Introduction

We would like to thank you for purchasing iPRECIO® .

iPRECIO®   allows for accurate intracorporeal administrations
of small-volumes over extended durations.

The iPRECIO® Users Manual will guide in programming and operation of iPRECIO®.

© Primetech Corporation 2007-2014 (July 2014)

***When using iPRECIO® , please follow all appropriate guidelines, processes, and protocols
mandated by the institution at which experimentation is performed***

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

1

Table of contents

About iPRECIO®

The World's First Totally Implantable, Programmable, Precision Micro-Infusion Pump for Small Laboratory Animals

iPRECIO® is the world's first completely implantable, programmable micro-infusion pump system for experimentation in small laboratory animals. The pump has a built-in microprocessor which can be programmed to administer small volumes, in vivo, for extended durations. Additionally, the pump houses a septum designed for percutaneous access, through which filling and exchange of solutions is made possible. The iPRECIO® system's highly precise, in vivo, capabilities uses a patented, high accuracy, mechanical pump technology, the "Rotary Finger Method", which was developed by Primetech.

Benefits of iPRECIO®
- Totally implantable (subcutaneously)
- Refillable percutaneously through a septum
- Programmable (requires Windows XP or 7 (32bit/64bit) and USB port)
- Battery life of up to 6 months (@ continuous 1.0 µL/hr)
- Highly precise delivery (unique peristaltic mechanism, patented Rotary Finger Method)

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com ▶iprecio@primetech.co.jp

Product Components

iPRECIO® Micro-Infusion Pump

5pcs/box

iPRECIO® Management System

- ✪ iPRECIO® Data Communication Device
  - › Data communication Device
  - › USB cable

- ✪ iPRECIO® Management Software Installation CD
- ✪ iPRECIO® Users Manual
- ✪ (2) AAA cell batteries

The Structure of the iPRECIO® Micro-Infusion Pump
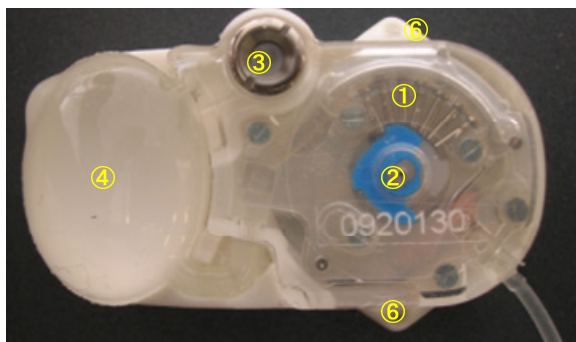
1. Finger pin
2. CAM
3. Septum
4. Reservoir
5. The position of IR device
6. Anchor holes
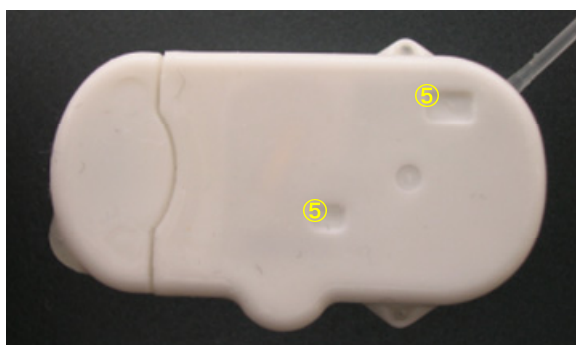
Rotary Finger Function of the iPRECIO® Micro-Infusion Pump

Internally, a micro-motor slowly revolves in a clockwise direction turning the cam with its four projections. In each quarter rotation, a single cam projection sequentially pushes up each of the seven finger pins. This continuous cycle compresses the liquid filled tube, creating a peristaltic like movement of the fluid. As the solution moves through the tube from right to left, it is forced from the reservoir of the pump into the test subject.

Septum

The septum allows for filling and exchange of drug solutions via a needle, at least 50 times with 27G needle.

Reservoir

Drug solution introduced via the septum is held in the 900µl capacity reservoir.

IR I/O Port

The iPRECIO® pump's IR I/O port is enabled magnetically when it is placed on the Data Communication device. The two recessed rectangles indicated in the figure above shows the location of the IR ports. Once the ports are enabled, communications with the pump for downloading/uploading/activation maybe carried out.

Note ▶ *Keep iPRECIO® pumps away from direct sunlight and magnetic fields. Strong lighting conditions may also interrupt IR programming. Keep the darkened cover closed and keep away from strong lighting when programming.*

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

The Structure of the iPRECIO® Data Communication Device

The iPRECIO® Data Communication Device allows communication between the pump and the PC installed with iPRECIO® Management Software, via a USB cable connection. It allows for the downloading of protocol settings, activation of the pump and uploading the built-in record which is stored inside the pump. When connected to the USB port, the PC supplies the power.
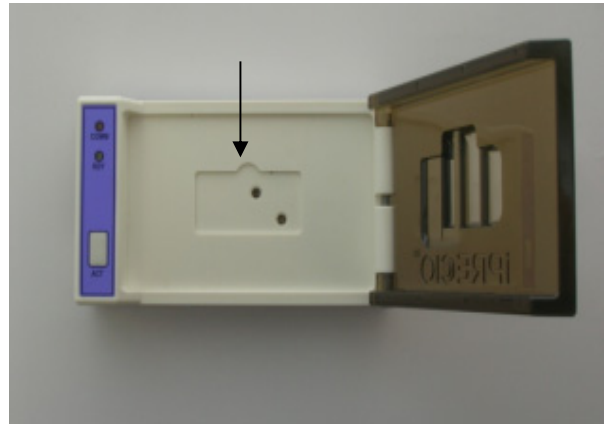
The device may also be used in standalone mode. In this mode, it is only used to activate the iPRECIO® pumps. (Refer to page 44). A PC is not required and it is battery powered. The pump must be set in the right orientation and position for activation.

The pump may be programmed in its blister pack or directly on the Data Communication Device. Orientation and position of the pump must align with the IR devices on the pump with ones on this device. The reference mark indicates the position of refilling port with stainless steel cap of the pump in the recessed rectangle.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
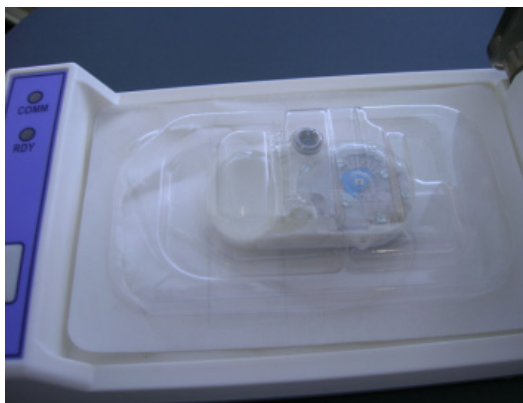
☑ Checklist for Precautions

- ☐ iPRECIO® is intended for use in Laboratory Animal Research ONLY. iPRECIO® is **NOT** for humans use, animals used for food, and food products.
- ☐ When using iPRECIO® , always follow established guidelines set by the institution at which animal experimentation is being conducted.
- ☐ For compatibility/incompatibility of solvents/vehicles and drugs, refer to the Compatibility Test Chapter within this manual.
- ☐ Please read the entire manual before using iPRECIO®.
- ☐ It is also recommended to review the FAQ and Technical Note 3: SOPs for flow validation of iPRECIO® pumps which are provided separately.

- ☐ **DO NOT** attempt to disassemble or alter the product.
- ☐ **DO NOT** store the product: where there is risk of fire, near organic solvents, where there is risk of extreme temperature variation (i.e. direct sunlight, freezing conditions, etc.).
- ☐ **DO NOT** use autoclave or EOG sterilization with high temperature, compression, or decompression.
- ☐ **DO NOT** use solutions such as phenols, alcohols, iodophor, or hypochlorite, as this may damage the silicon coating of the pump.
- ☐ **DO NOT** use iPRECIO® pumps near strong magnetic fields as it will activate the IR circuitry of the pump and it will also affect the performance of the pump.
- ☐ **DO NOT** forget to remove the pump from the iPRECIO® data communication device after programming and/or activation. If you do not remove it, you may drain all the power from the IR circuitry and you may not be able to download/upload or activate any more.
- ☐ **Do NOT** use IR remote controllers for electrical appliances near iPRECIO® pumps as it may affect the downloading/uploading/activation process.
- ☐ **DO NOT** unplug the USB cable during or after placement of the pump onto the communication device, as this may reset the factory set pump ID and Cal. Factor. It may also activate a programmed pump.

iPRECIO® Workflow

You should begin implementation of the iPRECIO® according to the following work flow.

1. Installing the iPRECIO® Management System
Install the iPRECIO® Management Software that is required for the iPRECIO® Management System, and the USB device driver of the iPRECIO® Data Communication Device, onto a PC.

Startup
Preparing to use the Management System

User Registration
Certify the system by setting a study director and management software user(s) upon initial setup of the software.

USB Interface Arrangement
Set a connection between the data communications device and the software. This step is necessary for the initial connection, as well as when a USB connection port is changed.

Software Customize
Customize the Infusion Protocol Setup header screen's pull-menus: Section Name, Animal Species, Animal Strain, and Administration Route by addition or deletion of the default pull-down menu options.

2. Starting a new study protocol
Using management software, set the protocol for each new study and download it to an iPRECIO® Micro-infusion Pump.

Input general information about the study
(study name, animal species, compound name, etc).

Select and Set the Infusion/Flow Rate mode
Select a group and the corresponding Infusion and Flow Rate modes. Two types of settings may be selected in both the Infusion mode and the Flow Rate mode, creating four possible administration protocols: **Instant/Constant**, **Instant/Variable, Post Recovery/Constant**, and **Post Recovery/Variable**. According to the Infusion/Flow Rate mode selected, the dosage and the duration of administration to each animal must be set in detail.

Pump Recognition
Pump recognition is performed for each animal pump and is confirmed by identification of each pump's unique ID.

3. Downloading the Pump
Each pump's administration protocol is downloaded into each pump.

4. Preoperative preparation
The pump must be programmed with the desired protocol before implanting it. You must also fill and activate the pump before implantation.

Filling the reservoir
Fill the pump reservoir with the desired solution(s) and volume to be administered.

Pump Activation
Set the programmed pump to the pre-driving state.

5. Implantation
After filling and activating the pump, implantation may be performed.

6. Status Management
The management software will predict the administration schedule based on the programmed protocol and will suggest when the pump needs refilling.

Refilling the pump
For a pump implanted in an animal, you refill the solution percutaneously according to the programmed protocol. After refilling, input a date/time and volume used into the management software for tracking in the device log.

Uploading data
When the study is complete, upload the pump's data recording to the management software and evaluate the pump's operation.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Product Warranty

Primetech Corporation ("Primetech") warrants to the customer of iPrecio™ products (including the iPRECIO™Micro Infusion Pump and the iPRECIO™ Management System and related products) that, for the warranty periods set forth below, the iPrecio™ products that Primetech and its authorized distributors have sold to the customer shall be free from defects in materials and workmanship. Primetech does not warrant that its products will meet the customer's requirements or will operate in the combinations (including with products not supplied by Primetech) which may be selected for use by the customer.

Customer's sole and exclusive remedy under the foregoing limited warranty is that Primetech will repair or replace, at the Primetech's option, any iPrecio™ product which is defective in materials or workmanship during the warranty periods set forth below at no cost to the customer, so long as such defect is not caused in transit or by customer's negligence, alteration, operation contrary to instructions, misuse, abuse, or parts or accessories not supplied by Primetech. Any defective product must be returned to Primetech for repair or replacement, transportation prepaid, and must be accompanied by a returned equipment declaration with RMA number supplied by Primetech.

This warranty shall be effective as follows: for the iPrecio™ micro-infusion pump, from the date the product is manufactured and, for the iPrecio™ management system, from the date the product is shipped, and shall continue for:
- A. 12 months for   iPrecio™ micro infusion pump
- B. 12 months for iPrecio™ management system
- C. Notwithstanding the foregoing, if an iPrecio™ micro infusion pump is implanted into an animal by or before the end of the twelve (12) month period as set forth above, then the warranty for such product shall be effective for the longer of: (i) twelve (12) months from the date the product is manufactured,or (ii)the operating life of the product based on the flow rate up to a maximum of six (6) months from the date the product is implanted in the animal.

The foregoing limited warranty is in lieu of all other warranties, express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Limitation of Liability

Primetech's liability for damages to the customers of   iPrecio™ products for any cause whatsoever, regardless of the form of action, whether in contract or tort, including negligence, shall be limited to the amount the customer paid for the product or products directly related to or which are the subject matter of the claim for damages.   In no event shall Primetech be liable for any loss or damage resulting in lost profits, or other consequential, incidental, special or indirect damages of its customers of iPrecio™ products, even if Primetech has been advised of the possibility of such damages, or for any claim against its customers of iPrecio™ products by any other party.   This warranty is null, void, and of no effect if the customer, its agents or employees, or any third party, uses the warranted iPrecio™ product for a use other than the intended use of that product, which is for use in animals.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com　▶iprecio@primetech.co.jp

iPRECIO® Startup Guide

Contents

This document describes the preparation to use iPRECIO® .

Requirements

- iPRECIO® Management Software Installation CD
- iPRECIO® Data Communication Device
- Work Station for management software (minimum requirements; *Windows XP or Windows 7 (32bit/64bit), 512MB of RAM, A hard drive with approximately 10MB of hard drive storage to install the software, 1024×768pixels 16 bit, CD-ROM drive, USB port*）

Note ▶ ***Turn OFF the screen-saver functions and select the power schemes "Always ON" at power Options Properties in Control Panel to avoid the management software crash.***

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com ▶iprecio@primetech.co.jp

Installing the iPRECIO® Management System

The USB device driver of the iPRECIO® Data Communication Device should be installed prior to installing Management Software. See <Step by step guide for iPRECIO® driver installation> on page 73 for <**How to install USB Driver for XP**> and page 87 for <**How to install USB Driver for Windows 7**> for further details**.**
Next, Install the iPRECIO® Management Software.

The installation of the iPRECIO® Management Software

Note
- *Ensure you have the authorization to install software and drivers on your PC. (User with Administrator Rights and Privileges is required)*
- *Ensure that correct USB drivers have been installed prior to software installation.*
- *If currently using an older version of iPRECIO® on the same PC, ensure that the< ipf> files are only used with the respective versions.*

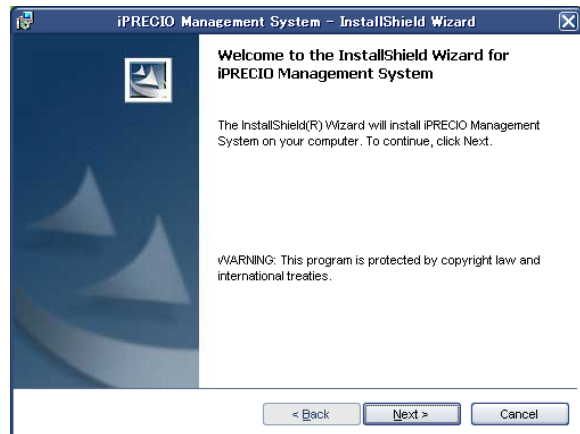Step *Files and folders in iPRECIO Installation CD*

1. Turn on the computer.
2. Put the iPRECIO® management software installation CD in the CD-ROM drive.
3. Open the CD-ROM Drive.
4. Double-click the Setup icon **<FirstStep>**. Agree to continue if required.
5. iPRECIO® Management System Setup program gets started, Click **Install**.

Software installator will automatically select the correct software and driver for Operating System.

📁 DISK1
📁 DISK2
📁 DISK3
📁 DISK4
📁 Documents for Returns
📁 Driver
📁 iPRECIO Workflow Examples
📁 Technical Notes
📁 User Manual – FAQ
🔧 AUTORUN.INF
🔵 FirstStep.exe
📄 Readme (for Serial Number information).txt

iPRECIO Management System Setup

Micro Infusion Pump

iPRECIO

- Driver Install
- Install
- Update
- Advanced Version
- Update(Advanced Version)
- Exit

iPRECIO™
Management System

Made in Japan

www.iprecio.com
For Support, please contact +81-3-6826-3737 or email iprecio@primetech.co.jp

CAUTION
The iPRECIO™ Management System use for Laboratory Animals ONLY. Do not use it in human.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

6. An installation screen of the management software is displayed; click **Next**.

7. The License agreement screen is displayed, Version **1.3 rev 531 for XP** and **7** (32bit/64bit). Upon agreement, select **I accept the terms in the license agreement**; click **Next**.
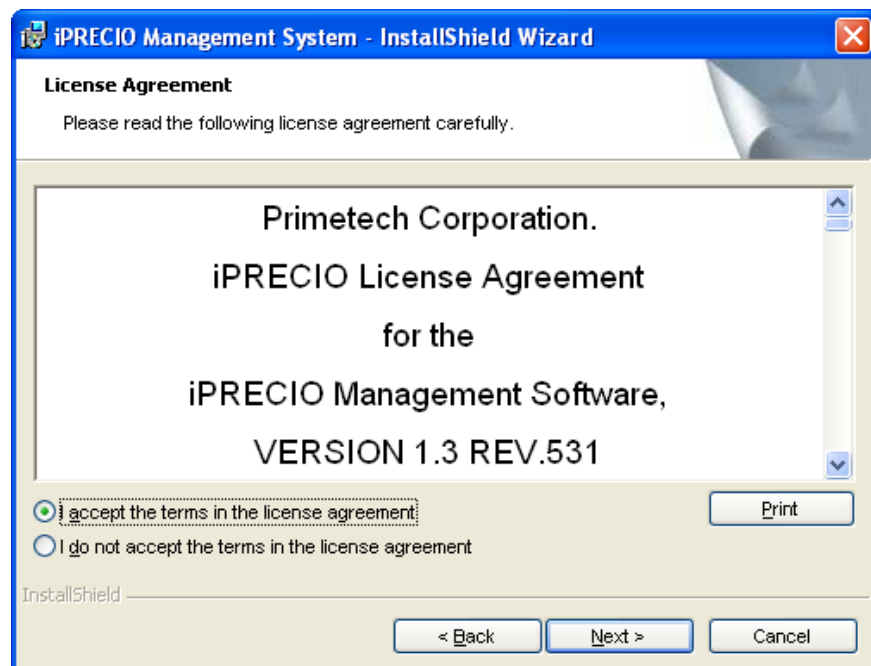
8. A customer information screen is displayed. See next page for information screen. Input User Name, Organization and **Serial Number** issued by Primetech.
9. The Serial Number should start with IMSV13R531XXX where XXX is a unique number; click **Next**.
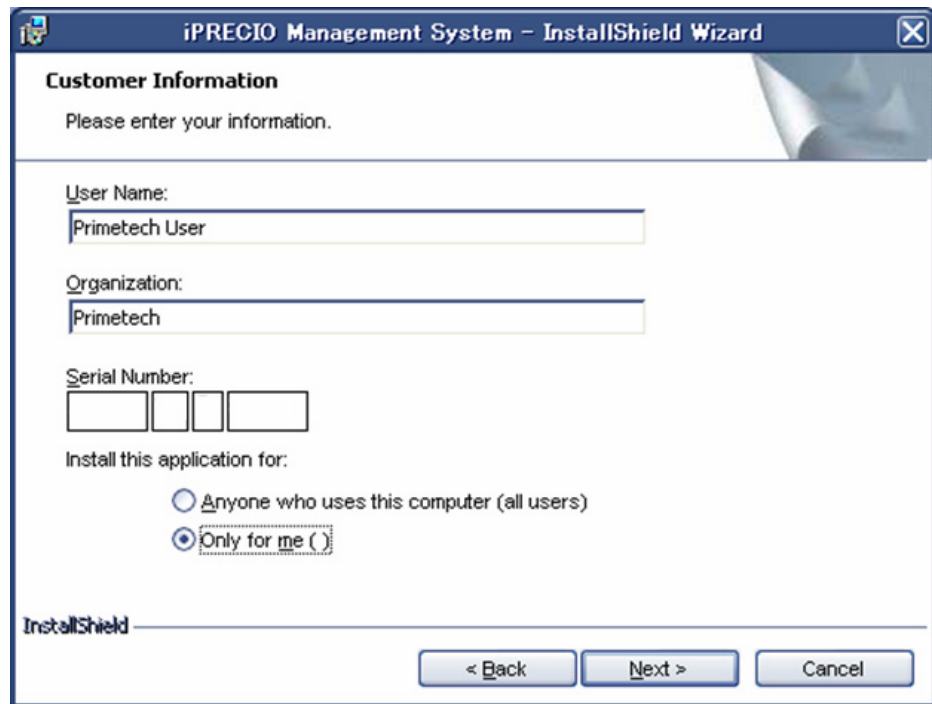
10. Select a folder for the installation of the management software; click **Next**. If you wish to change the previously selected folder, click **Change ...** and choose an appropriate folder.
11. The **Ready to Install the Program** screen is displayed; click **Install**.
12. An installation completion screen is displayed; click **Finish** to complete installation.
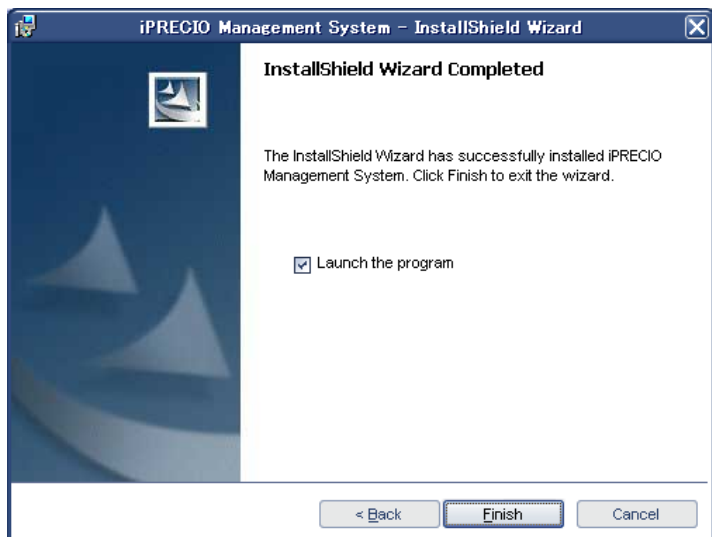
Note *Upon completion of initial software set-up and user registration, iPRECIO ® Management software will automatically detect the installed USB Communication Device.*

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com ▶iprecio@primetech.co.jp

15

Software Set-up

Logging on to the iPRECIO® management software

Logging on to the management software requires registration of the user account.

There are two kinds of user accounts;
› **Director account** is an optional account for study directors having all authority to operate the management software. If this account is registered, you can restrict access to the management software.
› **Operator account** is an essential account for the management software operators set individually by a specific user name and a password. This account is used to start new study.

Registering a new user account and setting the USB connection

Step
1. Select Programs> iPRECIO® Management System from the windows OS Start menu.
2. Log on to the management software. at first time, User Registration window is displays.
3. Input **Institution Name**, **Department Name**. If you want, input Director's **Name**, **Login ID**, and **Password**.

Memo | **Access restriction of the management software**
When you registered a director's account, you can restrict access to the management software.

User Registration		
	User Registration	
Institution Name (*)	Primetech Corporation	
Department Name (*)	Infusion Group	
(*) Required field		
Director's Name, Login ID, and Password are required only if you would like to have controlled access to the software. Otherwise, please leave the fields blank.		
Input a Director's name, ID, and password		
Name	Administrator	
Login ID	Admin	
New Password	****	
Confirmation	****	
Reg.		Cancel

4. Click **Reg.**, and the Operator Registration window is displayed.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

5. Input an operator name and password and click **Reg.**. The operator account can register a maximum of ten accounts. When deleting an operator account, click **Delete** to the left of the inputted operator list. <Operator Registration> window shown on the next page.
6. Click **OK**.

Key *Please register an operator name more than one. When none of the operators is registered, you cannot start study.*

Memo For security reasons, a director account should be created as well as operator accounts for each person who may be using the Management Software. After director creates the account, you can log on with operator privileges.

7. Upon completion of the registration of operator after first installation, <iPRECIO Management System> window opens to setup communication port automatically.
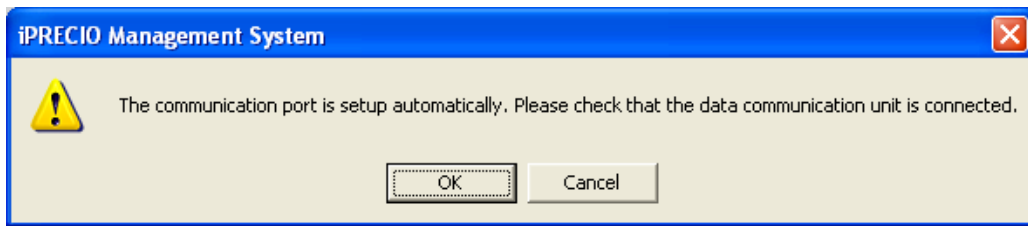
8. Click **OK** if the driver installation were completed successfully prior to iPRECIO® software installation, set-up will be completed automatically.

Memo *If the driver installation were completed successfully prior to iPRECIO® software installation, the software will automatically indicate that <USB COM> OK with green lamp.*

9. The above Window shows a successful installation with USB communication device connected. Set-up status for both **User Registration** and the **USB Interface Configuration** boxes are checked indicating correct installation, and the USB COM displays **OK** indicating that the software is communicating correctly with hardware device. The color green is also shown. (green circle)

Registering a new operator account

Note ▸ *You must be logged on as a director's account in order to complete this procedure.*

Step ▸ 1. Select **Operator** from the **Registration** menu.
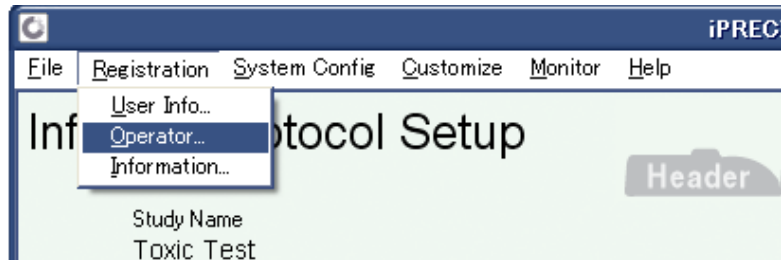
2. The **Operator Registration** window is displayed.

3. Input an operator name and password and click **Reg.**. The operator account can register a maximum of ten accounts. When deleting an operator account, click **Delete** to the left of the operator list.
4. Click **OK**.

Note ▸ *To log on thereafter with access restriction, log on by an account name and password of a director account or operator account that has already been set. If preset login ID and password are forgotten, reinstallation of the management software is necessary.*

PRIMETECH CORP. Tokyo, Japan
▸www.iprecio.com   ▸iprecio@primetech.co.jp

Confirmation of registered information

Step   1.   Select **Information** in the **Registration** menu.

2.   The **Registration Information** window is displayed.

3.   Verify registration contents; click **OK**.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Changing the director account

Step 1. Select **User Info...** in the **Registration** menu.

2. The **User Registration** window is displayed.

3. Change the registration contents; click **Reg.**.

Changing the USB connection

Step 1. Ensure that the Data communication device and the management software installed PC are connected with a USB cable.
2. Click the **System Config** menu.
3. Click the **I/O (USB) Setup…**, and then open the **USB Interface Arrangement** window.
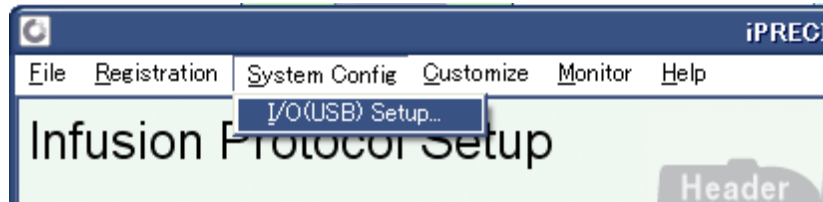
4. Click the **Setting method** pull-down and choose **Auto** or **Manual**.
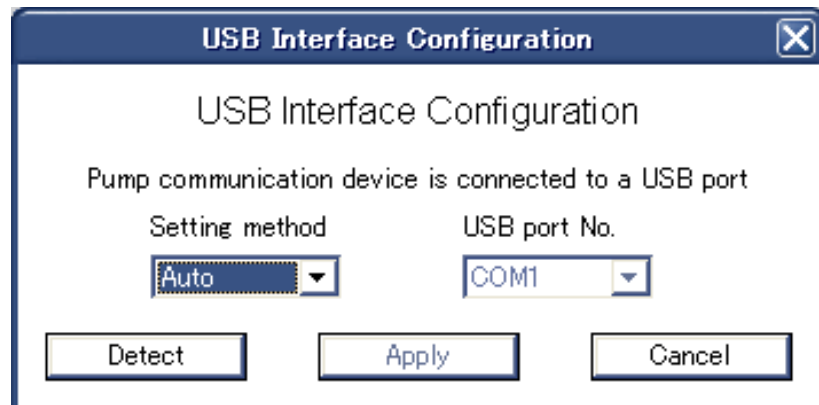
➢ **Auto**: Detect the USB port to which the USB communication device is automatically connected when you click **Detect**.

➢ **Manual**: Select an appropriate USB port from the **USB port No.** pull-down menu.   When you cannot automatically detect a USB port, you should select a USB port No. manually or select an appropriate USB port by selecting a free COM port from the Windows Control Panel >system >hardware >device manager >port.

5. Click **Apply**.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Customizing the software

Customization of pull-down menu items and selection of the standard unit to use in **Infusion Protocol Setup**.

New Registration pull-down menu

Step ▶

1. Click the **Customize** menu, and select **New Registration**.

2. The **List of Pull Down Menu** window is displayed.
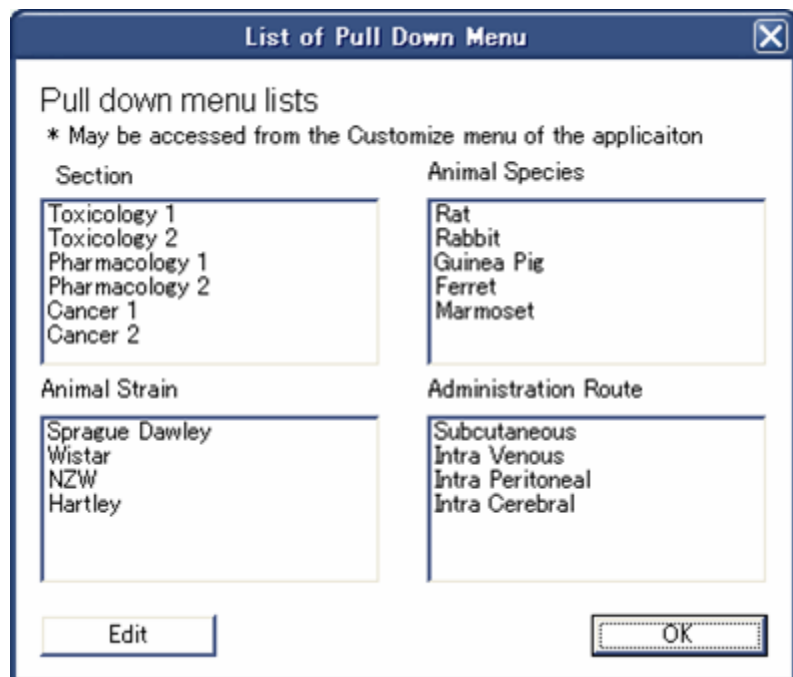
3. Click **Edit**, the Customization for Pull Down Menu window is displayed.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com　　▶iprecio@primetech.co.jp

1. Select the menu name of the list you want to add to from among the **Registration of a list** pull-down menu options and input the word that you want to add into the **Add PullDown Item** box.
2. Click **Add**; the input word is added to the **Pull Down List of Menu** box.
3. Click **Next**.
4. Confirm the additions on the **List of Pull Down Menu** window; click **OK**.

Choosing the standard unit

The preferred units of Time, Flow Rate, and Dose may be chosen. These units will then be applied in automatic calculation units during the Infusion/Flow Rate mode setting.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Setting of the Infusion and Flow Rate Modes

Infusion Mode allows for either an <u>Instant</u> on mode or a <u>Post Recovery</u> infusion mode to be selected. **Flow Rate Mode** allows either a fixed <u>Constant Flow Rate</u> or a <u>Variable Flow Rate</u> where several Flow Rate Steps (and durations) to be programmed. Details are described in the tables below.

Infusion Mode	
After activation and once the pre-drive state is complete (3hr-3min):	
Instant	The pump starts administration **instantly**.
Post Recovery (RCV Setup)	The pump starts the administration of a specified solution at a constant rate during animal convalescence, post-surgery, and keeps the infusion line open.

Flow Rate Mode	
Constant	The pump administers a fixed constant solution discharge for the infusion duration..
Variable	The pump administers according to several programmed flow rate steps, their start times and durations. Up to 10 flow-steps maybe programmed.

In total, there are four different combinations for administration protocol when programming the Infusion Mode/Flow Rate Mode:

Selectable protocols of iPRECIO®		Flow Rate mode	
		Constant	Variable
Infusion mode	Instant	***Protocol 1:*** **Instant/Constant**	***Protocol 2:*** **Instant/Variable**
	Post Recovery (RCV Setup)	***Protocol 3:*** **Post Recovery/Constant**	***Protocol 4:*** **Post Recovery/Variable**

Protocol 1: Instant/Constant

After activation of the pump and completion of the pre-driving state, an immediate and constant discharge of solution begins according to the pre-programmed protocol.

Protocol 2: Instant/Variable

After activation of the pump and completion of the pre-driving state, an immediate and variable discharge of solution begins according to the pre-programmed protocol.

Protocol 3: Post Recovery/Constant

After activation of the pump and completion of the pre-driving state, a constant discharge of solution begins during the post-operative recovery period according to its pre-programmed protocol. At the end of the post-operative recovery period, the pump may be refilled with a separate solution for a **constant** infusion rate according to its pre-programmed protocol.

Protocol 4: Post Recovery/Variable

After activation of the pump and completion of the pre-driving state, a constant discharge of solution begins during the post-operative recovery period according to its pre-programmed protocol. At the end of the post-operative recovery period, the pump may be refilled with a separate solution for **variable** infusion rates according to its pre-programmed protocol.

iPRECIO® Infusion Protocol Setup Guide

Instant/Constant mode

This protocol is a combination of the **Instant** Infusion mode and the **Constant** Flow Rate mode. After activation of the pump and completion of the pre-driving state, an immediate and constant discharge of solution begins according to the pre-programmed protocol.

Post Recovery(RCV Setup)/Variable mode

This protocol is a combination of the Post Recovery Infusion mode and the Variable Flow Rate mode. After activation of the pump and completion of the pre-driving state, a constant discharge of solution begins during the post-operative recovery period according to its pre-programmed protocol. At the end of the post-operative recovery period, the pump may be refilled with a separate solution for **variable** infusion rates according to its pre-programmed protocol.
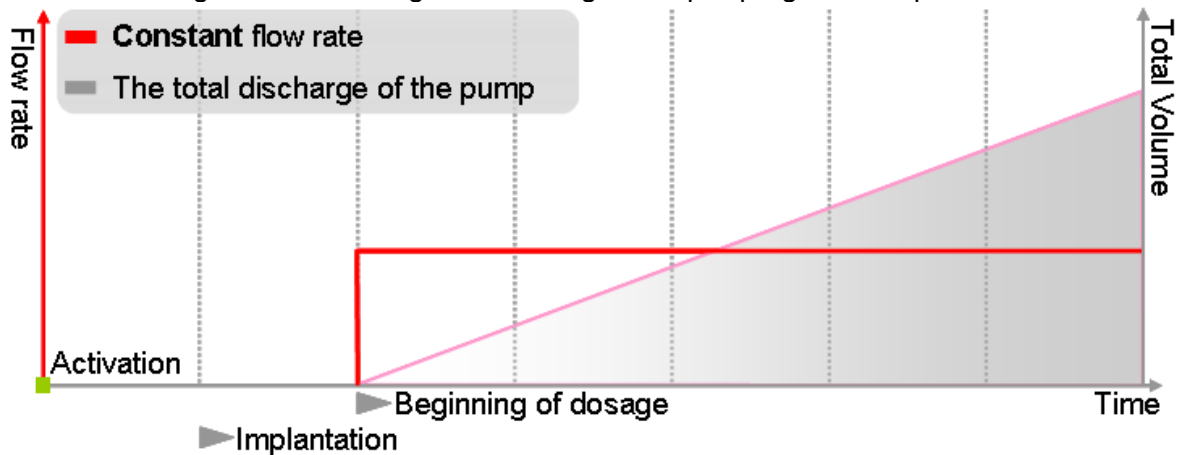
PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com ▶iprecio@primetech.co.jp
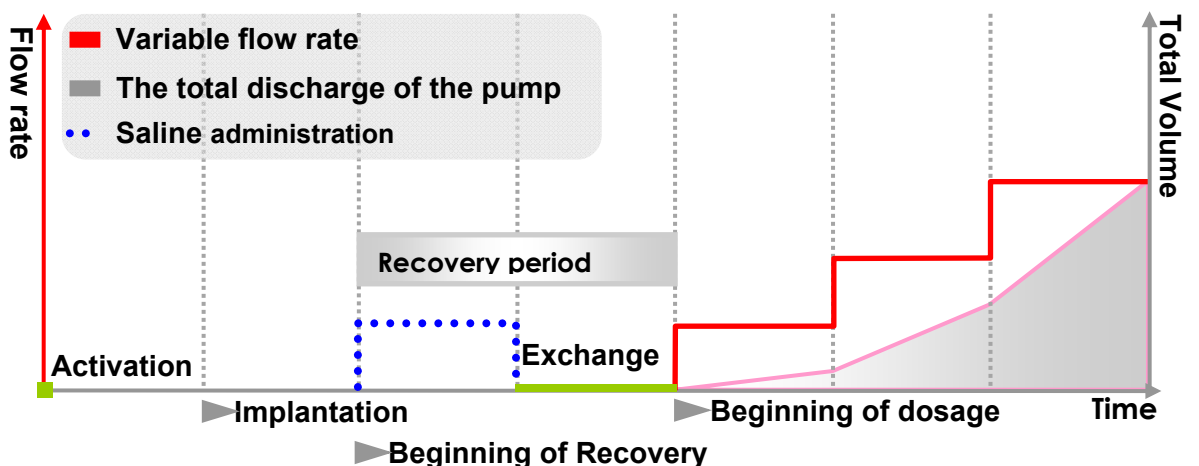
Saving and Loading infusion protocol settings

Saving a protocol settings

Step
1. Click **File** menu.
2. When over writing a protocol settings file, select **Save**. When saving with a file name, select **Save As...**.
3. Select the folder and drive in which to save the file. The file extension is **.ipf**.

Loading and Closing the protocol settings

Step
1. Click **File** menu.
2. When opening a saved setting protocol, click **Open** and select an .ipf file. When closing a current protocol, click **Close** and select **Yes** or **No** at the **save dialog** window.

Note
When closing an Unsaved file or modified file, Save Caution dialog is displayed. Users should save with the same infusion protocol name and accept to overwrite the old file as it logs information relating to Refilling, Action Management and other important parameters.
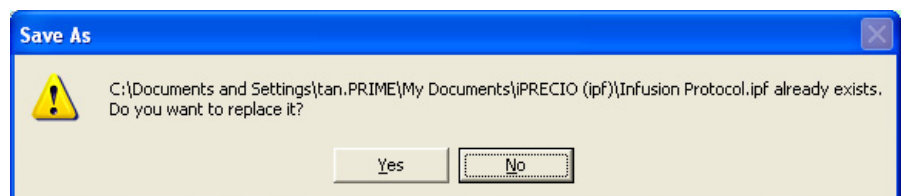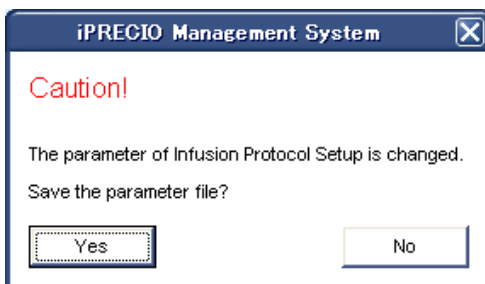
Printing/Exporting the schedule list

Step
1. Click **File** menu, and select **Print or Export (csv format file)…**.
2. Print/Export the schedule list. Schedule list will contain all information relating the protocol. (including Upload data, Refill and Exchange Schedule once they are logged and may serve as a final report for the infusion protocol).

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Prior to starting a new study

Step

1. Connect the Data communication device to the management PC with a USB cable.
2. Run the management software.
3. Check the dialogue and click **OK**.
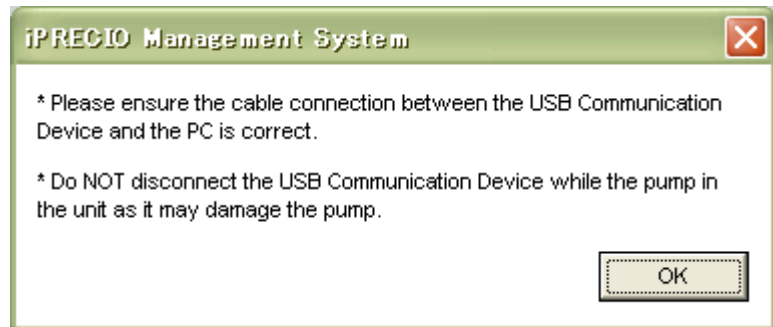
4. Ensure that the boxes of User Registration and USB Interface Configuration are checked.

5. Ensure that the **USB COM** displays **OK**.

Starting a new study

☐   Did you complete the "Setup Status" and "Customize of the software" already?
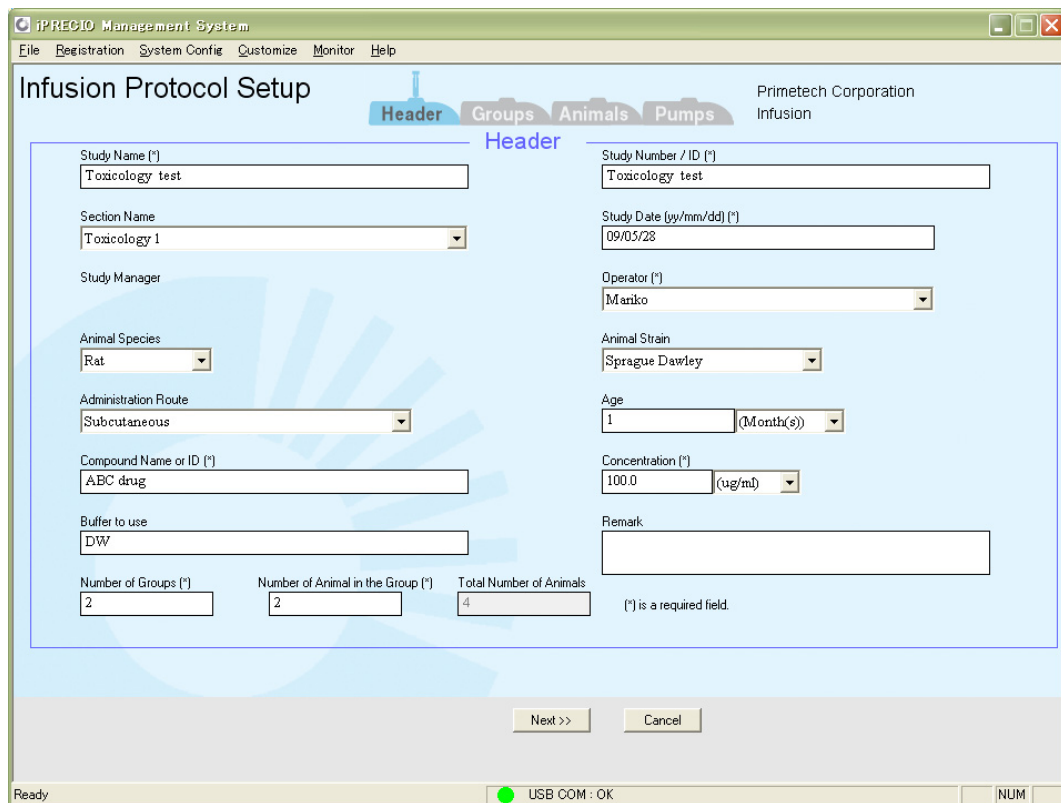
For Satisfactory Performance of the iPRECIO® Micro-Infusion Pump

☐   Did you consider the need for "Low Flow Infusion SOP" for satisfactory pump infusion accuracy?(Refer to page 41)

Header Step; *General information about the study*

Input the header information for the study.

Step

1.   Run the management software.
2.   Click **File** menu, and select **New**, Header screen is displayed.

3.   Type in each field or select by pull-down menu. (asterisk fields are required.)

Memo   Maximum of 20 groups may be assigned to the Number of Groups box. Maximum number of 20 animals may be assigned to the Number of Animal in the Group.

4.   Click **Next**.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Groups Step; *Animal Group Settings*

The Infusion mode, Flow Rate mode, and Dose or Flow Rate in each animal group must be set.

At the **Groups** screen, a **Group Number/ID** setting list is displayed depending on the number of groups input in the Header Step.

Step 1. Type in the fields of **Concentration** and **Estimated Max/Min Animal Weight**.(The default value of concentration is that you set on the Header Step. However you can change it here.)
2. Type **Group Number/ID**, and select **Infusion Mode** and **Flow Rate Mode** by pull-down menu.
3. Check either **Dose** or **Flow Rate** which you will use to set the infused volume.
4. Type Dose or Flow Rate if you select Constant Mode.
5. Click **Next**.

Memo **Copy of the Group list**
When you make multiple group lists, you can copy the group list information (group name, Infusion/Flow Rate mode, Dose and Flow Rate) from top down with **C** button (Consecutive number is added to the end of the Group name automatically.)

Memo **About Dose and Flow Rate in iPRECIO®**
➢ **Dose:** defined as the weight (mg, μg) of the compound divided by animal body weight (kg) and unit of time (hr, day). It is expressed in weight of the compound / kg body weight / unit time. Dose is then calculated into flow-rates
➢ **Flow Rate:** Regardless of the concentration of solution to be administered, the Flow Rate is defined as the amount of discharge (μl) from a pump divided by the unit of time administered. It is expressed as pump discharge / unit time.

Key **When programming in dose**, the best practice is to start your infusion protocol programming with the highest initial weight animal. This would then allow the program to calculate maximum duration possible for all animals for that infusion protocol. Battery life would depend on infusion protocol and <u>animal weight.</u>

Animals Step; *Advanced Settings of the Infusion/Flow Rate mode*

Data must be input on each animal, including weight, sex, a detailed setting of the Infusion, and Flow Rate modes followed by the animal's pump recognition.

Step

1. Select a **Group Number / ID** from the pull-down menu.
2. Type the **Animal ID**, **Weight (g)** and select the **Sex** of the animals.
3. Click **Set** to input the details of the protocol.

Note

When inputting the Start Date/Time of the administration, take into consideration the time required to implant the pump into the subject animal. In particular, when using multiple pumps simultaneously, the Start Date/Time should be set to allow for the time needed to implant each pump.

<If Instant Mode is selected>

1. Type **Start Date/Time** of the administration and click **Next**.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

<If Post Recovery Mode (RCV Set-up) is selected>
1. Type **Start Date/Time** of the administration

*Input the yellow field of **Dead Volume Setup**.*
2. Type the length of outlet tubing of the pump in the **Remain Tube Length** box.
3. Input the value required to calculate the dead volume of the additionally connected tubing.

> ➢ If the dead volume of additional tubing is known, check **Measurement value** and type the volume of the additional catheter in **Actual Dead Volume**.
> ➢ If the dead volume of additional tubing is unknown, check **Calculated value** and type in **Inside Diameter** and **Length** of the tubing. **Do not exceed Total Dead Vol. of 59.650μl**

4. Type Flow Rate of flushing in **Flushing rate of Dead Volume**.

*Input in the green field of **RCV Setup**.*
5. Type **Start Date/Time** of the Recovery duration and the **Flow Rate**.
6. Click **Next.**

Administration start date and time must be after the RCV Start time.

Memo **About dead volume in Post Recovery mode**
   The dead volume in the Post Recovery mode is the total of the tube volume of inner tubing (**Fundamental Dead Volume**) and the outlet tube volume outside of the pump. In the Post Recovery mode, it is necessary for the exchanged solution in the reservoir to reach the outlet tube tip at the start time of the administration. Therefore, in order to achieve a correct solution exchange schedule, a correct dead volume must be input. **Do not exceed Total Dead Vol. of 59.650μl**

   Due to the design of pump and the slight variability of the extraction and refilling procedure by different users, it is possible for the drug solution to reach the end of the catheter earlier or later than the expected start the administration time. (A lower dead volume or higher dead volume than expected) If the correct dead volume for additional catheter is correct, the maximum difference of dead volume is 5.7uL.

Memo **Adjust the Scheduled Exchange Date/Time**
   Scheduled Exchange Date/Time is calculated automatically based on start of administration, calculated dead volume, and flushing setup. If it was calculated to have an undesirable exchange date and time e.g. midnight, you can adjust the exchange time by changing the **Flushing rate of Dead Volume** (30μl/h default).

<If Constant Mode is selected>

1. Select Time Unit and type Duration of the administration.

2. Check Start Date/Time and End Date/Time, then click Next.

Note Duration cannot exceed Max Duration (battery life).

Constant Flow Mode

Constant Flow Mode

Animal ID	a1
Animal Weight	300(g)
Dose	1.00(ug/kg/hr)
Flow Rate	3.0(ul/hr)
Time Unit	(Day(s))
Max Duration	82.2(Day(s))
Duration	45.0
Start Date / Time	09/06/04 14:00
End Date / Time	09/07/19 14:00

Enter << Back Cancel

<If Variable Mode is selected>

1. Select **Time Unit.**

2. Type **Flow Rate** of each Step in the left most column and the **Duration** in the second column from the left. (If Dose was selected on Groups Step, type Dose in the leftmost columns.)

Memo

If you plan to use repeat mode, it is recommended to fill out Flow Rate and Duration for the all the required steps first before checking Repeat ON. This will allow you to verify all the start and stop times in the Date/Time for all flow-rates steps. After checking Repeat ON, not all data here are displayed. See Variable Flow Mode Table on the next page where not all fields are readable. See also <Memo> on pg. 35.

Variable Flow Mode

Variable Flow Mode

Animal ID b1   Weight   300(g)

Unit   Flow Rate(ul/hr)   Time Unit (Day(s))

Infusion Range
1.0 ~
30.0(ul/hr)

	Flow Rate	Duration (Day(s))	Program No.	Times(n)	Start	End
Step1	30.0	0.5			09/07/28 18:00	09/07/29 06:00
Step2	1.0	2.0			09/07/29 06:00	09/07/31 06:00
Step3	25.0	0.5			09/07/31 06:00	09/07/31 18:00
Step4	1.0	2.0			09/07/31 18:00	09/08/02 18:00
Step5	20.0	0.5			09/08/02 18:00	09/08/03 06:00
Step6	3.0	3.0			09/08/03 06:00	09/08/06 06:00
Step7	0.0	0.0				
Step8	0.0	0.0				
Step9	0.0	0.0				
Step10	0.0	0.0				

Remaining Battery life   128.7(Day(s))

<< Back   Enter   Cancel

Memo
- The allowed range of Flow Rate/Dose is displayed in red under the infusion Range column title.
- Up to 10 Flow Rate steps are programmable.
- In repeat mode, the 10 Flow Rate steps are programmable in one or several repeat cycle modes. (5 loops maximum, each loop repeated up to 250 times)

The next section concerns the use of Repeat Mode. You may skip points 3, 4 and 5 if you do not require Repeat Mode.

3. Check **Repeat ON**.
4. Type in **Program No.** column all the flow steps you want to have in the same loop. All the Steps with the same Program Number will be consecutively followed and then repeated.
5. Type the number of times the **Program No.** Loop should be repeated in the first line or row of the repeat loop in column 4 titled "**Times(n)**". It should contain the number of times that program loop should be repeated. See example on next page. Each repeat loop may be repeated 250* times.
*subject to battery life

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

	Infusion Range 1.0 ~ 30.0(ul/hr)	Duration (Day(s))	Program No.	Times(n)	Date/Time Start	End	
Step1	30.0	0.5	1	2	09/07/28 18:00	--/--/-- --:--	Program 1 with step 1 and 2
Step2	1.0	2.0	1	---	--/--/-- --:--	09/08/02 18:00	
Step3	25.0	0.5	2	3	09/08/02 18:00	--/--/-- --:--	Program 2 with step 3 and 4
Step4	1.0	2.0	2	---	--/--/-- --:--	09/08/10 06:00	
Step5	20.0	0.5	3	2	09/08/10 06:00	--/--/-- --:--	Program 3 with step 5 and 6
Step6	3.0	3.0	3	---	--/--/-- --:--	09/08/17 06:00	
Step7	0.0	0.0					
Step8	0.0	0.0					
Step9	0.0	0.0					
Step10	0.0	0.0					

Maximum duration for final step in infusion protocol   78.5(Day(s))

The table from the previous page is reproduced above with repeat. This example of Variable Flow Mode Table contains 3 Program No.'s which represent 3 Repeat loops. Each Program No. (Repeat Loop) then contains 2 flow steps. Therefore Program 1 contains Step1 and Step2. For both these two steps, Program No. is shown as 1 and on the first row or the Step1 row, Times(n) is shown as 2. The second row does not have Times(n) filled as it is part of the first. Also, it only shows the Start Date and Time and the End Date and Time for that Program No.

In summary, the first repeated loop includes Step 1 & 2 and is repeated twice. The second repeated loop includes Step 3 & 4 and is repeated 3 times. The third repeated loop includes Step 5&6 and is repeated twice. Therefore this protocol proceeds in the order as follows:

Step1-Step2-Step1-Step2

Step3-Step4-Step3-Step4-Step3-Step4

Step5-Step6-Step5-Step6

Memo   Our current recommendation is to fill out flow Rate and Duration for all the required steps first before checking repeat ON. After selecting <Repeat On> and if there is more than one repeat program loop, set-up the different program loops according to chronological order (also include number of times the program loop(s) need to be repeated). If these steps are followed in sequence and chronologically, the battery life calculations given by software would allow the protocol to be adjusted to the maximum duration for the last step in the infusion protocol.

When <Repeat On> is not used, remaining battery life is indicated and not maximum duration for the last step as in when <Repeat On> is used.

PRIMETECH CORP. Tokyo, Japan
►www.iprecio.com   ►iprecio@primetech.co.jp

A separate pump is identified or "recognized" for each individual animal.

Key
- ♦ ***DO NOT unplug the USB cable during or after placement of the pump onto the communication device, as this may reset the factory set pump ID and Cal. Factor.***
- ♦ ***DO NOT press ACT button on the Data Communication Device during the Data Communication Device is plugged to PC.***
- ♦ ***Please avoid static electricity to the pump.***
- ♦ ***DO NOT conduct communication between the pump and the Data Communication Device under intensive light like sunlight.***
- ♦ ***DO NOT use some remote apparatus within 10cm radius of the pump.***

Step
1. Place the pump or blister packed pump on the Data Communication Device and click Detect.

							Administration					
	Copy	Animals										
	Edit	Animal ID	Weight(g)	Sex	Mode	Start Date / Time	End Date / Time	Pump Detection	Pump ID	Cal. Factor	Status	
1	E C	b1	300	- ▼	Set	09/06/06 00:00	09/06/25 12:00	Detect	#######	1000	Mode Set	
2	E C	b2	300	- ▼	Set	09/06/06 00:00	09/06/25 12:00	Detect	#######	1000	Mode Set	

2. Click **Detect** in Pump Recognition Window and get the **PUMP ID** and **Default Cal. Factor** recognized automatically.
3. Click **Enter**.

Pump Recognition

Pump Recognition

Please set pump on communication device.

Pump ID (SER No.) [   ]

Default Cal. Factor [1000]

[Enter]

[Detect] [Validation] [Cancel]

Group Number / ID	Number of Animal in the Group	Infusion Mode	Flow Rate Mode	Calculated Min Dose
Group 1 ▼	2	Instant	Constant	0.33(ug/kg/hr)

							Administration					
	Copy	Animals										
	Edit	Animal ID	Weight(g)	Sex	Mode	Start Date / Time	End Date / Time	Pump Detection	Pump ID	Cal. Factor	Status	
1	E C	a1	300	- ▼	Set	09/06/04 14:00	09/07/19 14:00	Detect	0920138-1	1153	Recognized	
2	E C	a2	300	- ▼	Set	09/06/04 14:00	09/07/19 14:00	Detect	0920267-1	1046	Recognized	

[<< Back] [Next >>] [Cancel]

4. Click **Next**

Memo **Calibration of the pump**
Primetech guarantees pump accuracy in factory shipments. If necessary, however, a new Cal. Factor based on an actual value of pump discharge may be set, by performing calibration of the pump.(Refer to page 69)

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Pumps Step; *Downloading to the Pump*

Initiate the last confirmation of the setting protocol and download it to a pump.
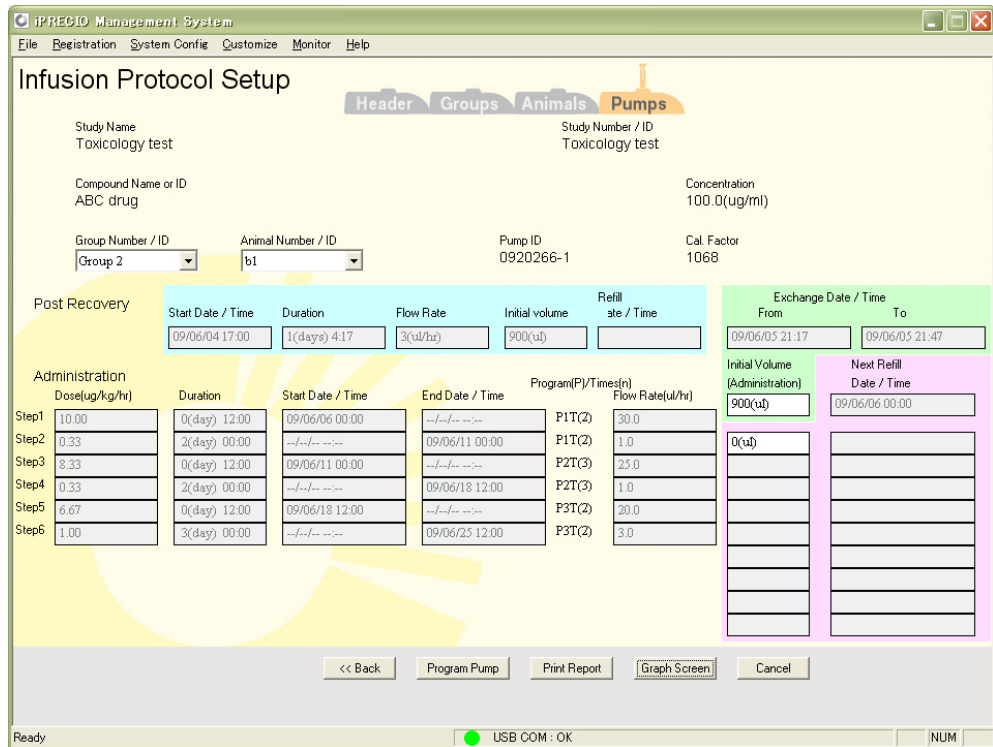
Key

◇ *DO NOT unplug the USB cable during or after placement of the pump onto the communication device, as this may reset the factory set pump ID and Cal. Factor.*
◇ *DO NOT press ACT button on the Data Communication Device during the Data Communication Device is plugged to PC.*
◇ *Please avoid static electricity to the pump.*
◇ *DO NOT conduct communication between the pump and the Data Communication Device under intensive light like sunlight.*
◇ *DO NOT use some remote apparatus within 10cm radius of the pump.*
◇ *Infusion Protocol must be downloaded at least 6 minutes prior to start.*

Step

1. Select **Group Number/ID**, **Animal Number/ID** and confirm the protocol.
2. Modify the default **Initial Volume** (Administration) from 900µl if necessary.
3. Place the pump or blister packed pump on the Data Communication Device.
4. Click **Program Pump**, the activation dialog window is displayed.
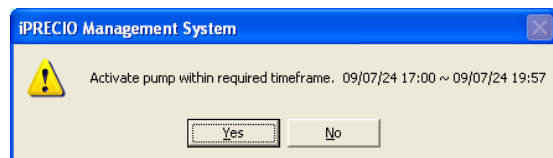
5. Confirm the allowed time window for Activation and click yes. *(See pg.44 for activation requirements. Workflow is shown on pgs. 8 & 9)*
6. The download status bar window will open when downloading and will close automatically on successful download.

PRIMETECH CORP. Tokyo, Japan

37

▶www.iprecio.com   ▶iprecio@primetech.co.jp
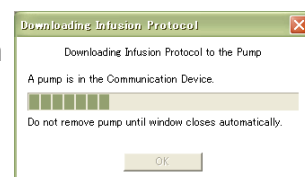
Key   The Pumps screen displays graph of the administration schedule set at Animals screen. You can switch to the list screen by pressing **List Screen** button.
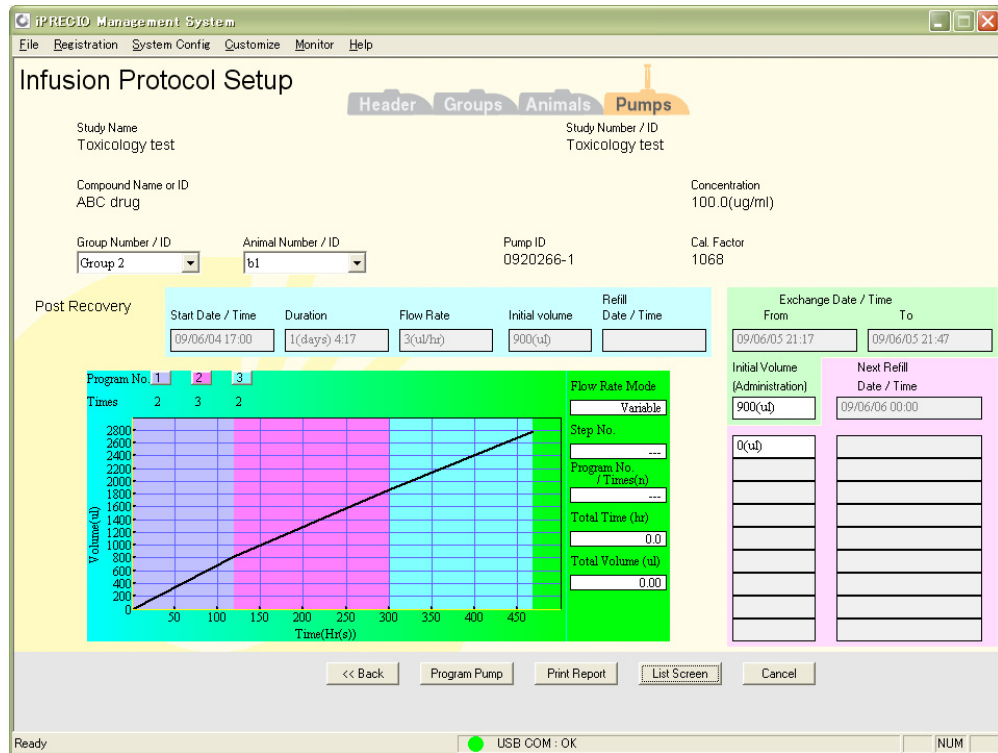
If the Protocol has repeat loop program, you can click the buttons of Program No. to see the graph window of each repeat loop. To close the window, please click on the window.
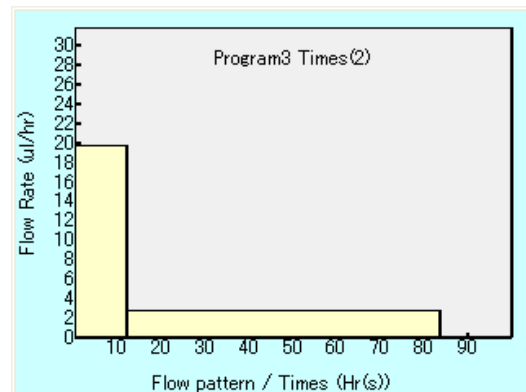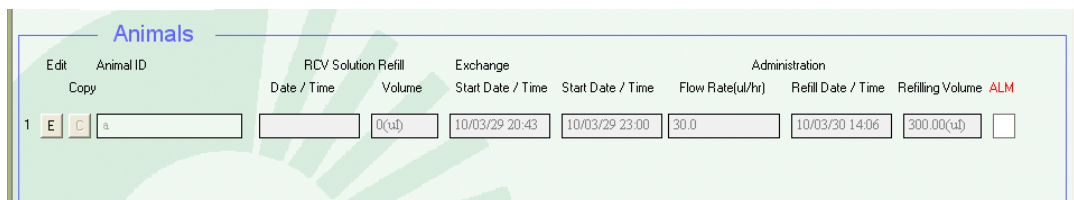

Note
➢ Until *all pumps in a group are downloaded, it will not be possible to go to the status manager screen.*

➢ *If you want to change the number of the pumps, you will need to go back to the Header Step screen and change the number of animals. Then retry downloading to the pumps.*

➢ *You may download to the pump as many times as needed to correct any errors. Once you have activated, you will not be able to download to the pump.*

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Editing the Downloaded Infusion Protocol

Normally, you cannot change the downloaded infusion protocol. If you want to change the infusion protocol, you can edit the infusion protocol at Animals step.

Step

1. Run the status manager. For detail, see **iPRECIO® management guide**.

2. Click **Back** to the Infusion Protocol Setup/Animals screen.

Edit	Animal ID		RCV Solution Refill		Exchange		Administration			
	Copy		Date / Time	Volume	Start Date / Time	Start Date / Time	Flow Rate(ul/hr)	Refill Date / Time	Refilling Volume	ALM
1	E C a			0(ul)	10/03/29 20:43	10/03/29 23:00	30.0	10/03/30 14:06	300.00(ul)	

3. Click the **E** button at the list, the list becomes changeable.

4. Download to the pump.

Key

You should not to change the infusion protocol of previously-activated pump. If modified/changed, the effect will be to cause a mismatch between the infusion protocol running in the pump and the management software.

iPRECIO®　Surgical Guide

Contents

This document describes preliminary implantation preparations and possible routes for pump administrations.

Make sure that the installation, the setup, and the customization of the iPRECIO® Management Software, the infusion protocol setup and the downloading are completed before implement these contents. For detail, see ***iPRECIO® Startup Guide(page13)***, *and* ***iPRECIO®　Infusion Protocol Setup Guide(page27)***.

Key

◇ When ***using iPRECIO®, always follow established guidelines set by the institution at which experimentation is being conducted.***

◇ Sterility ***of solutions and pumps must always be maintained as iPRECIO® pumps are designed to contain solutions for as long as 6 months.***

◇ ***Sterility must be maintained during first fill, exchange and each subsequent extract/refill procedure.***

◇ ***It is recommended that accurate information/measurements are made when calculating dead volumes for the iPRECIO® pumps. This is especially important for Post Recovery Mode where the flushing time is required to obtain an accurate start administration time. (see page 33 – RCV Mode description for further details).***

◇ ***For animal welfare considerations, the pump should be pre-warmed to 38°C prior to implantation.***

Preliminary implantation preparations for Pump

Low Flow Infusion SOP [1µl/hour to 3µl/hour]

In general, you should condition the pumps with or without their blister packs in 45°C incubator for 3 days to obtain maximum accuracy of pumps.

Low Flow Infusion SOP is strongly recommended especially if you plan to infuse at Flow Rates of between 1µl/hour to 3µl/hour. Special care should be taken to check Flow Rates when using the dose option. See "Infusion Protocol Set-up - Pumps" Menu which shows both dose and Flow Rate.

Step ▶

1. Place the pumps with or without the blister package into 45°C air incubator **for 3 days.**
2. After incubation, open the blister package under warm conditions or keep the pumps warm. All subsequent procedures until implantation should be carried out under warm conditions.
3. Program the pump.
4. Cut the outlet tube tip. Depending on administration route, connect additional catheter.
5. Fill the warmed solution to the pump reservoir. Make sure that the solution is filled to the tube tip or end of catheter (if attached)
6. Activation.

Key 🟦

🔹 ***Please ensure that the pump temperature is maintained until implantation, fill and re-fill with warmed solution, syringe and needle at warmed condition. (38°C)***

🔹 ***Sterility of solutions and pumps must always be maintained as iPRECIO® pumps are designed to contain solutions for as long as 6 months.***

🔹 ***Sterility must be maintained during first fill, exchange and each subsequent extract/refill procedure.***

Sterilizing the downloaded pump

The iPRECIO® Micro-Infusion Pump is sterilized in the factory. Blister packs ensure continued sterility until downloading the protocol. Therefore it is unnecessary to re-sterilize the pump in a usual way. If re-sterilization of the pump becomes necessary, please follow the sterilization procedure below.

Key — *DO NOT use autoclave or EOG sterilization with high temperature, compression, or decompression. DO NOT use solutions such as phenols, alcohols, iodophor, or hypochlorite, as this may damage the silicon coating of the pump.* If you want to treat with a solution other than 2% glutaraldehyde, contact Primetech for technical support.

Step
1.   Immerse pump into a 2% glutaraldehyde solution at least 12 hours.
2.   Immerse pump into a sterile saline solution for one-half hour.

Sterilization of the Data Communication Device

Decontaminate the area where pump or blister packed pump is placed by wiping with soft cotton gauze soaked in 70% ethanol and remove fluid with dry sterilized soft gauze.

Key — **Take care not to scratch (2) small window for IR communication.**

Step
1.   Open the cover of the Data Communication Device.

2.   Wipe the area where pump or blister packed pump is placed with gauze soaked in 70% ethanol.

3.   Remove fluid with dry sterilized gauze.

Connecting the antithrombotic catheter

An antithrombotic catheter which is coupled to the outlet tube of the pump should be inserted into the blood vessel.

Step
1. Cut the outlet tube under sterile conditions.
2. Connect the antithrombotic catheter to the outlet tube with a coupler.

Memo **About an antithrombotic catheter and a coupler**
Primetech recommends the CBAS® Heparin Coated PU 3 French or 3.5 French and the stainless steel tubing coupler 22ga (Instech Solomon, Plymouth Meeting PA, USA 800-443-4227, 610-941-0132, 610-941-0134 fax, www.instechlabs.com, www.Solsci.com).

Initial filling of the reservoir

The pump reservoir should be filled with medicinal solution according to the set protocol, using a 1 ml syringe. The needle should be 27G or smaller.

Step
1. In a programmed pump, cut the tube to the length required for the route of administration while maintaining sterility.
2. Fill a 1ml syringe (needle should be 27G or smaller) with solution; insert perpendicularly into the center of the septum on the top face of the pump until slight resistance is encountered.
3. Gently fill pump reservoir.

Note *Ensure the following;*

- *Make sure a finger pin is not compressing the tube prior to the pump's pre-driving state.*
- *Depending on the manufacturing batch of iPRECIO® pumps used, the tube tip of the pump could be sealed or open. Always check and if sealed, always cut away the sealed section before filling with solution.*
- *When filling the reservoir, always use a new needle. The fluorine coating of the needle is removed when inserted into the septum. Using a needle larger than 27G, multiple times, may damage the septum and/or pump.*
- *Always ensure that no air enters the reservoir when filling. If this occurs, remove air from the septum side.*
- *Make sure that the solution is filled to the tube tip.*
- *Do not apply excessive pressure to the reservoir by over- filling, as this may damage the pump.*
- *For the first or initial fill, it is recommended to fill the reservoir completely along with the catheter. Therefore more than 900 µl of solution will be required to fill both reservoir and dead volumes to have solution at the tip of the catheter. Exact volumes would depend on remaining catheter length of pump and any additional catheter. Dead volumes are typically 30-35 µl.*
- *Some proteins and peptides may be adsorbed in the inside of the reservoir. If a user requires administrating these compounds, please give us full information concerning the trial.*

Activating the pump

Note   *When should the pump be activated? A pump must be activated prior to implantation. Once a pump has been programmed with an administration protocol, it must be activated within a window of 3min.–3hr. prior to the planned dosage start time. Failure to activate the pump at least 3min. prior to the set dosage start time will cause the pump to automatically reset the administration protocol. Failure to activate the pump within 3hr. of the set dosage start time may result in tube fatigue due to the lengthy impingement caused by a finger pin compressing the tube in the pre-drive state. This tube fatigue will cause the accuracy of the pump discharge to be unpredictable. This inherent limitation in pump activation chronology necessitates careful planning when setting the administration protocol, taking into consideration the time required to implant single or multiple pumps.*

The pump pre-driving state is initiated by activating the pump with the either:-
● Management Software with the Data Communication Device **(Software Activation)** or
● Data Communication device in standalone mode where PC is not required. **(Hardware Activation)**

Note ***Do Not press ACT button of the Data Communication Device while the Data Communication Device is connected with the management PC.***

Memo The procedure to activate the pump is done by clicking the Activate button in the Status Manager window. It is not necessary to ensure the S/N of pump corresponds when activating. (It is different to downloading procedure.) The activation command will activate any pump which has a program and it is within the activation time window.

Step <u>**Software Activation**</u>
1. Connect the Data Communication Device with the management PC with USB cable.
2. Go to the Status Manager screen.
3. Place the filled pump on the Data Communication Device and close the cover.
4. Click the **Activate** button on the Status Manager screen.
5. Click **Yes** to the dialogue **"Do you wish to activate pump?"**
6. Activation signal is transmitted to pump and if successful, the software confirms activation of the pump. If not, an informative error message would be given.
7. On activation, the cam turns clockwise and a single finger pin closes/pinches the tubing. The Pre-driving state initiation is confirmed when the blue cam pushes a single finger pin into the "closed-tube" position. This process takes approximately 120sec. Also, there is production of clicking sound (for short period only) after the Activate button was clicked.

Step
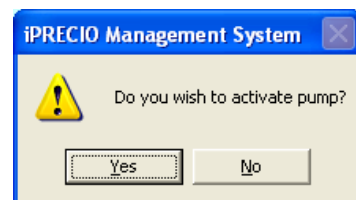
Hardware Activation (Data Communication Device only)
1. Place the filled pump on the unplugged communication device.
2. Press the ACT button and the orange COMM lamp light would turn on. (1-2 seconds)
3. If the communication device recognizes the existence of a pump, the orange COMM lamp should flash 3 times confirming that the pump and the device are communicating.
4. If the **pump is successfully activated**, the Green RDY lamp comes on for about 3 seconds and then switches off. The pump's CAM would then turn clockwise to move to the pre-drive state (see point 7 in software activation)
5. If the **pump is not successfully activated**, the data communication device will give either Error A or Error B.

Error A: RDY and COMM lamps flash alternately. (Pressing ACT button stops the flashing and switches off the unit) This error could be due to:-

➢ USB cable is connected to the Data Communication Device.
➢ Pump is not set on the Data Communication Device properly.
➢ Activation was not done in the required time window.
➢ The pump does not have an infusion protocol downloaded.
➢ The pump is already activated but has not started to infuse.
➢ The pump is already activated.

Error B: RDY lamp and COMM lamp are both ON at the same time. (Pressing ACT button switches of the unit) This error could be due to:-

➢ Lighting conditions interfering with the communications.

6. If the pump fails to be activated, reset the position of the pump and confirm that none of the above reasons caused the problem and re-try activation. If activation was not done in the right time window, you may need to modify the protocol and download. See also troubleshooting guide at the end of the manual.

Note

DO NOT leave the pump on the Data Communication Device after the pump is activated. The IR circuitry will continue to be active if it is on the Data Communication Device and will continue to consume battery power.

The magnet in the Data Communication Device may also affect the activation procedure.

Memo **The Process of Activation**

The cam of the pump driver consists of two parts, shown in blue and white in the diagram on the right. The white part is in a fixed position prior to use.   This prevents the finger pins from compressing the tube, leaving it in an "open-tube state". Upon activation, the blue part begins to turn clockwise, pushing a single finger pin against the tube, creating a "closed–tube state". This cycle takes about 120sec. This process is called the pre-driving state. The pump remains in this state until the pre-set dosage start time, at which point, clockwise rotation of the blue part resumes until the white and blue parts connect, creating a cam with four equal centrums, which move the seven finger pins in the driving state.

During the activation procedure, a small volume of liquid may be pushed out of the catheter (infused out). If necessary, remove or wipe away the solution before implanting.

| Factory shipment | Pre-driving state | Finished Cam |
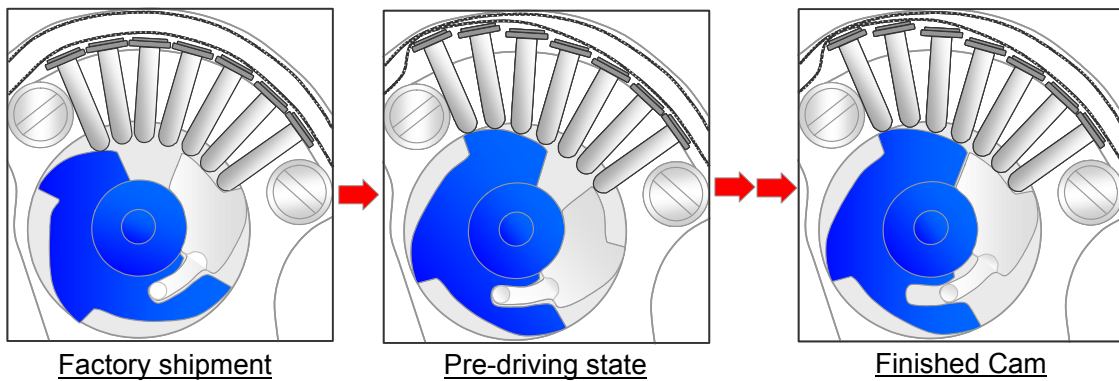
Preliminary implantation preparations for Animal

Key *When **using iPRECIO®** always follows the established guidelines set by the institution at which experimentation is performed.*

Key *Prior to implanting a programmed pump into the subject animal, attend to the following details:*

Measurement of the pump tube

It is necessary to measure the length of the pump outlet tube in order to calculate the dead volume for the Post Recovery mode (RCV setup) of the pump. This value is input into the administration protocol. (See page 33)

When calculating the required outlet tube length, consider the positioning of the pump in the subject animal, the administration route to be used, whether or not a catheter will be used, and the expected growth of the subject animal.

Stabilization of the pump

A programmed pump must be warmed to body temperature at least 15min. prior to implantation. The pump may be immersed into a clean saline bath or other buffer to achieve an appropriate temperature.

Different administration routes using iPRECIO® Pump

iPRECIO® micro-infusion pump maybe used for different administration routes. The pump's implantation procedure for Intravenous Administration, Subcutaneous Administration and Intraperitoneal Administration are described hereafter. For other administration routes, please contact Primetech Corporation or your local distributor.

Implement "preliminary implantation preparations" prior to surgery.

Recommendations for Intravenous Administration

<u>Requirements</u>

Perioperative Care
- Antibiotics and the treatments
- Anesthetic agents and the techniques
- Heating Pad
- Surgical glove, mask, cap and gown
- 70% Isopropyl Alcohol
- Disinfectant Soap
- Sterile saline
- Electric shaver or Hair remover

Pocket and Tunnel Making
- Surgical scissors and forceps
- Sterile scalpel blade with handle
- Trocar Sleeve Kit (metal trocar with plastic sleeve)

Pump Fixation
- 5-0 non-absorbable suture with curved needle

Intravenous Tube Fixation
- Cotton swab
- Microscissor or 23-gauge needle
- Antithrombotic catheter: CBAS® Heparin Coated PU 3 French or 3.5 French (supplied by Instech Solomon)
- Stainless coupler: Stainless steel tubing coupler 22ga × 15mm (supplied by Instech Solomon)

Wound Closing
- Wound clips and wound clips applier
- 3M™ Vetbond™ Tissue Adhesive (supplied by 3M)

Methods

1. Perioperative Care

    Careful attention to sterile techniques and the use of sterile equipment are crucial to successful surgery. Additionally, antibiotics are most effective to administer pre- and post-surgery in order to maximize blood levels during surgery and recovery. Primetech recommends the use of a heating pad to prevent decreased body temperature in the peri- and post-operative animal.

2. Anesthetize the Animal

    Anesthesia must be used to ensure a reliable experimental result. General anesthesia should be maintained for around 20 – 30 minutes. Primetech recommends using an anesthetic method that supports prompt post-operative recovery.

3. Catheter Attachment **...*See Fig.1***

    1. Cut the outlet tube around 5cm under sterile conditions.
    2. Connect the coupler into the tip of the tube.
    3. Cut the antithrombotic catheter around 10cm and connect to the outlet tube with a coupler.
    4. Fill the solution to the tip of the tube.
    5. Activate the pump.

4. Pocket Making **...*See Fig.2***

    1. Position the animal in sternal recumbency on the heating pad.
    2. Remove the hair from the incision site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended.
    3. Using a scalpel blade, make a 4cm midline incision through the skin on the thoracic vertebrae.
    4. Using blunt dissection, create a pouch under the skin from the point of the incision to the caudal area by separating the skin from the underlying tissue with scissors.

        The pocket should be the appropriate size (not too large and not too small) for pump fixation, low-stress implantation for a successful long-term infusion.

5. Tunnel Making **...*See Fig.2***

    1. Position the animal in dorsal recumbency on the heating pad.
    2. Remove the hair from the incision site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended.
    3. Using a scissors, make a 2cm midline incision through the skin on the neck. Gently separate the skin from the muscle by blunt dissection with a scissors.
    4. Position the animal in lateral recumbency on the heating pad.
    5. Using the metal trocar sleeve kit, tunnel subcutaneously from the dorsal pocket to the neck skin incision.

6. Access to Intravenous *...See Fig.3*

   1. Position the animal in dorsal recumbency on the heating pad and face toward near side.
   2. Tunnel the outlet tube subcutaneously from the dorsal pocket to the neck incision via/through the trocar sleeve.
   3. Isolate the jugular vein from the peripheral tissue using forceps or a cotton swab.
   4. Pass three surgical sutures (A, B, C) around the jugular vein. The cranial suture (A) will be used to completely occlude blood flow. The middle suture (B) will be used to hold the catheter in place after cannulation. The caudal suture (C) will be used to temporarily occlude blood flow.
   5. Tie a secure knot around the vein using suture (A) to ligate the vessel.
   6. Apply tension to suture (A) and tape the suture tails to the surgery table.
   7. Make a loose knot on suture (B), and tape the suture on one of the tails.
   8. Make a loose knot on suture (C), and clamp the suture tails with hemostat.
   9. Gently apply tension to suture (C) using a hemostat to occlude blood flow.
   10. Using a microscissor or 23 gauge needle, catheterize caudally;
       - I.   Using a microscissor
           - i.   Make small "V" cut into top of vein.
           - ii. Lift up "V" flap to open hole for easier insertion.
       - II. Using a 23 gauge needle
           - i.   Prepare a catheter introducer by bending the beveled tip of a 23-gauge syringe needle. Hold the syringe needle with the beveled side facing up. Grasp just the beveled area of the needle with a needle holder and bend the tip downward to an angle of approximately 90°. (See Figure 3) The syringe needle may be placed onto a 1 cc syringe to be used as a handle to hold onto the needle and allow for a clear view of the surgical area.
           - ii. Using the 23-gauge needle as an introducer, pierce the vessel just proximal to the ligation suture (A) and insert the catheter caudally. Once the catheter is inserted into the vessel, withdraw the catheter introducer.
   11. Secure the catheter to the jugular vein with suture (B) by gently pulling the loose suture tail.
   12. Once the catheter is secured, release the tension on suture (C) and advance the catheter around 12mm beyond suture (C).
   13. Tighten suture (B) and (C) around the catheter.
   14. Release the tension on the ligation suture (A) and tie the loose ends around the catheter to help anchor it in place.
   15. Trim all suture tails as short as possible.
   16. Close the skin incision with 5-0 non-absorbable suture or wound clips. Once closed, seal the incision with Vetbond™ tissue adhesive.

7. Pump Fixation *...See Fig.4*

   1. Place the pump into the pocket.
   2. Suture the pump to the muscle layer.

   Over tightening of the sutures may induce tissue necrosis and laceration due to compression.

8. Wound Closing

   Close the skin incision near the pump with 5-0 non-absorbable suture or wound clips. Once closed, seal the incision with Vetbond™ tissue adhesive.

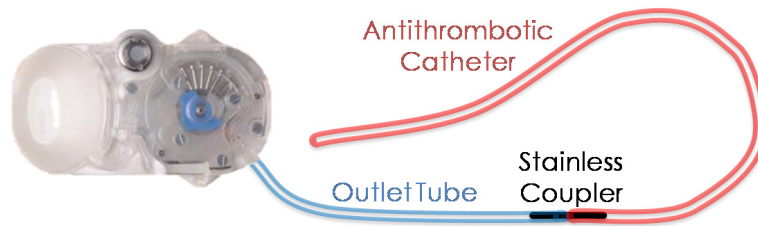   *Proper pocket closing will help in wound healing and help to prevent makes infection.*
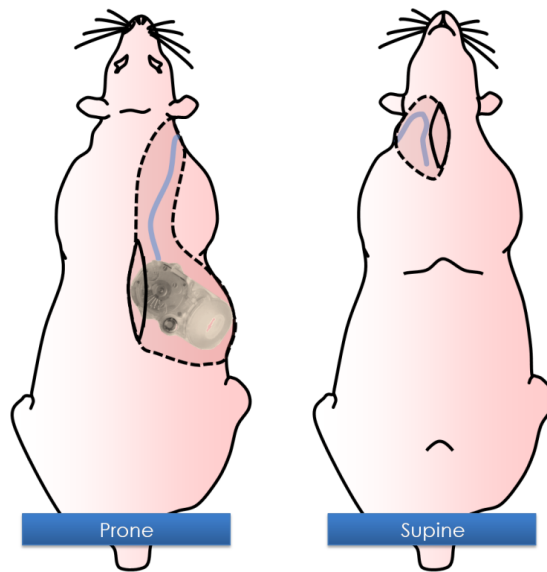
Fig. 1 Connect the antithrombotic catheter

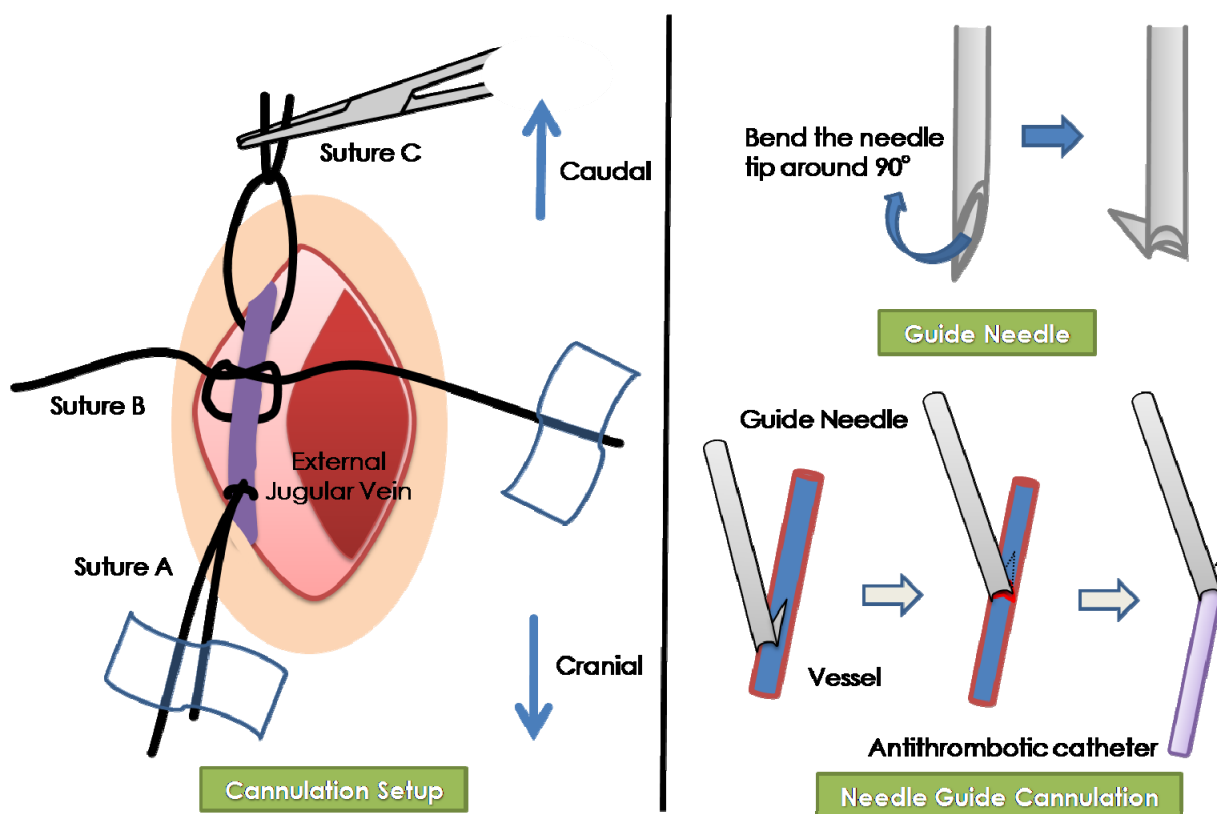Fig. 2 Dimensional drawing of the pump pocket and tunnel

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Suture C

Caudal

Suture B

External Jugular Vein

Suture A

Cranial

Cannulation Setup

Bend the needle tip around 90°

Guide Needle

Guide Needle

Vessel

Antithrombotic catheter

Needle Guide Cannulation

Fig. 3 Cannulation setup and needle introducer

Skin

Pump

Suturing
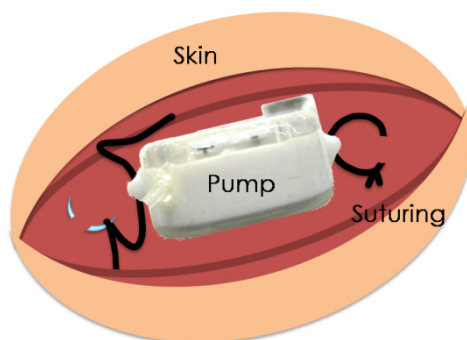
Fig. 4 Pump Fixation: View from the back of the pump with septum port on the right hand side.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Recommendations for Subcutaneous Administration

Requirements

Perioperative Care
- Antibiotics and the treatments
- Anesthetic agents and the techniques
- Heating Pad
- Surgical glove, mask, cap and gown
- 70% Isopropyl Alcohol
- Disinfectant Soap
- Sterile saline
- Electric shaver or Hair remover

Pocket and Tunnel Making
- Surgical scissors and forceps
- Sterile scalpel blade with handle
- Trocar Sleeve Kit

Subcutaneous Pump and Tube Fixation
- 5-0 non-absorbable suture with curved needle

Wound Closing
- Wound clips and wound clip applier
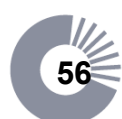 3M™ Vetbond™ Tissue Adhesive (supplied by 3M)

Methods

1. Perioperative Care

   Careful attention to sterile techniques and the use of sterile equipment are crucial to successful surgery. Additionally, antibiotics are most effective to administer pre- and post-surgery in order to maximize blood levels during surgery and recovery. Primetech recommends the use of a heating pad to prevent decreased body temperature in the peri- and post-operative animal.

2. Anesthetize the Animal

   Anesthesia must be used to ensure a reliable experimental result. General anesthesia should be maintained for around 20 – 30 minutes. Primetech recommends using an anesthetic method that supports prompt post-operative recovery.

   Subcutaneous Administration at the neck is described.

3. Pocket Making **…See Fig.1**

   1. Position the animal in sternal recumbency on the heating pad.
   2. Remove the hair from incision site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended.
   3. Using a scalpel blade, make a 4cm midline incision through the skin on the thoracic vertebrae.
   4. Using blunt dissection, create a pouch under the skin from the point of the incision to the caudal area by separating the skin from the underlying tissue with scissors.

   The pocket should be the appropriate size (not too large and not too small) for pump fixation, low-stress implantation for a successful long-term infusion.

4. Tunnel Making **...See Fig.1**

   1. Position the animal in appropriate position on the heating pad.
   2. Remove the hair from incision site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended.
   3. Using a scalpel blade, make a 2cm midline incision through the skin on the neck.
   4. Gently separate the skin from the muscle by blunt dissection with a scissors. Using the metal trocar sleeve kit, tunnel subcutaneously from the dorsal pocket to the infusion site on the neck.

5. Tube Fixation **...See Fig.2**

   1. Tunnel the outlet tube subcutaneously from the dorsal pocket to the incision on the neck via/through the trocar sleeve.
   2. Make a knot on the tube around 2cm distance from the tube tip. Make sure not to tighten the suturing too much. Gently suture the tube to the muscle using the knotted suture.
   3. Follow the same step on the tube around 1cm distance from the tube tip.
   4. Close the skin incision with 5-0 non-absorbable suture or wound clips. Once closed, seal the incision with Vetbond™ tissue adhesive.

6. Pump Fixation **...See Fig.3**

   1. Place in the pump into the pocket.
   2. Suture the pump to the muscle layer.

      Over tightening of the sutures may induce tissue necrosis and laceration due to compression.

7. Wound Closing

   1. Close the skin incision with 5-0 non-absorbable suture or wound clips. Once closed, seal the incision with Vetbond™ tissue adhesive.

   Proper pocket closing will help in wound healing and help to prevent infection.
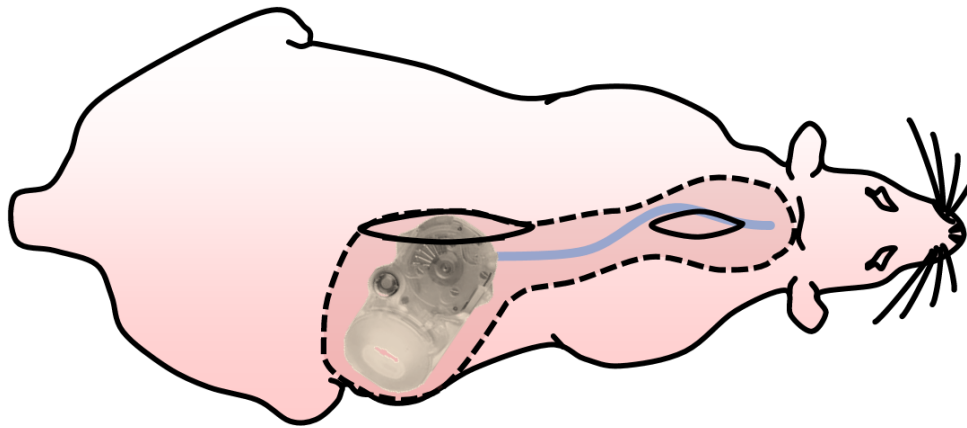
Fig. 1 Pocket and Tunnel for subcutaneous infusion on the neck

Incision

Tube tip

From the Pocket

Subcutaneous Space

Muscle Layer

1cm   1cm
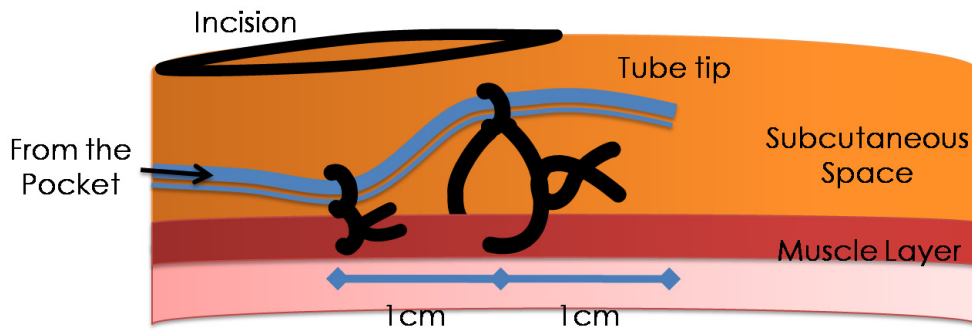
Fig. 2 Tube Fixation

Skin

Pump

Suturing
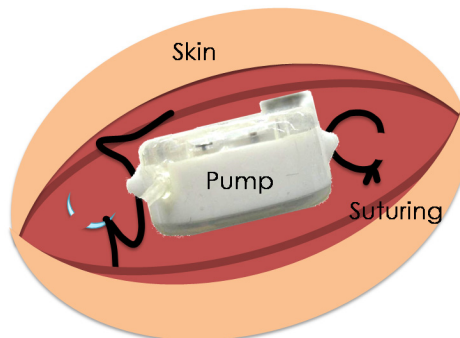
Fig. 3 Subcutaneous Pump Fixation:
View from the back of the pump with septum port on right hand side.

Recommendations for Intraperitoneal Administration

Requirements

Perioperative Care
- Antibiotics and the treatments
- Anesthetic agents and the techniques
- Heating Pad
- Surgical gloves, mask, cap and gown
- 70% Isopropyl Alcohol
- Disinfectant Soap
- Sterile saline
- Electric shaver or Hair remover

Pocket and Tunnel Making
- Surgical scissors and forceps
- Sterile scalpel blade with handle
- Trocar sleeve kit

Pump Fixation
- 5-0 non-absorbable suture with curved needle

Intraperitoneal Tube Fixation
- 23-gauge needle
- Side-hole catheter: Side-hole/Dacron® Mesh Silicone Catheter 3 French (supplied by Access Technologies)
- Stainless coupler: Stainless steel tubing coupler 22-gauge × 15mm (supplied by Instech Solomon)

Wound Closing
- Wound clips and wound clip applier
- 3M™ Vetbond™ Tissue Adhesive (supplied by 3M)

Methods

1. Perioperative Care

    Careful attention to sterile techniques and the use of sterile equipment are crucial to successful surgery. Additionally, antibiotics are most effective to administer pre- and post-surgery in order to maximize blood levels during surgery and recovery. Primetech recommends the use of a heating pad to prevent decreased body temperature in the peri- and post-operative animal.

2. Anesthetize the Animal

    Anesthesia must be used to ensure a reliable experimental result. General anesthesia should be maintained for around 20 – 30 minutes. Primetech recommends using an anesthetic method that supports prompt post-operative recovery.

3. Side-hole Catheter Attachment…***See Fig. 1***

   1. Cut the outlet tube to around 5cm under sterile conditions.
   2. Connect the coupler into the tip of the tube.
   3. Cut the side-hole catheter around 10cm and connect to the outlet tube with a coupler.
   4. Fill the solution to the tip of the tube. (if possible or up to the lowest positioned side hole)
   5. Activate the pump.

   This special accessory increases the perfusion area, and decreases the risk of tube clogging. At the catheter tip, there are 8 side holes evenly spread over a 3cm length. A Dacron® Mesh attachment is used to support catheter fixation with surrounding tissue.

4. Pocket Making …***See Fig. 2***

   1. Position the animal in sternal recumbency on the heating pad.
   2. Remove the hair from the incision site and scrub with disinfectant soap and isopropyl alcohol.   A series of three scrubs with both the disinfectant soap and alcohol is recommended.
   3. Using a scalpel blade, make a 4cm midline incision through the skin on the thoracic vertebrae.
   4. Using blunt dissection, create a pouch under the skin from the point of the incision to the caudal area by separating the skin from the underlying tissue with scissors.

   The pocket should be the appropriate size (not too large and not too small) for pump fixation, low-stress implantation for a successful long-term infusion.

5. Tunnel Making ***…See Fig.2***

   1. Position the animal in dorsal recumbency on the heating pad.
   2. Remove the hair from the incision site and scrub with disinfectant soap and isopropyl alcohol.   A series of three scrubs with both the disinfectant soap and alcohol is recommended.
   3. Using a scalpel blade, make a 2cm midline incision through the skin on the abdomen.
   4. Gently separate the skin from the muscle by blunt dissection with a scissors. Position the animal in lateral recumbency on the heating pad.
   5. Using the metal trocar sleeve kit, tunnel subcutaneously from the dorsal pocket to the abdominal skin incision.

6. Access to Abdominal Cavity***…See Fig.3A***

   1. Tunnel the outlet tube subcutaneously from the dorsal pocket to the abdominal skin incision.
   2. Make a 1cm midline incision on the abdominal wall for intraperitoneal tube fixation.
   3. Make a purse-string suture on the lateral abdominal wall.
   4. Insert a 23-gauge needle into the center of the purse-string suture.   Remove the needle and insert the tube into the hole. ***…See Fig.3B***
   5. Place forceps into the abdominal cavity from the incision site and withdraw the inserted tube around 5cm.
   6. Gently secure the tube with the purse-string suture.
   7. Gently suture the inserted tube to the abdominal wall midway between the purse-string suture and the abdominal wall incision.
   8. Ensure the tip of the tube is buried in the mesenterium and close the abdominal wall incision using 5-0 non-absorbable suture.
   9. Close the abdominal skin incision using wound clips or 5-0 non-absorbable suture.

7. Pump Fixation **...See Fig.4**

    1. Place the pump into the pocket.
    2. Suture the pump to the muscle layer.

    Over tightening of the sutures may induce tissue necrosis and laceration due to compression.

8. Wound Closing

    1. Close all skin incisions using wound clips or 5-0 non-absorbable suture.
    2. Use one drop of Vetbond™ in between wound clips, and press edges of skin together to seal wound.

    Proper pocket closing will help in wound healing and help to prevent infection.
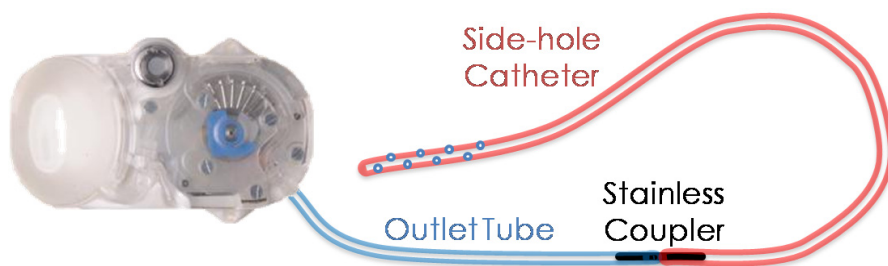
Fig. 1 Connect the side-hole catheter
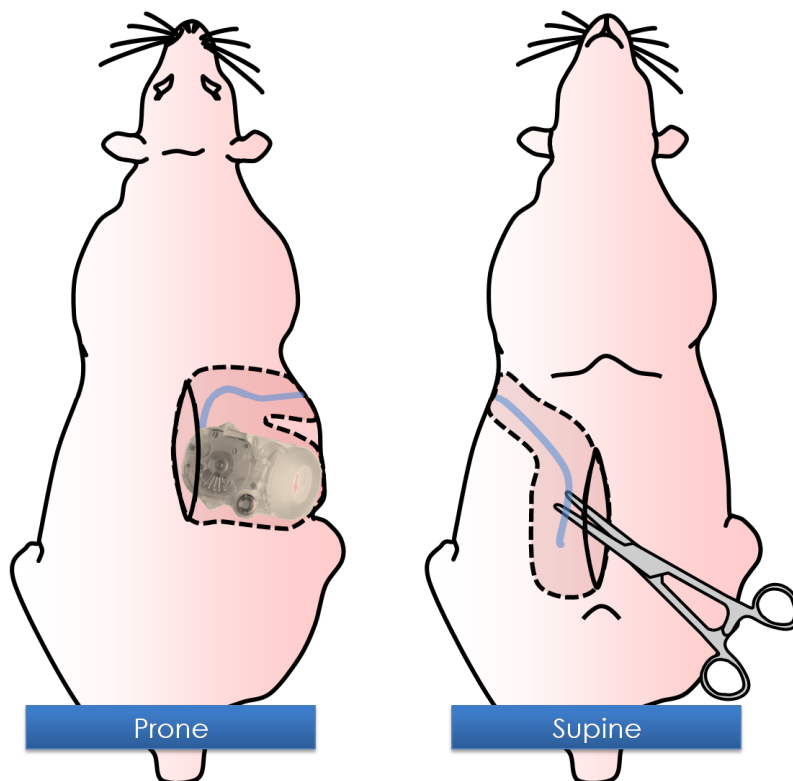
Fig. 2 Subcutaneous Pocket and Tunnel to Abdominal Incision

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
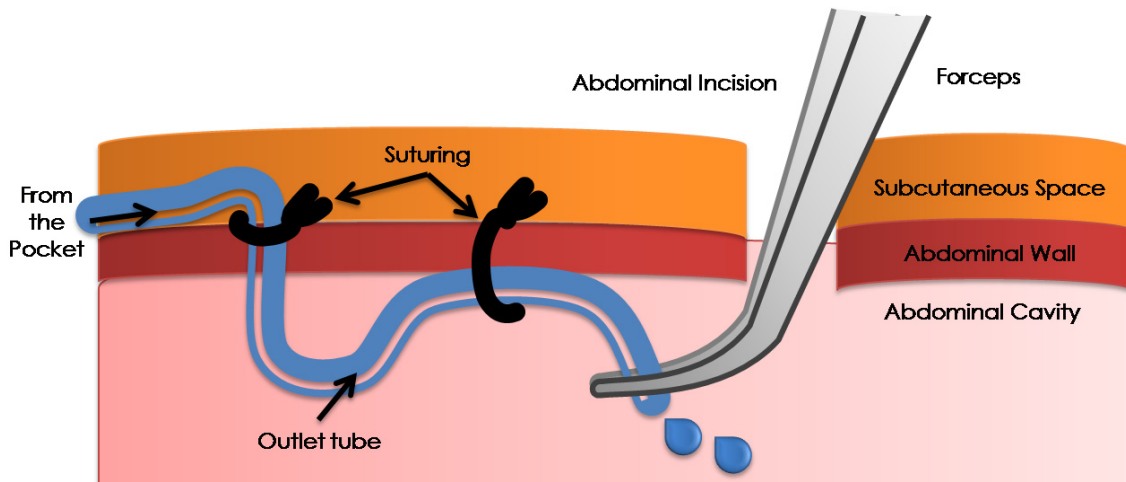
Fig.3A: Abdominal Tube Fixation
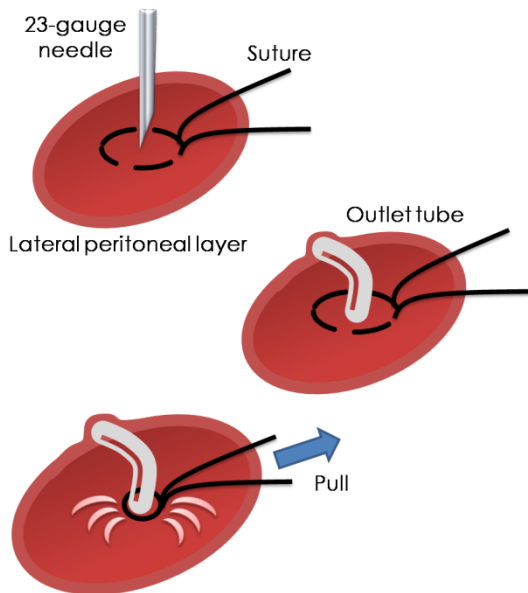
Fig.3B: Opening for catheter insertion and Purse-string suturing.
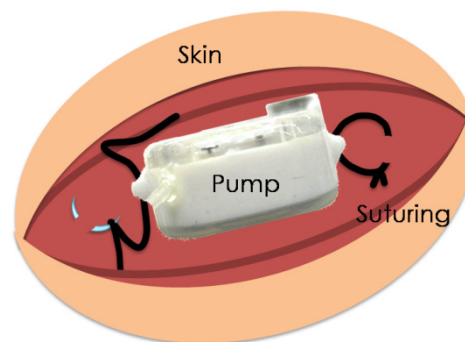
Fig.4: Subcutaneous Pump Fixation: View from the back of the pump with septum port on right hand side.

REFERENCES

Rat Jugular Vein and Carotid Artery Catheterization for Acute Survival Studies, A Practical Guide. Angela Heiser, Foreword by John H. K. Liu. Springer

Instech Solomon, Plymouth Meeting PA, USA, toll free 1-800-443-4227 tel +1-610-941-0132 fax +1-610-941-0134, www.instechlabs.com, www.Solsci.com

Access Technologies, 7350 N. Ridgeway Skokie, IL 60067, Toll-Free Phone (in USA only):877.674.7131
Phone: 847.674.7131 Fax: 847.674.7066 www.norfolkaccess.com info@norfolkaccess.com

☑ Checklist for iPRECIO® Implantation

Approval of the Required Animal Protocols
- ☐ When using iPRECIO® always follow established guidelines set by the institution at which animal experimentation is being conducted.
- ☐ Are you familiar with sterile techniques for surgery? Good sterile techniques are used during the filling, handling and surgical implantation of the pump.

Availability of the Appropriate Hardware
- ☐ **DO NOT** use autoclave or EOG sterilization with high temperature, compression, or decompression.
- ☐ **DO NOT** use solutions such as phenols, alcohols, iodophor, or hypochlorite, as this may damage the silicon coating of the pump. If you want to treat with a solution other than 2% glutaraldehyde, contact Primetech for technical support.

Small Animal Procedure Capabilities
- ☐ Do you have appropriate method for anesthesia?
- ☐ Do you have the appropriate experience to make the required administration route?
- ☐ Do you have all the required instrumentation required for your method?

For Satisfactory Performance of the iPRECIO® Micro-Infusion Pump
- ☐ Did you consider the need for "Low Flow Infusion SOP" for satisfactory pump infusion accuracy?
- ☐ Please ensure that the pump temperature is maintained until implantation, fill and re-fill with warmed solution, syringe and needle at warmed conditions. (38ºC)
- ☐ Were the remaining catheter tubing length and/or additional catheter dead volumes entered correctly to ensure accurate start administration time? Accurate dead volume flushing is important for start administration time to be accurate in Post Recovery Mode (RCV Mode).

Filling the reservoir
- ☐ Did you connect the proper catheter for the chosen administration route?
- ☐ Were good sterile techniques used to ensure that the pump and solution in the reservoir are sterile?

Pump Activation
- ☐ Did you verify that the activation of the pump was completed by either verifying that the cam turned clockwise and single finger pin closed/pinched the tubing or that there was production of clicking sound (immediately after activation for a few seconds) after the activation button was pushed
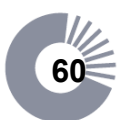
iPRECIO® 　Management Guide

Contents

This document describes the offline monitoring using status manager, refilling of the pump, and uploading the data of the pump.

Note ► *Make sure that the installation, the setup, and the customization of the i iPRECIO® Management Software, the infusion protocol setup and the downloading are completed before implement these contents. For detail, see* **iPRECIO® Startup Guide**, **iPRECIO®　Infusion Protocol Setup Guide**.

Requirements

- ◆ iPRECIO®　Micro Infusion Pump (when uploading)
- ◆ iPRECIO®　Data Communication Device (when uploading)
- ◆ Work station installed iPRECIO®　Management Software

About Status Manager

   You can implement offline monitoring the infusion protocol of the downloaded pump at Status Manager. The features of status manager are the confirmation of the administration schedule and the remaining volume of the pump reservoir, the confirmation and recording refill date, uploading of the pump data.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Offline Monitoring with Status Manager

Running Status Manager

After downloading all pumps in a group, the Status Manager opens automatically. Additionaly you can start the status manager from monitor menu.

Step ▶ 1. Select **Monitor** from **Monitor** menu.
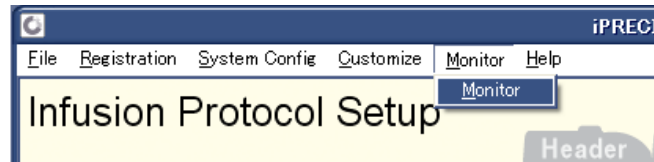
2. Study Selection window is displayed.
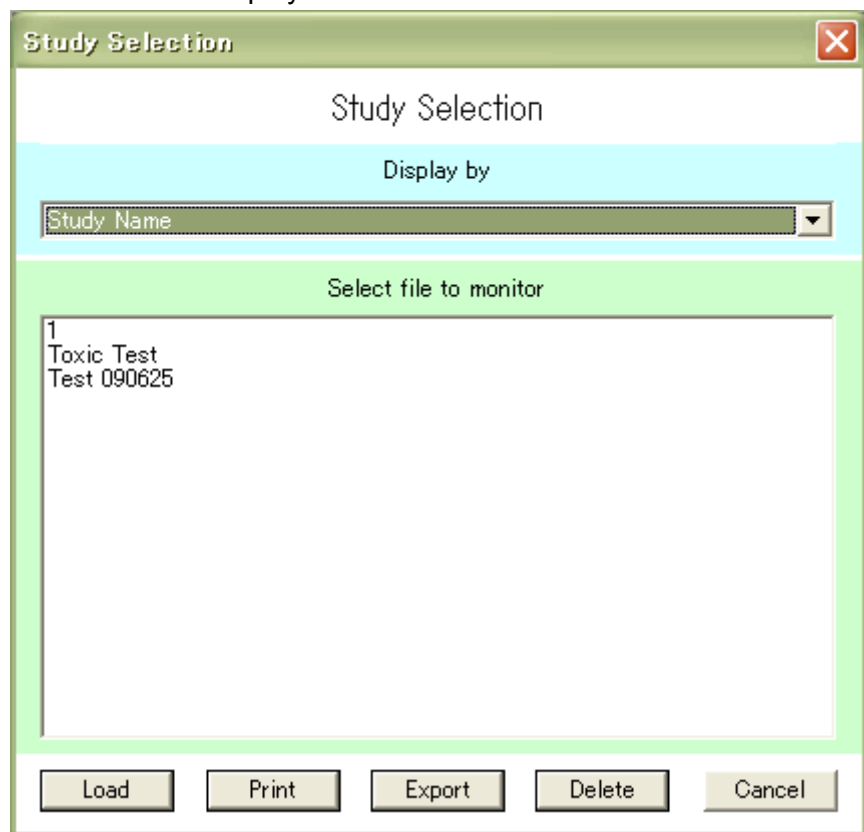
3. Select the study name from **Dialog box**, click **Load** to start the Status Manager. If necessary, you can print out the selected schedule list with click **Print**. You can sort the study in the dialog box by **Study Name**, **Study Number (ID)**, **Compound Number or ID**, **and Group Number or ID** from **Pulldown menu**.

Confirmation of the Infusion Protocol

Step

1. Select the **Group Number & ID** and **Animal Number & ID** from pull-down menus.
2. In the case of the Post Recovery infusion mode, **Start Date/Time** and **Period** of flushing at the recovery period, **Buffer Volume** that is necessary for refilling of buffer, **Date/Time** of the refill, and **Exchange Date/Time** to exchange a solution in the reservoir, are displayed by a Post Recovery field.

Post Recovery	Start Date / Time	Duration	Flow Rate	Initial volume	Refill ate / Time	Exchange Date / Time From	To
	09/05/28 20:00	7(days) 1:7	3(ul/hr)	900(ul)		09/06/04 21:07	09/06/04 21:37

3. An administration schedule is displayed in **Administration** box according to the selected Flow Rate mode. You can switch the list view and the graph view by click **List Screen** or **Graph Screen**. In the graph view, the black line indicates scheduled discharge volume of the pump, and the yellow line indicates total discharge volume of the pump according to the elapsed time. If the protocol has repeat loop, however, the volume of the start and end points of the repeat loop is just connected with the straight line, and so the black line does not indicate the scheduled discharge volume.

Administration

	Dose(ug/kg/hr)	Duration	Start Date / Time	End Date / Time	Program(P)/Times(n)	Flow Rate(ul/hr)
Step1	0.33	0(day) 18:00	09/06/05 00:00	--/--/-- --:--	P1T(2)	1.0
Step2	3.33	0(day) 06:00	--/--/-- --:--	09/06/07 00:00	P1T(2)	10.0
Step3	0.33	0(day) 18:00	09/06/07 00:00	--/--/-- --:--	P2T(2)	1.0
Step4	10.00	0(day) 06:00	--/--/-- --:--	09/06/09 00:00	P2T(2)	30.0
Step5	1.00	1(day) 00:00	09/06/09 00:00	09/06/10 00:00	P3T(1)	3.0

Confirmation of the Remaining Volume and the Refill Date/Time

*In **Action Management**, the **Calculated Remaining Volume** and **Scheduled Refill Date/Time** are displayed. **Scheduled Refill Date/Time** is based on when the remaining volume in the reservoir is calculated to reach 100μl. Default Alarm setting is also 100μl. This default **Alarm setting** threshold maybe modified to detect and alert when the solution in the reservoir is calculated to fall below the set value.*

Action Management

Calculated Remaining Volume	Alarm setting	Scheduled Refill Date / Time
900 ul	0 ul	07/10/04 08:36

*From the **Status Manager** Window where you have the Action Management and calculated remaining volume, go back to the **Animals Step** as shown below. It shows the Alarm Status, Scheduled next refill based on 100μl remaining in reservoir and current **Refilling Volume** which is 900μl–calculated remaining volume. The **Refilling Volume** shows how much the reservoir may be refilled at that time. **Refilling volume** here must be updated by going to **Status Manager** Window which is updated in real time. **Refilling Volume** may be updated by toggling between the 2.*

Animals

Edit Animal ID Copy	RCV Solution Refill Date / Time	Volume	Exchange Start Date / Time	Start Date / Time	Flow Rate(ul/hr)	Refill Date / Time	Refilling Volume	ALM
1 E C a		0(ul)	10/03/29 20:43	10/03/29 23:00	30.0	10/03/30 14:06	300.00(ul)	

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Refill

The refill feature is one of the benefits of using an iPRECIO® micro-infusion pump. Following the refill procedure properly is necessary to ensure a precise, continual, long-term administration protocol.

Key

- ◆ *Remove the hair from the refilling/injection site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended. Alternatively, Hibitane®/Nolvasan® surgical scrub and solution may be used.*
- ◆ *Sterility of solutions and pumps must always be maintained as iPRECIO® pumps are designed to contain solutions for as long as 6 months.*
- ◆ *Sterility must be maintained during first fill, exchange and each subsequent extract/refill procedure.*
- ◆ *Please ensure that the pump temperature is maintained during implantation, fill and re-fill with warmed solution, syringe and needle at warmed condition.*

Step **Confirm the refill date and time and capacity with the status manager.**
1. Fill a syringe (needle of 27G or smaller) with solution.
2. Hold the subject animal firmly to prevent movement of the implanted pump.
3. Ensure immobility of the pump and find the septum percutaneously.
4. Insert the solution-filled syringe perpendicularly into the center of the septum until slight resistance is encountered.
5. When resistance is met, gently inject the solution into the septum to fill the pump reservoir.
6. Input refill capacity, date, and time to status manager. For detail, see **Recording of the Refill**.

Note *Ensure the following;*

- ◆ *The solution must be warmed to body temperature before refilling pump.*
- ◆ *Immobilize the pump and animal in order to prevent accidental puncture of the pump reservoir. It may be necessary to anesthetize animal (i.e. ether aspiration), to achieve restraint.*
- ◆ *Always use a new needle when refilling the reservoir. Insertion of a needle into the septum removes its fluorine coating; therefore, multiple insertions of a needle larger than 27G may damage the septum.*
- ◆ *Avoid introducing air into the reservoir. If air enters the reservoir, remove it through the septum.*

Key

- ➢ *We recommend that you refill the drug solution early even if < refill> is not indicated in "refill schedule". In this case, please make sure that you input refilled volume and time in monitor screen of iPRECIO® management software. Then, you will be able to know the schedule for the next refill. Next refill will depend on remaining volume in reservoir plus refilled volume and scheduled infusion rate(s).*
- ➢ *You may also set an alarm to remind you of remaining residual volume. When threshold is reached, alarm will flash. Remaining volume alarm threshold should be set according to flow infusion rate, the ±5% accuracy of pump and working week. (consider weekend availability)*

Recording of the Refill

Step ➤

1. Select the **Group Number & ID** and **Animal Number & ID** pull-down menus.
2. Confirm the Refill Date/Time from **Action Management**, and refill to the pump if necessary.

If Constant Dose is required, refill the reservoir with a new concentration solution which takes into account weight change of the animal. Remaining volume in reservoir should be removed by extraction before re-filling with new solution.

Input the animal's weight and click calculate, then the concentration Calculator window pops up.

Click "Calculate" and confirm the number in "New Recommended Concentration" field is renewed accordingly.

Click "Remark", and then the window is closed and the weight and concentration will be automatically input in "Remark" field.

3. Input the refilled volume into **Volume** and the refilled **Date/Time**, and then click **Enter.** Or you can input the Date/Time automatically by clicking **Auto Date.**

4. The input refill recording is displayed at **Progress of Refill (Log)**, and **Action Management** information is updated.
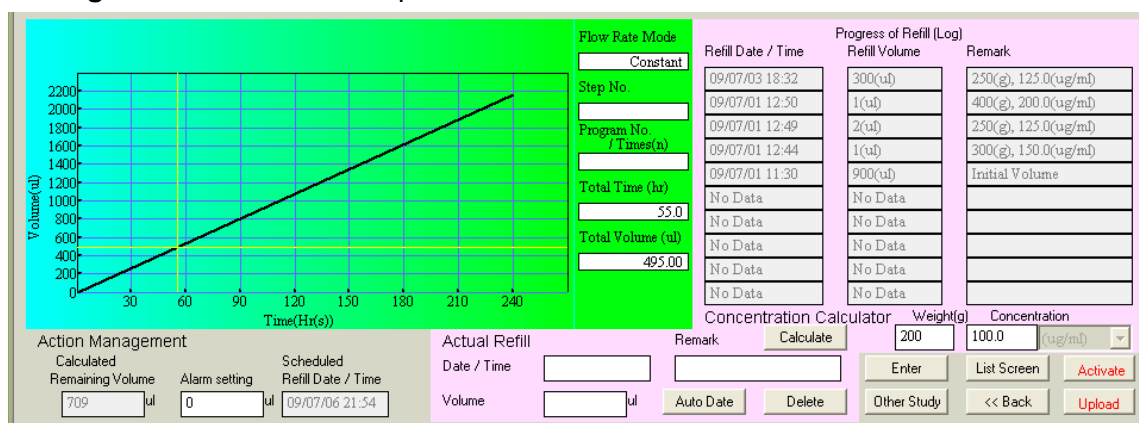
5. Repeat the process for all of the pumps which need refilling and/or concentration change.
6. After recording of the refill(s), save the file from file menu.

Replacing the reservoir solution in Post Recovery Infusion mode

Key
➢ *Remove the hair from the refilling/injection site and scrub with disinfectant soap and isopropyl alcohol. A series of three scrubs with both the disinfectant soap and alcohol is recommended. Alternatively, Hibitane®/Nolvasan® surgical scrub and solution may be used.*
➢ *Sterility of solutions and pumps must always be maintained as iPRECIO® pumps are designed to contain solutions for as long as 6 months.*
➢ *Sterility must be maintained during first fill, exchange and each subsequent extract/refill procedure.*
➢ *When filling and extracting viscous agents and vehicles, extra care must be taken especially when extracting remaining volume. See Technical Note 3 for guidelines and recommendations to ensure best practice is followed for maximum accuracy.*

Step
1. Confirm the reservoir exchange date, time, and remaining volume of the solution with the status manager.
2. Hold the subject animal securely.
3. Find the septum percutaneously.
4. Immobilize the implanted pump percutaneously.
5. Pierce the center of the septum with an empty syringe (27G needle or smaller), perpendicularly, until slight resistance is encountered.
6. Slowly aspirate the solution from the reservoir.
7. Stop aspiration when slight resistance is encountered, then continue to pull a slight vacuum (air gap created in syringe barrel of not more than 0.5cm)
8. Block the plunger with your finger to maintain slight vacuum and pull out syringe from septum port.
9. Fill syringe (27G needle or smaller) with a solution; insert needle perpendicularly into the center of the septum until slight resistance is encountered.
10. Gently fill pump reservoir with new solution.
11. Input the capacity, date, and time of refill to status manager.

Note
◆ *Solution must be warmed to body temperature before refilling pump.*
◆ *Immobilize the pump and animal in order to prevent accidental puncture of the pump reservoir. It may be necessary to anesthetize the animal (i.e. ether aspiration) to achieve restraint.*
◆ *Always use a new needle for refilling. Insertion of a needle into the septum removes its fluorine coating; therefore, multiple insertions with a needle larger than 27G may damage the septum.*
◆ *Avoid introducing air into the reservoir. If air enters the reservoir, remove it through the septum.*
◆ *Don't pull out drug with excessive pressure.*
◆ *Please certainly avoid emptying a reservoir. The materials of the reservoir stick together when you leave the empty reservoir for a long time (more than about 10min) by applied excessive pressure. Therefore, you can never use the pump again.*
◆ *Fill up with the exchanged drug after washing the reservoir with an appropriate solution (saline, buffer, or the exchanged drug of the same concentration).*
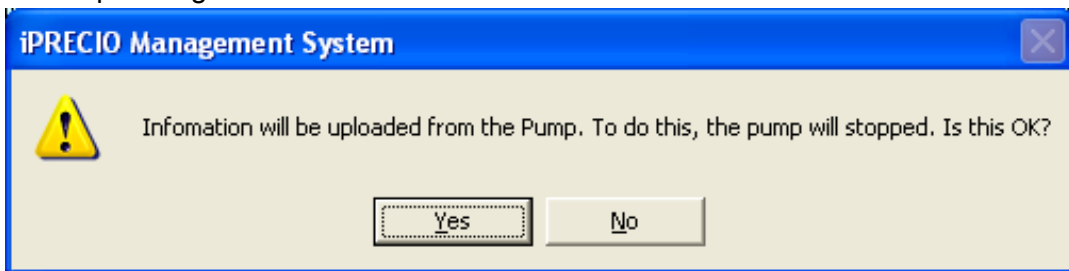
Uploading of the Pump Data

Upload the data from the pump when a study has been completed, to the software and confirm that the administration protocol was performed accurately.


Uploading of the Pump Data

Step

1. Place the pump on Data Communication Device.
2. Run the Status Manager.
3. Click **Upload**, uploading dialog is displayed.
4. Click **Yes** to get upload started. The pump which is still working is stopped by uploading.

iPRECIO Management System

⚠ Infomation will be uploaded from the Pump. To do this, the pump will stopped. Is this OK?

[Yes]   [No]

5. After completing status check, **Result of Upload** window is displayed. You can print out the uploaded schedule list as an individual pump ID/animal by using the Print function in the **Result of Upload** window shown below.
6. Click **OK** to return to the status manager.
7. All upload data, refill and exchange schedule which have been logged, maybe printed as a complete report (includes all groups and animals) along with the infusion protocol using the **Print** function from within the **File** menu in iPRECIO (See Printing the schedule list section).

Result of Upload

Pump ID	0780179-1
Reason of stop	Time progress
Remark	

[Print]   [OK]
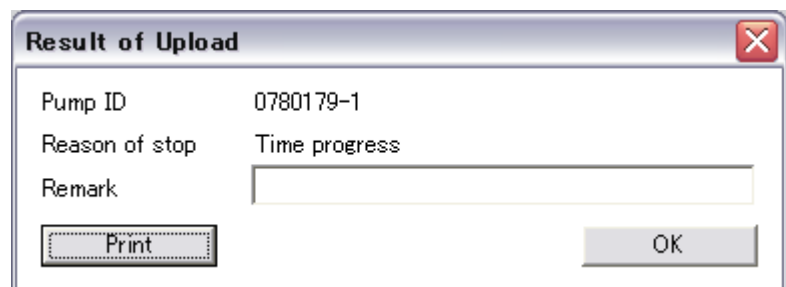
Memo About **Reason of stop**
Stop reason of the pump means following;

Time progress
The pump completed the infusion protocol as programmed.

Stop demand
The pump was uploaded while the administration schedule was still in progress.

Low Battery
The pump drive stopped due to low battery.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
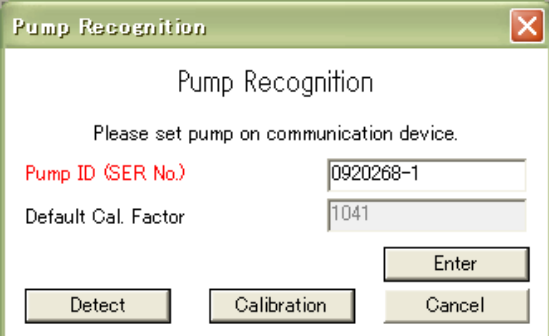
Re-calibration of the Pump

Each iPRECIO® micro-infusion pump is calibrated in the factory and the Cal. Factor is recorded in a built-in memory with its unique serial number.

If necessary, the user may perform calibration based on the pump discharge. A new Cal. Factor is calculated by performing a new calibration.

Note *If the pump is re-calibrated, the pump becomes pre-driving state (the pump is already activated.). Therefore the pump does not need to be activated by clicking the Activate button on Status Manager or pressing the ACT button on the Data Communication Device. The pump starts working as its protocol once the protocol is downloaded. The Start Date/Time of the administration should be within 3 hours from the end time of the Calibration.*

Step

1. Warm the pump to body temperature (Approximately 37-40 degrees).

2. Fill the pump, from the reservoir to the outlet tube tip, with a saline solution warmed to body temperature   (Approximately 37-40 degrees).

3. Connect the outlet tube of the pump to a micro syringe. Next, introduce a very small amount of air into the micro syringe. This air bubble is a marker which shows the solution discharged by a pump.

4. Place the pump on the Data Communication Device.

5. In the Animals Step, click **Detect** of the animal list of the pump to be calibrated.

6. In the Pump Recognition window, click **Detec**t to get the Pump ID and default Cal.factor recognized.

7. Click **Calibration**, and then a **Performed Pump Calibration** screen is displayed.

8. Select a number of cam rotations in **Rotation of Cam**. **Calibration period** and **Calculated Volume** are displayed.

9. Click **Pump ON** to get the Activation of the pump started. Click Pump OFF when the air in the syringe moves to the appropriate position to stop the pump.

Performed Pump Calibration

Perform Pump Calibration

Animal ID	Pump ID
a1	0920268-1

Calibration Setup

Rotation of Cam: 1.0
Calibration duration: 16 Min [Pump ON]
Calculated Volume: 6.070
Current Cal. Factor: 1041 [Start]

Actual Volume: 0.000(ul)
New Cal. Factor: 0

[Accept]   [Cancel]

10. Click **Start**, and the **Calibration of Pump flux** screen is displayed.

11. Click OK of the message "Calibration was started" and the calibration will start.

Calibration of Pump flux

Calibration of Pump flux is performed.

Pump calibration is complete.
Quantity is measured and value is input

Measurement value input: 0.000(ul)

[OK] [Pump OFF] [Cancel]

iPRECIO Management System

⚠ Calibration was started.

[OK]

12. When the calibration is completed (the bar completes), input the volume that the air bubble in the micro syringe moved and click **OK**. To measure again; click **Retry**.

13. The **New Cal. Factor** is calculated; click **Accept**.

14. Click Enter of Pump Recognition window to get the new Cal. Factor recognized.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Compatibility test

The parts of the pump (reservoir, catheter tube and connecters) which are exposed to the solution for infusion in an iPRECIO® Micro-infusion pump are made with medical grade SIBS, SEBS and PP. The solution is also in contact with the septum material. Current compatible and incompatible solvents are listed hereafter.

For the most current list of compatible solvents, check www.iprecio.com or contact your nearest official distributor.

For studies longer than 3 months, contact your nearest official distributor to confirm compatible solvents.

Last Updated September 2012

Compatible Solvents

Acids, with pH 4.5 or weaker
Bases, with pH less than 14
Buffered Phosphate Saline (PBS)
Cremophor EL, up to 25% in water
Culture Media (1% benzyl alcohol)
Cyclodextrin
Dextrose, up to 5% in water or saline
N,N-Dimethyl formamide (DMF), up to 25% in water
DMSO 50% and water or saline 50%
DMSO, up to 50% in ethanol (≤15%) and water
DMSO 5% and PEG400 95%
50% DMSO + 50% Propylene Glycol
DMSO 50% and water 50%
DMSO 50% + 15% ethanol and 35% water
Dulbecco's Modified Eagle Medium (D-MEM) (1X), liquid
Ethanol, up to 50% in water
Glycerin, up to 75% in water
Glycerol 100%
1-Methyl-2-Pyrrolidone, up to 12.5% in water
Propylene Glycol
Ringer's solution (without lactate)
Saline, 0.9% (or other aqueous salt solution)
Triacetin, up to 5% in water
Tween 80, up to 2% in water
Water, distilled

Viscosity up to 20 cp is ok. (Higher viscosity not tested due to the use of 27G needles. Difficulty to aspirate solution with 27G needle)

Last Updated September 2012

Short term use only (1 - 1.5month)

PEG200 100%
PEG300 100%
PEG400 100%
Solutol® 15% in water

In-compatible Solvents

Acids, with pH less than 1.8
Bases, with pH higher than 14
Benzyl-alcohol >10% vol
Corn Oil
DMSO (100%)
DMSO 50% + ethanol 50%
DMSO 50% and PEG400 50%
DMSO 50% and PEG300 50%
DMSO 50% and PEG200 50%
Ethyl Oleate
Mineral Oil
Sesame Oil
Solutol® 30% in water

In-compatible Drugs/Molecules

Rotenone (CAS 83-79-4) ≥ 3µg/ml

  Primetech Corporation recommends that a compatibility test be performed before using a pump to ensure the drug and solvent solutions are compatible with the materials used. Strong acids, strong alkalis and organic solvents may cause decomposition or denaturation of the materials comprising the pump. Drug compounds may also be absorbed by the materials.

  Primetech is able supply the complete sub-assembly composing of SIBS reservoir, PP refill port with septum, PP connecters and SEBS catheter for evaluation of compatibility. For compatibility testing, add the solution in question into the reservoir and catheter sub-assembly (warmed to body temperature), in a controlled environment. Incubate for a period of time exceeding the expected study duration. After incubation, analyze the solution according to known analysis procedures.

  A test kit containing the different materials used is also available for evaluation.

How to install USB driver for Windows XP

Step by step guide for iPRECIO® driver installation.

- **Install iPRECIO drivers before installing iPRECIO® Management Software.**
- **For iPRECIO® Software installation, see User Manual, page 13.**

Notes and Warnings
- ◆ iPRECIO USB Communication Device must be disconnected from PC before installing drivers.
- ◆ **Administrator Rights are required for correct driver installation.**

1. Turn on the computer.
2. Put the iPRECIO® management software installation CD in the CD-ROM drive.
3. Open the CD-ROM Drive.
4. Double-click the Setup icon **<FirstStep>**
5. iPRECIO® Management System Setup program gets started as shown below, **Select <Driver Install>.**

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
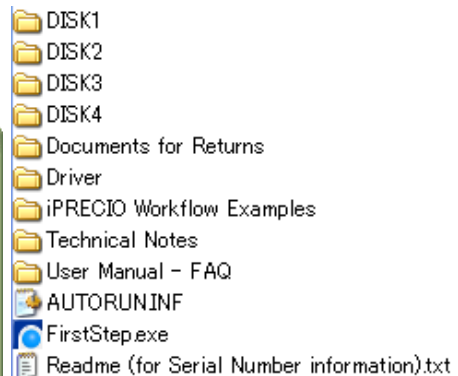
Select <Driver Install>
After selecting <Driver Install>, the following window will appear as the installation process begins.

A short while later, the <Software Installation> window below will automatically open.

Select <Continue Anyway> and to proceed to the next step.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

A short while later, the <Software Installation> window will automatically open.
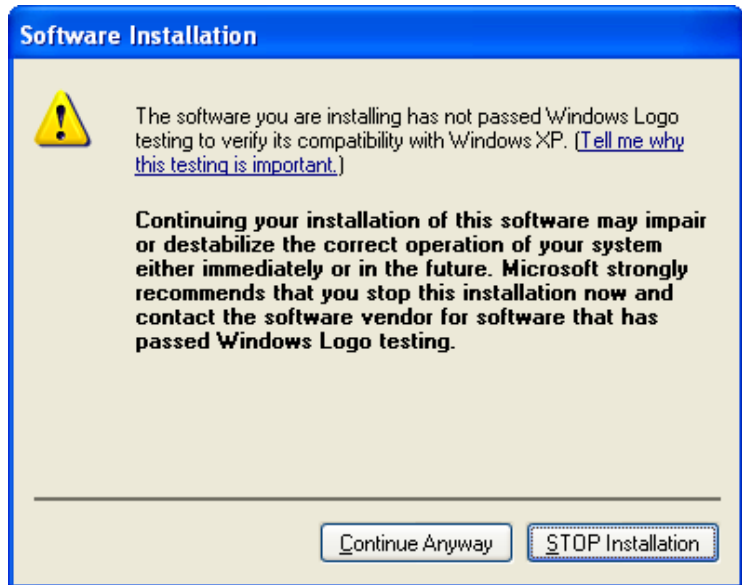
Select <Continue Anyway> and upon completion of this step, you should have the following window to confirm that the installation was successful.

First part of installation is now complete. Click on <OK>

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
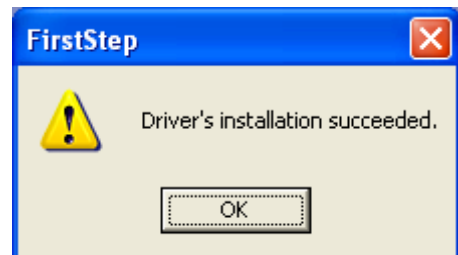
Now connect the iPRECIO® USB Communication Device to the PC USB Port.

You may or may not have the first window shown directly below (depending on XP version).

- If the first window is opened with the following question <Can Windows connect to Windows Update to search for software>, select **<No, not this time>**
- It will then be followed by a second window. (You may have the second window directly

Select <Continue Anyway> and upon completion of this step, you should have the following window to confirm that the installation was successful.

<First Window> : You may or may not have this.

<Second Window>: You may have this window directly,

Select **<Install the software automatically (recommended)>**

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Then the following <Found New Hardware Wizard> window will open. You may or may not have the same number of files as shown. (3 choices)

- If you only have one choice, please select the one <iPRECIO USB Converter 2.4.6.0> but most likely, it will continue automatically to install without further prompts.
- If you have more than one choice, please select from <**c:\windows\inf\oemXX.inf**>
- If the choice includes more than one oemXX.inf file, select the file with the highest numerical number which should be most recently installed driver. For the example below, it is highlighted in blue, < **c:\windows\inf\oem54.inf** >.
- Click <Next>
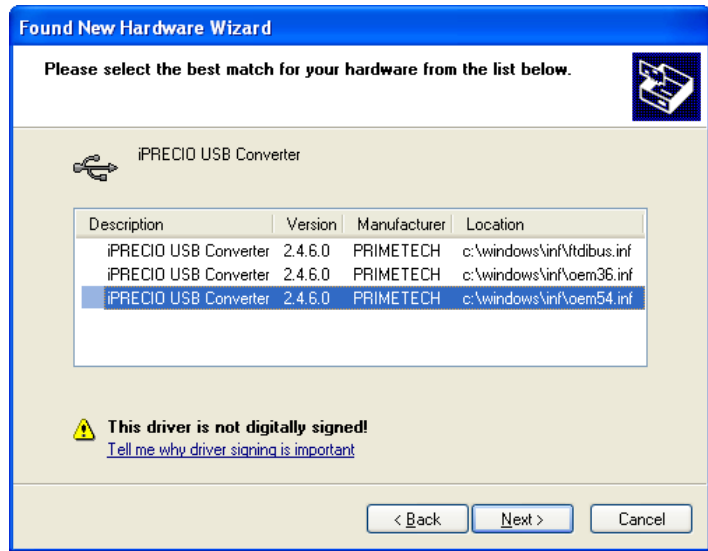
The following window will appear.
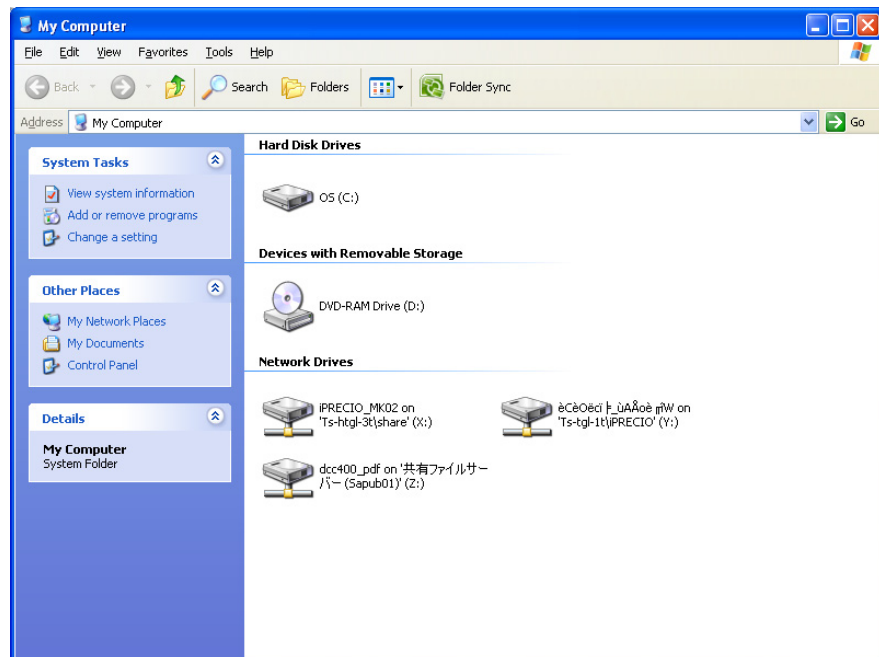

Click on <Continue Anyway>

This then completes the installation of <iPRECIO USB Converter>.

The following window will appear.
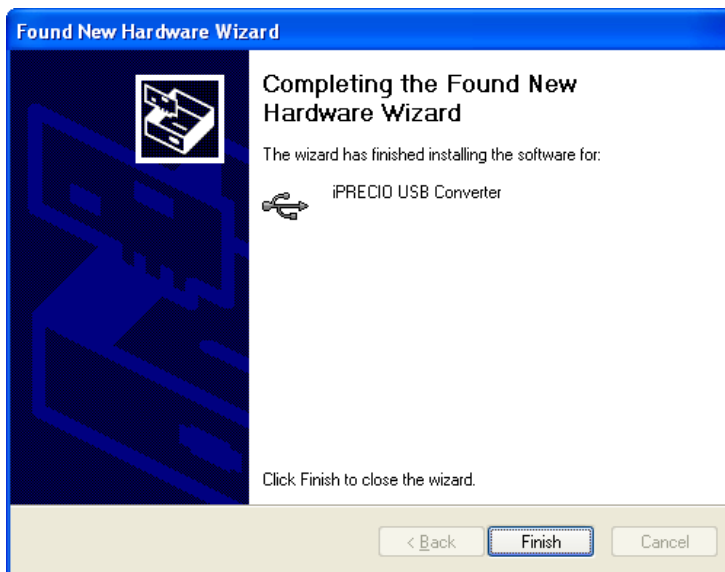
Click on <Finish> to complete this installation. A few seconds after selecting <Finish>,

<iPRECIO® USB Port Installation> window will automatically open.

Select <Install the software automatically (Recommend)> and click on <Next>

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com　▶iprecio@primetech.co.jp

Then the following window will open. You may or may not have the same number of files as shown (3 choices)

- If you only have one choice, please select the one <iPRECIO USB Converter 2.4.6.0> but most likely, it will continue automatically to install without further prompts.
- If you have more than one choice, please select from <**c:\windows\inf\oemXX.inf**>
- If the choice includes more than one oemXX.inf file, select the file with the highest numerical number which should be most recently installed driver. For the example below, it is highlighted in blue, **< c:\windows\inf\oem55.inf >**.
- Click <Next>
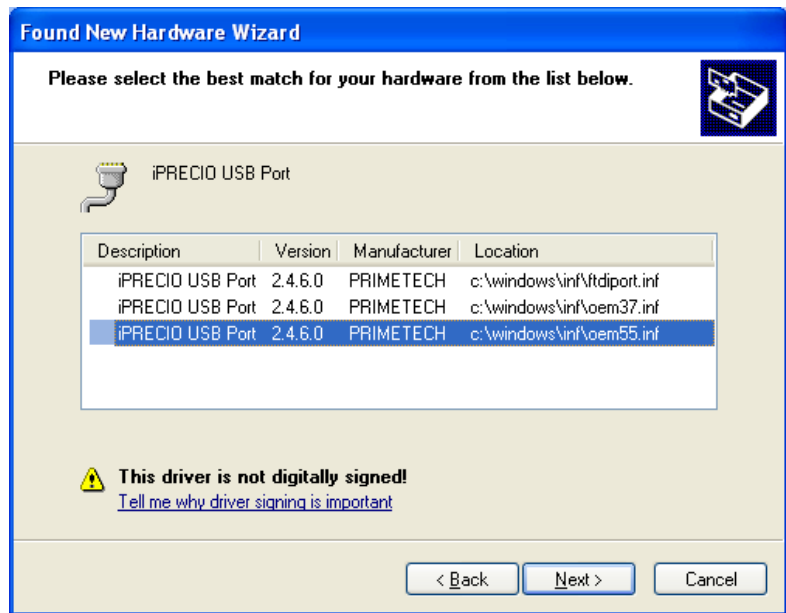
The following window will appear.

Click on <Continue Anyway> You will then go to the next window.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
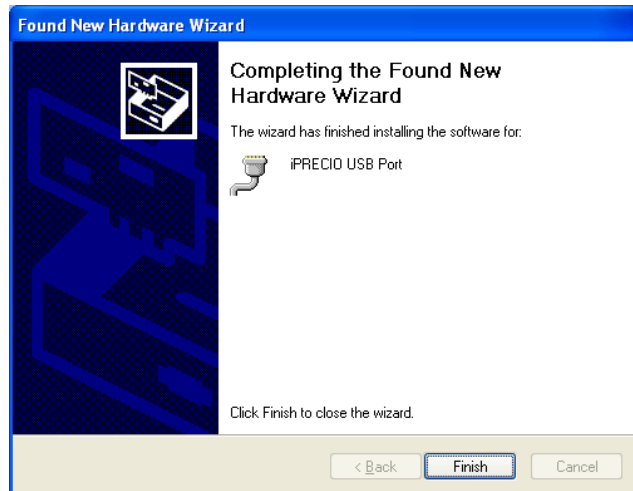
Select <Finish>. Unless you have some <Warnings> the drivers should have been successfully installed.

You can now Proceed Directly to Page 13 of iPRECIO® User Manual Startup Guide. Once installed the iPRECIO® Management Software will automatically check installation of drivers. If installation completed successfully and that the assigned COM Port is 8 or lower, you will not need to check Installation of Driver Manually. If there is a problem, please follow the following Guide.

Manual Check: Status of iPRECIO® Driver and Converter

To check that Installation of Driver completed OK, open <My Computer> on your PC
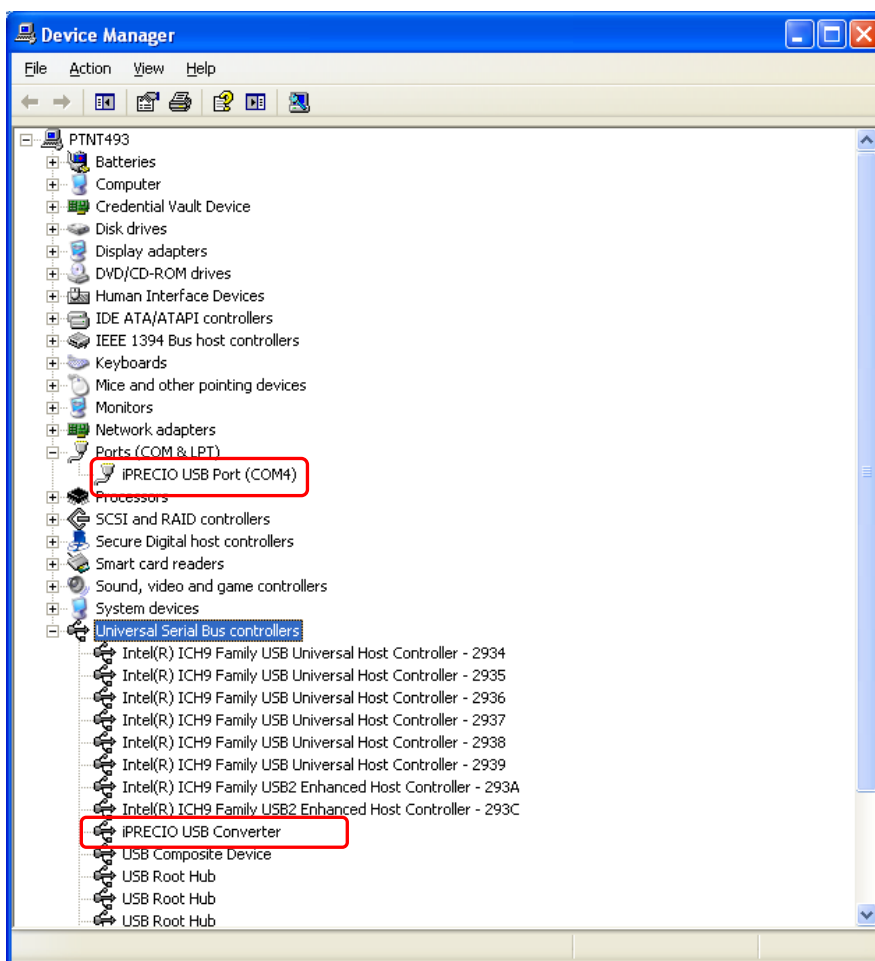

Select <View System Information>

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
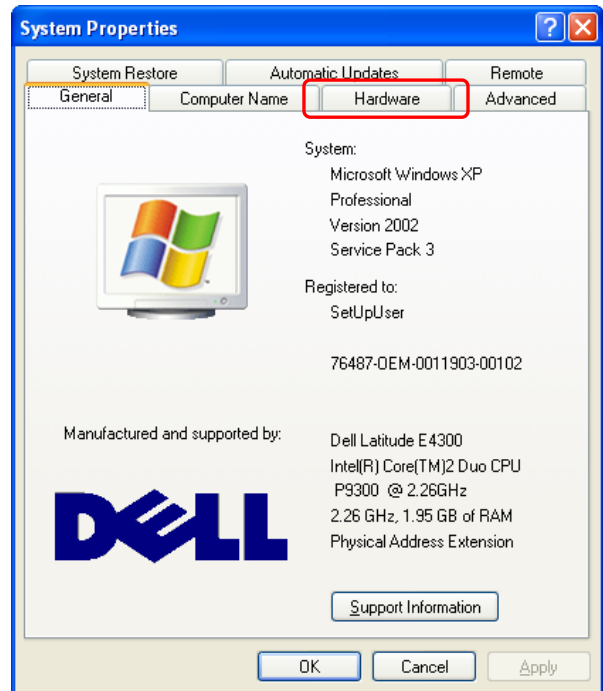
Select <**Hardwar**e> Tab and then select <**Device Manager**>. Windows Edition and System type are shown for reference here – **Windows XP**.
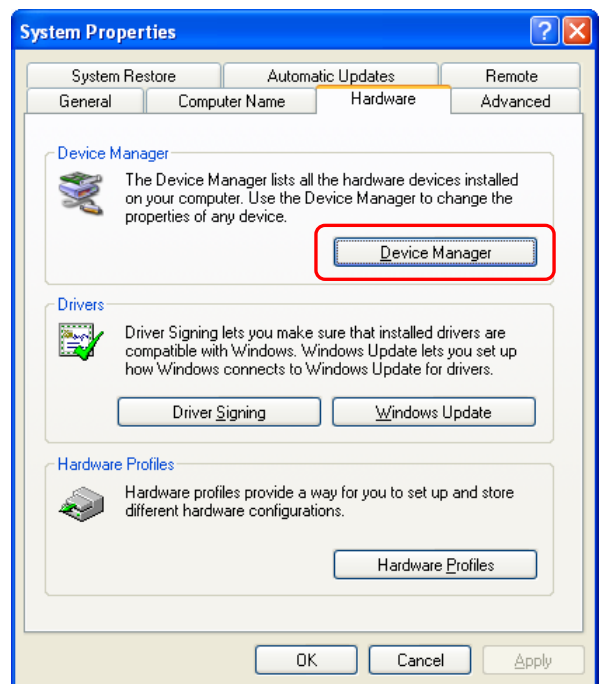
You will then be able to check that the iPRECIO® USB Port Driver and iPRECIO® USB converter have been installed correctly. The <**Device Manager**> window below shows that there are no error messages for both. (Highlighted). It is also important to ensure that the iPRECIO® USB Port has been assigned to a port of 8 or less. In the example below, iPRECIO® have been assigned to Com 4.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
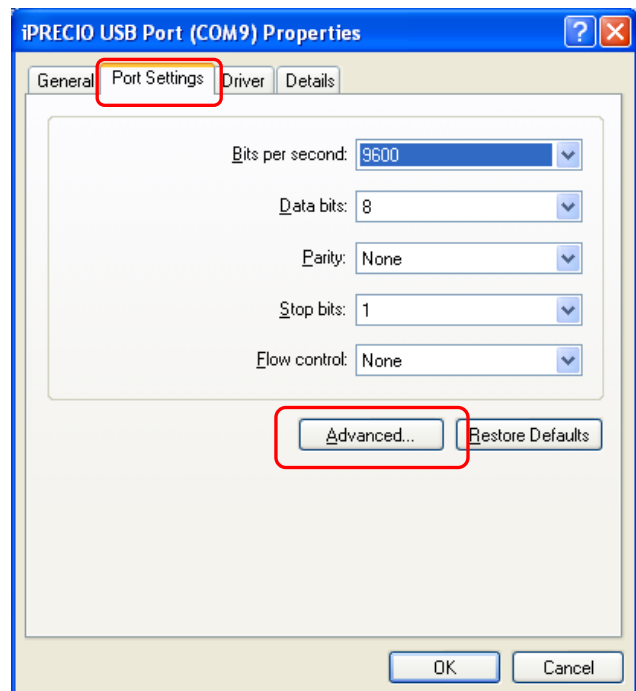
If iPRECIO® USB port has been assigned to COM 9 or higher, you can change the setting manually.
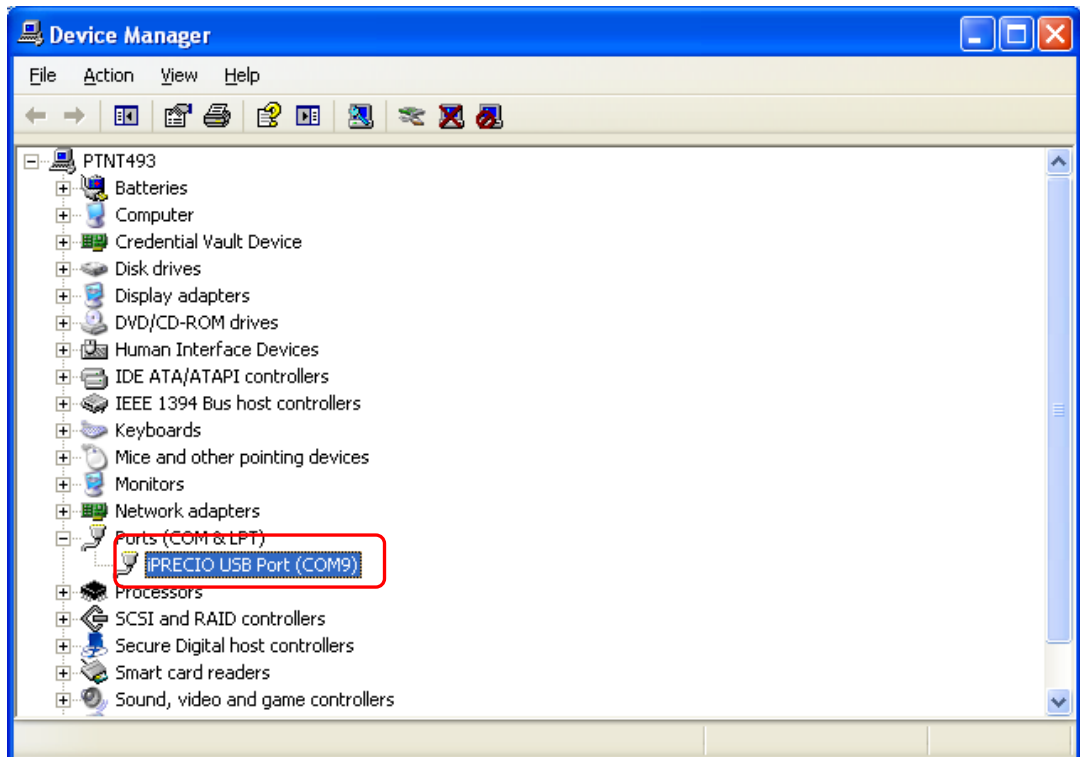
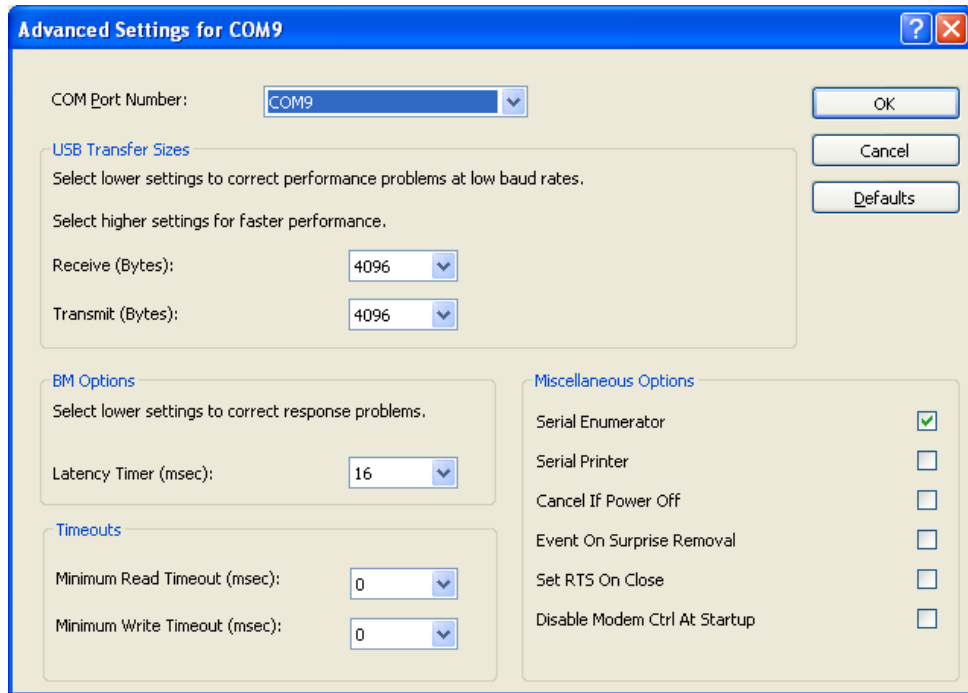Right Mouse Click after selecting <iPRECIO USB Port (COM9)> and Select <Properties> or double click on <iPRECIO USB Port (COM 9)>.

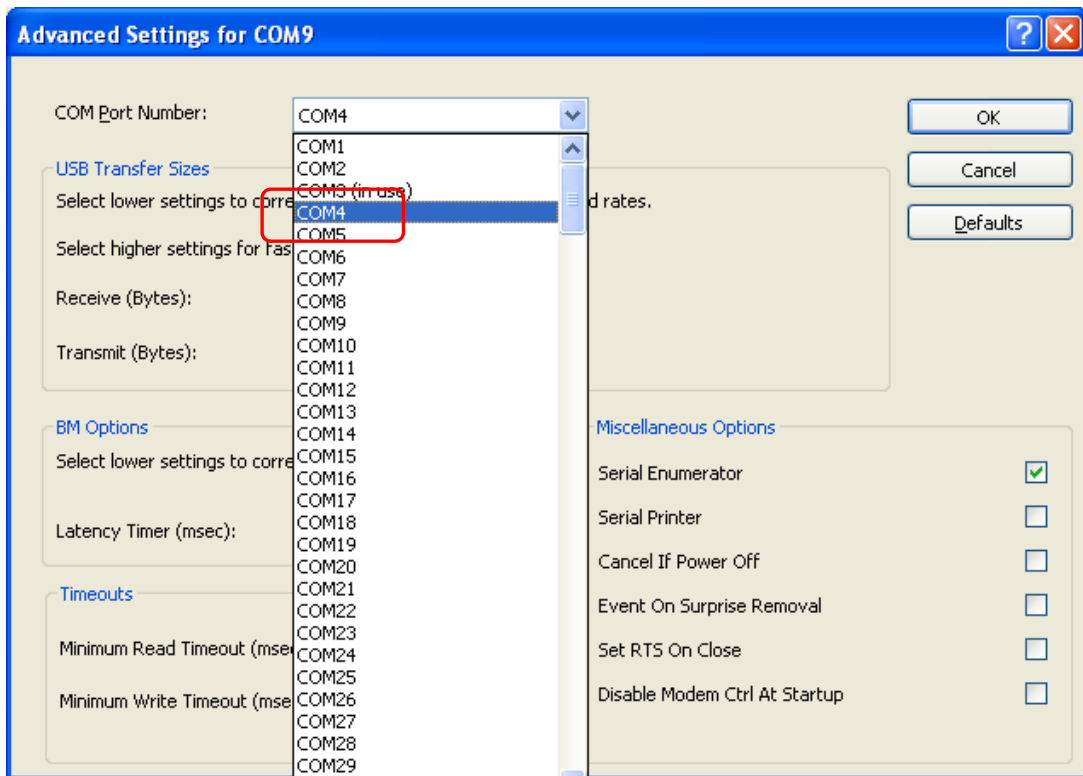Then select <Port Settings> Tab and select <Advanced> button
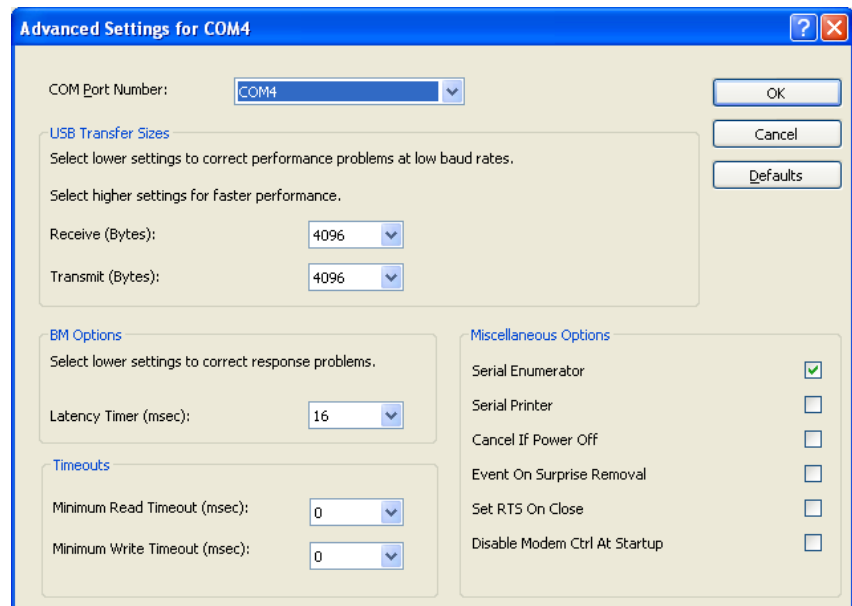
<Advance Settings for COM9> window opens.

Select <COM Port Number> between **1 and 8** and do not select COM ports which are in use. Here COM4 is selected and it is highlighted.

Once you have selected the right COM Port, then close all the windows by selecting
<OK> and closing all the open windows by successively selecting <OK>

Advanced Settings for COM4

COM Port Number: [COM4 ▼]

OK
Cancel
Defaults

USB Transfer Sizes
Select lower settings to correct performance problems at low baud rates.

Select higher settings for faster performance.

Receive (Bytes): [4096 ▼]

Transmit (Bytes): [4096 ▼]

BM Options
Select lower settings to correct response problems.

Latency Timer (msec): [16 ▼]

Timeouts

Minimum Read Timeout (msec): [0 ▼]

Minimum Write Timeout (msec): [0 ▼]

Miscellaneous Options

Serial Enumerator ☑
Serial Printer ☐
Cancel If Power Off ☐
Event On Surprise Removal ☐
Set RTS On Close ☐
Disable Modem Ctrl At Startup ☐

Notes:
1. If you use other USB devices, it is recommended to ensure that there is no
    conflict of COM Ports.
    a. Best way to check this is by having all USB devices connected to the PC
        when checking free COM port positions. Example below shows that
        COM3 is already in use and you must not select it. Depending on the
        number of USB devices in use, you will need to select an unused COM
        Port Number.

You will then be able to check that the iPRECIO® USB Port Driver and iPRECIO® USB converter have been installed correctly. **You can now Proceed Directly to Page 13 of iPRECIO® User Manual Startup Guide**.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
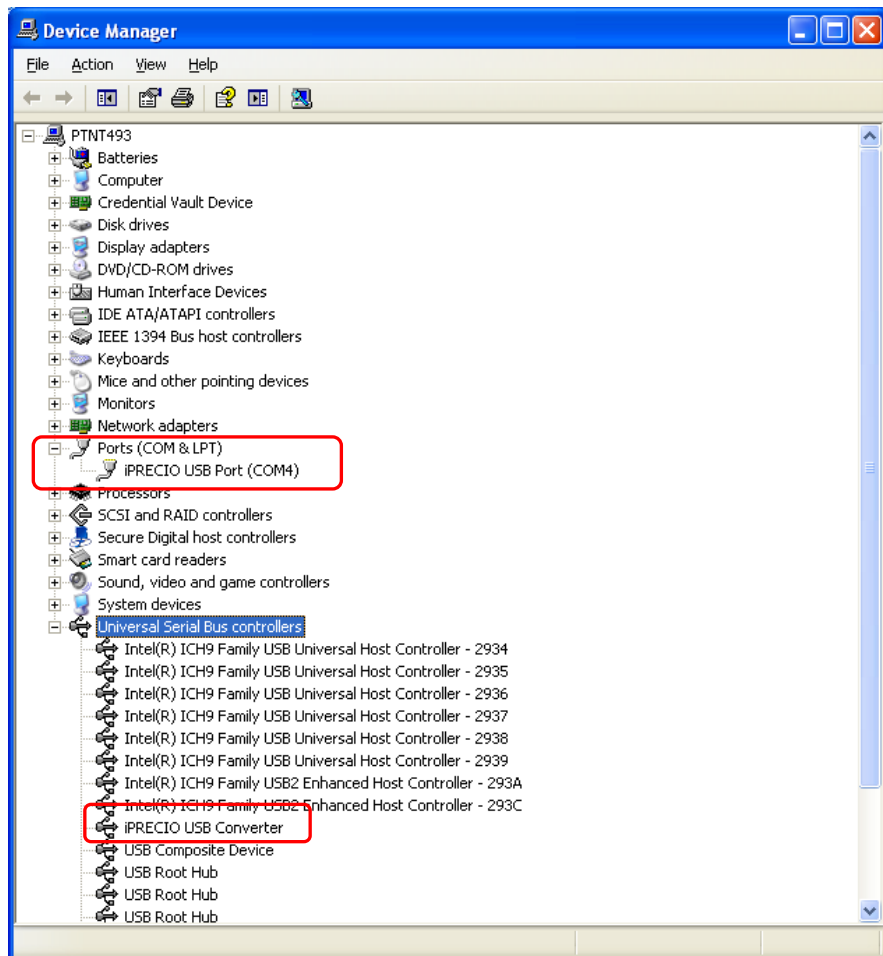
How to install USB driver for Windows 7

Step by step guide for iPRECIO® driver installation.

- **Install iPRECIO drivers before installing iPRECIO® Management Software.**
- **For iPRECIO® Software installation, see User Manual, page 13.**

Notes and Warnings

◆ iPRECIO USB Communication Device must be disconnected from PC before installing drivers.

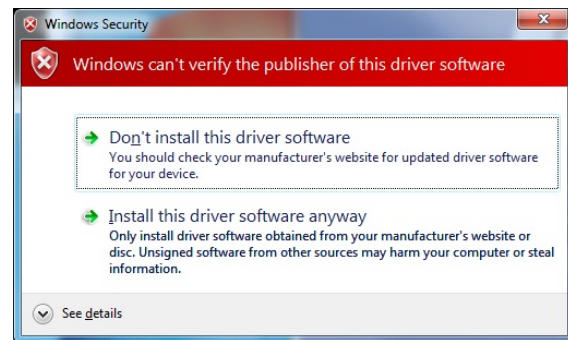◆ **Administrator Rights are required for correct driver installation.**

1. Turn on the computer.
2. Put the iPRECIO® management software installation CD in the CD-ROM drive.
3. Open the CD-ROM Drive.
4. Double-click the Setup icon **<FirstStep>**
5. iPRECIO® Management System Setup program gets started as shown below, **Select <Driver Install>.**

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

After selecting <**Driver Install**>, the following window will appear as the installation process begins.
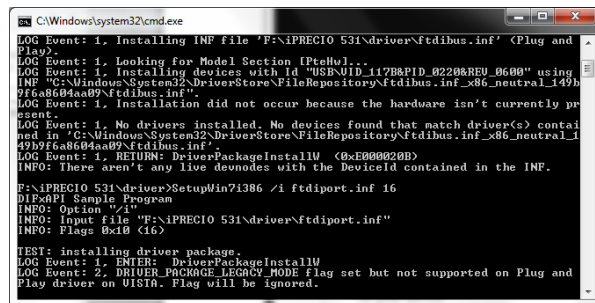

Then the following window opens.
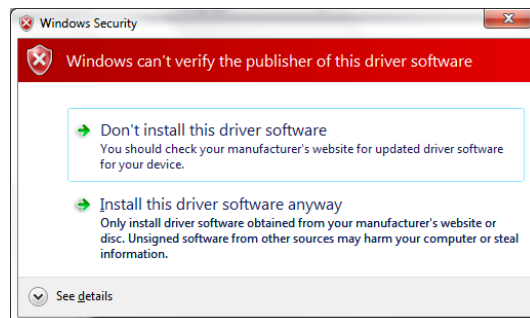

Select <**Install this driver software anyway**>

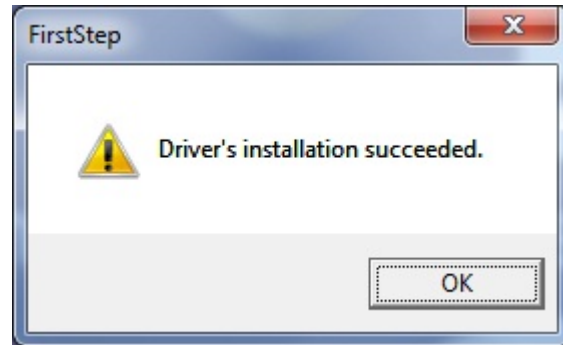A short while later, the <Command Line Window> below will automatically open as the installation process continues.


Then the following window opens.

Select <**Install this driver software anyway**>

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com　　▶iprecio@primetech.co.jp

First part of installation is now complete. Click on <**OK**>

Now connect the iPRECIO® USB Communication Device to the PC USB Port.

When you connect the iPRECIO® USB communication device to the PC USB Port, the PC will automatically associate the successful driver installation with the device. When successfully associated and installed, the following Window and information is provided.
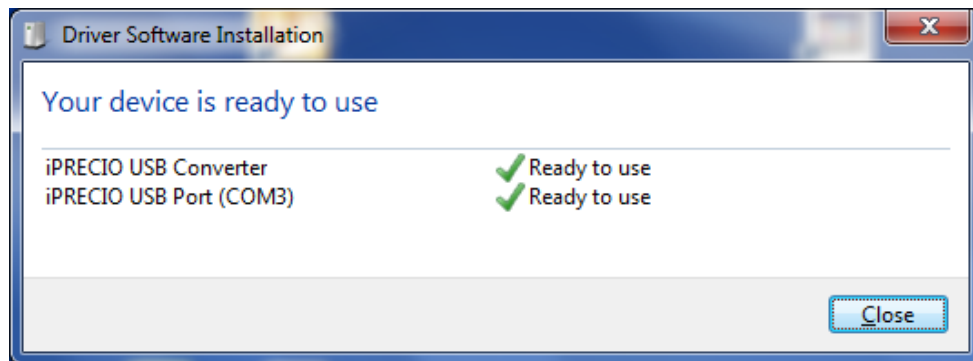
Select <Close>. Unless you have some <Warnings> the drivers should have been successfully installed. If installation completed successfully and that the assigned COM Port is 8 or lower, you will not need to check Installation of Driver Manually.

You can now Proceed Directly to Page 13 of iPRECIO® User Manual Startup Guide. Once installed the iPRECIO® Management Software will automatically check installation of drivers. If installation completed successfully and that the assigned COM Port is 8 or lower, you will not need to check Installation of Driver Manually. If there is a problem, please follow the following Guide for Manual Check of Status of Driver.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Manual Check: Status of iPRECIO® Driver and Converter

To check that Installation of Driver completed OK, open <**Computer**> on your PC from the start menu. Then select <**View System Properties**>
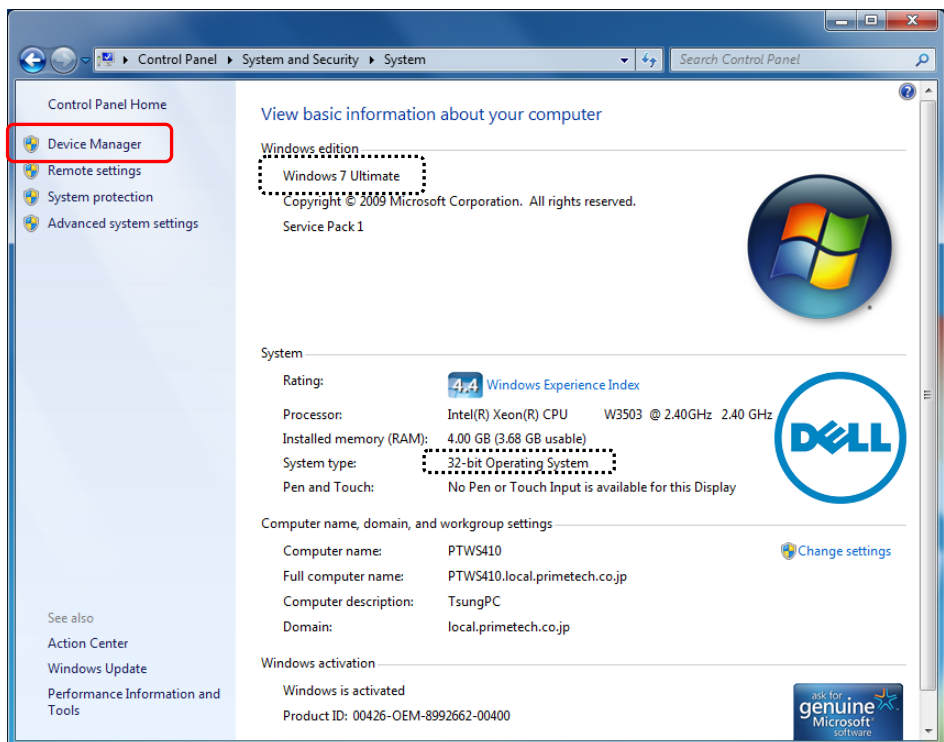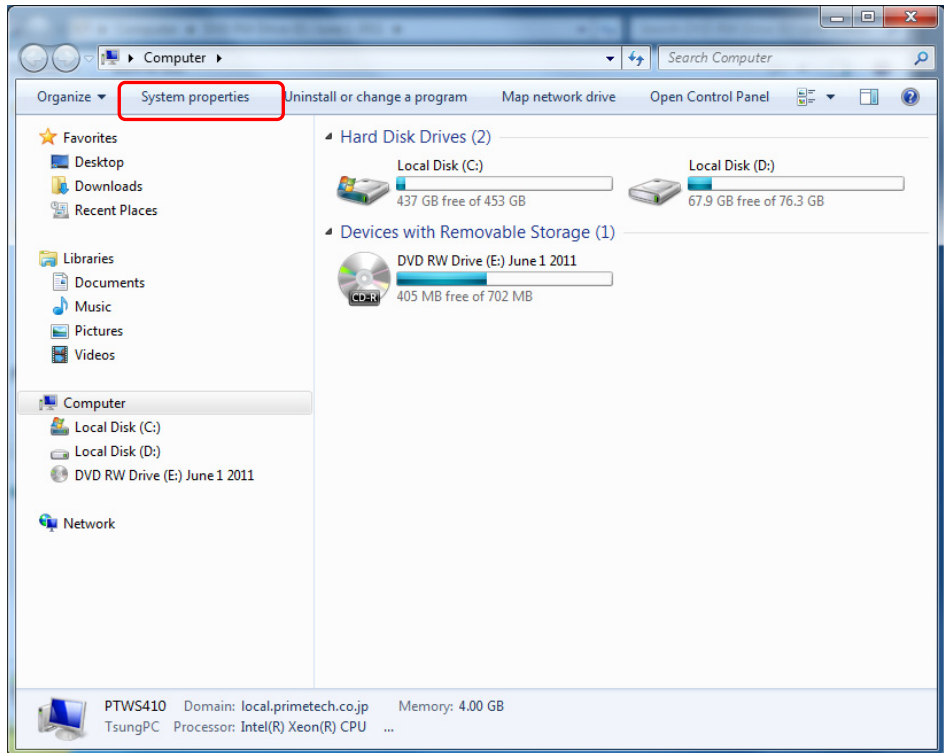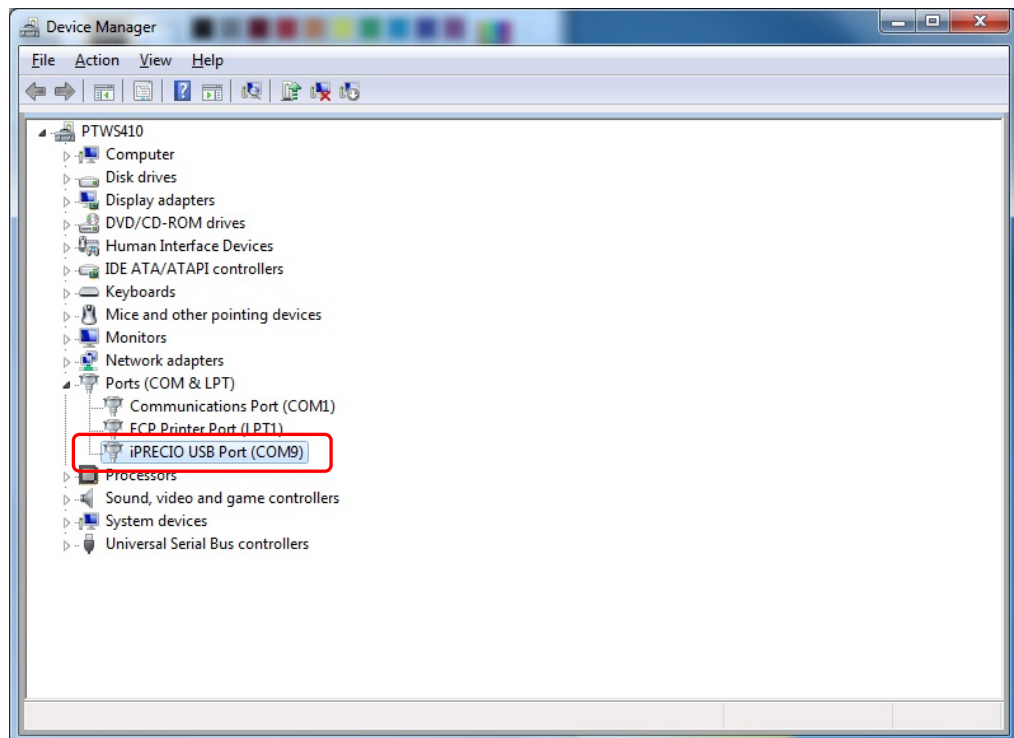

In <**System Properties**> select <**Device Manager**>. Windows Edition and System type are shown for reference here – **Windows 7** Ultimate with **32 bit Operating System**.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

<Device Manager> Screen is shown below.
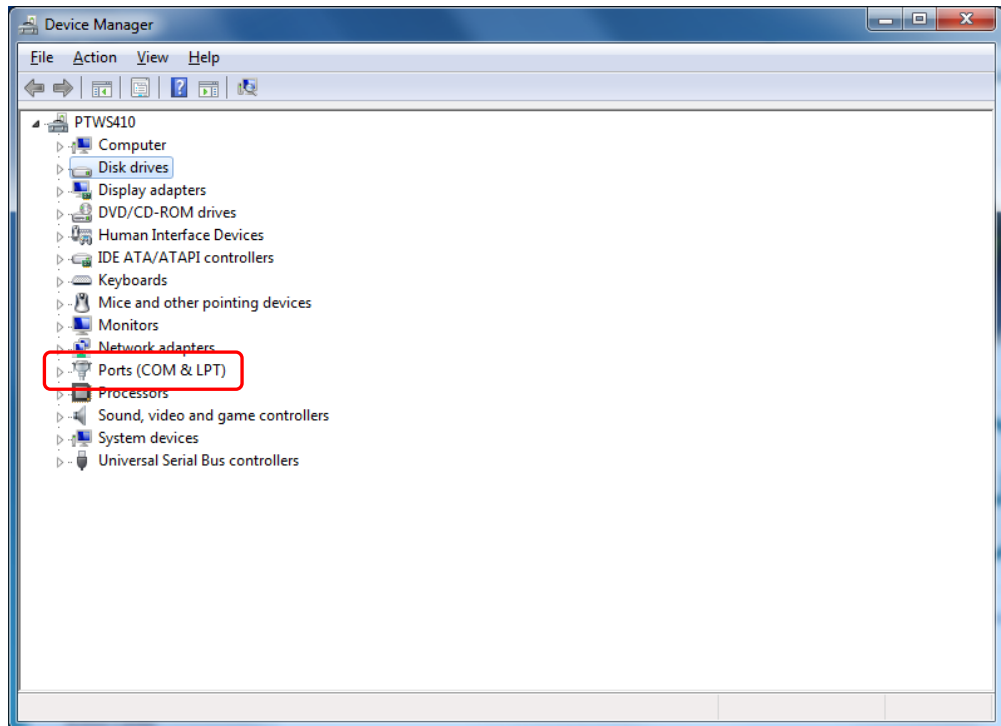
In <Device Manager> select and double click on <Ports (COM&LPT)

As there are no error messages, iPRECIO® was successfully installed. However, as it was assigned to COM 9, it will need to be re-assigned to COM 8 or lower. Select and double click on <iPRECIO USB Port (COM9)> to access properties. In <Properties> select <Port Settings> then select <Advanced>.

<Advance Settings for COM9> window opens. Click on <COM 9>
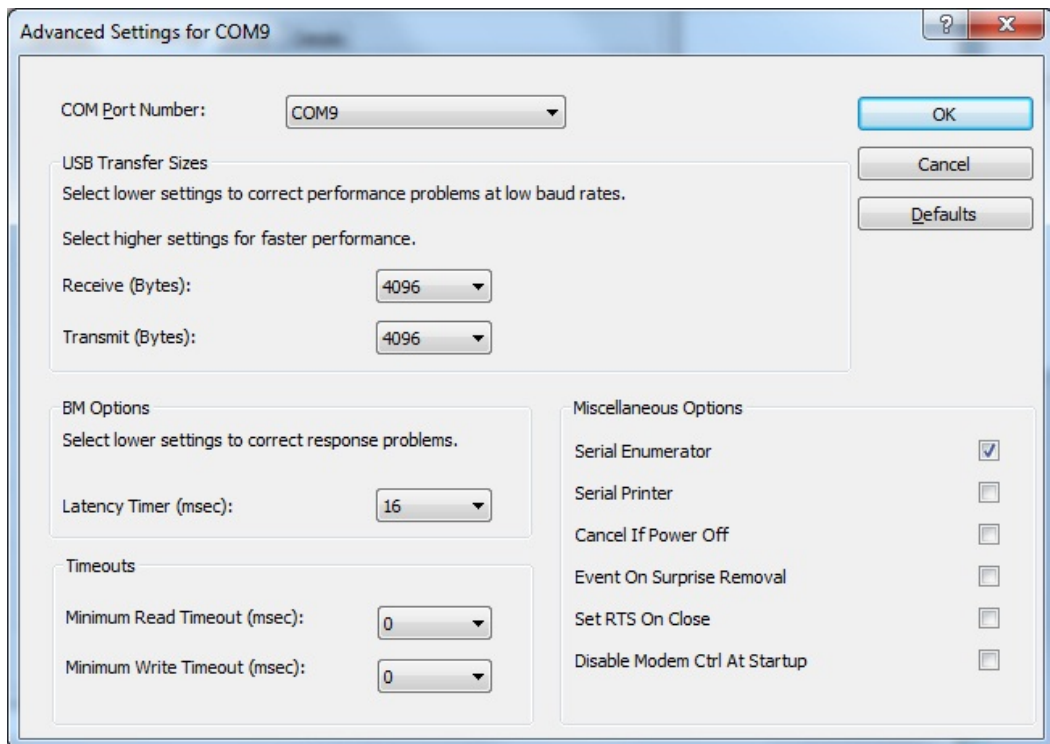
Select <COM Port Number> between **1 and 8** and do not select COM ports which are in use. In this example, COM4 is selected and then click <OK>.

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp
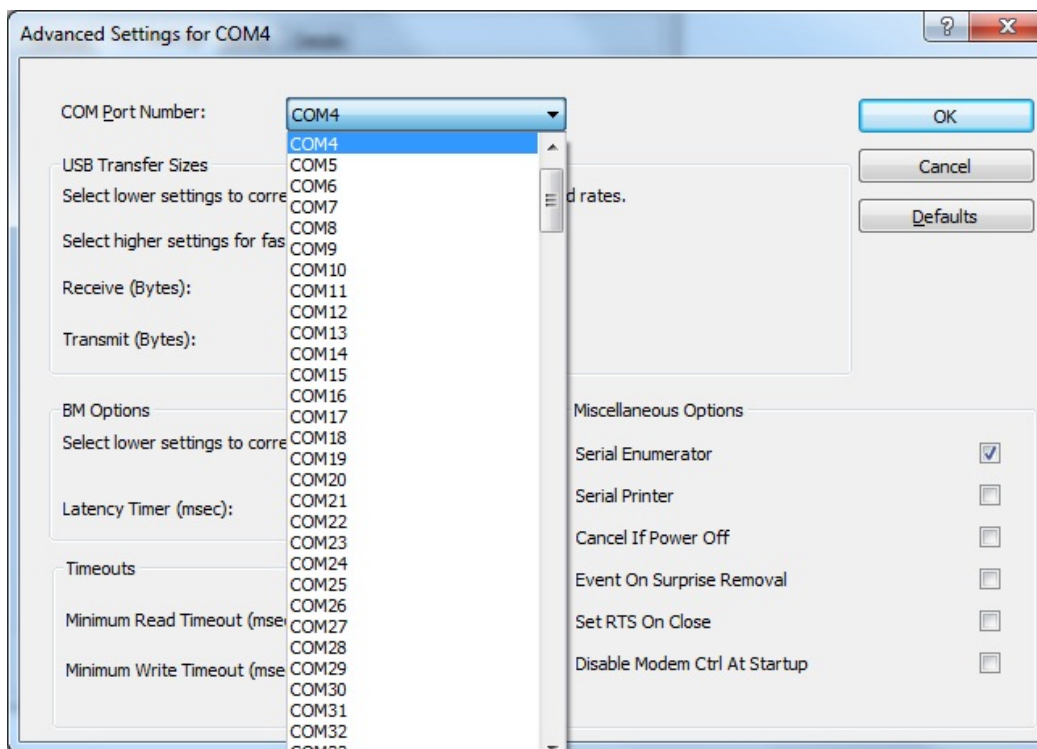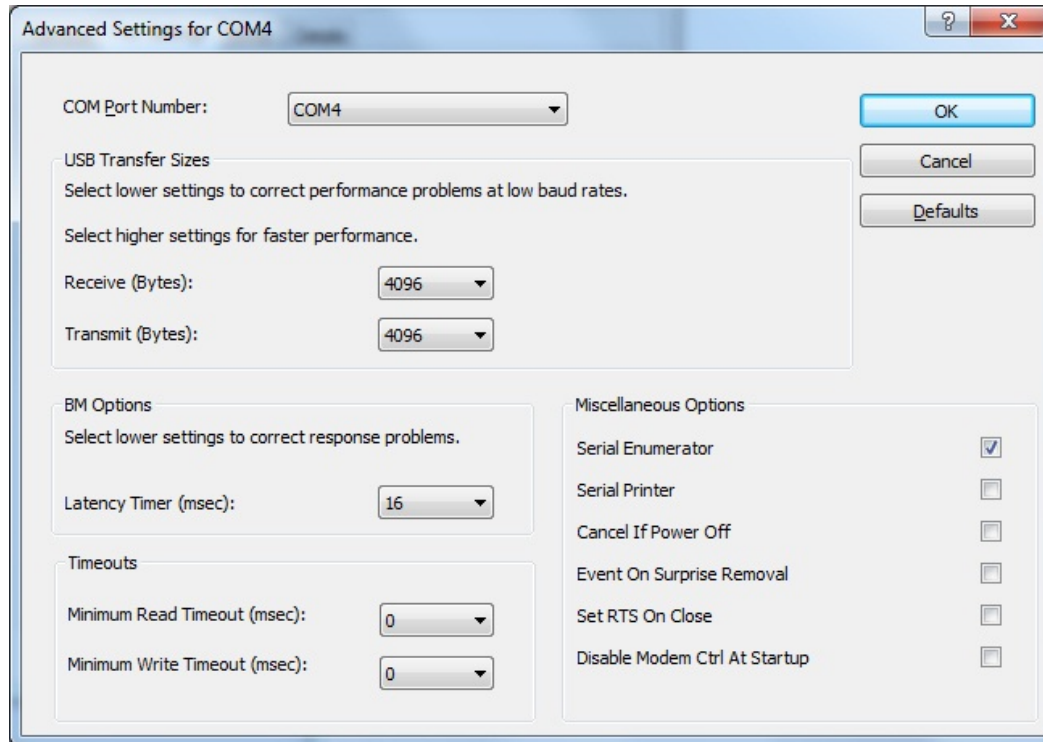
Select and successively click on <OK> until the following screen is shown where **<iPRECIO USB (COM4)>** is shown without any error messages. The driver should now work correctly when associated with iPRECIO® communication device to the PC USB. **You can now Proceed Directly to Page 13 of iPRECIO® User Manual Startup Guide**.
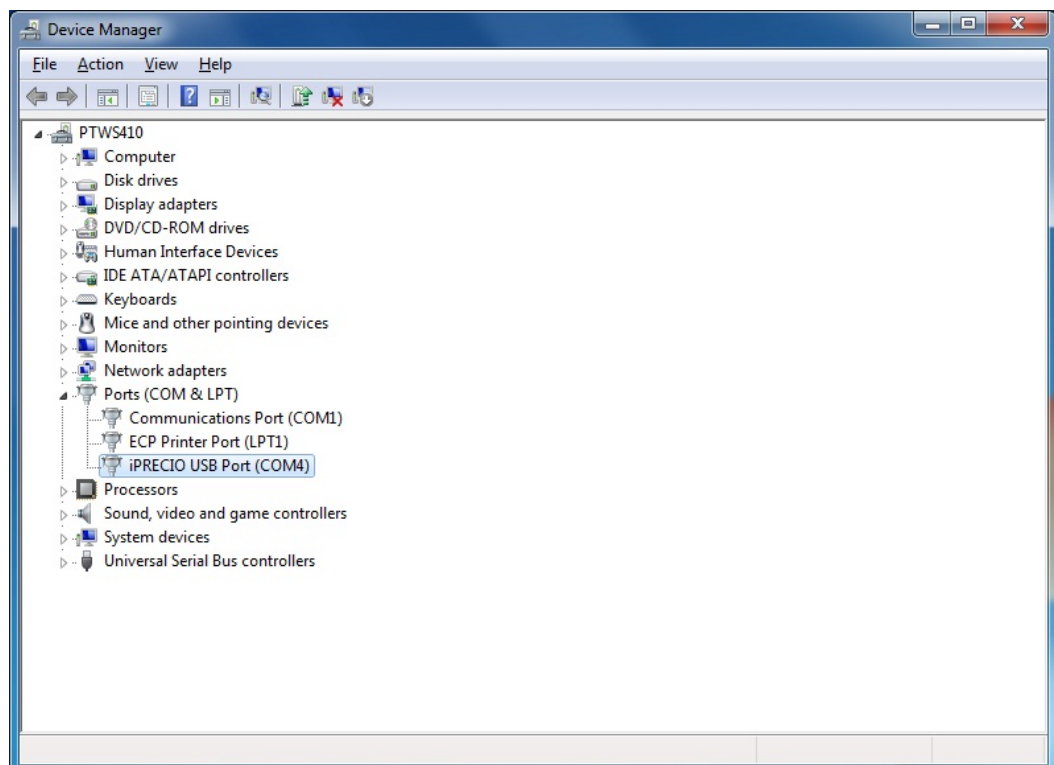
If you use other USB devices, it is recommended to ensure that there is no conflict of COM Ports. Best way to check this is by having all USB devices connected to the PC when checking free COM port positions. Example shows that COM1 is already in use and you must not select it. Depending on the number of USB devices in use, you will need to select an unused COM Port Number.

Trouble Shooting

Screen	Problem	Solution	Reference Page
Ready	The User Registration is not checked when start up the software.	Register Users.	16
Ready	The USB Interface Configuration in not checked when start up the software.	Set up the USB connection.	18
Ready	USB COM displays Problem.	Ensure that USB connection is set-up correctly by following guide to check status to solve problem.	18
Header Step	I cannot find the option which I would like to select.	Click **Add New Option** and input new option.	30
Header Step	I cannot open Groups screen even if clicking **Next**.	All fields must be completed before moving to next screen. Input all the fields with asterisk.	30
Groups Step	I cannot open Animals screen even if clicking **Next**.	All fields must be completed before moving to next screen. Input Flow Rate or Dose if Constant Mode is selected. You also need to fill in estimated minimum and maximum animal weight.	31
Animals Step	The "Animal's weight" that I input is automatically changed to another value.	You cannot input the value which is lower or higher than the Max/Min weight that you set on the "Groups step". If you wish to change, please back to the "Groups step" and modify the values.	31
Animals Step	"**Initial**" does not change to "**Mode Set**" in the Status box.	Click **Set** and input appropriate **Start Date/Time** and **Duration**.	32
Animals Step	The error message pops up when I input Start Date/Time.	The Start Date/Time should be input in the format "year/month/date hour:min" and that date and time must allow enough time for activation after programming and downloading.	32
Animals Step	The input Duration is changed automatically to another value.	Duration cannot exceed Max duration subject to the battery life.	34

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com　▶iprecio@primetech.co.jp

Screen	Problem	Solution	Reference Page
Animals Step	Error message pops up when clicking **Detect** of Pump Recognition window.	Put the pump on the Data Communication Device correctly.	36
Animals Step		Ensure that the **USB COM** displays **OK**.	36
Animals Step		Close the cover of the Data Communication Device and try again.	36
Animals Step		Ensure that there is no intensive light around.	36
Animals Step	Error message pops up when clicking Enter of Pump Recognition window.	Ensure the pump has not detected for the other animal in the protocol.	36
Pumps Step	Error message pops up when clicking **Program Pump**.	Put the pump on the Data Communication Device correctly.	37
Pumps Step		Ensure that the **USB COM** displays **OK**.	37
Pumps Step		Close the cover of the Data Communication Device and try again	37
Pumps Step		Ensure that direct sunlight or strong lighting conditions are not causing interference.	37
Pumps Step		Place the pump of the same ID as that on the screen.	37

Infusion volume/battery life guidelines

The battery life is up to 6 months at a Flow Rate of 1.0 µl/h continuously. As a guide, see table below. You can confirm the attested battery life on the PC screen when you set the infusion protocol by the iPRECIO® Management Software.

Flow Rate	Continuous Infusion	Total Volume
1.0 µl/h	4,328 hours (about 6 months)	4.33 ml
8.5 µl/h	669 hours (about 1 month)	5.69 ml
19.0 µl/h	307 hours (about 1.8 weeks)	5.83 ml
30.0 µl/h	196 hours (about 1 weeks)	5.88 ml

PRIMETECH CORP. Tokyo, Japan
▶www.iprecio.com   ▶iprecio@primetech.co.jp

Specifications

iPRECIO® Micro-Infusion Pump

	Infusion Method	Rotary Finger Method (patented peristalsis)
	Reservoir	900μL Built-in Elastic Reservoir (Medical Grade SIBS)
Tubing	Inner Tubing	Material: Medical Grade SEBS（Olefin Series） Inner Diameter : 0.57 mm / 0.0224 in
	Outer Tubing	Material: Medical Grade SEBS（Olefin Series） Inner Diameter : 0.55 mm / 0.0216 in Outer Diameter : 1.20 mm / 0.047 in / 3.6 Fr Length of Outer Tube : approx.135mm
	Activation Method	IR Communication
	Data Communication	
	Range of Flow Rate	1.0μL/hr - 30.0μL/hr (Resolution: 0.1μL/hr)
	Accuracy	±5% accuracy (under 0-80cmH$_2$O pressure）
	Battery Life	6 Months at 1.0μL/hr - 1 week at 30.0μL/hr
	Size / Weight	38.7mm(L) × 19.2mm(W) × 9.7mm(H) / 7.9g
	Type of Usage	Disposable
	Package	EO Sterilized blister package (5pcs/box)

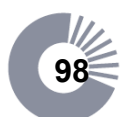iPRECIO® is for use in Laboratory Animal Research Only. Not for human use.

iPRECIO® Management System

iPRECIO® Management Software (requires Windows XP or 7 and USB port)

Management of Infusion Protocol Study Name, Number/ID, Date, Experiment Period, Section Name, Operator, Number of Groups/Animals, Animal Species, Strain, Age. Compound Name/ID, Concentration, Buffer Name, Administration Route, etc.	
Automated Recognition of Pump ID / Calibration Factor	
Pump Programming via PC	
Programmable Parameters	Start date/time, Stop date/time, and Flow Rate
Infusion Mode Selection	1. Instant Infusion Mode 2. Post Recovery Infusion Mode
Flow Rate Mode Selection	1. Constant Flow Rate Mode 2. Variable Flow Rate Mode * In Variable Flow Rate Mode, Repeat Mode is selectable.
Dead Volume Setting	Catheter diameter and length or Actual Volume
Flushing Setting	Flushing Rate and Exchange Schedule
Infusion Management Schedule (offline)	Exchange Schedule, Refill date/time, Alarm, Elapsed Time and Total volume, etc.
Re-calibration of iPRECIO® pump	
Upload the Pump's log	

iPRECIO® Data Communication Device

Interface	USB / Serial Interface
Communication with pump	IR communication
Power Supply	PC USB or AAA batteries
Size/Weight	120mm(L) × 67mm(W) × 35mm(H) / 147g (with batteries）
Accessaries	1 USB cable (1m), 2 AAA batteries

Index