

Instruction Manual

SAR-CommVS

Remote Control Software for SAR-1000 Ventilator



Read instructions carefully before operating this device.

- ① This device is not to be used for Human Life Support applications.
- ② To avoid possible electrical shock, do not operate this device if it is wet or has had liquids spilled onto it.
- ③ Service or calibration procedures should only be performed by qualified personnel familiar with the electrical hazards of line-powered devices.



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1.0 INTRODUCTION

The SAR-1000 Small Animal Ventilator has built-in remote-control capabilities that can be used for a variety of applications. These include custom respiratory protocols for imaging (breath-holding, volume clamping, etc.), control of breathing research, lung function testing, and others.

The SAR-CommVS software application runs on any Windows-based computer (Windows 7 and later) with an available USB port.

The software is easy to install and operate, but please follow the instructions below to ensure a trouble-free installation!

2.0 SOFTWARE AND DRIVER INSTALLATION

The SAR-1000 USB port will, in most cases, be automatically recognized by Windows which will create a *virtual serial port* for communication with the SAR-1000 ventilator. This COM port (e.g., COM3, COM5), should be entered into the COM PORT box on the main screen.

We also provide the software drivers for manual installation if your computer does not recognize the SAR-1000 USB port. Here is the procedure to install these drivers:

1. Locate the `CDM20600.EXE` program on the USB drive shipped with the SAR-1000 ventilator, or download from the SAR-1000 page of the cwe-inc.com website.

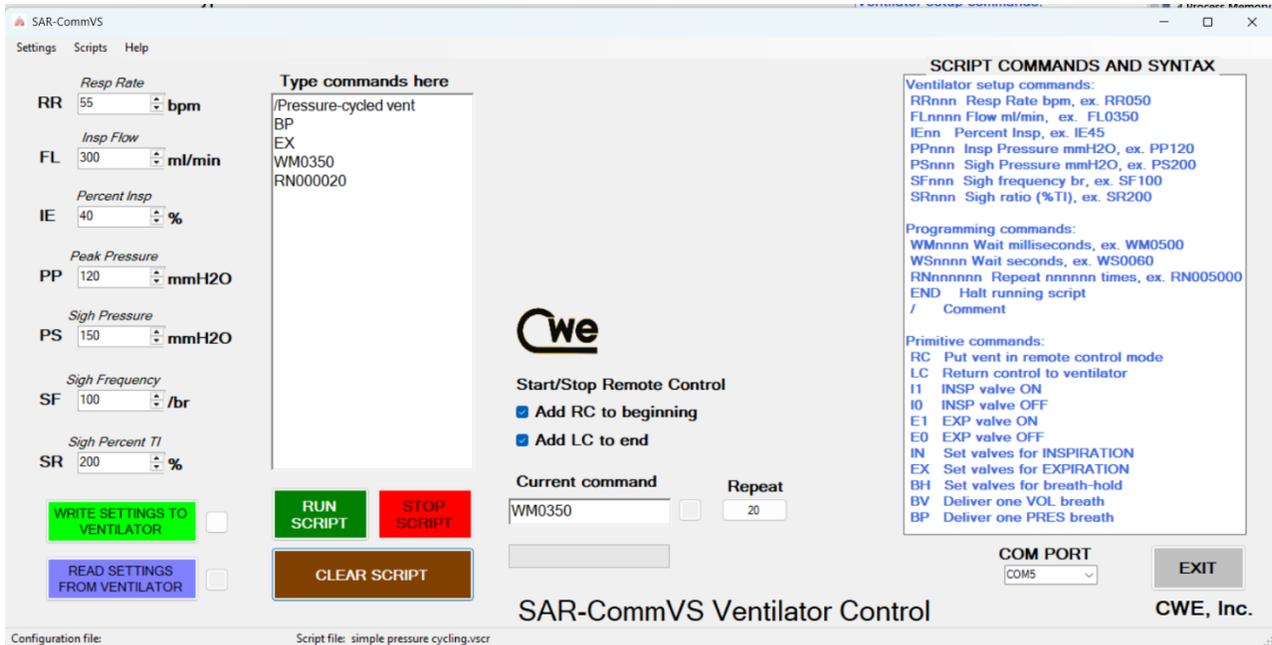
Run this program to create a COM port. The COM port created can be found at Start\Control Panel\System\Device Manager\Ports(COM & LPT). It will be identified as COM1, COM2, or other assigned port number.

2. Locate the `setup.exe` file in the SAR-CommVS deploy folder, either on the CD-ROM or downloaded from the website. Run this program to install the SAR-CommVS software. We recommend following the prompts and using the default settings.

3.0 SOFTWARE OPERATION

Be sure the USB cable is attached between your computer and the rear-panel USB connector on the SAR-1000. Turn on the SAR-1000 ventilator **before** launching the SAR-CommVS application.

After the application starts, note the COM PORT text box on the bottom-left of the screen. This drop-down control will show all the available COM ports. If more than one is available, select the COM PORT that was installed earlier. If the COM PORT box is empty, try re-installing the driver as described earlier.



Main screen of SAR-CommVS remote-control program

Functional description of screen zones:

Menus – At the top of the screen are drop down menus for loading and saving ventilator settings, and for loading and saving script programs.

Ventilator settings – On the left side of the screen is a full set of SAR-1000 ventilator settings. These can be written to or read from the attached ventilator. Sets of settings can be saved to computer files, or read from stored files.

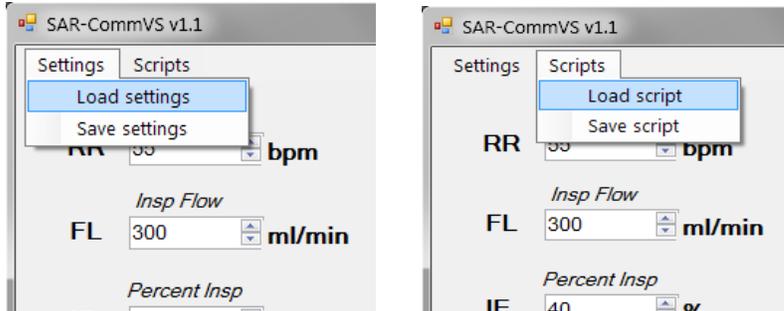
Script functions – In the middle is the text box and controls for entering program scripts.

Script commands box – This box at the right side of the screen contains a help list of the available scripting commands.

Status bar – This strip at the bottom of the screen shows what (if any) settings file or scripting file is being used.

Saving and loading stored files:

Menus – At the top of the screen are drop down menus for loading and saving ventilator settings and script programs.



The **Settings** menu loads and saves complete sets of ventilator settings. The **Scripts** menu loads and saves user-created script files. If any loads or saves are done, the active files will be displayed on the status strip at the bottom of the screen.

Button controls – The WRITE SETTINGS TO VENTILATOR and READ SETTINGS FROM VENTILATOR buttons act as expected and are used to store or retrieve sets of ventilator parameters from the attached SAR-1000.

Creating and running Scripts:

Scripts are simply lists of commands which are executed sequentially. For the simple scripting language used here, the commands must be formatted exactly as shown in the **Script Commands and Syntax** window. These commands are shown below:

Ventilator setup commands:

These commands set the primary ventilator parameters. They can be sent at any time, and do not start, stop, or interfere with ongoing ventilator function.

- RRnnn** Resp Rate bpm, ex. RR050
- FLnnnn** Flow ml/min, ex. FL0350
- IEnn** Percent Insp, ex. IE45
- PPnnn** Insp Pressure mmH2O, ex. PP120
- PSnnn** Sigh Pressure mmH2O, ex. PS200
- SFnnn** Sigh frequency br, ex. SF100
- SRnnn** Sigh ratio (%TI), ex. SR200

Note: Commands are not case-sensitive.

Programming commands:

These commands are used in structuring your program scripts, but do not have a direct effect on ventilator operations.

WMnnnn Wait milliseconds, ex. WM0500

WSnnnn Wait seconds, ex. WS0060

RNnnnnnn Repeat nnnnnn times, ex. RN000025

END Halt running script (optional)

/ Comment

Note: The RNnnnnnn command, if present, will always be the last command used. That is, the program will loop back to the start when this command is encountered. You can put RNnnnnnn commands inside the program and comment them out (/ RN000010), or un-comment them to provide additional looping points.

Primitive commands:

These low-level commands work directly on the ventilator hardware. These commands, in conjunction with the timing functions described above, can be used to create simple ventilation protocols. Although they can be used at any time, they are most effectively used when preceded by the **RC** command, and followed by the **LC** command.

RC Put vent in remote control mode (valves set for EXPIRATION)

LC Return control to ventilator

I1 INSP valve ON

I0 INSP valve OFF

E1 EXP valve ON

E0 EXP valve OFF

IN Set valves for INSPIRATION

EX Set valves for EXPIRATION

BH Set valves for breath-hold

BV Perform one VOLUME-CYCLED breath ^{Note 1}

BP Perform one PRESSURE-CYCLED breath ^{Note 1}

Note1: The Single Breath commands (BV and BP) use the current ventilator settings for Flow, RR, Pp, etc., to produce the inspiration.

Note2: The SAR-CommVS program automatically inserts a 10mS delay between commands that are sent to the ventilator. This provides a refractory time for the ventilator to receive and execute each command.

The screenshot shows the SAR-CommVS Script controls interface. On the left, a text box titled "Type commands here" contains the following text: "/Pressure-cycled vent", "BP", "EX", "WM3500", and "RN000020". Below the text box are three buttons: a green "RUN SCRIPT" button, a red "STOP SCRIPT" button, and a brown "CLEAR SCRIPT" button. On the right side, the "Cwe" logo is displayed. Below the logo, there are two checked checkboxes: "Add RC to beginning" and "Add LC to end". Underneath these checkboxes, there is a "Current command" field containing "WM3500" and a "Repeat" field containing "1". A progress bar is located below the "Current command" field, showing a green segment on the left and a grey segment on the right.

SAR-CommVS Script controls

Script controls:

The script programs are typed into the text box, or loaded from a file using the menus. These programs can be as simple as one command (e.g., RR060, set respiratory rate to 60bpm), or a complex ventilator protocol that is repeated many times.

Besides the **RUN / STOP / CLEAR SCRIPT** buttons, which are self-explanatory, there are a few other elements to consider:

The two checkboxes allow the user to automatically add the **RC** (Remote Control) and/or the **LC** (Local Control) commands to the script program. These are checked by default but should be un-checked if not using these functions.

The **Current Command** box shows the command being executed at the moment.

The **Progress Bar** beneath the Current Command shows the progress of commands involving a time delay (WMnnnn and WSnnnn).

The **Repeat** button indicator blinks when a script repeats, or loops, following the **RNnnnnnn** command. The number of times the program has repeated is displayed inside the button.

Note: Please read the **Release Notes** text file for information on software versions, improvements, or known issues.