode	✓	✓	✓	✓	✓	×
Fire Mode	✓	×	×	×	×	×

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
General						
Heavy Duty/Normal Duty Select	**Commander C**	✓	×	×	×	×
Variable selector	**Commander C**	✓	×	×	×	×
Displayable Parameters	5	5	11	13	3	22
Energy meter	**Commander C**	✓	×	×	✓	×
Trip time stamping	**Commander C**	✓	×	×	✓	×
Previous trip data parameters	4	✓	5	×	3	3
Run time log	Marshal	✓	×	4	✓	✓
Diagnostics	✓	✓	×	✓	✓	×
Auto-reset after trip	✓	✓	✓	✓	✓	✓
Power loss ride through	✓	✓	×	✓	✓	×
Control word control	✓	✓	×	✓	×	×
Cloning	✓	✓	×	✓	✓	×
Security	✓	✓	✓	✓	✓	×
On-board PLC	**Commander C**	×	×	×	×	×
Spare application parameters	**Commander C**	×	×	×	×	×
Second motor set-up	**Commander C**	✓	×	×	×	×
Easy Motor Data	Connect supports motor list	Calculates from motor power	×	×	×	×
User Access Level	**Commander C**	✓	×	×	×	×
Parameter Filter	Menu Structure, Option in Marshal	✓	×	✓	✓	×
Adjust display parameter	**Commander C**	✓	✓	×	✓	×
Keep-Running	✓	✓	×	×	×	×
Real Time Clock	**Commander C**	✓	×	×	×	×
Configurations/Macros						
Separate Ref/Run Configurations	✓	✓	×	✓	×	×
Local/Remote	✓	×	×	✓	✓	×
Voltage & Presets	✓	✓	×	✓	✓	×
Current & Presets	✓	×	×	×	✓	×
Sum Presets	×	✓	×	×	×	×
Presets	✓	✓	×	×	×	✓
Keypad	✓	✓	×	×	×	✓
Terminal Up/Down (MOP)	✓	✓	×	×	✓	×
Frequency	✓	×	×	×	×	×
PID + Voltage Ref	✓	✓	×	✓	✓	×
PID + Feedforward	✓	✓	×	×	×	×

	Commander S100	Siemens V20	Delta VFD-EL	Schneider ATV12	ABB ACS150	Rockwell PowerFlex 4M
Start/Stop	✓	×	×	✓	×	×
Default Reference Configuration	Local/Remote	BOP (Keypad)	Analog Input Reference	Start/Stop	Run + Reverse (2-Wire) & 0 to 20 mA Reference	×
En+RF+RR	✓	×	×	✓	✓	✓
RF+RR (3 Wire)	✓	✓	×	✓	×	✓
En+Run+Reverse	✓	×	×	×	×	×
Run + Reverse (3 Wire)	✓	×	×	×	✓	×
Run + Jog (3 Wire)	✓	×	×	×	×	×
RF+RR (2 Wire)	✓	×	×	×	×	✓
Run+Reverse (2 Wire)	✓	×	×	×	×	×
Run+Reverse+Jog	✓	✓	×	×	×	×
Keypad	✓	✓	×	×	×	✓
Keypad + Enable	✓	×	×	×	×	×
Keypad Jog	✓	✓	×	×	×	×
Default Run Configuration	En+RF+RR	BOP (Keypad)	Keypad STOP enabled. Run FWD, Run REV	Enable and Run Forwards Only	×	×

Key:

✓ = Functionality Supported ✓ = Similar Functionality Supported × = Functionality Not Supported

Nidec

All for dreams