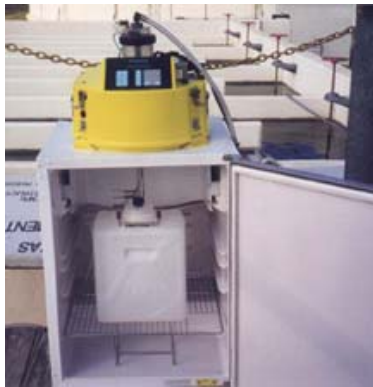


Model VSR Stationary Vacuum Samplers (Refrigerated)



VSR Sampler with Standard Refrigerator



VSR Sampler Control Panel



VSR Sampler Operation

◆ **Low Cost of Ownership.**

Over their useful life, vacuum samplers are the least expensive suction lift samplers to own. With few moving parts, critical components rated for thousands of operations, and 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 useful life of a Model VSR sampler.

◆ **Accurate, Repeatable Sample Volumes.**

Precise accuracy and repeatability of sample volumes for the VSR sampler is within 0.5% of pre-set volume (versus the $\pm 5\%$ volume 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.**

Experts and other sampler manufacturers agree a critical, if not the most critical, factor in obtaining a representative sample is the sampler's transport velocity. With a transport velocity of 5.13 fps at a 5-foot head height, the VSR easily exceeds the Environmental Protection Agency (EPA) recommended minimum of 2 ft/sec for transport velocity over a wide range of horizontal and vertical heights, ensuring the most representative samples possible.*

* Based on United States Geological Survey (USGS) sampler test 7/11/95.

◆ **Standard Refrigerator.**

The optional 110 VAC refrigerator is durable, corrosion resistant, and is offered in a white enamel-coated or stainless steel finish. Capable of maintaining samples at the EPA recommended 0–4°C, even in high ambient temperatures, this industrial-grade refrigerator is built to handle the toughest environments. Features, such as a corrosion-resistant frame and exterior, refrigerant lines wrapped with asphalt cork tape to resist damaging environments, non-ferrous evaporation coils with corrosion resistant finish, and a heavy-duty compressor ensure reliable operation under the harshest conditions.

◆ **Economy Refrigerator.**

Proudly introduced, in Spring '05, this unit is offered as an economical alternative to the Standard Refrigerator and can be used with the Manning VSR, single bottle (composite) samplers. This refrigerator will maintain the EPA recommended temperature of 32–39°F (0–4°C) as long as the ambient air temperature is within the range of 40–110°F (4.44–43.33°C)*. Aimed at single-bottle, sheltered, indoor, or protected environment applications, this clever choice will appeal to the money-saving measures needed to survive today's budget cuts and cost reduction programs. *Please see the Economy Refrigerator Data Sheet for more specifications.*

◆ **Versatile Controller.**

The sampler's microprocessor-based controller is housed in an enclosure rated for environmental protection by the National Electrical Manufacturers Association as NEMA 4X/NEMA 6.

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 enabling the operator to quickly change or review programming and settings, avoiding frustrating navigation through long, complicated menu structures.

◆ **Single or Multiple Bottle Sampling.**

The VSR has various bottle options for single or 24-bottle sampling of non-toxic liquids. It is convertible from multiple to single bottle operation sampling in the field 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 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 VSR 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 VSR sampler.

Specifications

| | |
|--------------------------------|--|
| Size | Controller: 16.25 in. (41.28 cm) high x 17.5 in. (44.45 cm) diameter Refrigerator: W 23.875 in. (60.65 cm) x H 34.5 in. (87.63 cm) x D 24 in. (60.96 cm) Complete Unit (Controller w/Refrigerator): W 23.875 in. (60.65 cm) x H 50.75 in. (128.9 cm) x D 24 in. (60.96 cm) Optional NEMA 3R Sampler Enclosure: W 32 in. (81.3 cm) x H 74 in. (187.9 cm) x D 30 in. (76.2 cm) |
| Weight (dry)..... | Sampler: 17.5 lbs (7.94 kg) Standard Refrigerator: 110 lbs (49.9 kg) Economy Refrigerator: 50.5 lbs (22.91 kg) Multi-bottle assembly: 15.5 lbs. (7.03 kg) Single bottles: Weights vary with size and material. All weights are without packaging or pallets. |
| Environmental Protection | NEMA 4X/NEMA 6 ABS housing around electromechanical components with all stainless steel hardware |
| Temperature Limits | Standard unit: 32–122°F (0–50°C); unit with optional NEMA 3R with heater and fan: -40–122°F (-40–50°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 |
| Refrigeration..... | Standard units are capable of maintaining the sample bottle compartment at 32–39°F (0–4°C) for ambient temperatures to 120°F (49°C) and are provided with either a white enamel coating or stainless steel exterior. Economy units are capable of maintaining the sample bottle compartment at 32–39°F (0–4°C) within an ambient temperature range of 40–110°F (4.4–43.33°C)* and are provided with a black enamel coating only. |
| Sample Programming | Programming features include but are not limited to: |
| | <ul style="list-style-type: none">• Data logging (512-event capacity)• Flow proportional pacing (contact closure)• Flow pacing with time override capability• Flow pacing with delay sampling feature• Flow pacing with maintained event sampling• Totalized flow pacing (analog input)• Uniform and non-uniform time intervals• Multiple bottles per sample• Multiple samples per bottle• Multiple bottle compositing• Bottle grouping• Program delay (time or flow)• Sampling based on external device input• Hydrologic level event mode (storm water sampling)• Real-time clock (time and date)• Password protection• Manual test cycle feature• Activity review log (current and past)• Intake fault alert• Intake line purge• Automatic shut-off• Power fail/auto restart |
| Internal Clock | Indicates real time within 1 minute per month accuracy |
| Internal Battery Backup..... | 5-year internal lithium battery to maintain program logic, RAM memory, real-time clock |
| Power Requirement | 110 VAC, 220 VAC, 110 VAC with battery backup, or 220 VAC with battery backup |
| Alarm Contacts (optional)..... | Three SPST contacts rated 5 A 110/220 VAC |
| 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. *Please see Economy Refrigerator Data Sheet for more specifications. **Second compressor required, please consult factory. |

Ordering Information

Model VSR Sampler Spare Parts/Accessories

- **Replacement Pinch/Discharge Tubing:**
3/8-inch tubing P/N 566925*
5/8-inch tubing P/N 566919*
**Please specify required length in inches.*
- **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.*
- **Hose Couplings**
5/8-inch straight female hose coupling P/N 552031
3/8-inch female quick disconnect fitting P/N 552104
3/8-inch male quick disconnect fitting P/N 552105
- **Pressure Switch**
P/N 638540
- **Cool Mann Jr.™**
Radiant barrier wrap for Bucket Mann™ P/N 889725
- **Conversion Kits**
Multi-bottle to single bottle (3/8-inch) P/N 889774
Multi-bottle to single bottle (5/8-inch) P/N 889775
- **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
- **Replacement Bottles:**
One 2.5-gallon polyethylene bottle w/cap P/N 687547
One 4-gallon polyethylene bottle w/cap P/N 687551
One 5-gallon polyethylene bottle w/cap P/N 687535
One 2.5-gallon glass bottle w/Teflon® lid liner P/N 889715
Set of 24 1000-ml polyethylene bottles w/caps P/N 889117
Set of 24 500-ml polyethylene bottles w/caps P/N 889041
5-gal Bucket Mann™ with splashguard & transport lid P/N 889721
- **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
- **Manual**
P/N MAN-VSR

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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

- VSR3** 3/8-inch ID vacuum pump stationary sampler system (requires 3/8-inch sampling hose)
VSR5 5/8-inch ID vacuum pump stationary sampler system (requires 5/8-inch sampling hose)

POWER REQUIREMENT

- | | |
|------------------|---|
| A 110 VAC | C Battery backup -- 110 VAC (for sampler only -- not refrigerator) |
| B 220 VAC | D Battery backup -- 220 VAC (for sampler only -- not refrigerator) |

REFRIGERATOR

- | | |
|-------------------------------------|--|
| 1 None | 4 Stainless steel -- 110 VAC, 60 Hz |
| 2 Standard -- 110 VAC, 60 Hz | 5 Stainless steel -- 220 VAC, 50 Hz |
| 3 Standard -- 220 VAC, 50 Hz | 8 Economy -- 110 VAC, 60 Hz* |

* Recommended for single bottle applications, protected from the elements, indoors, or in a shelter only. Hood option not available on this refrigerator. See *Economy Refrigerator Data Sheet*.

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

- | | |
|---------------------------------------|--------------------------------------|
| A Contact closure input | C Option A plus RS-232 output |
| B Option A plus 4--20-mA input | D Option B plus RS-232 output |

BOTTLE CONFIGURATION

- A** 1 bottle for non-toxic liquids with bottle full sensor
C 24 bottles for non-toxic liquids

BOTTLE TYPE

- | | | | |
|--|----------------------------------|-------------------------------|-------------------------------|
| 1 None | } For single bottle sampler only | 6 1000-ml polyethylene | } For 24- bottle sampler only |
| 2 2.5-gallon polyethylene | | 7 500-ml polyethylene | |
| 3 5-gallon polyethylene | | | |
| 4 4-gallon polyethylene | | | |
| 5 2.5-gallon glass w/Teflon® lid liner | | | |
| 9 5-gal Bucket Mann™ with splashguard & transport lid | | | |

SAMPLING HOSE TYPE If no sampling hose is ordered, a quick disconnect or hose coupling is required.

- | | |
|---|--|
| A None | H 5/8-inch ID PVC hose -- 50 ft |
| B 3/8 inch ID PVC hose -- 10 ft | J 5/8-inch ID PVC hose -- 100 ft |
| C 3/8 inch ID PVC hose -- 25 ft | K Teflon® hose -- 10 ft (3/8 inch ID only) |
| D 3/8 inch ID PVC hose -- 50 ft | L Teflon® hose -- 25 ft (3/8 inch ID only) |
| E 3/8 inch ID PVC hose -- 100 ft | M Teflon® hose -- 50 ft (3/8 inch ID only) |
| F 5/8 inch ID PVC hose -- 10 ft | N Teflon® hose -- 100 ft (3/8 inch ID only) |
| G 5/8 inch ID PVC hose -- 25 ft | |

SAMPLING STRAINER TYPE

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

ENVIRONMENTAL PROTECTION*

- A** None
C Hood, no heater (Not available with Economy Refrigerator)
G NEMA 3R fiberglass insulated sampler enclosure
H NEMA 3R sampler enclosure with heater
J NEMA 3R sampler enclosure with light
K NEMA 3R sampler enclosure with fan
L NEMA 3R sampler enclosure with heater, light, and fan
M NEMA 3R sampler enclosure with heater and light
N NEMA 3R sampler enclosure with heater and fan
P NEMA 3R sampler enclosure with light and fan

*Fan recommended on all units. Please consult factory for 220 V applications.

ALARMS

- 1** None
2 Three alarm contacts (sample in progress, missed sample, and bottle-full condition for a single bottle sampler or end-of-sample sequence for a multiple bottle sampler)

Manual included with all samplers.

Configuration Number

Select one of each category

Engineering Specification

1. The sampler is suitable for automatic collection and preservation of composite or discrete non-toxic liquid samples.
2. The enclosure is a thick walled ABS with NEMA 4X/NEMA 6 ratings.
3. Minimum internal diameter (ID) of all wetted parts is 3/8 inch or 5/8 inch, as ordered. Non-toxic samples shall be collected using a clear PVC measuring chamber adjustable 20–500-ml sample volume and $\pm 0.5\%$ repeatability of preset value. All wetted parts are stainless steel, PVC, or silicone.
4. The sampler incorporates vacuum compressor technology. The sampling mechanism consists of a heavy-duty vacuum compressor with an aluminum body coated with corrosion-resistant paint. The sample does not pass through a pump. Samplers using technologies requiring regularly scheduled parts replacement will not be acceptable. 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. There is no need to compensate for changes in draw height or intake line length.
5. The sampler enables field conversion from multiple to single bottle sampling to collect non-toxic liquids by using a parts kit which does not require special tools.
6. The sampler collects composite and/or discrete samples. For composite sampling, an overflow protection mechanism shall automatically terminate any further sampling. Discrete sampling can be multiple bottles of the same sample or multiple samples in multiple bottles.
7. Bottle-full condition is detected using a stainless steel sensor located in the bottleneck. It is easily removable for cleaning or replacement without using special tools.
8. 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.
9. An optional weighted sampling strainer of PVC or stainless steel is used.
10. A hermetically sealed 24-button keypad and a 2-line by 20-character alphanumeric backlit LCD is linked to a programmable CPU.
11. Refrigeration: The **Standard Refrigerator** is composed of carbon steel (with iron phosphate pretreatment, covered by white baked acrylic enamel) or stainless steel. The refrigerator condenser is made of carbon steel with a baked enamel finish. Copper refrigerant lines are coated with asphalt cork tape for protection from hydrogen sulfide gas attack. The refrigerator thermostat is capable of maintaining a temperature of 0–4°C. The evaporator plates have a baked-on, powder coat paint finish for protection. The fan motor is unit bearing. The 440 BTU compressor has a high efficiency fan and condenser arrangement permitting reliable operation in high ambient temperatures. Foam insulation forms a CFC-free polyethylene with an interior of food-grade plastic. The capacity is 6.1 cu. ft. The **Economy Refrigerator** is for single bottle use, only when protected from the elements, or for indoor or sheltered applications. The exterior is black enamel coated steel. The cabinet and door insulation is polyurethane with an interior plastic liner for cabinet and door of food-grade quality. The refrigerator thermostat is capable of maintaining the EPA-recommended temperature of 0–4°C provided the ambient temperature is within the specifications listed in the Economy Refrigerator data sheet. The capacity is 4.9 cu. ft. Please see the Economy Refrigerator Data Sheet for more specifications.
12. No unique symbols or codes for programming, or to indicate operating conditions, are used. The software is menu driven; prompting input of requested information by using the keypad. The display indicates each programming step. After entering data, the system automatically advances to the next programming step.
13. A password feature is used to restrict access to authorized persons only.
14. 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.
15. The sampler purges the sampler hose immediately prior to and following each sample. Purge duration is selectable from 3–99 seconds.

If a sample is not obtained on the first attempt, the sampler immediately retries to collect the sample. If a sample still cannot be collected, the sampler will omit that sample and continue the sampling sequence.
16. Manual sampling, independent of a programmed sequence, is initiated by a keystroke. 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.
17. 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.
18. 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.
19. Operating status is reviewed with minimal effort and includes:
 - a. Program status,
 - b. Time and date program started,
 - c. Minutes or flow signals remaining to the next sample,
 - d. Bottle number,
 - e. Number of samples collected,
 - f. Number of samples remaining,
 - g. Volume collected, and
 - h. Volume remaining.
20. All program settings are reviewed followed by a review of the completed program.
21. The entire refrigerated sampler is enclosed in an optional weather-resistant, NEMA 3R outdoor enclosure made of fiberglass-reinforced polyester and insulated with 0.75 in. (19.05 mm) thick polyurethane. It is equipped with a full-sized gasketed door with lockable latch, duplex electrical outlet, air vents, and access holes for the sampling hose. It also includes any or all of the following: an optional heater with thermostat suitable for sampler operation to -40°F (-40°C) outside temperature, an optional light and/or optional fan. See the NEMA 3R data sheet for more information.
22. The sampler is a Manning Model VSR series.

Data Sheet VSR 09/09/08

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