Sechrist Millennium Technical Bulletin 005

How To Setup Remote Communication

Introduction

The remote communication provides remote monitoring of the control, measured, and alarm parameters of the Sechrist Infant Ventilator, Model Millennium.

The ventilator data output contains the following 2 types:

a) Ventilator Settings and Measured Data
b) Ventilator Alarms / Alerts

The ventilator transmits a Ventilator Settings and Measured Data packet once per second. Ventilator Alarms / Alerts packets are transmitted as the alarm / alert occurs.

Hardware Interface

The transmission is simplex (transmit only) via a Fiber Optic interface located at the ventilator's rear panel. The data is transmitted at 19200 baud with 8 data bits, 1 stop bit, and no parity. There is no handshake support (neither xon / xoff nor hardware handshake).

Additional Equipment Required

a) Opto Coupler W/Cable Kit (Order Information: Sechrist P/N 20438)
b) Any Terminal Communication
c) Any PC Compatible or Notebook Computer, having a serial (COM) port

Terminal Communication Program Setup

Any terminal communication / emulation program, such as **`HyperTerminal`** supplied in Windows operating system, or a third party freeware, such as **`Tera Term Pro`** can be used.

HyperTerminal Setup:

a) HyperTerminal program can be launched either from Start → All Programs → Accessories → Hyper Terminal or by Start → run → type in "hypertrm" → then OK.

b) Inside Hyper Terminal program, from File → Properties → Phone Number tab → Connecting Using: *Direct to Com 1*.

c) From File → Properties → Phone Number tab → Configure… → then setup as follows:

Bits per second:	*19200*
Data bits:	*8*
Parity:	*None*
Stop bits:	*1*
Flow control:	*None*

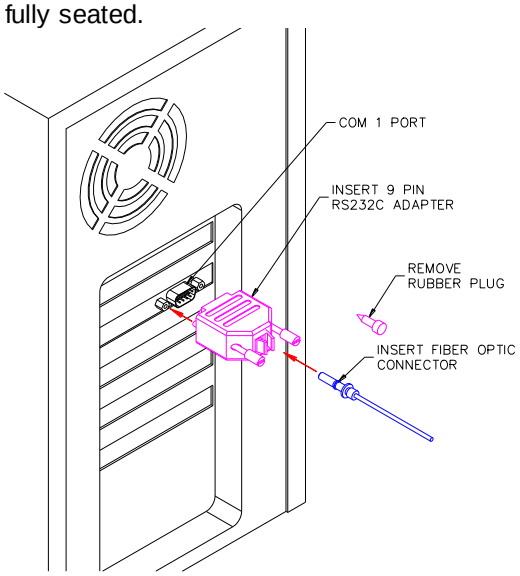
Tera Term Pro Setup:

Tera Term Pro (v. 2.3) has been tested to be compatible to use in this remote communication. Install the program by running setup.exe.

You can setup communication protocol similar to the HyperTerminal program above, or request from Sechrist customer service, a copy of a pre-configured "TERATERM.INI" file to replace its original ini file in the TTERMPRO program folder, and it will be ready to communicate with the ventilator.

Computer Port Setup

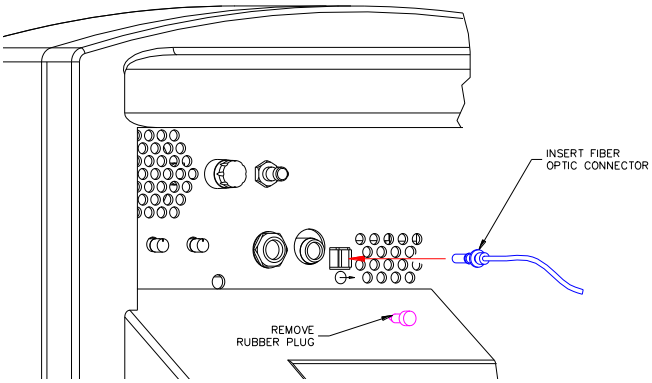
a) Locate the COM1 port for your computer and plug-in the 9-Pin RS232C to Fiber-Optic Adapter (supplied by the Sechrist Opto Coupler W/Cable Kit, P/N 20438).
b) Remove the rubber cover plug if it is pre-installed on the adapter (save for re-plug later).
c) Insert one end of the fiber-optic cable connector (from the Sechrist Opto Coupler W/Cable Kit, P/N 20438) into the fiber optic port on the adapter as shown in figure below. Make sure that the connector is fully seated.



Ventilator Setup

The ventilator is pre-configured for standard "HOST" remote communication via a serial fiber-optic output port located at the back panel.

If a rubber cover plug is installed on the port, remove the plug first (save for re-plug later). Insert the other end of the fiber-optic cable connector (from the Sechrist Opto Coupler W/Cable Kit, P/N 20438) into the output port as shown in figure followed. Make sure that the connector is fully seated.



Start Capturing Ventilator Data

a) Launch the terminal communication program, such as **HyperTerminal** or **Tera Term Pro**.
b) Make sure that the Millennium® Infant Ventilator is operating in A/C, SIMV, or CPAP mode.

NOTE: If the Millennium® Infant Ventilator is in Standby or the system is OFF, other diagnostic data from Control Micro will be outputting. This is ventilator's normal operation.

c) From the terminal screen, ventilator data should be outputting once a second.

Ventilator Host Communication Protocol

The ventilator transmits its control settings and measured data packet (Type 0) once per second. Ventilator Alarm / Warning packets (Type 1) are transmitted as the alarm / alert occurs.

The general message packet protocol is as follows:

| Start Of Header (1 byte) **| Type #** (1 byte) **| Data…** (?? bytes) **| End Of Text** (1 byte) **| Checksum** (1 byte) **| CR** (1 byte) **| LF** (1 byte) **|**

Encoding:	**ASCII**
Start Of Header:	**0x5b** ("**[**")
Type #:	**0** (0x30, control/measured data) **1 (**0x31, alarm/alert/system error data)
Data…	**data** are separated by comma (**0x2c**) delimiters (see below for details)
End Of Text:	**0x5d** ("**]**")
Checksum:	2 hex ASCII characters
CR:	Carriage Return (**0x0d**)
LF:	Line Feed (**0x0a**)

NOTE: CR and LF control codes may not show on terminal display.

Data Fields:

Field 1: Ventilator Mode: STBY, A/C, SIMV, CPAP
Field 2: Set Rate in breaths per minutes
Field 3: Set Ti in seconds
Field 4: I:E Ratio in 1:XX.X or XX.X:1 formats
Field 5: Trigger Sensitivity, 0 = OFF, 1 – 10 (most sensitive)
Field 6: Pressure Units in cmH2O or kPa
Field 7: High Inspiratory Pressure Limit in XX (cmH2O) or X.X (kPa)
Field 8: Low/Prolonged Inspiratory Pressure Limit in XX (cmH2O) or X.X (kPa)
Field 9: Low PEEP/Baseline Pressure Limit Limit in XX (cmH2O) or X.X (kPa)
Field 10: High Rate Limit in XXX BPM
Field 11: Alarm Delay Time in XX seconds
Field 12: Measured Peak Inspiratory Pressure in XX (cmH2O) or X.X (kPa)
Field 13: Measured PEEP / Baseline Pressure in XX.X (cmH2O) or X.XX (kPa)
Field 14: Measured Mean Airway Pressure in XX.X (cmH2O) or X.XX (kPa)
Field 15: Measured Rate in XXX BPM

NOTE: All data fields are separated by commas.

Sample Outputs:

Type 0:

```
[0,A/C , 30,0.40,1: 4.0, 9,cmH2O, 30,
5,OFF, 45,10,  0,  0.0,  0.0,  0]24

[0,A/C , 30,0.40,1: 4.0, 9,cmH2O, 30,
5,OFF, 45,10, 17,  0.0,  0.0,  0]0C
```

Type 1:

```
[1,      W03: Standby Too Long]E0

[1,A01:   Low/Loss of Inlet Gas]21
```

NOTE: Refer to Millennium Technical Bulletin 003 for available alarm/warning/system error messages.