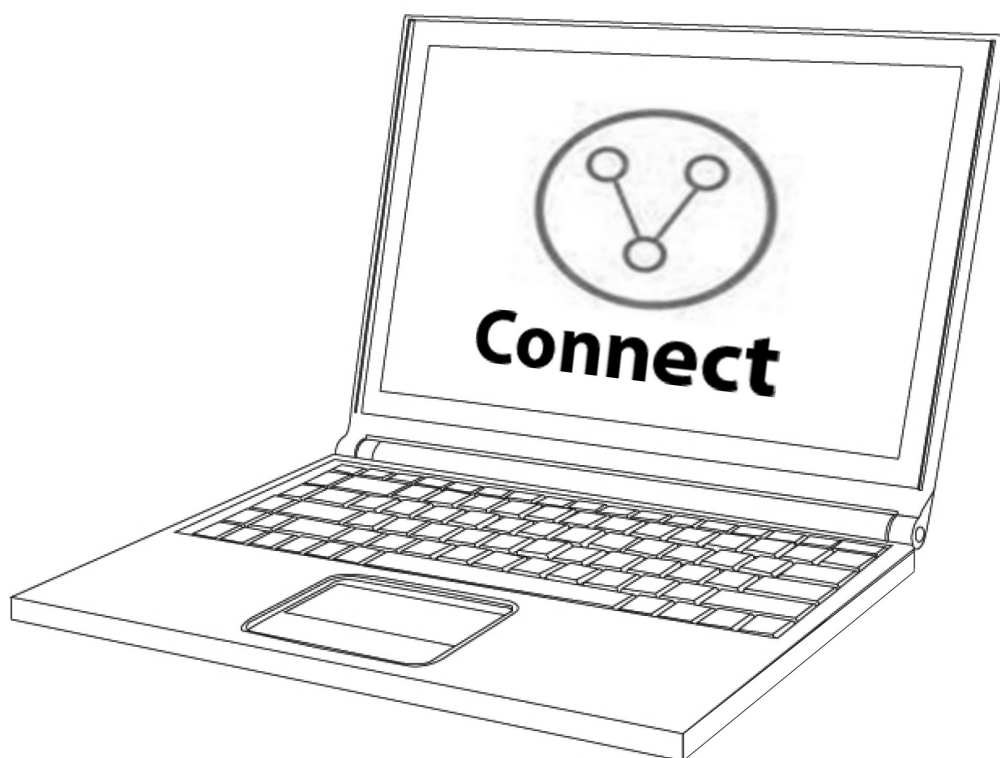




Connect



Instructions for Use

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Contents

1.	Indications for Use.....	4
2.	Contraindications, Warnings, Precautions and Adverse Reactions.....	4
3.	Main Components of Vitalograph Connect.....	4
	3.1.Features of Vitalograph Connect.....	4
	3.2.Cybersecurity.....	4
4.	Setting Up Vitalograph Connect	5
	4.1.Installation	5
	4.2.Local Installation	5
	4.3.Network installation	5
	4.4.Connect URL Configuration.....	8
	4.5.Start/Restart Connect Service.....	8
	4.6.Starting the Application.....	8
5.	Operating Instructions	8
	5.1.Main Functions	8
	5.2.Orders.....	9
	5.3>Returns	9
	5.4.Recalls.....	9
	5.5.Security.....	10
6.	Setup HL7 EMR Connection	10
	6.1.Add HL7 EMR Connection.....	10
	6.2. Configure Unsolicited Returns	10
	6.3.HL7 Configuration.....	10
7.	Setup GDT EMR Connection.....	13
	7.1.Add GDT EMR Connection	13
	7.2.GDT Configuration	13
8.	Setup EMIS WEB EMR Connection.....	14
	8.1.Add EMIS EMR Connection.....	14
	8.2.EMIS Configuration.....	14
	8.3.Order Tests for EMIS EMR.....	14
9.	Setup Vision EMR Connection.....	15
	9.1.Add Vision EMR Connection	15
	9.2.Vision Configuration.....	15
	9.3.Order Tests for Vision EMR.....	15
10.	Vitalograph Device Configuration	16
	10.1. Spirotrac 6 Configuration	16
	10.2. Alpha Configuration.....	16
11.	Power Management.....	16
12.	Cleaning & Hygiene	16
13.	Fault Finding Guide	16
	13.1. Software Check.....	17
14.	Customer Service.....	17
15.	Consumables and Accessories.....	17
16.	Disposal	17
17.	Explanation of Symbols	17
18.	Technical Specification.....	18
19.	CE Notice	18
20.	FDA Notice.....	18
21.	EU Declaration of Conformity.....	18
22.	Guarantee	18
1.	Appendices	19
1.1.	Appendix 1 - HL7 Spirometry Parameter Mappings	19
1.2.	Appendix 2 - HL7 ECG Parameter Mappings.....	27
1.3.	Appendix 3 - HL7 Respiratory Muscle Strength Parameter Mappings	27

1. Indications for Use

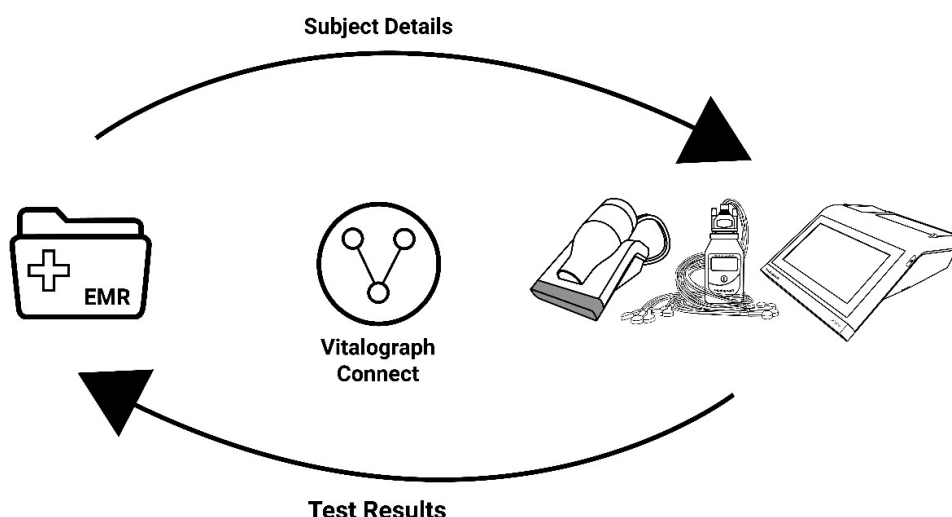
Vitalograph Connect is a PC based software application intended to transfer subject details from an EMR system to a Vitalograph device or Vitalograph software and pass the resulting test data back to the EMR system. It is intended for use by adult professionals (e.g. IT administrative staff) in a variety of healthcare environments, e.g. primary care, hospitals, and occupational health centres.

2. Contraindications, Warnings, Precautions and Adverse Reactions

N/A

3. Main Components of Vitalograph Connect

Vitalograph Connect is middleware software that provides functionality to transfer subject details and test data between an EMR system and a Vitalograph device or software. Connect is delivered on USB flash drive, as such it does not have any physical components.



3.1. Features of Vitalograph Connect

Features include:

1. Facilitates setup of an EMR connection to Vitalograph products:
 - Spirotrac 6
 - Alpha
 - In2itive
2. Supports connectivity to an EMR system using:
 - Health Level Seven (HL7) Standard version 2.6 protocol
 - GDT version 2.10 protocol
 - EMIS Web version 4 Protocol
 - Vision 3 and Vision Anywhere
3. Facilitates transfer of subject data from an EMR to a Vitalograph product.
4. Facilitates transfer of test data from a Vitalograph product to an EMR.
5. Shows summarized list of test request orders from the EMR system.
6. Shows summarized list of test returns (test results) from a Vitalograph product to the EMR system.
7. Facilitates secure communications with Vitalograph devices.

3.2. Cybersecurity

When using Connect on a PC it is recommended that the PC has the following cybersecurity in place: Operating System should be configured for automatic update for security patches and have all the latest patches applied.

- Antivirus/antimalware application should be installed and have all updated virus definitions in place.
- Secure Login: the PC should be password protected via industry standard user access controls via active directory or other methods.
- Firewall: if the PC is connected to the internet ensure a firewall or equivalent protection is in place to protect against unauthorised external access.
- Responsibility for security controls on the underlying operating system and physical communication infrastructure is outside the scope of the application.
- It is also advised that a risk analysis that considers the specific user's environment be carried out.
- It is recommended that https is used as protocol when configuring Connect to run on IIS

Note: Vitalograph commits to providing software that is virus-free. Vitalograph assumes no liability for the security of customer computer systems. Any computer connected to the local area network {LAN} or internet is at risk of the system being compromised. Vitalograph recommends that customers take appropriate measures to mitigate such risk including

installation and maintenance of anti-virus software and firewall(s) on IT systems to prevent intrusion and protect those systems, in line with customer's internal IT policies.

4. Setting Up Vitalograph Connect

4.1. Installation

Choose either local or network installation.

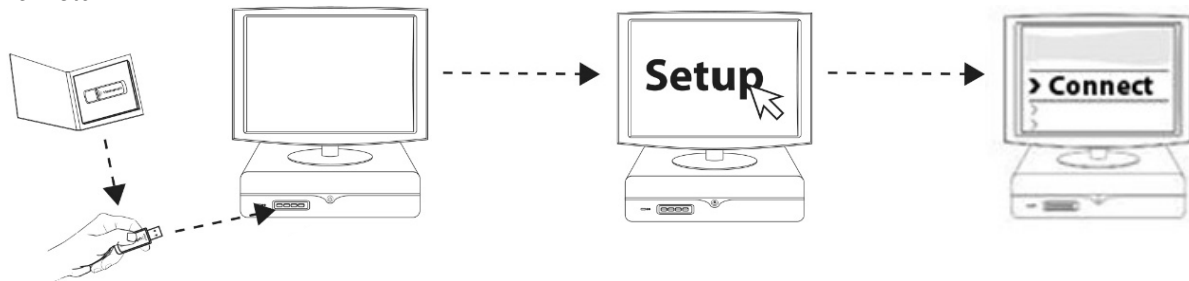
- Local Installation (see [Section 4.2](#))
 - This is the default installation method.
 - Connect is installed as a self-hosted windows service.
 - Accessible by Spirotrac running on the same machine.
- Network installation (see [Section 4.3](#))
 - Connect is installed on a networked server.
 - Connect services run under IIS (Internet Information Services).
 - Accessible by applications and devices over ethernet or Wi-Fi.

4.2. Local Installation

Refer to [Section 17](#) Technical Specification for recommended PC requirements.

Note: This Installation requires administrative privileges.

To install:



1. Insert USB flash drive into USB port on PC. Browse media contents and run Setup.
2. Follow onscreen instructions. Click "Install Connect".
3. The installer may prompt "Do you want to allow this app to make changes to your device? Click Yes to continue.
4. A message confirms when installation is complete. Click Close.

4.3. Network installation

4.3.1. Server Setup

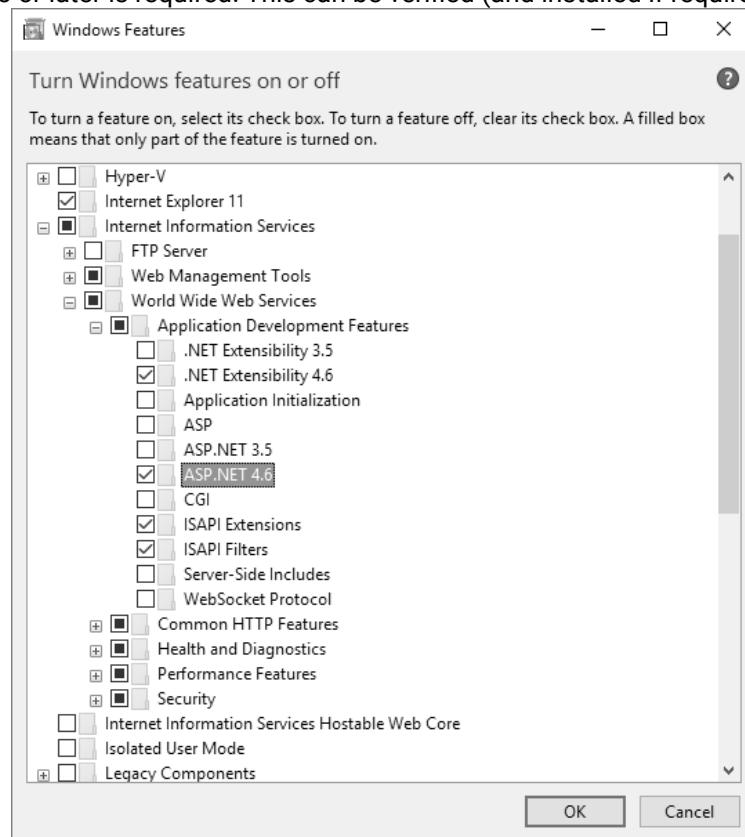
Connect may be installed on a network server and exposed to applications and devices via Internet Information Services. (see steps 1-9 below)

Note: This requires administrator privileges. As the environment is not controlled by Vitalograph, these instructions assume a basic knowledge of Internet Information Services configuration.

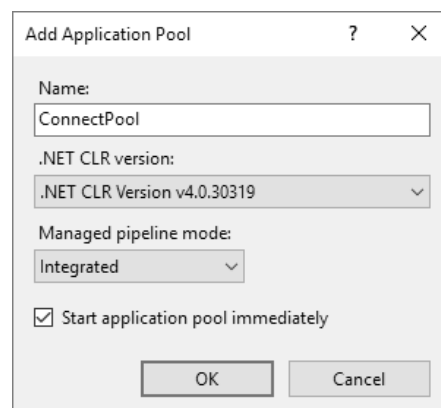
Note: Customer may connect to this server location via wired, wireless or hotspot connection as defined and managed by customer in accordance with customers own IT policy.

Basic Requirements:

ASP.Net Version 4.5 or later is required. This can be verified (and installed if required) under Windows Features:

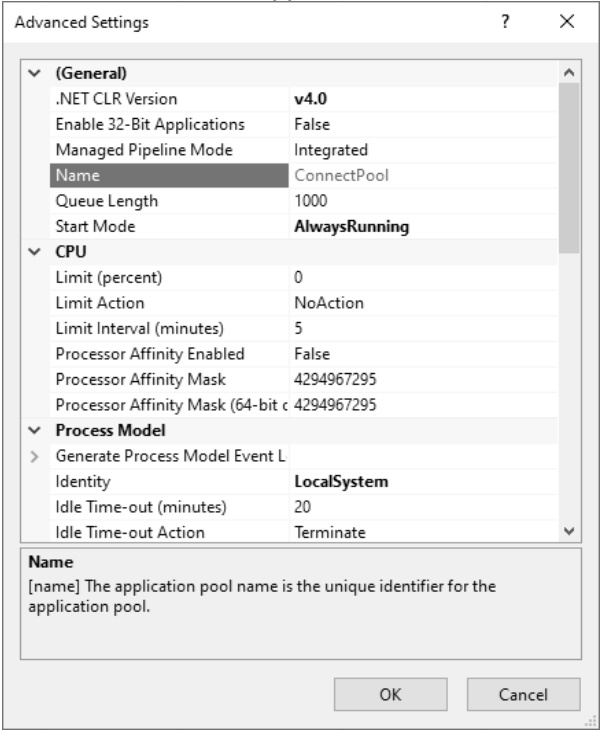


1. Install Connect as per [section 4.2](#) above on the required server.
2. Locate Batch file **setupweb.bat** from the "web" directory. This directory is below the installation directory. E.g. default install location: C:\Program Files (x86)\Vitalograph\Connect\web.
3. Run Batch file by right clicking on it and running as admin (this copies files and creates program data directory).
4. As the system is installed as a windows service by default, it is necessary to disable this service on installations with IIS.
 - a. Run the **Services App** within Windows.
 - b. Locate the service called "Vitalograph Connect Host Service".
 - c. Right Click on the service and click **Stop**.
 - d. Right Click on the service again and click Properties.
 - e. Change Startup Type from Automatic to **Disabled** and click **OK**.
5. Launch Internet Information Services (IIS) Manager.
6. Create the application pool by expanding the list of connections and right clicking on "Application Pools" -> Select "Add Application Pool".
 - Name it ConnectPool.
 - Select .NET CLR Version of v4

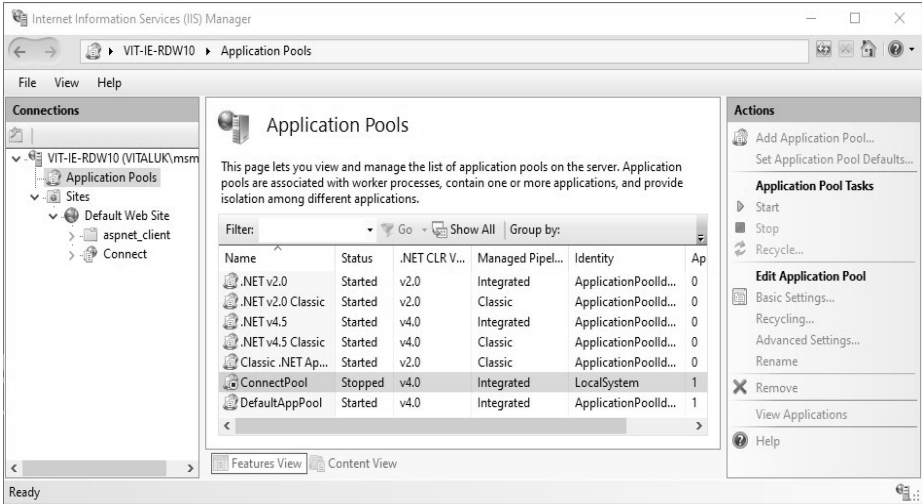


7. Select **Advanced Settings** and set the following properties:
 - Start Mode: **AlwaysRunning**

- Identity: **LocalSystem**
- When integrating with EMIS, Enable 32-bit Applications must be **True**



8. Create the application on IIS: Under **Sites** select **Default Web Site**. Right click and choose “**Add Application**” with the following settings:
- Alias: **Connect**
 - Application Pool: **ConnectPool**
 - Physical Path: **C:\Connect**
9. Go to Application Pools, select **ConnectPool** and choose the **Start** action.



4.3.2. Client Setup

Multiple client installations from different PCs may be setup to view the status of orders and returns.

Note: *Editing EMR settings in a client installation is disabled and must be carried out on the server.*

To setup a client:

1. Install Connect on the required PC as per [section 4.2](#) Local Installation.
2. Run the **Services App** within Windows.
3. Locate service called "Vitalograph Connect Host Service".
4. Right click on the service and click **Stop**.
5. Right click the service again and click **Properties**.
6. Change Startup Type from Automatic to **Disabled**. Click **OK**.
7. Configure the connection URL as per section 4.4 to point to the required server.
8. Setup is complete. Double click on the Connect Icon on the desktop to start the client.

4.4. Connect URL Configuration

It is possible to view/configure the URL where the instance of Connect will run.

Open the following file: C:\ProgramData\Vitalograph\Vital.Connect\ClientSettings.json

1. For **local installations**, the default settings are: "ApiAccessUrl": "**http://localhost:80/connect/**"
2. For **network installations**, the settings are: "ApiAccessUrl": "**http:// IP_ADDRESS_OF_SERVER:80/connect/**"

Note: *This only needs to be changed if the instance of Connect is installed on a network location.*

4.5. Start/Restart Connect Service

By default Connect runs automatically. If it is necessary to start or restart Connect manually:

On Machine where application is running as Windows service

- Run the Services App within Windows.
- Locate the service called "Vitalograph Connect Host Service".
- Right Click on the service and click Start.
- If Start is greyed out, Click Restart.

On Machine where application is running as network service under IIS

- Run the Internet Information Services Manager.
- Select Application Pools.
- Within the Application Pools list, select ConnectPool.
- Select Start.
- If Start is greyed out, Select Recycle.

4.6. Starting the Application

Note: **By default, this Application runs under local system account**

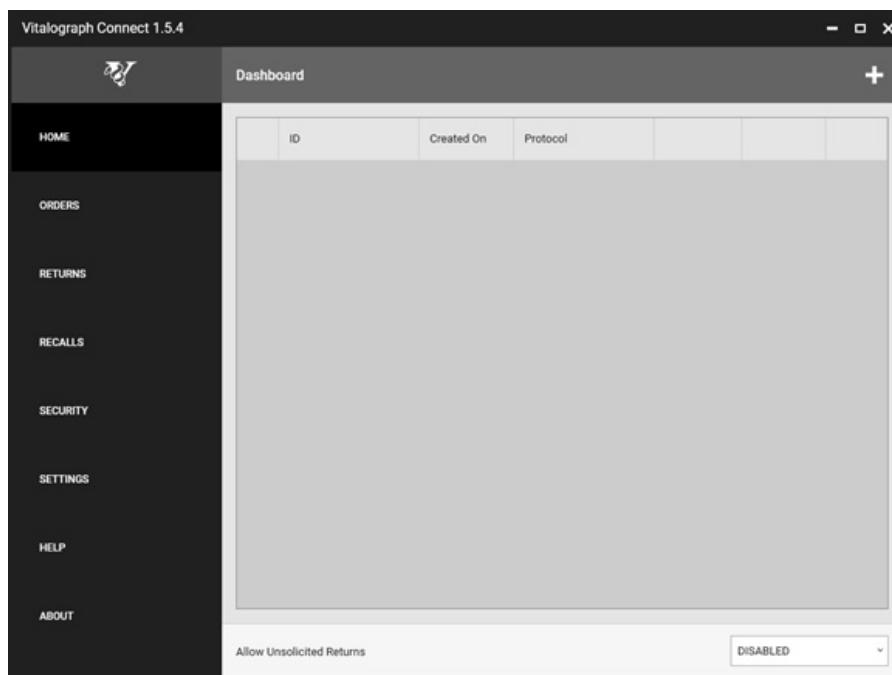
It is recommended to limit the application to run under a specific service account. At a minimum, access to the following directories is required for this service account:

- Write to C:/ProgramData/ folder to create Vitalograph/Vital.Connect folder.
- Read/Write access to C:\ProgramData\Vitalograph\Vital.Connect.
- The default file paths for specific EMRs are located under C:\ProgramData\Vitalograph\Vital.Connect\Emr\ If user changes from these defaults through the User Interface (See Sections 6.3.2, 7.2.2, 8.2.2), then the new folders need Read/Write access also.

The Application runs automatically on completion of installation. Double click the Connect Icon on the Desktop to configure the application.

5. Operating Instructions

5.1. Main Functions



The main components of the User Interface are:

<i>Home Dashboard</i>	Add/Edit EMR connection(s) and connection settings based on the communication protocol desired.
<i>Orders</i>	View a summarized list of test request orders generated by the EMR system.
<i>Returns</i>	View a summarized list of test returns (test results) from a Vitalograph product to the EMR system.
<i>Recalls</i>	View a summarized list of recalls generated by the EMR system.
<i>Security</i>	Enable secure communications with Vitalograph devices
<i>Settings</i>	Application settings e.g. language
<i>Help</i>	View the "Instructions for Use" document.
<i>About</i>	View information about Software Version and contact information.

5.2. Orders

A list of test request orders generated by the EMR system displays on the orders dashboard. The following is displayed for each order:

- Test Type of ECG or Spirometry.
- Date order was created.
- ID of test subject.
- Status
 - **Pending:** Order was received by Connect and is available to be processed by the Vitalograph product (e.g. Alpha/Spirotrac).
 - **Allocated:** Vitalograph product assigned the order.
 - **Completed:** Testing completed, and test data returned to Connect.
 - **Returned:** Test data generated and sent to EMR.
 - For FILE transfer, Connect transfers the return data as files to the configured directory.
 - For TCP transfer, Connect transfers the return data as a message over TCP/IP. In case of MLLP2, it expects an acknowledgement before setting the status to Returned.

Note: When a Pending or Allocated order is created in error, that order can be cancelled using the red X button. Once cancellation is confirmed, the status shall change to Cancelled and the order will no longer be processed.

Note: MLLP 1 – An EMR running MLLP version 1 will not acknowledge data returned to it. MLLP 2 – An EMR running MLLP version 2 will acknowledge data returned to it.

The number of failed orders displays at the bottom of the screen. A failed order indicates Connect has received the order but was unable to process it. The date and time of the most recent failed order is displayed.

Note: When Orders are sent to Spirotrac/Alpha, core demographic information from the EMR should not be manipulated unnecessarily as this could potentially impact on patients predicted values.

5.3. Returns

A list of test returns (test results) generated by a Vitalograph product is displayed on this screen. The following is displayed for each test return:

- Type – Ordered or Unsolicited.
- Test Type of ECG or Spirometry.
- Date order was returned.
- ID of test subject.
- Status
 - **Started:** Test return was initiated from Vitalograph product.
 - **Completed:** The test return was completed.
 - **Returned:** The test return was sent back to the EMR.

5.4. Recalls

A list of recalls (test results) generated by EMR displays on this screen.

These are EMR requests to the Vitalograph product (eg Alpha / Spirotrac) to recall subject or test information.

There is no return generated for these requests and they are actioned by the Vitalograph product.

- Type – Test or Subject.
- Ordered - Date request was received by Connect
- Subject – Subject ID
- Status:
 - Pending: Request has been received by Connect and is available.
 - Completed: Request has been received by the Vitalograph product.

5.5. Security

Provides facility to enable and administer secure communications with Vitalograph devices.

Note: *this functionality is only available on the computer running Connect. If connecting to a remotely hosted instance of Connect, it is not possible edit security settings.*

When security is enabled, a list of devices requesting access is displayed, and requests for each device can be Granted, Denied or Revoked.

Note: *When security is enabled, security access must be granted to allow successful processing.*

6. Setup HL7 EMR Connection

6.1. Add HL7 EMR Connection

On the home dashboard select “+” to add a new EMR connection.

Note: *this functionality is only available on the computer running Connect. If connecting to a remotely hosted instance of Connect, it is not possible to add or configure an EMR connection.*

The following are required:

1. **ID:** Unique identifier for the EMR connection.
2. **Protocol:** The protocol required to connect to the EMR. Select HL7 2.6
3. **Transfer Inbound:** This is the transfer protocol used for data coming into Connect. The transfer protocol defines the method of transmission, or how the data is sent. The options for HL7 are:
 - a. File
 - b. TCP/IP
4. **Transfer Outbound:** This is the transfer protocol used for data sent from Connect. The transfer protocol defines the method of transmission, or how the data is sent. The options for HL7 are:
 - a. File
 - b. TCP/IP
 1. **Data Inbound:** This is the data protocol used for data coming into Connect. The data protocol sets the predefined structure to be used for that data. For HL7 the setting will always be ORM (Order Message).
 2. **Data Outbound:** This is the data protocol used for data sent out from Connect. The data protocol sets the predefined structure to be used for that data. For HL7 the setting will always be ORU (Observation Result). When Complete, Select **Add**.
Select **Home** to view all EMRs configured for Connect.

6.1.1. Delete HL7 EMR Connection

To delete an EMR select the red X of the associated EMR in the list.

Note: *Deleting an EMR is irreversible and all data relating to that EMR is deleted.*

When an EMR system has been marked for deletion, it is no longer be possible to configure the EMR system.

The EMR and all related data are deleted when the Connect service is restarted.

When the service is restarting, if the EMR system directory or contents are in use, the delete operation may fail.


If this occurs, the delete operation will be re-scheduled for the next restart.

6.2. Configure Unsolicited Returns

Within HL7, it is possible to configure the system to return unsolicited (unordered) test data to a specific EMR. Unsolicited tests do not have a test order associated with them. If enabled on an EMR, all unsolicited tests received will be sent to that EMR.

To configure unsolicited returns for a specific EMR select the HOME dashboard and select the required EMR in the drop-down list in "Allow Unsolicited Returns". This option can also be disabled here.

6.3. HL7 Configuration

On the HOME dashboard select the  button on the required EMR to view/edit specific configuration belonging to the required EMR connection.

6.3.1. System Info

System info contains high-level configuration for the HL7 EMR as setup in [Section 6.1](#).

6.3.2. General Settings

The following settings can be configured for HL7:

- Inbound File Path:** If the transfer inbound protocol is File based, the inbound HLF files are placed in this folder. If the service is locally hosted, the user may browse and select the folder. If no folder is specified by the User, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Inbound). It is not possible to specify a folder which is already in use for another EMR.
- Outbound File Path:** If the transfer outbound protocol is File based, the outbound HL7 files are placed in this folder. If the service is locally hosted, the user may browse and select the folder. If no folder is specified, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Outbound). It is not possible to specify a folder which is already in use for another EMR.
- Outbound Report Path:** If the transfer outbound protocol is File based, the outbound Report files are placed in this folder. If the service is locally hosted, the user may browse and select the folder. If no folder is specified, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Outbound). It is not possible to specify a folder which is already in use for another EMR.
- Outbound Report Path Format:** The user must specify the format of the file path to be used in the ORU_R01 file. Options are: URI or Windows File path.
- Unsolicited Application:** If the return message is an unsolicited return, the field populates with this configured value. The field is optional and will not impact on other configuration. Free text may be entered here as required/understood by the EMR application.
- Unsolicited Facility:** If the return message is an unsolicited return, the field populates with the configured value. The field is optional and will not impact on other configuration. Free text may be entered here as required/understood by the EMR application.
- Date Format:** Date format to be used by Connect when processing EMR Requests Default yyyyddMM
- Time Format:** Time format to be used by Connect when processing EMR requests. Default HHmmss

Note: UNC paths are required if the Paths/Directories to be used are not on the local machine. A UNC path is the path to a folder or file on a network and contains the server name in the path.

E.g. \\server01\directory01\subdirectory02\subdirectory03

6.3.3. Parameters

Supported parameters for both spirometry and ECG can be configured on/off for the HL7 EMR. When creating a return to the EMR, only the parameters that are configured as on will be returned.

6.3.4. Mappings

The configuration of HL7 mappings allow Connect to interpret various inbound items and map these to a defined outbound identifier. Multiple inbound items can be mapped to an outbound identifier. For example, M or Male can be configured as mapping to M for Connect outbound returns.

Gender

All inbound gender maps to one of 2 supported Connect genders or specified as Unset.

Connect Gender Type	Inbound Mappings (CDC* Identifier)	Outbound Mapping (CDC Identifier)
Male	M, Male	M
Female	F, Female	F

*CDC - Centers for Disease Control and Prevention

Race

Connect supports 6 Level 2 CDC races. All inbound races maps to one of 6 supported Connect races or specified as Unset.

EN

Connect CDC Race Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)
American Indian or Alaska Native	1002-5, American Indian or Alaska Native, 1004-1, American Indian, 1735-0, Alaska Native,	1002-5
Asian	2028-9, Asian, Oriental, 2040-4, Korean,	2028-9
Black or African American	2054-5, Black or African American 2056-0, Black, 2058-6, African American,	2054-5
Caucasian	2106-3, White, Caucasian, 2108-9, European, 2110-5, English, 2116-2, Scottish, 1886-1, Wales, 2112-1, German, 2111-3, French,	2106-3
Native Hawaiian or Other Pacific Islander	2076-8, Native Hawaiian or Other Pacific Islander, 2118-8, Middle Eastern or North African,	2076-8
Other	2131-1, Other Race, Other, 2149-3, Mexican American, 2146-9, Spanish Basque, 2135-2, Hispanic or Latino,	2131-1

Units

CONNECT TYPE	Inbound Identifier (CDC Identifier)	Default Outbound Identifier (CDC Identifier)
Centimetres	cm, centimetres, centimetre, centimeters, centimeter	cm
Inches	in, inch, inches	in
Kilograms	kg, kilogrammes, kilograms	kg
Pounds	lb, lbs, pound, pounds	lbs

Spirometry Parameter Mappings

See Appendix 1 - HL7 Spirometry Parameter Mappings

ECG Parameter Mappings

See Appendix 2 - HL7 ECG Parameter Mappings

Other

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)
--------------	--------------------------------------	--------------------------------------

Weight	Body Weight, Weight, BW, WT, W	Weight
Height	Body Height, Height, BH, HT, H	Height

6.3.5. TCP/IP Settings

If the transfer protocol is set TCP/IP the following settings are available:

Inbound Settings for incoming data to Connect

- Port Number
- Timeout(ms)
- Number of Connections (1-5)
- MLLP Version (1 or 2)

Outbound Settings for data going from Connect

- IP Address
- Port Number
- Send Attempts (1-3)
- MLLP Version (1 or 2)

Note: The Connect Service must be restarted for any change to take effect. To Restart the Connect Service, refer to [section 4.5](#)

7. Setup GDT EMR Connection

7.1. Add GDT EMR Connection

On the home dashboard select “+” to add a new EMR connection.

Note: This functionality is only available on the computer running Connect. If connecting to a remotely hosted instance of Connect, it is not possible to add or configure an EMR connection.

The following are required:

1. **ID:** Unique identifier for the EMR connection.
2. **Protocol:** The protocol required to connect to the EMR. Select GDT 2.10
3. **Transfer Inbound:** This is the transfer protocol to be used for data coming into Connect. The transfer protocol defines the method of transmission, or how the data is sent. Select File.
4. **Transfer Outbound:** This is the transfer protocol to be used for data sent from Connect. The transfer protocol defines the method of transmission, or how the data is sent. Select File.
5. **Data Inbound:** This is the data protocol to be used for data coming into Connect. The data protocol defines the predefined structure to be used for that data. Select GDT.
6. **Data Outbound:** This is the data protocol to be used for data sent out from Connect. The data protocol defines the predefined structure to be used for that data. Select GDT.

When details are complete, select Add.

Select Home to view all EMRs that are configured for Connect.


7.1.1. Delete GDT EMR

To delete an EMR select the red X of the associated EMR in the list.

Note: Deleting an EMR is irreversible and all data relating to that EMR are deleted.

When an EMR system has been marked for deletion, it is no longer possible to configure the EMR system. The EMR and all related data are deleted when Connect service is restarted.

7.2. GDT Configuration

On the HOME dashboard select the  button on the required EMR to view/edit specific configuration belonging to the required EMR connection.

7.2.1. System Info

System info contains high-level configuration for the GDT EMR as setup in 4.1

7.2.2. General Settings

The following settings can be configured for GDT:

1. **Inbound File Path:** The user can specify a folder where inbound GDT files are placed. If the service is locally hosted, the user may browse and select the folder. If no folder is specified by the User, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Inbound). It is not possible to specify a folder which is already in use for another EMR.
2. **Outbound File Path:** The user can specify a folder where outbound GDT files are placed. If the service is locally hosted, the user may browse and select the folder. If no folder is specified, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Outbound). It is not possible to specify a folder which is already in use for another EMR.
3. **Outbound Report Path:** The user can specify a custom folder where outbound Report files are placed. If the service is locally hosted, the user may browse and select the folder. If no folder is specified, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Outbound). It is not possible to specify a folder which is already in use for another EMR.

Note: UNC paths are required if the Paths/Directories to be used are not on the local machine. A UNC path is the path to a folder or file on a network and contains the server name in the path. E.g.: \\server01\directory01\subdirectory02\ subdirectory03

1. **Export Files:** If enabled sends the GDT files when returning GDT data.
2. **Export Reports:** If enabled sends PDF reports when returning GDT data.
3. **Include interpretations:** If enabled includes the ECG interpretation when returning GDT data.
4. **Decimal Separator:** Defines the decimal separator to be used.

Options are:

- System Defined
- Comma
- Decimal Point

7.2.3. Parameters

Supported parameters for both spirometry and ECG can be configured on/off for the GDT EMR. When creating a return to the EMR, only the parameters that are configured as on will be returned.

8. Setup EMIS WEB EMR Connection

8.1. Add EMIS EMR Connection

On the home dashboard select "+" to add a new EMR connection.

Note: This functionality is only available on the computer running Connect. If connecting to a remotely hosted instance of Connect, it is not possible to add or configure an EMR connection.

The following are required:

1. **ID:** Unique identifier for the EMR connection.
2. **Protocol:** The protocol required to connect to the EMR. Select EMIS 4
3. **Transfer Inbound:** Select TCP/IP
4. **Transfer Outbound:** Select TCP/IP
5. **Data Inbound:** Select EMIS.
6. **Data Outbound:** Select EMIS.

When details are complete, select **Add**.

Select **Home** to view all EMRs that are configured for Connect.


8.1.1. Delete EMIS EMR

To delete an EMR select the red X of the associated EMR in the list.

Note: Deleting an EMR is irreversible and all data relating to that EMR are deleted.

When an EMR system has been marked for deletion, it is no longer be possible to configure the EMR system. The EMR and all related data are deleted when Connect service is restarted.

8.2. EMIS Configuration

On the HOME dashboard select the  button on the required EMR to view/edit specific configuration belonging to the required EMR connection

8.2.1. System Info

System info contains high-level configuration for the EMIS EMR as setup in 8.1

8.2.2. General Settings

The following settings can be configured for EMIS:

- **Application Type:** Select Emis Web
- Contact your local administrator/IT for the following information

- **IP Address:** This is the IP address of the machine containing the EMIS Web Database.
- **Organisation ID:** This is the identifier for the EMIS Web Organisation ID
- **Supplier ID:** This is a Unique identifier to authenticate each supplier.
- **Outbound Report Path:** The user can specify a custom folder where outbound Report files are placed. If the service is locally hosted, the user may browse and select the folder. If no folder is specified, the system reverts to using default folder (C:\ProgramData\Vitalograph\Vital.Connect\Emr\EMR_NAME\Outbound). It is not possible to specify a folder which is already in use for another EMR.


8.2.3. Parameters

Supported parameters for both Spirometry and ECG can be configured on/off for the EMIS EMR. When creating a return to the EMR, only the parameters that are configured as on will be returned.

8.3. Order Tests for EMIS EMR

To create a test order, ensure that the Connect Application is running on the same PC as EMIS Web client. The user must login to EMIS web client to begin the workflow. Select the patient to be tested in the EMIS Web client.

To Order a test:

- Open the Connect Client and select the "Create Order" button  for the EMIS EMR from the Home Dashboard
- A widows shall display the patients' details. Verify this is the correct patient for testing
- Select the type of test required
 - Spirometry
 - ECG
- Click "Create Order" button
- A message will be displayed confirming that the Order has been created successfully
- The Order will now be available to any devices configured (See [Section 10](#))

9. Setup Vision EMR Connection

9.1. Add Vision EMR Connection

On the home dashboard select "+" to add a new EMR connection.

Note: This functionality is only available on the computer running Connect. If connecting to a remotely hosted instance of Connect, it is not possible to add or configure an EMR connection.

The following are required:

1. **ID:** Unique identifier for the EMR connection.
2. **Protocol:** The protocol required to connect to the EMR. Select Vision.
3. **Transfer Inbound:** Select TCP/IP
4. **Transfer Outbound:** Select TCP/IP
5. **Data Inbound:** Select VISION.
6. **Data Outbound:** Select VISION.

When details are complete, select *Add*.

Select Home to view all EMRs that are configured for Connect.

9.1.1. Delete Vision EMR

To delete an EMR select the red X of the associated EMR in the list.

Note: Deleting an EMR is irreversible and all data relating to that EMR are deleted.

When an EMR system has been marked for deletion, it is no longer be possible to configure the EMR system. The EMR and all related data are deleted when Connect service is restarted.

9.2. Vision Configuration

On the HOME dashboard select the button on the required EMR to view/edit specific configuration belonging to the required EMR connection

9.2.1. System Info

System info contains high-level configuration for the Vision EMR as setup in Section 9.1

9.2.2. General Settings

The following settings can be configured for Vision:

Contact your local administrator/IT/Vision Support for the following information

- **API URL:** This is the URL for Vision
- **Organisation ID:** This is the clinic identifier
- **API Key:** This is a Unique identifier to authenticate each supplier.


- **Username & Password:** The credentials used to authenticate to Vision API

9.2.3. Parameters

Supported parameters for both Spirometry and ECG can be configured on/off for the Vision EMR. When creating a return to the EMR, only the parameters that are configured as on will be returned.

9.3. Order Tests for Vision EMR

To Order a test:

- Open the Connect Client and select the “Create Order” button  for the Vision EMR from the Home Dashboard
- Enter the Vision id, name or date of birth of the patient required for testing and select “Create Order”.
- A window shall display the patients’ details. Verify this is the correct patient for testing
- Select the type of test required
 - Spirometry
 - ECG
- Click “Create Order” button
- A message will be displayed confirming that the Order has been created successfully
- The Order will now be available to any devices configured (See [Section 10](#))

10. Vitalograph Device Configuration

10.1. Spirotrac 6 Configuration

Spirotrac 6 can be configured to connect to an EMR using Vitalograph Connect. Test orders received by Connect can be forwarded to an instance of the Spirotrac 6 application for processing. Refer to the Spirotrac Instructions for Use for details.

The URL required for Spirotrac setup is as per [Section 4.4](#)

10.2. Alpha Configuration

A Vitalograph Alpha can be configured to connect to an EMR using Vitalograph Connect. Test orders received by Connect can be forwarded to a connecting Vitalograph Alpha device. Configuration of the Alpha is setup on the Alpha device. Refer to the Alpha Instructions for Use for details.

The URL required for Alpha setup is as per [Section 4.4](#)

11. Power Management

N/A

12. Cleaning & Hygiene

N/A

13. Fault Finding Guide

Problem Fault Symptoms:	<ul style="list-style-type: none"> • Vitalograph product unable to communicate with Connect
Possible Cause/ Solution: (In probable order)	<ul style="list-style-type: none"> • Connect not running – start Connect (See Sections 4.5, 4.6) • Configuration mismatch – Check that configuration on the Vitalograph device matches the URL where Connect is running (default http://localhost:80/connect/)
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Vitalograph product unable to communicate with Connect
Possible Cause/ Solution: (In probable order)	<ul style="list-style-type: none"> • Connect is running on a server and the user is accessing from a remote client system. • It is not possible to change configurations unless the user is accessing Connect on the machine on which it is running.
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Unauthorized access to service error message is displayed
Possible Cause/ Solution: (In probable order)	<ul style="list-style-type: none"> • Access has not been granted on the server running Vitalograph Connect Service (see Section 5.5)
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Grant access request failed error message is displayed or • Loading Security settings failed error message is displayed or • Saving Security settings failed error message is displayed
Possible Cause/ Solution: (In probable order)	<ul style="list-style-type: none"> • Connect not running – start Connect (See Sections 4.5, 4.6)

Problem Fault Symptoms:	<ul style="list-style-type: none"> • Connect fails to run
Possible Cause/ Solution: (In probable order)	<ul style="list-style-type: none"> • Port number configured for Connect is in use by another process. • Solution: Change the port number that Connect runs on by changing the port number in the following location • C:\ProgramData\Vitalograph\Vital.Connect\ClientSettings.json • "ApiAccessUrl": "http://IPADDRESSOFSERVER:80/connect/", • Default is port 80 • Restart the service following any port changes (See Section 4.5)
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Connect service does not run automatically when PC starts up
Possible Cause/ Solution: (In probable order)	<p>Service is not configured to start automatically.</p> <p>Solution:</p> <ul style="list-style-type: none"> • Run the Services App within Windows • Locate the service called "Vitalograph Connect Host Service" • Right click on the service. Click Properties. • In the field "Startup Type" select Automatic and click OK.
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Connect is unable to connect to EMIS Web
Possible Cause/ Solution: (In probable order)	<p>The Connect Client is not configured correctly.</p> <p>Solution:</p> <ul style="list-style-type: none"> • Check that the configuration settings are correct for Application Type, IP address, Organisation and Supplier under General Settings for the relevant EMR <p>EMIS Web is not running, or is not running on the same machine from which the user is connecting</p> <p>Solution:</p> <ul style="list-style-type: none"> • Check that EMIS Web is running on the same machine as the Connect client is running on • Start EMIS Web if it is not running • Log in to the Emis Web Application
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Connect is unable to get patient details from EMIS Web
Possible Cause/ Solution: (In probable order)	<p>The User has not selected a patient on the EMIS Web Screen</p> <p>Solution:</p> <ul style="list-style-type: none"> • Select the patient for whom testing is required on the EMIS Web Screen
Problem Fault Symptoms:	<ul style="list-style-type: none"> • Connect is unable to get patient details from Vision
Possible Cause/ Solution: (In probable order)	<p>The Connect Client is not configured correctly.</p> <p>Solution:</p> <ul style="list-style-type: none"> • Check that the configuration settings are correct for Vision under General Settings for the relevant EMR <p>User entered an invalid patient id,name or date of birth</p> <ul style="list-style-type: none"> • Find the patient in Vision and ensure the correct patient id/name/date of birth is entered in Connect

13.1. Software Check

Software Version can be located by selecting the "About" option from the main application menu.

14. Customer Service

Service and repairs should be carried out only by the manufacturer, or by Service Agents approved by Vitalograph. Contact information for approved Vitalograph Service Agents may be found at the start of this manual. Any serious incident that has occurred in relation to the device should be reported to Vitalograph or its Authorized

Representative and the Regulatory Authorities of the country. Refer to the Vitalograph contact information at the start of this manual.

15. Consumables and Accessories

N/A

16. Disposal

N/A

17. Explanation of Symbols

N/A

18. Technical Specification

Product	Vitalograph Connect 94000
Minimum PC System Requirements	<p>Processor Speed: 2GHz or greater RAM: 2GB (Min), 4GB (Recommended)</p> <p>Disk Space: 1GB or greater</p> <p>Operating System: Windows 7 or above Monitor: 1280 x 800 pixel</p> <p>Input Device: Microsoft® mouse or compatible pointing device Other:</p> <ul style="list-style-type: none"> • Minimum of .Net framework 4.5.1 • WiFi Connection should be available to allow Compatible devices to access Connect instance • Install the application as System Administrator and provide full read/write access rights for all applicable users to the relevant configured folders and sub-folders.

19. CE Notice

N/A

20. FDA Notice

N/A

21. EU Declaration of Conformity

N/A

22. Guarantee

Terms of Guarantee

Subject to the conditions listed below, Vitalograph Ltd. and its associated companies, (hereinafter called the Company) guarantee to repair or at its option replace any component thereof, which, in the opinion of the Company is faulty or below standard as a result of inferior workmanship or materials.

The conditions of this guarantee are:-

1. This Guarantee shall only apply to hardware defects which are notified to the Company or to its accredited distributor within 1 year of the date of purchase of the equipment, unless otherwise agreed in writing by the Company.
2. Software (meaning computer software, or user installable modules) is guaranteed for 90 days from the date of purchase.
3. The Company warrants that the software when correctly used in conjunction with the hardware will perform in the manner described in the Company's literature and user manuals. The Company undertakes to rectify at no expense to the customer any software failure notified within the period stated above, provided that the failure can be recreated and the software has been installed and used in accordance with the user manual. Notwithstanding this clause, the software is not warranted to be free of errors.
4. This Guarantee does not cover any faults caused by accident, misuse, neglect, tampering with the equipment, use of consumable items or parts not approved by the Company, or any attempt at adjustment or repair other than by personnel accredited by the Company, nor does it cover reinstatement of any configuration changes caused by the installation of any software.
5. If a defect occurs please contact the supplier from it was purchased for advice. The Company does not authorize any person to create for it any other obligation or liability in connection with Vitalograph® equipment.
6. This Guarantee is not transferable and no person, firm or company has any authority to vary the terms or conditions of this guarantee.
7. To the maximum extent permitted by law, the Company does not accept liability for any consequential damages arising out of the use of, or inability to use any Vitalograph® equipment.
8. This Guarantee is offered as an additional benefit to the Consumer's statutory rights and does not affect these rights in any way.

1. Appendices

1.1. Appendix 1 - HL7 Spirometry Parameter Mappings

* No default mapping - value will not be processed by Connect.

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Vc	*	19866-3	Liters	Measured
Vc	*	19865-5	Liters	Predicted
Vc	*	VC-3	Percentage	PercPredicted
Vc	*	VC-4	Liters	Post
Vc	*	VC-5	Percentage	PercPostPredicted
Vc	*	VC-6	Percentage	PercPrePost
Fvc	*	19868-9	Liters	Measured
Fvc	*	19869-7	Liters	Predicted
Fvc	*	19871-3	Percentage	PercPredicted
Fvc	*	19874-7	Liters	Post
Fvc	*	19873-9	Percentage	PercPostPredicted
Fvc	*	69982-7	Percentage	PercPrePost
Fev1	*	20150-9	Liters	Measured
Fev1	*	20149-1	Liters	Predicted
Fev1	*	20152-5	Percentage	PercPredicted
Fev1	*	20155-8	Liters	Post
Fev1	*	FEV1-5	Percentage	PercPostPredicted
Fev1	*	69983-5	Percentage	PercPrePost
Fev6	*	65655-3	Liters	Measured
Fev6	*	65656-1	Liters	Predicted
Fev6	*	FEV6-3	Percentage	PercPredicted
Fev6	*	FEV6-4	Liters	Post
Fev6	*	FEV6-5	Percentage	PercPostPredicted
Fev6	*	FEV6-6	Percentage	PercPrePost
Fev1Fvc	*	FEV1/FVC-1	Ratio	Measured
Fev1Fvc	*	19925-7	Ratio	Predicted
Fev1Fvc	*	FEV1/FVC-3	Percentage	PercPredicted
Fev1Fvc	*	FEV1/FVC-4	Ratio	Post
Fev1Fvc	*	FEV1/FVC-5	Percentage	PercPostPredicted
Fev1Fvc	*	FEV1/FVC-6	Percentage	PercPrePost
Fev1R	*	19926-5	Ratio	Measured
Fev1R	*	19925-7	Ratio	Predicted
Fev1R	*	FEV1R-3	Percentage	PercPredicted
Fev1R	*	69970-2	Ratio	Post
Fev1R	*	FEV1R-5	Percentage	PercPostPredicted
Fev1R	*	69984-3	Percentage	PercPrePost
Fev1Fev6	*	FEV1/FEV6-1	Ratio	Measured

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Fev1Fev6	*	FEV1/FEV6-2	Ratio	Predicted
Fev1Fev6	*	FEV1/FEV6-3	Percentage	PercPredicted
Fev1Fev6	*	FEV1/FEV6-4	Ratio	Post
Fev1Fev6	*	FEV1/FEV6-5	Percentage	PercPostPredicted
Fev1Fev6	*	FEV1/FEV6-6	Percentage	PercPrePost
PefLperSec	*	PEF-LS-1	Liters Per Second	Measured
PefLperSec	*	69974-4	Liters Per Second	Predicted
PefLperSec	*	69977-7	Percentage	PercPredicted
PefLperSec	*	69976-9	Liters Per Second	Post
PefLperSec	*	69978-5	Percentage	PercPostPredicted
PefLperSec	*	PEF-LS-6	Percentage	PercPrePost
PefLperMin	*	33452-4	Liters Per Minute	Measured
PefLperMin	*	PEF-LMIN-2	Liters Per Minute	Predicted
PefLperMin	*	69977-7	Percentage	PercPredicted
PefLperMin	*	PEF-LMIN-4	Liters Per Minute	Post
PefLperMin	*	PEF-LMIN-5	Percentage	PercPostPredicted
PefLperMin	*	PEF-LMIN-6	Percentage	PercPrePost
Fivc	*	FIVC-1	Liters	Measured
Fivc	*	FIVC-2	Liters	Predicted
Fivc	*	FIVC-3	Percentage	PercPredicted
Fivc	*	FIVC-4	Liters	Post
Fivc	*	FIVC-5	Percentage	PercPostPredicted
Fivc	*	FIVC-6	Percentage	PercPrePost
PifLperSec	*	PIF-LS-1	Liters Per Second	Measured
PifLperSec	*	PIF-LS-2	Liters Per Second	Predicted
PifLperSec	*	PIF-LS-3	Percentage	PercPredicted
PifLperSec	*	PIF-LS-4	Liters Per Second	Post
PifLperSec	*	PIF-LS-5	Percentage	PercPostPredicted
PifLperSec	*	PIF-LS-6	Percentage	PercPrePost
PifLperMin	*	PIF-LMIN-1	Liters Per Minute	Measured
PifLperMin	*	PIF-LMIN-2	Liters Per Minute	Predicted
PifLperMin	*	PIF-LMIN-3	Percentage	PercPredicted
PifLperMin	*	PIF-LMIN-4	Liters Per Minute	Post
PifLperMin	*	PIF-LMIN-5	Percentage	PercPostPredicted
PifLperMin	*	PIF-LMIN-6	Percentage	PercPrePost
Fef2575	*	19945-5	Liters Per Second	Measured
Fef2575	*	69971-0	Liters Per Second	Predicted
Fef2575	*	FEF25-75-3	Percentage	PercPredicted
Fef2575	*	69973-6	Liters Per Second	Post
Fef2575	*	FEF25-75-5	Percentage	PercPostPredicted

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Fef2575	*	FEF25-75-6	Percentage	PercPrePost
Tv	*	TV-1	Liters	Measured
Tv	*	TV-2	Liters	Post
Tv	*	TV-3	Percentage	PercPrePost
Irv	*	IRV-1	Liters	Measured
Irv	*	IRV-2	Liters	Post
Irv	*	IRV-3	Percentage	PercPrePost
Erv	*	19924-0	Liters	Measured
Erv	*	ERV-2	Liters	Post
Erv	*	ERV-3	Percentage	PercPrePost
Ic	*	19852-3	Liters	Measured
Ic	*	19851-5	Liters	Predicted
Ic	*	19855-6	Percentage	PercPredicted
Ic	*	IC-4	Liters	Post
Ic	*	IC-5	Percentage	PercPostPredicted
Ic	*	IC-6	Percentage	PercPrePost
Bev	*	65654-6	Millilitres	Measured
Bev	*	VExt-2	Millilitres	Post
Bev	*	*	Percentage	PercPrePost
Text	*	VExt-3	Milliseconds	Measured
Text	*	VExt-4	Milliseconds	Post
Text	*	*	Percentage	PercPrePost
TRise	*	65820-3	Milliseconds	Measured
TRise	*	TPEF-2	Milliseconds	Post
TRise	*	*	Percentage	PercPrePost
Fet	*	65819-5	Seconds	Measured
Fet	*	FET-2	Seconds	Post
Fet	*	*	Percentage	PercPrePost
Ivc	*	IVC-1	Liters	Measured
Ivc	*	IVC-2	Liters	Predicted
Ivc	*	IVC-3	Percentage	PercPredicted
Ivc	*	IVC-4	Liters	Post
Ivc	*	IVC-5	Percentage	PercPostPredicted
Ivc	*	IVC-6	Percentage	PercPrePost
Evc	*	*	Liters	Measured
Evc	*	*	Liters	Predicted

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Evc	*	*	Percentage	PercPredicted
Evc	*	*	Liters	Post
Evc	*	*	Percentage	PercPostPredicted
Evc	*	*	Percentage	PercPrePost
Pcf	*	*	Liters Per Second	Measured
Fef25	*	65821-1	Liters Per Second	Measured
Fef25	*	FEF25-2	Liters Per Second	Predicted
Fef25	*	FEF25-3	Percentage	PercPredicted
Fef25	*	FEF25-4	Liters Per Second	Post
Fef25	*	FEF25-5	Percentage	PercPostPredicted
Fef25	*	FEF25-6	Percentage	PercPrePost
Fef50	*	65822-9	Liters Per Second	Measured
Fef50	*	FEF50-2	Liters Per Second	Predicted
Fef50	*	FEF50-3	Percentage	PercPredicted
Fef50	*	FEF50-4	Liters Per Second	Post
Fef50	*	FEF50-5	Percentage	PercPostPredicted
Fef50	*	FEF50-6	Percentage	PercPrePost
Fef75	*	65823-7	Liters Per Second	Measured
Fef75	*	FEF75-2	Liters Per Second	Predicted
Fef75	*	FEF75-3	Percentage	PercPredicted
Fef75	*	FEF75-4	Liters Per Second	Post
Fef75	*	FEF75-5	Percentage	PercPostPredicted
Fef75	*	FEF75-6	Percentage	PercPrePost
Tlc	*	19862-2	Liters	Measured
Tlc	*	TLC-2	Liters	Post
Tlc	*	*	Percentage	PercPrePost
Rv	*	20146-7	Liters	Measured
Rv	*	RV-2	Liters	Post
Rv	*	RV-3	Percentage	PercPrePost
Frc	*	19843-2	Liters	Measured
Frc	*	19847-3	Liters	Predicted
Frc	*	FRC-3	Percentage	PercPredicted
Frc	*	FRC-4	Liters	Post
Frc	*	FRC-5	Percentage	PercPostPredicted
Frc	*	FRC-6	Percentage	PercPrePost
Fev05	*	20148-3	Liters	Measured
Fev05	*	20147-5	Liters	Predicted
Fev05	*	FEV.5-3	Percentage	PercPredicted

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Fev05	*	FEV.5-4	Liters	Post
Fev05	*	FEV.5-5	Percentage	PercPostPredicted
Fev05	*	FEV.5-6	Percentage	PercPrePost
Fev05Fvc	*	FEV.5/FVC-1	Ratio	Measured
Fev05Fvc	*	FEV.5/FVC-2	Ratio	Predicted
Fev05Fvc	*	FEV.5/FVC-3	Percentage	PercPredicted
Fev05Fvc	*	FEV.5/FVC-4	Ratio	Post
Fev05Fvc	*	FEV.5/FVC-5	Percentage	PercPostPredicted
Fev05Fvc	*	FEV.5/FVC-6	Percentage	PercPrePost
Fev075	*	FEV.75-1	Liters	Measured
Fev075	*	FEV.75-2	Liters	Predicted
Fev075	*	FEV.75-3	Percentage	PercPredicted
Fev075	*	FEV.75-4	Liters	Post
Fev075	*	FEV.75-5	Percentage	PercPostPredicted
Fev075	*	FEV.75-6	Percentage	PercPrePost
Fev075Fvc	*	FEV.75/FVC-1	Ratio	Measured
Fev075Fvc	*	FEV.75/FVC-2	Ratio	Predicted
Fev075Fvc	*	FEV.75/FVC-3	Percentage	PercPredicted
Fev075Fvc	*	FEV.75/FVC-4	Ratio	Post
Fev075Fvc	*	FEV.75/FVC-5	Percentage	PercPostPredicted
Fev075Fvc	*	FEV.75/FVC-6	Percentage	PercPrePost
Fev3	*	FEV3-1	Liters	Measured
Fev3	*	41233-8	Liters	Predicted
Fev3	*	FEV3-3	Percentage	PercPredicted
Fev3	*	FEV3-4	Liters	Post
Fev3	*	FEV3-5	Percentage	PercPostPredicted
Fev3	*	FEV3-6	Percentage	PercPrePost
Fev3Fvc	*	FEV3/FVC-1	Ratio	Measured
Fev3Fvc	*	FEV3/FVC-2	Ratio	Predicted
Fev3Fvc	*	FEV3/FVC-3	Percentage	PercPredicted
Fev3Fvc	*	FEV3/FVC-4	Ratio	Post
Fev3Fvc	*	FEV3/FVC-5	Percentage	PercPostPredicted
Fev3Fvc	*	FEV3/FVC-6	Percentage	PercPrePost
Fev3Vc	*	FEV3/VC-1	Ratio	Measured
Fev3Vc	*	FEV3/VC-2	Ratio	Predicted
Fev3Vc	*	FEV3/VC-3	Percentage	PercPredicted
Fev3Vc	*	FEV3/VC-4	Ratio	Post
Fev3Vc	*	FEV3/VC-5	Percentage	PercPostPredicted
Fev3Vc	*	FEV3/VC-6	Percentage	PercPrePost
Fev1Vc	*	FEV1/VC-1	Ratio	Measured

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Fev1Vc	*	FEV1/VC-2	Ratio	Predicted
Fev1Vc	*	FEV1/VC-3	Percentage	PercPredicted
Fev1Vc	*	FEV1/VC-4	Ratio	Post
Fev1Vc	*	FEV1/VC-5	Percentage	PercPostPredicted
Fev1Vc	*	FEV1/VC-6	Percentage	PercPrePost
Fev6Fvc	*	FEV6/FVC-1	Ratio	Measured
Fev6Fvc	*	FEV6/FVC-2	Ratio	Predicted
Fev6Fvc	*	FEV6/FVC-3	Percentage	PercPredicted
Fev6Fvc	*	FEV6/FVC-4	Ratio	Post
Fev6Fvc	*	FEV6/FVC-5	Percentage	PercPostPredicted
Fev6Fvc	*	FEV6/FVC-6	Percentage	PercPrePost
Fef0212	*	FEF0.2-1.2-1	Liters Per Second	Measured
Fef0212	*	FEF0.2-1.2-2	Liters Per Second	Predicted
Fef0212	*	FEF0.2-1.2-3	Percentage	PercPredicted
Fef0212	*	FEF0.2-1.2-4	Liters Per Second	Post
Fef0212	*	FEF0.2-1.2-5	Percentage	PercPostPredicted
Fef0212	*	FEF0.2-1.2-6	Percentage	PercPrePost
Fef2575Fvc	*	FEF25-75/FVC-1	Ratio	Measured
Fef2575Fvc	*	FEF25-75/FVC-2	Ratio	Predicted
Fef2575Fvc	*	FEF25-75/FVC-3	Percentage	PercPredicted
Fef2575Fvc	*	FEF25-75/FVC-4	Ratio	Post
Fef2575Fvc	*	FEF25-75/FVC-5	Percentage	PercPostPredicted
Fef2575Fvc	*	FEF25-75/FVC-6	Percentage	PercPrePost
Fef7585	*	FEF75-85-1	Liters Per Second	Measured
Fef7585	*	FEF75-85-2	Liters Per Second	Predicted
Fef7585	*	FEF75-85-3	Percentage	PercPredicted
Fef7585	*	FEF75-85-4	Liters Per Second	Post
Fef7585	*	FEF75-85-5	Percentage	PercPostPredicted
Fef7585	*	FEF75-85-6	Percentage	PercPrePost
Fiv1	*	FIV1-1	Liters	Measured
Fiv1	*	FIV1-2	Liters	Post
Fiv1	*	FIV1-3	Percentage	PercPrePost
Fif25	*	FIF25-1	Liters Per Second	Measured
Fif25	*	FIF25-2	Liters Per Second	Predicted
Fif25	*	FIF25-3	Percentage	PercPredicted
Fif25	*	FIF25-4	Liters Per Second	Post
Fif25	*	FIF25-5	Percentage	PercPostPredicted
Fif25	*	FIF25-6	Percentage	PercPrePost
Fif50	*	FIF50-1	Liters Per Second	Measured

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Fif50	*	FIF50-2	Liters Per Second	Predicted
Fif50	*	FIF50-3	Percentage	PercPredicted
Fif50	*	FIF50-4	Liters Per Second	Post
Fif50	*	FIF50-5	Percentage	PercPostPredicted
Fif50	*	FIF50-6	Percentage	PercPrePost
Fif75	*	FIF75-1	Liters Per Second	Measured
Fif75	*	FIF75-2	Liters Per Second	Predicted
Fif75	*	FIF75-3	Percentage	PercPredicted
Fif75	*	FIF75-4	Liters Per Second	Post
Fif75	*	FIF75-5	Percentage	PercPostPredicted
Fif75	*	FIF75-6	Percentage	PercPrePost
FivcFvc	*	FIVC/FVC-1	Ratio	Measured
FivcFvc	*	*	Ratio	Predicted
FivcFvc	*	*	Percentage	PercPredicted
FivcFvc	*	FIVC/FVC-2	Ratio	Post
FivcFvc	*	*	Percentage	PercPostPredicted
FivcFvc	*	FIVC/FVC-3	Percentage	PercPrePost
Fev1Pef	*	FEV1/PEF-1	Liters Per Liters Per Second	Measured
Fev1Pef	*	FEV1/PEF-2	Liters Per Liters Per Second	Predicted
Fev1Pef	*	FEV1/PEF-3	Percentage	PercPredicted
Fev1Pef	*	FEV1/PEF-4	Liters Per Liters Per Second	Post
Fev1Pef	*	FEV1/PEF-5	Percentage	PercPostPredicted
Fev1Pef	*	FEV1/PEF-6	Percentage	PercPrePost
Fif50Fef50	*	FIF50/FEF50-1	Ratio	Measured
Fif50Fef50	*	FIF50/FEF50-2	Ratio	Predicted
Fif50Fef50	*	FIF50/FEF50-3	Percentage	PercPredicted
Fif50Fef50	*	FIF50/FEF50-4	Ratio	Post
Fif50Fef50	*	FIF50/FEF50-5	Percentage	PercPostPredicted
Fif50Fef50	*	FIF50/FEF50-6	Percentage	PercPrePost
Fev1Fivc	*	FEV1/FIVC-1	Ratio	Measured
Fev1Fivc	*	FEV1/FIVC-2	Ratio	Predicted
Fev1Fivc	*	FEV1/FIVC-3	Percentage	PercPredicted
Fev1Fivc	*	FEV1/FIVC-4	Ratio	Post
Fev1Fivc	*	FEV1/FIVC-5	Percentage	PercPostPredicted
Fev1Fivc	*	FEV1/FIVC-6	Percentage	PercPrePost
Fev1Ivc	*	FEV1/IVC-1	Ratio	Measured
Fev1Ivc	*	FEV1/IVC-2	Ratio	Predicted

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
Fev1Ivc	*	FEV1/IVC-3	Percentage	PercPredicted
Fev1Ivc	*	FEV1/IVC-4	Ratio	Post
Fev1Ivc	*	FEV1/IVC-5	Percentage	PercPostPredicted
Fev1Ivc	*	FEV1/IVC-6	Percentage	PercPrePost
Fiv1Fivc	*	FIV1/FIVC-1	Ratio	Measured
Fiv1Fivc	*	FIV1/FIVC-2	Ratio	Post
Fiv1Fivc	*	FIV1/FIVC-3	Percentage	PercPrePost
Fiv1Fvc	*	*	Ratio	Measured
Fiv1Fvc	*	*	Ratio	Post
Fiv1Fvc	*	*	Percentage	PercPrePost
Fef50Fif50	*	FEF50/FIF50-1	Ratio	Measured
Fef50Fif50	*	FEF50/FIF50-2	Ratio	Predicted
Fef50Fif50	*	FEF50/FIF50-3	Percentage	PercPredicted
Fef50Fif50	*	FEF50/FIF50-4	Ratio	Post
Fef50Fif50	*	FEF50/FIF50-5	Percentage	PercPostPredicted
Fef50Fif50	*	FEF50/FIF50-6	Percentage	PercPrePost
MvvInd	*	20159-0	Liters Per Minute	Measured
MvvInd	*	20158-2	Liters Per Minute	Predicted
MvvInd	*	20164-0	Percentage	PercPredicted
MvvInd	*	20160-8	Liters Per Minute	Post
MvvInd	*	20161-6	Percentage	PercPostPredicted
MvvInd	*	MVVind-6	Percentage	PercPrePost
Eotv	*	EOTV-1	Liters	Measured
Eotv	*	EOTV-2	Liters	Post
Fev1Ht2	*	FEV1/HT2-1	Liters Per Meter Squared	Measured
Fev1Ht2	*	FEV1/HT2-2	Liters Per Meter Squared	Post
Fev1Ht2	*	FEV1/HT2-3	Percentage	PercPrePost
FefMax	*	FEFmax-1	Liters Per Second	Measured
FefMax	*	FEFmax-2	Liters Per Second	Predicted
FefMax	*	FEFmax-3	Percentage	PercPredicted
FefMax	*	*	Liters Per Second	Post
FefMax	*	*	Percentage	PercPostPredicted
FefMax	*	*	Percentage	PercPrePost
RawInd	*	RAWind-1	Kilopascal Liters Per Second	Measured
RawInd	*	RAWind-2	Kilopascal Liters Per Second	Post

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
RawInd	*	RAWind-3	Percentage	PercPrePost
THes	*	THes-1	Milliseconds	Measured
THes	*	THes-2	Milliseconds	Post
BevFvc	*	BEV/FVC-1	Percentage	Measured
BevFvc	*	BEV/FVC-2	Percentage	Post
Fmft	*	*	Seconds	Measured
Fmft	*	*	Seconds	Predicted
Fmft	*	*	Percentage	PercPredicted
Fmft	*	*	Seconds	Post
Fmft	*	*	Percentage	PercPostPredicted
Fmft	*	*	Percentage	PercPrePost

1.2. Appendix 2 - HL7 ECG Parameter Mappings

* No default mapping - value will not be processed by Connect.

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
EcgHeartRate	*	88867-4	Beats Per Minute	Measured
EcgAverageRr	*	80404-7	Milliseconds	Measured
EcgPDduration	*	8627-2	Milliseconds	Measured
EcgPqInterval	*	PQ interval	Milliseconds	Measured
EcgStDuration	*	ST segment	Milliseconds	Measured
EcgPrInterval	*	8625-6	Milliseconds	Measured
EcgQrsDuration	*	8633-0	Milliseconds	Measured
EcgQtInterval	*	8634-8	Milliseconds	Measured
EcgQtcFridericia	*	76634-5	Milliseconds	Measured
EcgQtcHodge	*	*	Milliseconds	Measured
EcgQtcBazett	*	76635-2	Milliseconds	Measured
EcgQtcFramingham	*	*	Milliseconds	Measured
EcgQrsAxis	*	*	Degrees	Measured
EcgPAxis	*	*	Degrees	Measured
EcgTAxis	*	*	Degrees	Measured

1.3. Appendix 3 - HL7 Respiratory Muscle Strength Parameter Mappings

* No default mapping - value will not be processed by Connect.

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
MIP	*	60952-9	cmH2O	Measured
MIPPredicted	*	MIP-2	cmH2O	Measured
MIP%Predicted	*	MIP-3	Percentage	Measured
PIP	*	60951-1	cmH2O	Measured
PIPPredicted	*	PIP-2	cmH2O	Measured
PIP%Predicted	*	PIP-3	Percentage	Measured
MEP	*	60949-5	cmH2O	Measured
MEPPredicted	*	MEP-2	cmH2O	Measured

Connect Type	Inbound Mappings (CDC Identifier)	Outbound Mapping (CDC Identifier)	Connect Unit Type	Derived Mapping Type
MEP%Predicted	*	MEP-3	Percentage	Measured
PEP	*	76249-2	cmH2O	Measured
PEPPredicted	*	PEP-2	cmH2O	Measured
PEP%Predicted	*	PEP-3	Percentage	Measured
SNIP	*	SNIP-1	cmH2O	Measured
SNPPredicted	*	SNIP-2	cmH2O	Measured
SNIP%Predicted		SNIP-3	Percentage	Measured
PCF		PCF-1	L/s	Measured



