

# VS1ST AC DRIVES



**Starter replacement drive that is compact, cost effective, and provides powerful control functions. The VS1ST can be started by adjusting just a few basic parameters.**

The VS1ST is a feature rich V/Hz product targeted at the equipment manufacturing markets. Combining performance with an intuitive operator interface, the VS1ST can handle the most demanding applications.

## Features

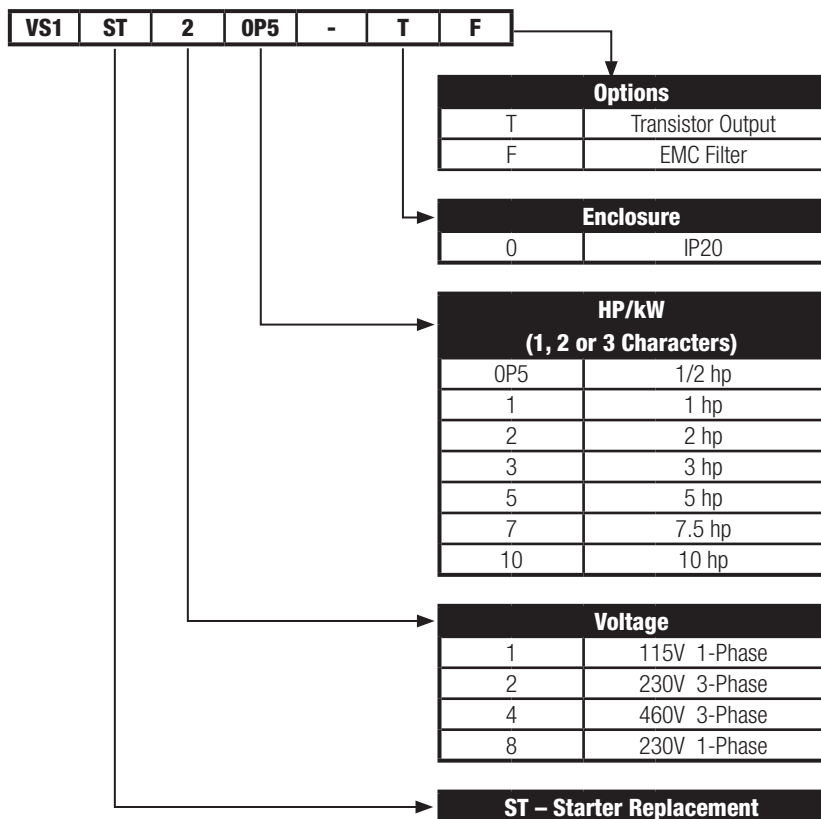
- Single Phase Input Voltage / Power Ratings
  - 115 VAC: 0.5 to 1.5 hp (0.37 to 1.1 kW)
  - 240 VAC: 0.5 to 3 hp (0.37 to 2.2 kW)
- Three Phase Input Voltage / Power Ratings
  - 240 VAC: 0.5 to 5 hp (0.37 to 4 kW)
  - 480 VAC: 1.0 to 10 hp (0.75 to 7.5 kW)
- IP20 Enclosure
  - DIN rail mounting
  - Pluggable I/O terminal strip
  - Easy access power terminals
- Enhanced V/Hz Control (Fan/Pump, Linear, Custom)
- Operator Interface
  - User friendly control; basic start/stop, forward/reverse and speed control
  - LED Display; six character
  - Basic parameter list for quick start up
  - Remote keypad option
  - Program loader (upload/download capable)
- Operation Functions
  - Power – Off E-Stop
  - DC injection braking
  - Power line dip ride through
  - Skip frequency
  - Software parameter lock
  - Display speed scaling for custom units
  - PI control
  - Auto restart
  - Slip compensation
  - Brake transistor (frames B & C)
  - Start into a rotating load
- Modbus-RTU Standard (built-in)

## Specifications

- Digital Inputs 1 & 2
  - Fully configurable
  - Factory set to common defaults
  - 24 VDC sink / source
- Digital Input 3 / Analog Input 2:
  - Configurable for motor thermistor input
  - Programmable as Analog Input 2
  - 0-10V or 4-20mA
  - 12 bit resolution
- Analog Input 1 / Digital Input 4:
  - 0-10V or 4-20mA
  - 12 bit resolution
  - Programmable as Digital Input 4
- Relay Output: Normally Open Contact
- Analog Output: 0-10V / Digital Output
  - Proportional to Motor Speed, Motor Current, Drive Enable or Motor at Speed
  - Programmable as Digital Output
- Preset Speeds (4)
- Fault Memory
  - Last (4) fault history
- Environmental
  - 0 to 50° C
  - 3300 feet (1000m)
  - 10 to 95% Humidity, non-condensing
- Electrical
  - 115 VAC (99-126 VAC) @ 48-62 Hz
  - 240 VAC (198-264 VAC) @ 48-62 Hz
  - 480 VAC (342-528 VAC) @ 48-62 Hz
  - 97% efficiency @ full load and frequency
- Output Ratings
  - 150% for 1 minute, 175% for 2 seconds
  - 0 to 500Hz Output Frequency
  - 4 to 32 kHz switching frequency

# VS1ST AC DRIVES

## VS1ST Catalog Number Definition



### Agency Certifications/ Listings:

- UL
- cUL
- CE

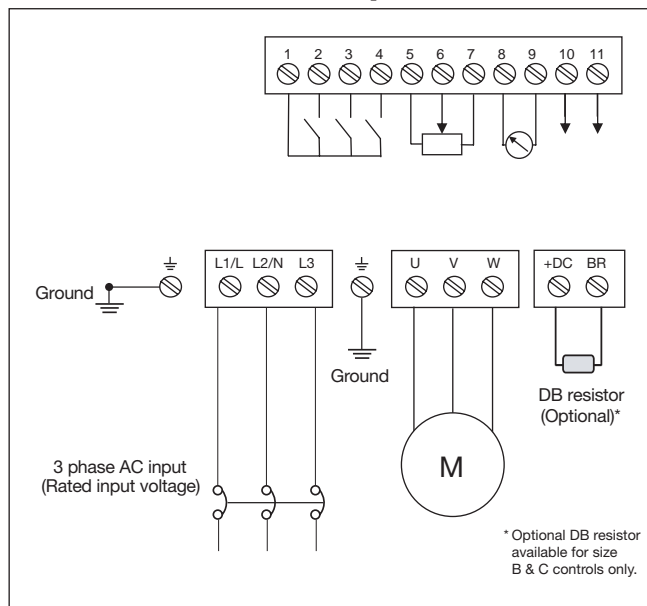
### Optional Equipment and Accessories

- Remote Keypad
- CopyCat Loader
- 2nd Relay Output Card
- HVAC Output Card (Fault & Drive Run)
- Drive Run & Trip Relays
- DB Resistor Kit
- Serial Network Cables
- Communication Network Gateway Interface

## VS1ST Connections

Control Terminal	Signal	Description
1	+24 Volts	+24V, 100mA
2	Digital Input 1	0 = 0-4 VDC; 1 = 8-30 VDC
3	Digital Input 2	0 = 0-4 VDC; 1 = 8-30 VDC
4	Digital Input 3	0 = 0-4 VDC; 1 = 8-30 VDC
5	Analog Input 2	Analog: 0 to 10V, 0 to 20mA or 4 to 20mA
6	+10 Volts	10mA, (1kOhm min) potentiometer
7	Analog Input 1	Analog: 0 to 10V, 0 to 20 or 4 to 20mA
8	Digital Input 4	0 = 0-4 VDC; 1 = 8-30 VDC
9	0 Volts	User ground, connected to terminal 9
10	Analog Output	Analog: 0 to 10V, 20mA maximum
11	Digital Output	Digital: 0 to 24V
9	0 Volts	User ground, connected to terminal 7
10	Relay Common	
11	Relay N/O	250V AC 6A / 30V DC 5A
Power Terminal	Signal	Description
L1/L, L2/N, L3	AC Line Input	Input power to drive
U, V, W	Drive output	Output terminals to motor (3-Phase)
+DC, BR	Brake control	DB Resistor Connection only available for B and C frames
⏏	Ground	Chassis Ground

## Terminal Description Chart



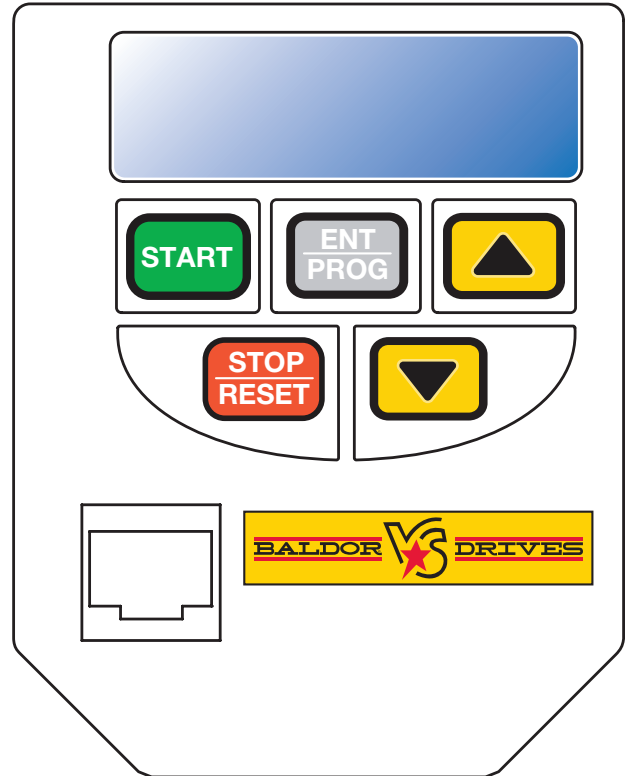
## Operation – Using the Keypad

**Increase/Decrease:** In operation mode, increase/decrease arrows increase or decrease the speed reference. Used to navigate between parameters in edit mode.

**Ent/Prog:** Access the parameters menu by holding the Ent/Prog key for >1 second. Used to display a parameter and store a new value into memory.

**Stop:** Stop the drive.

**Start:** Run the drive in keypad operation mode. Changes motor direction if pressed while running.



## Programming Parameters

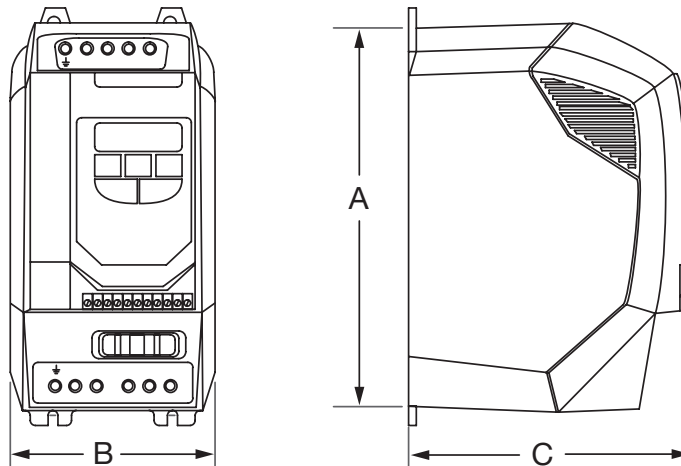
Keypad Display	Parameter Name
P-00	Read-only Parameters
P-01	Motor Rated Voltage
P-02	Motor Rated Current
P-03	Motor Rated Frequency
P-04	Motor Rated Speed
P-05	Minimum Speed
P-06	Maximum Speed
P-07	Start/Stop Source
P-08	Operating Mode
P-09	Stop Mode
P-10	Accel Time
P-11	Decel Time
P-12	Preset Speed 1
P-13	Preset Speed 2
P-14	Preset Speed 3
P-15	Preset Speed 4
P-16	Analog Input Scaling
P-17	Analog In 1
P-18	Voltage Boost
P-19	Energy Savings Enable
P-20	Trip Log
P-21	PWM Frequency
P-22	Relay Output

Keypad Display	Parameter Name
P-23	Display Speed Scaling
P-24	Analog Output Function
P-25	Digital & Relay Output Limits
P-26	Skip Frequency
P-27	Skip Frequency Band
P-28	Restart Mode
P-29	Restart Attempts
P-30	Analog Input Offset
P-31	Brake After Stop
P-32	Brake Before Start
P-33	Decel 2 Fast Stop
P-34	Brake Chopper Enable
P-35	Communication Node Address
P-36	V/Hz Frequency
P-37	V/Hz Voltage
P-38	PI Proportional Gain
P-39	PI Integral Time Constant
P-40	PI Operating Mode
P-41	PI Reference Select
P-42	PI Digital Reference
P-43	PI Feedback Select
P-44	Analog In 2 Format
P-45	Parameter Access Lock

# VS1ST AC DRIVES

## Ratings and Dimensions:

Model Number		Transistor Output	Hp	kW	Input Current (Amps)	Output Current (Amps)	Frame	Weight lbs. (kg.)	A inches (mm)	B inches (mm)	C inches (mm)
Standard	w/ EMC Filter										
<b>115V 50/60Hz 1-Phase Input, 230V 3-Phase Output</b>											
VS1ST10P5-0	N/A	No	0.5	0.37	6.7	2.3	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST11-0	N/A	No	1	0.75	12.5	4.3	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST11P5-0T	N/A	Yes	1.5	1.1	16.8	5.8	B	5.73 (2.6)	8.7 (221)	4.29 (109)	5.91 (150)
<b>230V 50/60Hz 1-Phase Input, 3-Phase Output</b>											
VS1ST80P5-0	VS1ST80P5-0F	No	0.5	0.37	6.7	2.3	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST81-0	VS1ST81-0F	No	1	0.75	12.5	4.3	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST82-0	VS1ST82-0F	No	2	1.5	19.3	7	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST82-0T	VS1ST82-0TF	Yes	2	1.5	19.3	7	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
VS1ST83-0T	VS1ST83-0TF	Yes	3	2.2	28.8	10.5	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
<b>230V 50/60Hz 3-Phase Input/Output</b>											
VS1ST20P5-0	N/A	No	0.5	0.37	3	2.3	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST21-0	N/A	No	1	0.75	5.8	4.3	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST22-0	N/A	No	2	1.5	9.2	7	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST22-0T	VS1ST22-0TF	Yes	2	1.5	9.2	7	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
VS1ST23-0T	VS1ST23-0TF	Yes	3	2.2	13.7	10.5	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
VS1ST25-0T	VS1ST25-0TF	Yes	5	4	20.7	18	C	TBD	10.28 (261)	5.16 (131)	6.89 (175)
<b>460V 50/60Hz 3-Phase Input/Output</b>											
VS1ST41-0	VS1ST41-0F	No	1	0.75	2.9	2.2	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST42-0	VS1ST42-0F	No	2	1.5	5.4	4.1	A	2.42 (1.1)	6.81 (173)	3.23 (82)	4.84 (123)
VS1ST42-0T	VS1ST42-0TF	Yes	2	1.5	5.4	4.1	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
VS1ST43-0T	VS1ST43-0TF	Yes	3	2.2	7.6	5.8	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
VS1ST45-0T	VS1ST45-0TF	Yes	5	4	12.4	9.5	B	5.73 (2.6)	8.70 (221)	4.29 (109)	5.91 (150)
VS1ST47-0T	VS1ST47-0TF	Yes	7.5	5.5	16.1	14	C	TBD	10.28 (261)	5.16 (131)	6.89 (175)
VS1ST410-0T	VS1ST410-0TF	Yes	10	7.5	17.3	18	C	TBD	10.28 (261)	5.16 (131)	6.89 (175)



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