

### Model VST Portable Vacuum Samplers



Manning VST Sampler



Manning VST Sampler Control Panel



VST Sampler Bottle Placement

◆ **Low Cost of Ownership.**

Model VST samplers have few moving parts and any critical components are rated for thousands of operations. Since these samplers have no regularly scheduled replacement of consumable parts (such as peristaltic pump tubing), labor and spare parts costs are minimized. It is possible to save hundreds, if not thousands, of dollars over the life of a Model VST sampler. Over their useful life, vacuum samplers are the least expensive suction lift samplers to own.

◆ **Accurate, Repeatable Sample Volumes.**

Precise accuracy and repeatability of sample volumes for the VST sampler is within 0.5% of pre-set volume versus the  $\pm 10$  ml typical of a peristaltic sampler. Changes in vertical or horizontal head height will not affect sample volume taken, since the sample is volumetrically measured. The collected sample will be exact, ensuring the validity of your sampling data.

◆ **High Transport Velocity.**

Most sampler manufacturers and other experts agree a critical, if not the most critical, factor in obtaining a representative sample is the sampler transport velocity. Unlike most peristaltic samplers, the VST has a transport

velocity of 5.13 fps at a 5-foot head height. Therefore, it easily meets the EPA-recommended minimum of 2 ft/sec for transport velocity over a wide range of heights and distances, ensuring the most representative samples possible.

◆ **Versatile Controller.**

The sampler bottle case and microprocessor based controller are housed in NEMA 4X/NEMA 6 enclosures for environmental protection. The controller offers advanced functionality and features such as data logging, review of settings and operating status, with a variety of flow and time modes. With its step-by-step menu format, dedicated-button keypad, and large backlit LCD, the controller is simple to set up, even in the dark! Easy to understand prompts and shortcut keys save manpower and time by avoiding frustrating navigation through long, complicated menu structures.

◆ **Multiple Uses.**

The VST can be used for a wide range of sampling needs from heavy influent to critical storm water or combined sewer overflow sites. The larger 5/8-inch internal diameter (ID) intake option is recommended for applications with potential clogging problems or large solids. It is ideal for liquids containing hard organic matter, which harmlessly pass through the sample tract and into the bottle, preventing expensive repairs and critical failures. The lightweight VST can be easily transported to remote sites or used at fixed locations.

With the optional Cool Mann™, the life expectancy of the ice can be increased to 8+ hours (see Accessories) to make the VST even more versatile.

◆ **Single or Multiple Bottle Sampling.**

The VST has various bottle options for single or 24-bottle sampling of non-toxic liquids. With an optional kit (see Accessories), a multi-bottle VST is easily convertible in the field to single bottle sampling without special tools.

◆ **Comprehensive, Flexible Programming.**

The exceptional sampling software is designed to be highly flexible and easy to use. The menu-driven system provides many programming features. (See a partial listing in Specifications on page 2.)

◆ **Durable Construction.**

Manning samplers over twenty years old are still in regular service. No other sampler company can claim a longevity record like that! The VST is no exception. Its Acrylonitrile Butadiene Styrene (ABS) enclosure protects the electromechanical parts and the stainless steel hardware can withstand corrosive environments. These features, along with watertight connectors, ensure that no other sampler will last as long as a Manning VST sampler.

# Specifications

Size .....	27.75 in. (70.5 cm) high x 17.75 in. (45.08 cm) diameter
Weight (dry).....	24.5 lbs. (11.1 kg) without battery and with empty sample bottle(s). 12 volt, 7 amp hour battery 5.5 lb (2.4 kg); 12 volt, 17 amp hour battery 15.0 lbs (6.8 kg)
Environmental Protection .....	NEMA 4X/NEMA 6 ABS housing around electromechanical components with stainless steel hardware
Sample Cooling.....	Bottle case holds 15 lbs. of ice with 24 one-liter bottles and has an average thermal resistance factor of R-12
Temperature Limits .....	32–122°F (0–50°C)
Sample Pump.....	Diaphragm vacuum compressor pump, 12 VDC
Maximum Lift.....	28 ft (8.53 m)*
Intake Hose .....	Size: 3/8-inch ID (5/8 inch OD) hose or 5/8 inch ID (7/8 inch OD) hose Type: PVC or Teflon® in 10 ft (3 m), 25 ft. (7.6 m), 50 ft. (15.2 m) or 100 ft. (30.4 m) lengths
Transport Velocity .....	With 3/8 inch ID hose: 5.13 ft/sec @ 5 ft of lift (1.56 m/sec @ 1.5 m of lift)
Sample Volume.....	Infinitely adjustable; chamber holds 500 ml per cycle; maximum of 2000 ml using multiple chamber fills (max. 4)
Accuracy .....	± 0.5% of set volume
Repeatability .....	± 0.5% of the average largest and smallest sample volume in a sample set
Membrane Keypad.....	Hermetically sealed 24-key, multiple function keypad with 2-line by 20-character alphanumeric backlit LCD
Sample Programming .....	Programming features include but are not limited to: <ul style="list-style-type: none"><li>• Data logging (512 event capacity)</li><li>• Flow proportional pacing (contact closure)</li><li>• Flow pacing with time override capability</li><li>• Flow pacing with delay sampling feature</li><li>• Flow pacing with maintained event sampling</li><li>• Totalized flow pacing (analog input)</li><li>• Uniform and non-uniform time intervals</li><li>• Multiple bottles per sample</li><li>• Multiple samples per bottle</li><li>• Multiple bottle compositing</li><li>• Bottle grouping</li><li>• Program delay (time or flow)</li><li>• Sampling based on external device input</li><li>• Hydrologic level event mode (storm water sampling)</li><li>• Real-time clock (time and date)</li><li>• Password protection</li><li>• Manual test cycle feature</li><li>• Activity review log (current and past)</li><li>• Intake fault alert</li><li>• Intake line purge</li><li>• Automatic shut-off</li><li>• Power fail/auto restart</li></ul>
Internal Clock .....	Indicates real time with ± 1 minute per month accuracy
Internal Battery Backup.....	5-year internal lithium battery to maintain program logic, RAM memory, real-time clock, and date
Power Requirement .....	Standard: External 12-volt, 7-amp-hour battery Optional: External 12-volt, 17-amp-hour battery or 110/220 VAC power supply (for use without battery)
Input/Output (optional) .....	Contact closure with or without 4–20-mA input and/or RS-232 output in various combinations
Warranty:.....	One year from date of shipment. <i>*Second compressor required, please consult factory.</i>

# Ordering Information

## Model VST Sampler Spare Parts/Accessories

- **Battery Chargers:**
  - Standard-output Rapid/Float Two-stage Charger for 110 VAC operation (12 VDC @ 750 mA) P/N 885400
  - High-output Rapid/Float Two-stage Charger for 110/220 VAC operation (12 VDC @ 1.25 A) P/N 889825
- **External 110-220 VAC Power Supply**
  - Converts line power to 12 VDC to power sampler instead of battery. P/N 889927
- **Cables:**
  - 3 ft (1 m) long, 4-pin plug contact/analog input cable P/N 818016
  - 10 ft (3 m) long, 4-pin plug contact/analog input cable P/N 818018
  - Serial output (RS-232 6-inch patch cable) P/N 810059
  - Battery cable, 18-inch (0.5 m) long, terminated with 2-pin MS-type plug for sampler connection and two battery-post clips to connect the battery. P/N 818015
- **Extra Bottles:**
  - 2.5-gallon polyethylene bottle (single bottle only)
  - 5-gallon polyethylene bottle (single bottle only)
  - 4-gallon polyethylene bottle (single bottle only)
  - 2.5-gallon glass bottle w/Teflon® cap liner (single bottle only)
  - 1000-ml polyethylene bottle (multi-bottle only)
  - 500-ml polyethylene bottle (multi-bottle only)
  - 5-gal Bucket Mann™ with splashguard & transport lid P/N 889721
- **Multiple-to-Single Bottle Conversion Kit**
  - For non-toxic use only; includes bottle-full sensor, harness, and chamber base (no bottle). P/N 885012
- **Pressure Switch** P/N 638540
- **Replacement Intake Hose**
  - 5/8-inch bulk clear intake hose P/N 566918\*
  - 5/8-inch bulk nylon-reinforced intake hose P/N 566901\*
  - 3/8-inch bulk clear intake hose P/N 566917\*
  - 3/8-inch bulk Teflon®-lined intake hose P/N 566920\*
  - \*Please specify required length in feet.*
- **Replacement Pinch/Discharge Tubing:**
  - 3/8-inch tubing P/N 566925B\*\*
  - 5/8-inch tubing P/N 566919B\*\*
  - \*\*Please specify required length in feet.*
- **Hose Couplings:**
  - 5/8-inch female hose coupling P/N 552030
  - 3/8-inch female quick disconnect fitting P/N 552104
  - 3/8-inch male quick disconnect fitting P/N 552105
- **Strainers:**
  - 3/8-inch PVC strainer P/N 889147
  - 3/8-inch Stainless Steel strainer P/N 579591
  - 5/8-inch PVC strainer P/N 889148
  - 5/8-inch Stainless Steel strainer P/N 579584
- **Cool Mann™**
  - Cool Mann™ radiant barrier wrap for VST P/N 889726
  - Cool Mann Jr.™ radiant barrier wrap for Bucket Mann™ P/N 889725
- **Suspension Harness** P/N 889042
- **Manual** P/N MAN-VST

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*In the interest of improving and updating its equipment, Manning reserves the right to alter specifications to equipment at any time.*

# Ordering Information

## MODEL NUMBER

- VST3** 3/8-inch ID vacuum pump portable sampler system (requires 3/8-inch sampling hose)  
**VST5** 5/8-inch ID vacuum pump portable sampler system (requires 5/8-inch sampling hose)

### POWER SOURCE (Battery cable included with all samplers)

- A** None
- B** 12-volt, 8-amp-hour sealed lead acid battery
- C** 12-volt, 18-amp-hour sealed lead acid battery
- D** 12-volt Power Supply 110-220 VAC input (for use without battery)

### BATTERY CHARGER TYPE

- 1** None
- 2** 12V 750mA three-stage charger 110 VAC input for sealed lead acid battery
- 3** 12V 1.2A (high-output) two-stage charger 110/220 VAC input

### INPUT/OUTPUT OPTION (3' input cable included with all units and patch cable for serial out (RS-232) when applicable)

- A** Contact closure input
- B** Contact closure and analog (4–20-mA) input
- C** Contact closure and serial out (RS-232)
- D** Contact closure and analog (4–20-mA) input with serial out (RS-232)

### BOTTLE CONFIGURATION

- A** Single bottle (for composite sampling)
- C** Multi-bottle (for discrete sampling)

### BOTTLE TYPE

- |  |   |   |   |   |
|--|---|---|---|---|
| <ul style="list-style-type: none"> <li><b>1</b> None</li> <li><b>2</b> 2.5-gallon polyethylene bottle</li> <li><b>3</b> 5-gallon polyethylene bottle</li> <li><b>4</b> 4-gallon polyethylene bottle</li> <li><b>5</b> 2.5-gallon glass bottle w/Teflon® cap</li> <li><b>9</b> 5-gallon polyethylene container with snap-on lids</li> </ul> | } | <ul style="list-style-type: none"> <li><b>6</b> (24) 1000-ml polyethylene bottle</li> <li><b>7</b> (24) 500-ml polyethylene bottle</li> </ul> | } | <p>Multi-bottle sets for discrete sampler</p> <p>Individual bottles for composite sampler</p> |
|--|---|---|---|---|

### SAMPLING HOSE TYPE

- |                                     |  |
|-------------------------------------|--|
| <b>A</b> Connector – no hose        | <b>H</b> PVC 5/8" ID hose -- 50 ft                       |
| <b>B</b> PVC 3/8" ID hose -- 10 ft  | <b>J</b> PVC 5/8" ID hose -- 100 ft                      |
| <b>C</b> PVC 3/8" ID hose -- 25 ft  | <b>K</b> Solid Teflon® (or equal) 3/8" ID hose -- 10 ft  |
| <b>D</b> PVC 3/8" ID hose -- 50 ft  | <b>L</b> Solid Teflon® (or equal) 3/8" ID hose -- 25 ft  |
| <b>E</b> PVC 3/8" ID hose -- 100 ft | <b>M</b> Solid Teflon® (or equal) 3/8" ID hose -- 50 ft  |
| <b>F</b> PVC 5/8" ID hose -- 10 ft  | <b>N</b> Solid Teflon® (or equal) 3/8" ID hose -- 100 ft |
| <b>G</b> PVC 5/8" ID hose -- 25 ft  |  |

### SAMPLING STRAINER TYPE

- 1** None
- 2** PVC strainer
- 3** Stainless steel strainer

Manual included with all samplers.

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Select one of each category

## Configuration Number

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# Engineering Specifications

1. A Manning Model VST-series sampler is appropriate for automatic collection and preservation of composite or discrete non-toxic liquid samples.
2. The Model VST is cylindrical in shape and suitable for suspension in 18-inch manholes.
3. The enclosure is impact/corrosion-resistant ABS with NEMA 4X/NEMA 6 ratings with stainless steel fittings, carrying handles, and latches.
4. The minimum internal diameter of all wetted parts are 3/8 inch or 5/8 inch, as ordered. Non-toxic samples are collected using clear PVC measuring chamber with adjustable 10–500-ml sample volume and  $\pm 0.5\%$  repeatability of preset value. All wetted parts are stainless steel, PVC, or silicone.
5. The sampler incorporates vacuum compressor technology. The sampling mechanism consists of a heavy-duty vacuum compressor with an aluminum body with corrosion-resistant coating. The sample is not passed through a pump. Samplers using technologies requiring regularly scheduled parts replacement are unacceptable. A 500-ml precision measuring chamber with  $\pm 0.5\%$  repeatability of preset volume is used. Multiple draws (up to 4) are possible for a total sample volume of 2000 ml. The sampler does not need to compensate for changes in draw height or intake line length.
6. Field conversion from multiple to single bottle non-toxic liquids sampling is possible using an accessory parts kit that requires no special tools.
7. The sampler collects composite and/or discrete samples. For composite sampling, an overflow protection mechanism automatically terminates any further sampling. Discrete sampling can be multiple bottles of the same sample or multiple samples in multiple bottles.
8. Bottle full condition is detected by using a stainless steel sensor located in the bottleneck. Sensor is easily removable for cleaning or replacement without using special tools.
9. The sampler is capable of collecting 20–2000-ml samples through a 3/8-inch ID sample line at a minimum transport velocity of 2.5 ft/sec at 20 ft of lift using a 25-foot sampling hose, and 5.13 ft/sec at 5 ft of lift using a 15-foot hose.
10. The sampler has an optional weighted sampling strainer of PVC or stainless steel.
11. The sampler has a hermetically sealed 24-button keypad and a 2-line by 20-character alphanumeric backlit LCD linked to a programmable CPU.
12. The sampler is powered by:
  - a) The standard external 12-volt, 7-amp-hour lead acid battery.
  - b) An optional external 12-volt, 17-amp-hour lead acid battery.
  - c) An optional external 110-220 VAC power supply.
13. An optional external battery charger can trickle charge the sampler battery while the sampler is operating. The charger is a:
  - a) Standard output rapid/float two-stage charger for 110 VAC operation, providing 12 VDC @ 750 mA, or
  - b) High output rapid/float two-stage charger for 110/220 VAC operation, providing 12 VDC @ 1.25 A.
14. The sampler does not use unique symbols or codes for programming or to indicate operating conditions. The software is menu driven, prompting input of requested information using the keypad. The display indicates each programming step. After entering data, the system automatically advances to the next programming step.
15. A password feature restricts access to unauthorized persons.
16. A sampling program can be delayed by entering the number of hours and minutes for the sampler to count down (up to 99 hrs, 59 min), or the number of contact closures to occur. The delay is independent of the sampling interval.
17. The sampler purges the intake hose immediately prior to and following each sample. Purge duration is selectable from 3–99 seconds.
18. If a sample is not obtained on the first attempt, the sampler immediately retries to collect the sample. If the sample is still not collected, the sampler omits that sample and continues the sequence.
19. When initiated by a keystroke, the sampler is capable of manual sampling independent of a programmed sequence. The sampler logs manual collections, and is selectable to allow taking test samples:
  - a) Only when the sampler is not running a program,
  - b) During a program but the test sample is not counted as a sample, or
  - c) During a program and the test sample is counted as a sample.
20. In the time mode, the interval between samples is adjustable (1–5999 min. in 1-minute increments). In the flow mode, the sampler accepts and totalizes contact closures (1–9999), or a 4–20-mA DC analog signal input for sampling at a user set point.
21. The sampler uses a hydrologic event algorithm to enable sample programming based on a combination of parameters including water level, differential (rising and falling) water levels, and time defaults as established for hydrologic events by the U.S. Geological Survey.
22. Sampler operating status is reviewed with minimal effort, and include:
  - Program status
  - Time and date program started
  - Minutes or flow signals remaining to the next sample
  - Bottle number
  - Number of samples collected
  - Number of samples remaining
  - Volume collected, and,
  - Volume remaining
23. All program settings are reviewed in addition to seeing the review of the completed program.
24. The sampler is a Manning Model VST series.

Data Sheet VST 05/17/11

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