QUICK DEPLOY GUIDE

PVS5120

Portable
Water Samplers

RS-485 Options

PVS5120C Shown.

PN 31279 1/16

Info Link

IMPORTANT NOTE: *This Quick Deploy Guide is a general reference guide to give the installer an overview of the steps required to make this system operational. The Owner's Manual is the definitive source for detailed installation instructions and information.*

Caution!

- When sampling hydrocarbons, grease, oil, etc., regular cleaning of the metering chamber, volume control tube, liquid detect/conductivity rod, and intake flow tubing is essential to continuous successful sampling.
- Placing the end of the intake tubing directly on sand and gravel beds can result in unrepresentatively high sediment loads being collected. If a strainer is not used, gravel and sand may lodge in and plug the intake tube, metering chamber, and sampler distribution body (discrete sampler only).
- Connecting the battery cables improperly will cause the PVS5120 fuses to blow in order to protect the PVS5120. Replace them with the same rated fuses as the originals. (28314-5A, 28315-10A)
- Before deploying, check all connections, intake tubing, vacuum tubing, and the meter chamber cover for proper tightness and seating to prevent air leakage.
- Exercise proper lifting techniques when hefting this product.
- Damages caused by freezing conditions will not be covered by the warranty.
- When the PVS5120 is being stored for periods of time, disconnect the battery to reduce discharge over time.

Figure 1A- PVS5120D

Figure 1B - USB Cable

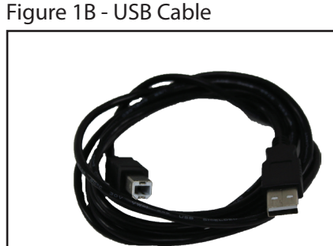


Figure 1C - Control Cable

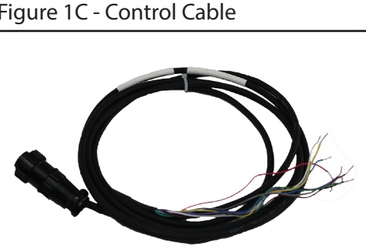
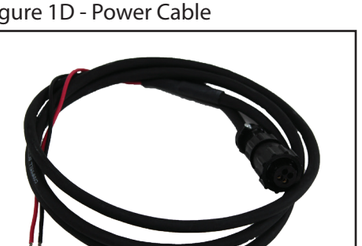


Figure 1D - Power Cable



Introduction:

This guide provides the steps to set up and run a PVS5120 sampler using RS-485 and a Campbell Scientific datalogger in two common deployments: A) via Modbus and B) via PakBus.

1 Required Gear

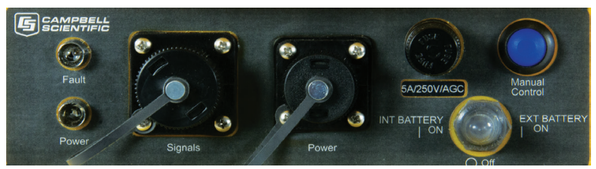
- Sampler (top, control section, base with bottles)
- 7/8" wrench (adjusting rods)
- 9/16" wrench (adjusting rods)
- 5/32" Allen wrench (adjusting rods)
- Small Flat head screw driver (wiring to PVS5120)
- USB cable (connecting to VSC100)
- Control cable (connects datalogger to sampler)
- 12V Battery
- External power cable (only if using an external battery)
- Datalogger with its own power supply, protected in an enclosure if necessary
- MD485 and cable (SC12 serial cable)
- 3/8" Hose clamp to connect intake hose to the sampler
- Laptop Computer with *Device Configuration Utility* (*DevConfig* 2.09 or higher)
- 1/4" nut driver (to tighten hose clamps)

2 Physical Deployment

Refer to Figure 1a.

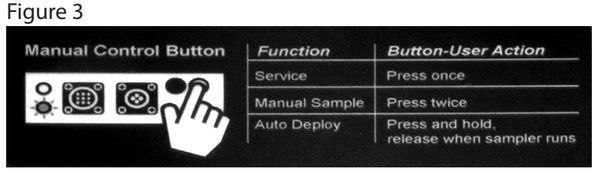
1. Loosen the brass nut to set the volume control tube to the approximate volume required for collection. Align the base of the tube with the desired graduated marking on the metering chamber. It is best to collect this volume at least once to make sure it matches expectations. If necessary, adjust the tube up or down to obtain the desired collection volume.
2. Set the height of the conductivity rod. The bottom of the conductivity rod must be higher in the metering chamber than the volume control tube (at least 1/2"), but below the bottom of the float valve barrier.
3. Connect the positive lead to the top of the conductivity rod (yellow cap).
4. Connect the battery.
   - If using an internal battery, place it in the mount and connect the red and black leads to the matching terminals.
   - If using an external battery, make sure the external power cable (Fig. 1D) is stripped and the correct leads are in place to connect to the battery. Connect the external power cable to the front of the sampler (Fig 2).
   - Connect the yellow caps around the fuse.

Figure 2



5. Turn on the sampler and set the 3-way switch on the control panel to the power source being used (Fig. 2). If powered correctly, the green indicator light (Fig. 2) will come on for several seconds, and then start blinking green once per second.
6. Connect the intake hose and tighten the hose clamp.
7. Put the sinker end of the intake hose into the water body to be sampled, ensuring at least 3 inch depth.
8. Run the *Autodeploy* routine by pushing and holding the manual control button until the sampler begins running (hold the button shown in Fig. 2 and 3 for approximately 5 seconds). The *Autodeploy* routine will set the purge and vacuum times based on the length of the hose and the change in height between the sampler and the water source. **Wait for the sampler to stop before proceeeding to Step 9.**
9. Remove the control section of the sampler and empty the sample just collected.
10. Push the **Manual Control button ONCE** (Figs. 2 and 3). This will "service the

Figure 3



sampler" and reset the sample count to 0.

11. a. Connect the USB cable (Fig. 1B) to the front of the sampler controller (VSC100) and the other end to the laptop USB port (Fig. 4). **Wait for Windows to install the driver before opening the software.**

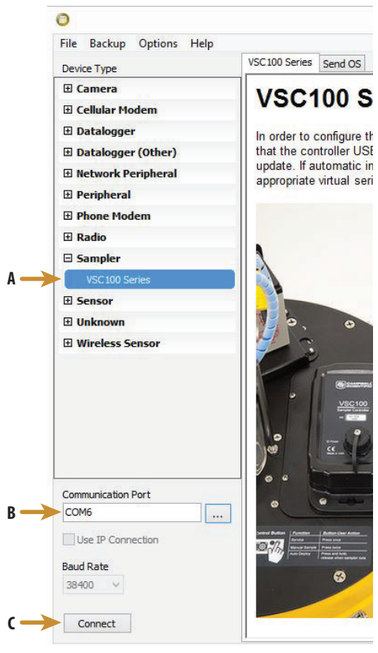
Figure 4

b. Open *DevConfig*. Select the VSC100 Series under the *Sampler* option as shown in Figure 5A. Select the **Communication Port** option and find the correct COM port (Fig. 5B). Click **Connect** (Fig. 5C)

c. Click the **Clock** tab at the top. Next, click on **Set Clock**. This will sync the sampler clock with the computer clock.

12. It is now time to configure the rest of the sampler settings. The sampler leaves the factory assuming it will be controlled via SDI-12, have 24 bottles in the base, and collect 1 sample per bottle. All of these general settings can be easily changed. Proceed to Section 3, *Configuring the MD485*. Continue to Section 4, *Scenario A: Modbus Control Via CR1000* or Section 5, *Scenario B: Pakbus Control Via CR1000*.

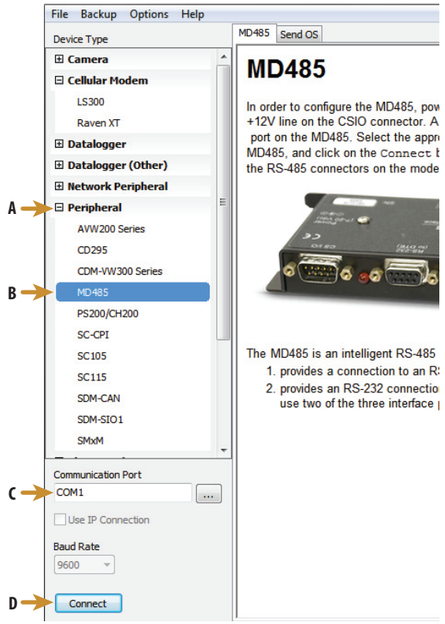
Figure 5



3 Configuring the MD485

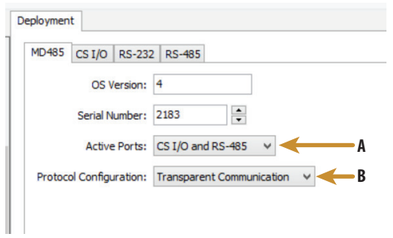
1. Connect a serial cable to the RS-232 port on the MD485 and to the laptop.
2. Supply power (12 Vdc) to the MD485 by the power jack or through the +12 V line on the *CSIO* connector.
3. Open *Devconfig*. Click on peripheral (Figure 6A). Select MD485 (Figure 6B). Select communication port (Figure 6C). Push the **Program** button on the MD485. Click **Connect** (Figure 6D). The **Program** button is located to the right of the RS-485 connectors on the modem's front panel.

Figure 6



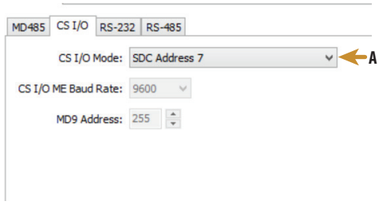
4. Click the **MD485** tab. Select **CS I/O and RS-485** in the Active Ports box (Figure 7A). And select **Transparent Communication** in the Protocol box (Figure 7B).

Figure 7



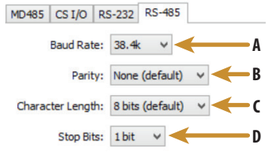
5. Click the **CS I/O** tab. Set the CS I/O mode based on the datalogger used. In this example, a CR1000 is used, so **SDC Address 7** is chosen (Figure 8A).

Figure 8



6. Click the **RS-485** tab. Set the Baud Rate to **38.4k** (Figure 9A). Set the Parity to **None** (Figure 9B). Set the character length to **8 bits** (Figure 9C). Set the Stop Bits to **1 bit** (Figure 9D).

Figure 9

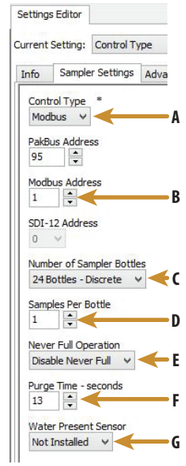


7. Click **Apply**.

4 Scenario A: Modbus Control Via CR1000

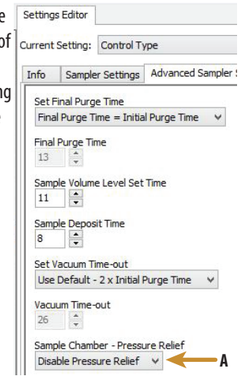
1. Click the **Sampler Settings** tab (Figure 10).
   A. Set the Control Type to **Modbus**
   B. Set the Modbus Address. This is the address of the sampler and will be referenced in the CRBasic program running on the datalogger. Possible address choices are 1–127.
   C. Set the Number of Sample Bottles. This can range from 1–24.
   D. Set the Samples Per Bottle
   E. The Never Full Operation is a special configuration and should remain disabled for most users. See the manual for an explanation of Never Full.
   F. If the *Autodeploy* routine described in Section 2 has been performed, the Purge Time will already be set.
   G. Change this setting if a Water Present Sensor is to be to installed. This sensor is wired to the sampler control cable. See the manual for more information.

Figure 10



2. Click the **Advanced Sampler Settings** tab (Figure 11). If the *Autodeploy* routine has been run, many of these settings will already be set.
   A. Set Sample Chamber-Pressure Relief. If collecting a sample volume > 450 mL or if the intake hose is longer than 50 ft, This feature will need to be enabled.
3. Click **Apply**. The option to save this configuration to file is given. It is a good idea to always keep the configuration file for future reference.

Figure 11



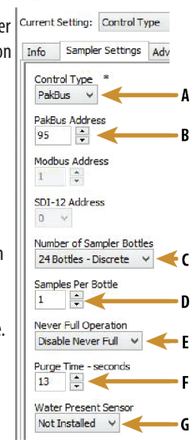
Modbus Coil Map

Modbus Coils	Coil #	Start
Start	00001	1
Service	00002	2
Auto Deploy	00003	3

5 Scenario B: PakBus Control Via CR1000

1. Click the **Sampler Settings** tab (Figure 12).
   A. Set the Control Type to **Pakbus**.
   B. Set the Pakbus Address. This is the address of the sampler and will be referenced in the CRBasic program running on the datalogger.
   C. Set the Number of Sample Bottles. This can range from 1–24.
   D. Set the Samples per bottle
   E. The Never Full Operation is a special configuration and should remain disabled for most users. See the manual for an explanation of Never Full.
   F. If the *Autodeploy* routine described in Section 2 has been performed, the Purge Time will already be set.
   G. Change this setting if a Water Present Sensor is to be installed. This sensor is wired to the sampler control cable. See the manual for more information.

Figure 12



2. Click the **Advanced Sampler Settings** tab (FIgure 11). If the *Autodeploy* routine has been run, many of these settings will already be set.
   A. Set Sample Chamber-Pressure Relief. If collecting a sample volume > 450 mL, or if the intake hose is longer than 50 ft, this feature will need to be enabled.
3. Click **Apply**. The option to save this configuration is given. It is a good idea to always keep the configuration file for future reference.

6 Interacting with the CR1000

Wiring of the sampler cable to the datalogger and program values are the same for Modbus and PakBus and are listed below. The only difference will be the commands used in the CRBasic program.

1. Connect the Control Cable (Fig. 1C) to the front of the PVS5120 (Fig. 2). Next, wire the cable to the MD485.

Wire color	Port on MD485
White	RS-485 A-
Black	RS-485 B+
Brown	Resistive Ground

2. Example CRBasic programs available on the website show how to control a PVS5120 via RS-485 with a CR1000. Other programs are available at the Campbell Scientific website. There are multiple best practices for programming the Sampler. Refer to the manual for this information. www.campbellsci.com/pvs5120d.
3. Connect to the datalogger. The following steps assume a knowledge of how to set up a CR1000 and connect via a direct connection or remote connection. See the datalogger manual for more detailed instructions on connecting to the datalogger.
   A. From the *LoggerNet Connect* screen click on **Collect Now** to collect any data on the datalogger.
   B. From the *Connect* screen, click on the **Send** button. Browse to find the CRBasic program that controls the PVS5120 via either Modbus or PakBus. Click **Open**, and then click **Send**.
   C. Below is the register map or array values for the VSC100. These values will not translate to Modbus/PakBus monitoring of a PVS5120 when it is being controlled via Pulse or Time. See the manual for more information. Also these array values are not aliased in the VSC100.

Modbus Register Map and PakBus Public Table

Reg Start	Array Value	Name	Description
1	1	Bottles	Number of bottles in sampler.
3	2	SampPerBottle	Number of samples to be put in each bottle(s)
5	3	NeverFull	Determines if the sampler loops without stopping (Requires Human Service before Sampler is full to prevent overflow).
7	4	PurgeTime1	Purge Time 1 (Initial Purge Time) time in seconds the sampler hose is purged before collecting sample.
9	5	LevelSetTime	Time in seconds to evacuate sample chamber to desired sample volume.
11	6	DepositTime	Time in seconds to hold Pinch Valve open to allow sample to be deposited in bottle.
13	7	PurgeTime2	Final purge time in seconds the sampler hose is evacuated after collecting sample.
15	8	UsePurgeTime2	A True/False variable which indicates if PurgeTime2 is set independently of PurgeTime1 or is set to same value as PurgeTime1.
17	9	SetTimeOut	True/False value to determing if the vacuum time will be 2xPurgeT1 or set independently.
19	10	TimeOut	Vacuum timeout in seconds to determine how long sampler should attempt to collect a sample before triggering an error.
21	11	SamplerType	The sampler type determined by the corresponding integer value: 0 = Pakbus, 1 = Pulse, 2 = Modbus, 3 = SDI-12
23	12	Bottle	Indicates in which bottle the last sample was deposited. Always one for Composite sampler.[1]
25	13	SampleCount	Displays the number of samples deposited in to bottle. Always one for Never Full option.[1]
27	14	Response	Displays any Response codes. 0 indicates no errors.[1]
29	15	Batt	Sampler battery voltage.[1]

[1]These values are READ ONLY status values returned from the sampler.

Numeric response code	Definition
0	No error
1	All samples complete
2	Low start battery (V < 11.0 Vdc)
3	Low run battery (V < 10.5Vdc occurs after pumping has started)
4	Sampler vacuum timed out, no sample detected
5	Sample overflow detected (only if an overflow sensor is installed for stationary samplers)
6	No sample liquid detected (only if water detect sensor is installed)
7	Arm Calibration error
8	Conductivity rod and Sample tube are shorted