

IDEXX **ProCyte Dx**^{*} Hematology Analyzer
Operator's Guide
For Research Applications

Proprietary Rights Notice

Information in this document is subject to change without notice. Companies, names and data used in examples are fictitious unless otherwise noted. No part of this document may be reproduced or transmitted in any form or by any means, electronic, mechanical or otherwise, for any purpose, without the express written permission of IDEXX Laboratories. IDEXX Laboratories may have patents or pending patent applications, trademarks, copyrights or other intellectual or industrial property rights covering this document or subject matter in this document. The furnishing of this document does not give a license to these property rights except as expressly provided in any written license agreement from IDEXX Laboratories.

© 2016 IDEXX Laboratories, Inc. All rights reserved. • 06-29605-02

*ProCyt Dx, Laminar Flow Impedance, VetCollect, and Smart Flags are trademarks or registered trademarks of IDEXX Laboratories, Inc. or its affiliates in the United States and/or other countries. e-CHECK is a trademark or registered trademark of Sysmex Corporation. Vacutainer and Hemogard are trademarks of Becton, Dickinson and Company. Windows is a registered trademark of Microsoft Corporation. Clorox is a registered trademark of The Clorox Company. All other product and company names and logos are trademarks of their respective holders.



Manufactured for IDEXX Laboratories, Inc.
One IDEXX Drive, Westbrook, Maine 04092
USA
idexx.com

Contents

Preface	vi
Safety Precautions	vi
International Symbol Descriptions	vii
Other Symbols	ix
Caution Symbols	ix
 A Getting Started	 A-1
Introduction	A-1
What Is a Scatter Plot?	A-2
Components	A-6
Analyzer Status	A-6
Navigating the System	A-7
Powering the Analyzer and IPU On/Off	A-8
Logging On/Off of the IPU	A-8
Opening/Closing the Sample Drawer	A-9
Adding/Modifying User Settings	A-9
Analysis Parameters	A-9
Compatible Species	A-11
 B Using the ProCytex Dx* Analyzer	 B-1
Overview	B-1
Changing the Tube Adapter	B-1
Analyzing Samples	B-3
Viewing Test Results	B-3
Printing Test Results	B-3
Modifying the Sample ID	B-4
Modifying the Sample Mode	B-4
Modifying the Sample Category	B-5
Reanalyzing Results with a Different Algorithm	B-6
Naming an Algorithm	B-7
Creating Reference Intervals	B-7
Manual Gating	B-8
 C Managing Reagents and Stains	 C-1
Overview	C-1
Changing a Reagent Kit/Stain Pack	C-2
Viewing Reagent/Stain Information	C-4
Reagent Kit Components	C-4
Stain Pack Components	C-6

D	Sample Collection and Preparation	D-1
	Overview	D-1
E	Customizing the Settings	E-1
	Modifying Printed Report Settings.....	E-1
	Calibrating HGB and HCT for a Species	E-2
	Backing Up or Restoring the Settings	E-2
	Switching RBC and PLT	E-3
	Customizing the Sample Door Settings	E-3
	Enabling/Disabling the X-barM Feature.....	E-4
	Setting Upper and Lower Limits on X-barM	E-4
F	Quality Control	F-1
	Overview	F-1
	Quality Control Materials	F-1
	Adding a Quality Control Lot	F-1
	Running Quality Control.....	F-2
	Viewing and Printing Quality Control Results	F-2
	Viewing Quality Control Lot Information	F-2
G	Maintenance	G-1
	Overview	G-1
	Upgrading the Software.....	G-1
	Running the Daily Shutdown Procedure	G-1
	Powering Off the Analyzer Weekly	G-2
	Running the Monthly Rinse Procedure.....	G-2
	Cleaning the Case	G-3
	Cleaning the Fan Filter.....	G-3
	Setting Up CSV Files	G-3
	Managing Data	G-4
	CSV File Key	G-4
	Maintenance Log	G-9
H	Troubleshooting	H-1
	Overview	H-1
	Accessing the ProCyt Dx Maintenance Menu	H-1
	Running the Auto Rinse Procedure	H-2
	Running the Rinse Waste Chamber Procedure	H-2
	Running the Rinse Flowcell Procedure.....	H-2
	Running the Drain Reaction Chamber Procedure.....	H-3
	Running the Drain RBC Isolation Chamber Procedure.....	H-3
	Running the Drain Waste Fluid Procedure	H-3
	Running the Air Pump Procedure.....	H-3
	Running the Aspiration Unit Motor Procedure.....	H-4
	Running the Sheath Motor Procedure	H-4
	Running the Tube Holder Motor Procedure.....	H-4

Running the WB Aspiration Motor Procedure	H-4
Running the Remove Clogs Procedure.....	H-4
Running the Pinch Valve Procedure	H-4
Smart Flags*.....	H-5
Responding to an Alert.....	H-6

I Appendices I-1

Installing the ProCyte Dx* Analyzer.....	I-1
Using Antivirus Software on the IPU.....	I-4
Updating the IPU Operating System	I-4
Technical Specifications	I-5
IDEXX Technical Support Contact Information	I-8

Preface

Serving customers throughout the world, IDEXX Laboratories understands that medical content, including interpretation of diagnostic results and medical protocols may vary from country to country. A medical review board has approved the content presented in this document.

Safety Precautions

The IDEXX ProCytex Dx* Hematology Analyzer weighs approximately 55 pounds (25 kg). It may require multiple people to lift the instrument. Be sure to use a table or desk that can support the weight of the analyzer.

Position the analyzer so that the power switch and power cord are easily accessible.

DO NOT stack other equipment or containers on top of the analyzer.

Keep analyzer away from sources of heat or flames.

DO NOT place or operate the analyzer near x-ray equipment, photocopiers, or other devices that generate static or magnetic fields.

PROTECT your equipment from damp conditions or wet weather.

Take care not to spill water or other fluids on the unit.

DO NOT use any of the following liquids, abrasives, or aerosol sprays on or near the analyzer, as they may damage the outer case and may adversely affect results:

- Organic solvents
- Ammonia-based cleaners
- Ink markers
- Sprays containing volatile liquids
- Insecticides
- Polish
- Room freshener

The ProCytex Dx analyzer uses a semiconductor laser unit. This laser unit is shielded with a sealed box cover. DO NOT remove the cover. If the cover is removed, the unit is equipped with an interlock system that prevents laser operations. DO NOT look directly into the laser beam.

Line voltage for the ProCytex Dx analyzer is 100–240 V AC, 50/60 Hz. Be sure to plug all equipment into properly grounded electrical outlets.

Use only the power cable supplied.

Disconnect the power cable:

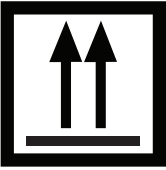
- If the cable becomes frayed or otherwise damaged.
- If anything is spilled onto the analyzer.
- If your analyzer is exposed to excessive moisture.
- If your analyzer is dropped or the case has been damaged.

The ProCytex Dx analyzer should only be used as described in this guide. Failure to follow these instructions may adversely affect results, as well as the safety features of the analyzer.

International Symbol Descriptions

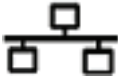
International symbols are often used on packaging to provide a pictorial representation of particular information related to the product (such as expiration date, temperature limitations, batch code, etc.). IDEXX Laboratories has adopted the use of international symbols on our analyzers, product boxes, labels, inserts, and manuals in an effort to provide our users with easy-to-read information.

Symbol	Description	Symbol	Description
	Use by A utiliser avant Verwendbar bis Usare entro Usar antes de 使用期限		Temperature limitation Température limite Zulässiger Temperaturbereich Temperatura limite Limitación de temperatura 保存温度(下限)
	Batch code (Lot) Code de lot (Lot) Chargenbezeichnung (Partie) Codice del lotto (partita) Código de lote (Lote) ロット番号		Upper limit of temperature Limite supérieure de température Temperaturobergrenze Limite superiore di temperatura Limite superior de temperatura 保存温度(上限)
	Serial number Numéro de série Seriennummer Numero di serie Número de serie シリアル番号		Consult instructions for use Consulter la notice d'utilisation Gebrauchsanweisung beachten Consultare le istruzioni per l'uso Consultar las instrucciones de uso 取扱説明書をご参照ください。
	Catalog number Numéro catalogue Bestellnummer Numero di catalogo Número de catálogo 製品番号		Keep away from sunlight Conserver à l'abri de la lumière Vor direkter Sonneneinstrahlung schützen Mantener alejado de la luz solar Tenere lontano dalla luce diretta del sole 遮光してください。
	Authorized Representative in the European Community Représentant agréé pour la C.E.E. Autorisierte EG-Vertretung Rappresentante autorizzato nella Comunità Europea Representante autorizado en la Comunidad Europea EC内の正規販売代理店		WEEE Directive 2002/96/EC Directive 2002/96/CE (DEEE) WEEE-Richtlinie 2002/96/EG Directiva 2002/96/CE RAEE Direttiva RAEE 2002/96/CE 廃電気電子機器指令(WEEE Directive 2002/96/EC)
	Manufacturer Fabricant Hersteller Ditta produttrice Fabricante 製造元		Biological risks Risques biologiques Biogefährlich Rischi biologici Riesgos biológicos 生物学的リスク
	Caution, consult accompanying documents Attention, consulter les documents joints Achtung, Begleitdokumente beachten Attenzione, consultare la documentazione allegata Precaución, consultar la documentación adjunta 注意、添付文書をご参照ください。		Do not reuse Usage unique Nicht wiederverwenden No reutilizar Non riutilizzare 再利用しないでください。

Symbol	Description	Symbol	Description
	Caution, hot surface Attention, surface très chaude Precaución, superficie caliente Vorsicht, heiße Oberfläche Attenzione, superficie rovente 高温注意		Electrostatic-sensitive device Appareil sensible aux charges électrostatiques Dispositivo sensible a descargas electrostáticas Gerät ist sensibel auf elektrostatische Ladung Dispositivo sensibile alle scariche elettrostatiche 静電気の影響を受ける装置
	Keep dry Conserver dans un endroit sec Mantener seco Vor Nässe schützen Tenere al riparo dall'umidità 濡らさないこと。		Fragile Fragile Frágil Zerbrechlich Fragile 取扱注意
	This side up Haut Este lado hacia arriba Diese Seite nach oben Alto この面を上にする。		Date of manufacture Date de production Fecha de producción Herstelldatum Data di produzione 製造年月日:
GHS P 304	IF INHALED: EN CAS D'INHALATION: EN CASO DE INHALACIÓN: BEI EINATMEN: IN CASO DI INALAZIONE: 吸引した場合	GHS P 312	Call a POISON CENTER or doctor/physician if you feel unwell Appeler un CENTRE ANTIPOISON ou un médecin en cas de malaise. Llamar a un CENTRO DE INFORMACION TOXICOLOGICA o a un médico en caso de malestar Bei Unwohlsein GIFTINFORMATIONSZENTRUM oder Arzt anrufen In caso di malessere, contattare un CENTRO ANTIVELENI o un medico 気分が悪くなった時は医師に連絡すること

Symbol	Description
GHS H 303/313/333	May be harmful if swallowed, on contact with skin, and if inhaled Peut être nocif par ingestion, inhalation, par contact avec la peau et par inhalation Puede ser nocivo en caso de ingestión, en contacto con la piel o en caso de inhalación Kontakt mit der Haut, einatmen oder verschlucken kann Gesundheitsschäden verursachen Può essere nocivo per ingestione, inalazione, e contatto con la pelle 吸入、接触または飲み込むと有害のおそれ。

Other Symbols

Symbol	Description	Symbol	Description
	USB symbol		Ethernet/network symbol

Caution Symbols

Right Side of the Analyzer

Do not put your fingers inside of the analyzer when the analyzer is powered on. Doing so may result in injury. (Caution symbol circled below.)



Rear of the Analyzer

To avoid electrical shock, unplug the analyzer before servicing.

Replace only with fuses of the specified type and current rating. The fuse rating is 5.0 A L 250 V (time lag low breaking capacity).

A Getting Started

Introduction

The IDEXX ProCytex Dx* Hematology Analyzer is an automated hematology analyzer for animal blood. The analyzer evaluates and provides the results of 26 parameters for each blood sample in approximately 2 minutes, and is for veterinary use only.

How It Works

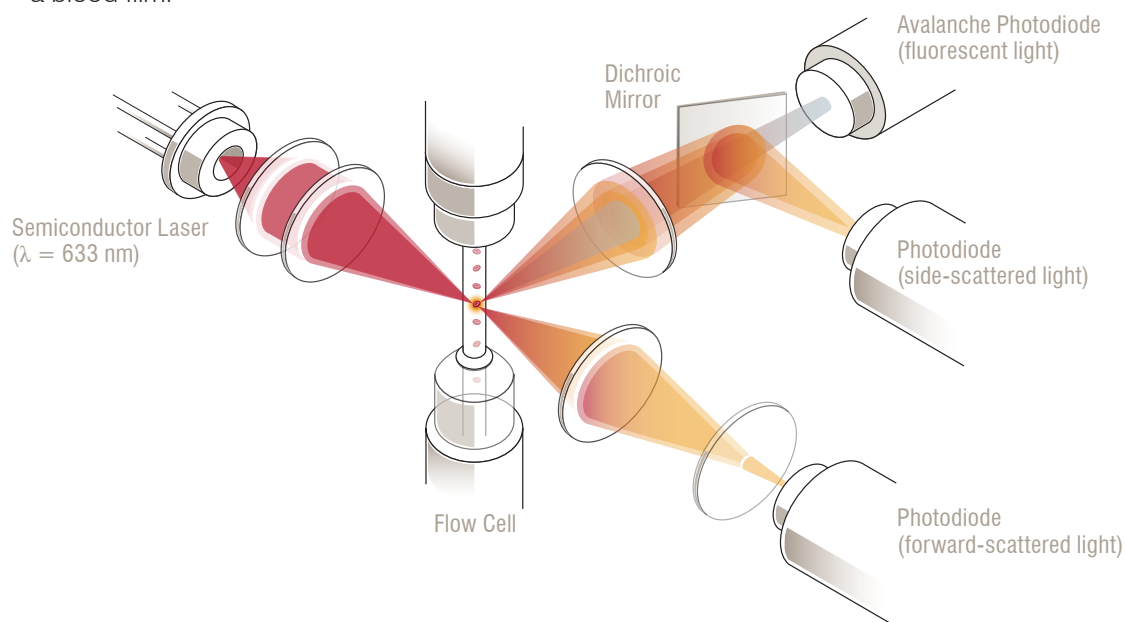
The ProCytex Dx analyzer employs three state-of-the-art technologies—laser flow cytometry, optical fluorescence, and Laminar Flow Impedance*—as well as the SLS-hemoglobin method.

Laser Flow Cytometry

With laser flow cytometry, the system performs two separate analyses:

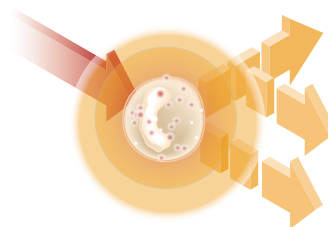
- Red blood cell optical—analyzes mature red blood cells, reticulocytes, and platelets
- White blood cell differential—analyzes and classifies the five-part differential

The cellular suspensions are hydrodynamically focused through a narrow orifice that is exposed to focused red laser light. Forward-scattered light and side-scattered light are then collected for each cell. These optical signatures provide information on the size, complexity, contents, and structure within each cell. This analysis mimics what a trained pathologist does when examining a blood film.



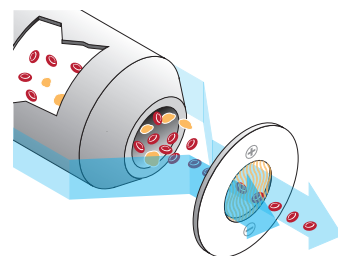
Optical Fluorescence

With optical fluorescence, the ProCytex Dx Leukocyte Stain and Reticulocyte Stain bind to nucleic acids in the cells and are excited by the red laser light. The fluorescence signatures are uniquely captured at a higher wavelength from the normal side-scattered light by utilizing a dichroic mirror. This method is the gold standard for determining reticulocyte count and provides additional sensitivity for identifying the five-part white blood cell differential.



Laminar Flow Impedance*

Laminar Flow Impedance is the fastest method for analyzing the size and number of red blood cells and platelets. With this method, a diluted sample is focused through the center of a detection aperture and an electrical signal is disrupted by each cell's presence. The resistance measured can determine the size and type of each cell. The ProCyt Dx analyzer sends the sample through the aperture in one coaxial core stream of sample and reagent. Simultaneously, the core stream is surrounded by a faster moving sheath reagent, which ensures that only one cell is in the aperture at a time, preventing any count coincidence or recirculation.



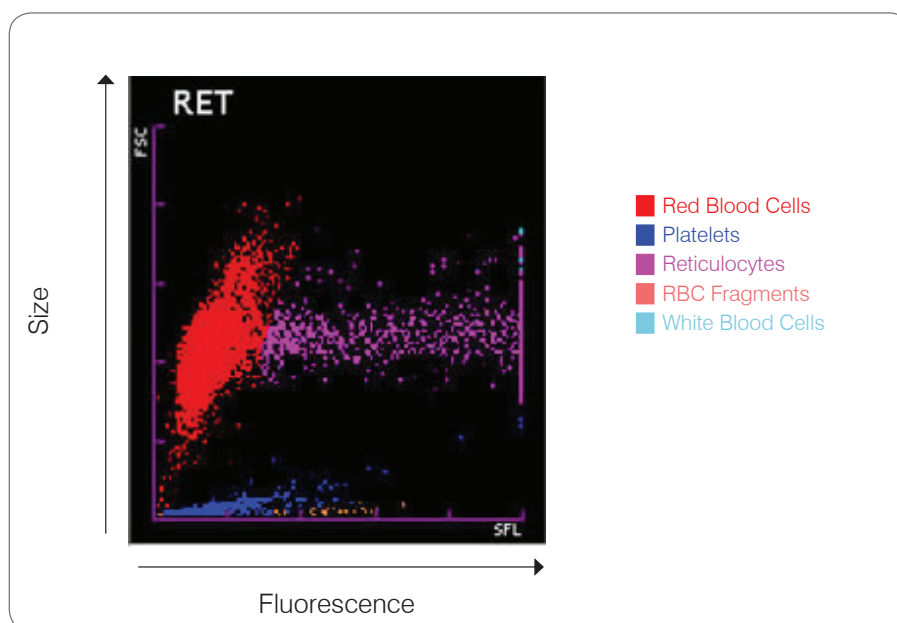
SLS-Hemoglobin Method

Hemoglobin conversion with the SLS-hemoglobin method is fast and does not use poisonous substances, as other methods (such as the cyanmethemoglobin method) do, making it a suitable method for automation. And since it can be used to measure methemoglobin, it can also accurately measure blood containing methemoglobin, as is the case with control samples.

What Is a Scatter Plot?

Scatter plots are a visual representation of the complete blood count (CBC) and are a valuable tool for quickly interpreting sample results on the ProCyt Dx analyzer. Each dot in the plot represents a single cell as it is analyzed by the device. The different cellular elements of the blood appear as distinct clouds of dots, and when the definition of the cloud is diminished or intensified, this indicates variability within that particular cellular population, which could indicate an abnormality. The greater the abnormality, the greater the potential variation from normal. A blood film review will provide additional information. For example, if the clouds of dots are more dense than normal, an increased count for that particular cell type will likely be evident in a blood film.

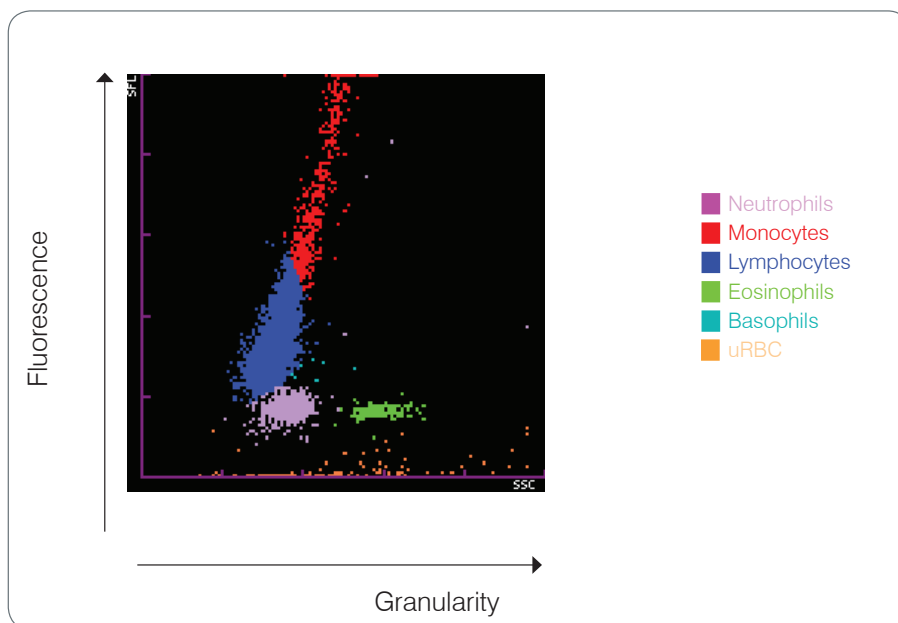
Red Blood Cell Scatter Plot



On the red blood cell run, the ProCyt Dx Analyzer classifies the following populations:

- **Red Blood Cells (RBCs)**—The red blood cells (erythrocytes) are primarily responsible for carrying oxygen to tissue cells and carrying carbon dioxide away from those cells.
- **Platelets**—Platelets (thrombocytes) play an integral role in the processes of primary and secondary hemostasis leading to the formation of clots. Due to their smaller size, they spend less time in front of the laser beam, absorb less light, and therefore fall closer to the bottom on the y axis.
- **Reticulocytes**—Reticulocytes are immature red blood cells that contain ribosomal RNA. The reticulocytes are larger than many of the RBC population and more granular because of the RNA. These larger cells absorb more stain and fluoresce in the presence of the laser. They are located to the right of the RBC population.
- **RBC Fragments**—RBC fragments are fragile red blood cells that have fragmented during the red blood cell optical reagent chemistry. These are generally intact red blood cell membranes that have released their hemoglobin. The particles have a similar size to platelets but refract light differently and are therefore located to the left of the platelet population.
- **White Blood Cells**—On occasion, a small amount of white blood cells can be seen on the red blood cell scatter plot. These cells are larger than reticulocytes and therefore appear higher on the plot. The cells appear because they have absorbed the IDEXX ProCyt Dx Reticulocyte Stain and, given their intercellular content, their cell signatures will have far more fluorescent light scatter than reticulocytes.

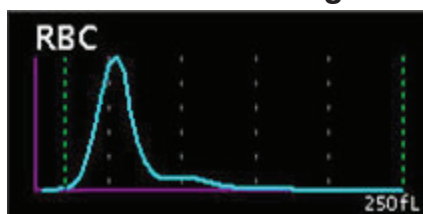
White Blood Cell Scatter Plot



The ProCyt Dx analyzer utilizes side-scattered fluorescence and side scatter for the primary classification of white blood cells:

- **Neutrophils**—Normally, the nucleic acid content of neutrophils is the lowest of the five-part differential. Conversely, they are more optically complex than the mononuclear cells, therefore they have the least fluorescence but higher scatter than lymphocytes and monocytes.
- **Lymphocytes**—Normally, lymphocytes are the smallest cells relative to the other cells in the five-part differential. They are also the least complex, but have a high concentration of nucleus to cytoplasm. Therefore, these cells have a higher fluorescence but less side scatter than neutrophils and less fluorescence than monocytes.
- **Monocytes**—Monocytes have the largest nucleus of the normal differential. They are less complex than neutrophils but can be more complex than lymphocytes due to their lacy-appearing cytoplasm. Monocytes contain the highest amount of fluorescence and have slightly more side scatter than lymphocytes but less than neutrophils.
- **Eosinophils**—There is a great deal of variation in the size and granularity of eosinophils from species to species. Normally, canine, equine, bovine, and ferret eosinophils appear as a cluster of cells uniquely higher in side scatter to the right of the neutrophils. There is also a degree of fluorescence increase, as well. In feline samples, eosinophils are unique in that they have nearly the highest fluorescence and the most scatter of all of the cells.
- **Basophils**—Basophils also vary species to species. In general, they have more fluorescence than neutrophils, and also have more side scatter. In canine, equine, bovine, and ferret samples, they appear just above neutrophils in fluorescence, and to the right of the lymphocytes on side scatter. In feline samples, basophils appear below the eosinophils in fluorescence and to the right of lymphocytes in side scatter.
- **uRBC**—This population consists of red blood cell ghosts and unlysed red blood cells. Because the red blood cells have no nuclear content, they have little fluorescent light scatter and fall lower on the plot than any white blood cells.

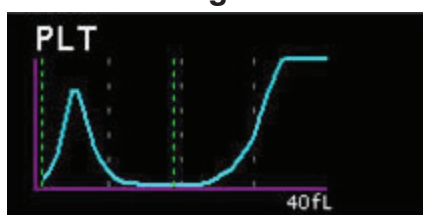
Red Blood Cell Histogram



The red blood cell (RBC) count is a particle count found between two discriminators, a lower discriminator (LD) and upper discriminator (UD), which are automatically set up between 5–75 fL and 200–250 fL, respectively.

Particle size distributions are checked for abnormalities, including abnormal relative frequencies at the different discriminator levels, existence of two or more peaks, and abnormal distribution widths.

Platelet Histogram



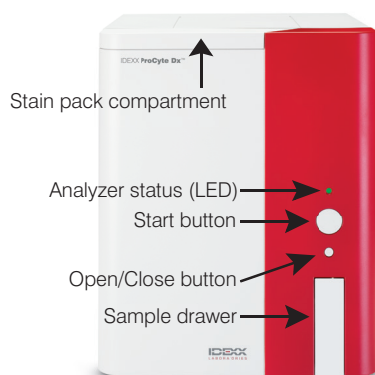
Platelet (PLT) particle size distributions are analyzed using three discriminators: a lower discriminator (LD) and upper discriminator (UD), which are automatically set up between 2–6 fL and 12–30 fL, respectively; and a fixed discriminator, which is set up at 12 fL.

Platelet particle size distributions are checked for abnormalities, including abnormal relative frequencies at the lower discriminator levels, abnormal distribution widths, and the existence of more than one peak.

Components

The ProCyt Dx analyzer is a self-contained system that analyzes animal blood and control samples. It is connected to and communicates with the Information Processing Unit (IPU).

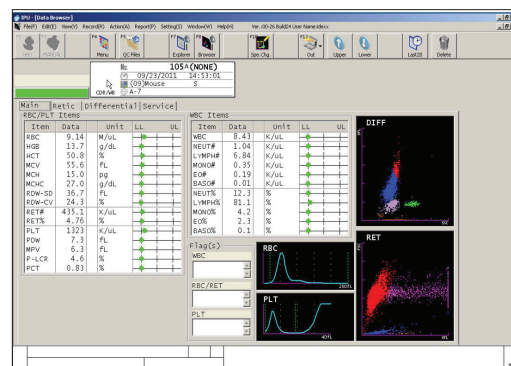
Analyzer



Information Processing Unit (IPU)

The IPU is a dedicated computer that connects to the ProCyt Dx analyzer. This computer acts as the central processing unit for the ProCyt Dx analyzer. It is required for the system to function correctly.

Important: Do not change the IPU's computer name in the Control Panel/System settings. Changing the name will make the IPU unusable until it can be serviced by IDEXX.



Analyzer Status

The light-emitting diode (LED) indicator on the front panel of the ProCyt Dx analyzer indicates the analyzer's status.

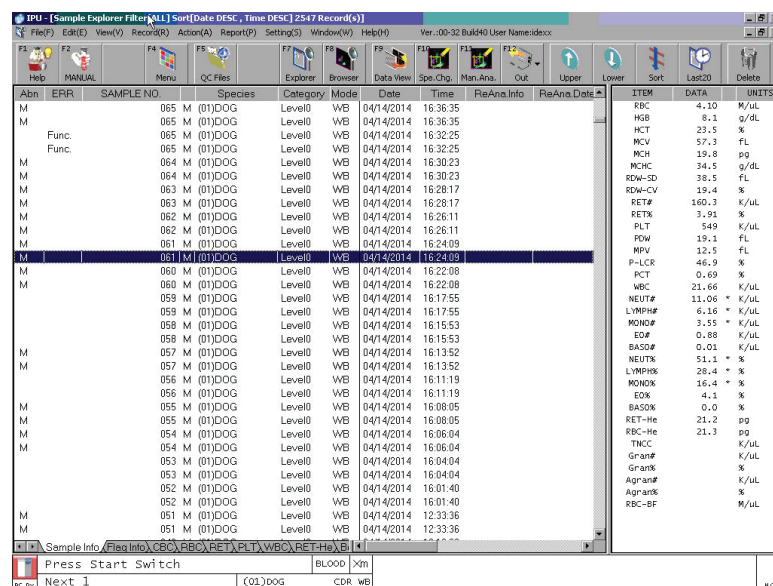
LED Color	Description
No color	OFF; analyzer is turned off
Green (steady)	READY; analyzer is ready to process samples or perform maintenance/diagnostic tasks
Green (flashing)	IN PROCESS; analyzer is aspirating sample
Red	ERROR; an error has occurred; review error or alert messages on the IPU

Navigating the System

There are 3 main screens on the IPU:

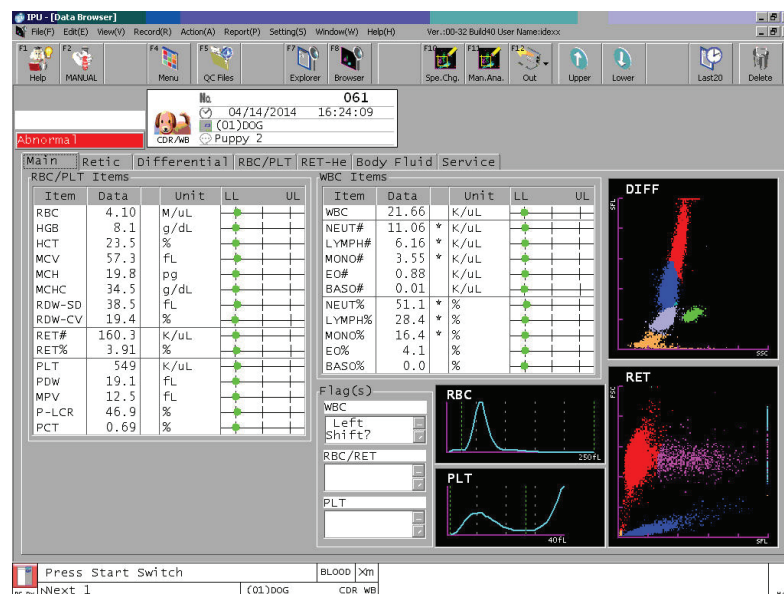
Explorer Screen

The Explorer screen is accessed by clicking the Explorer button at the top of the screen or by pressing F7 on your keyboard.



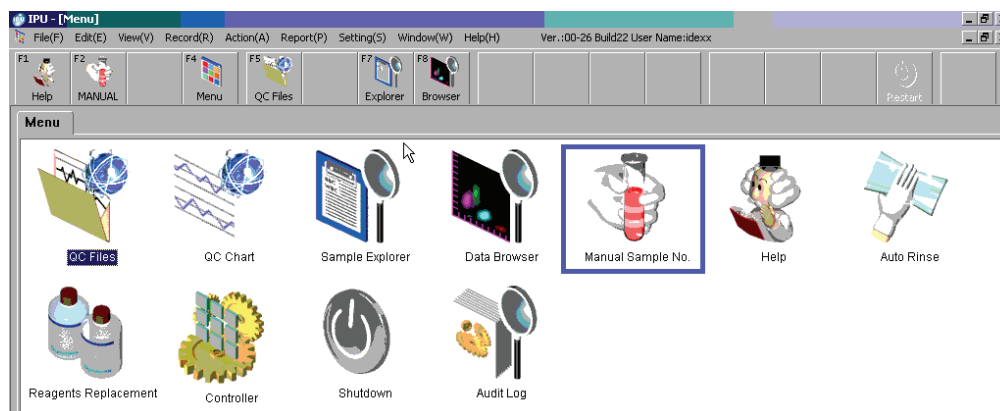
Browser Screen

The Browser screen is accessed by clicking the Browser button at the top of the screen or by pressing F8 on your keyboard.



Main Menu

The Main Menu is accessed by clicking the Menu button at the top of the screen or by pressing F4 on your keyboard.



Powering the Analyzer and IPU On/Off

It is recommended that you power off the analyzer and the IPU once per week (for additional maintenance tasks, see the *Maintenance Log* on page G-9).

To Power On the Analyzer and IPU

1. Power on the IPU by pressing the power button on the front of the IPU computer.
2. Power on the IDEXX ProCytex Dx analyzer using the switch located on the right side of the analyzer. When prompted, click **OK**. The ProCytex Dx performs a variety of self-check procedures (if a self-check procedure fails, an alert message will display on the IPU monitor). This process takes approximately 8 minutes.
3. If the self-check procedure is successful, the status of the ProCytex Dx icon on the IPU changes to green and the LED on the ProCytex Dx analyzer turns green (steady).

To Power Off the Analyzer and IPU

Note: The analyzer and IPU should not be powered off unless performing maintenance or troubleshooting tasks.

1. Power off the IDEXX ProCytex Dx analyzer using the switch located on the right side of the analyzer.
2. From the **Start** menu, click **Shut Down**.
3. Select **Shut Down** from the drop-down list and then click **OK**.

Logging On/Off of the IPU

If your IPU has multiple users with their own log-in information, each user can use the following processes to log onto or off of the IPU

To Log On to the IPU

1. Enter the case-sensitive **User Name** and **Password** in the appropriate text boxes.
2. Click **OK**.

To Log Off of the IPU

1. From the **File** menu, click **Log Off**.
2. To confirm that you want to log off of the IPU, click **OK**.

Opening/Closing the Sample Drawer

Press the **Open/Close** button on the analyzer to open or close the sample drawer.

Adding/Modifying User Settings

If your IPU has multiple users with unique log-in information, you can add additional users or modify the log-in information for existing users with these instructions.

To Change the User Settings

1. From the **Setting** menu, click **IPU**.
2. To change the user properties, click **Property**, update the settings as needed, and then click **OK**.

3. To add a user, click **Add User** and specify the Logon Name, Operator Name, Operator Info, and permissions.
4. To change the user password, click **Change Password**, enter (and then reenter) the new password, and then click **OK**.

Note: Passwords are case-sensitive and should be fewer than 12 characters.

5. Click **OK**.

Analysis Parameters

The ProCyt Dx analyzer provides results for the following parameters†:

Parameter	Description
RBC	Total number of erythrocytes
HCT	Hematocrit value: erythrocyte ratio of total blood volume
HGB	Hemoglobin concentration
MCV	Mean erythrocyte volume in total sample
MCH	Mean hemoglobin volume per red blood cell (RBC) count
MCHC	Mean hemoglobin concentration of erythrocytes
RDW-CV	Calculated distribution width of erythrocytes, coefficient of variation
RDW-SD	Calculated distribution width of erythrocytes, standard deviation
RET%	Reticulocyte percent
RET#	Reticulocyte count

Parameter	Description
RET-He	Reticulocyte hemoglobin
RET-Y	The intensity of forward scattered light from reticulocytes (mainly reflecting size)
LFR	Low fluorescence ratio
MFR	Medium fluorescence ratio
HFR	High fluorescence ratio
IRF	Immature reticulocyte fraction
RBC-He	Red blood cell hemoglobin
RBC-Y	The intensity of forward scattered light from mature red blood cells (mainly reflecting size); known to demonstrate a high degree of correlation with MCH.
WBC	Total number of leukocytes
NEUT%	Neutrophil percent
LYMPH%	Lymphocyte percent
MONO%	Monocyte percent
EO%	Eosinophil percent
BASO%	Basophil percent
NEUT#	Neutrophil count
LYMPH#	Lymphocyte count
MONO#	Monocyte count
EO#	Eosinophil count
BASO#	Basophil count
PLT [†]	Total number of platelets
PDW	Platelet distribution width; the degree of variation in size of the platelet population
MPV	Mean platelet volume
P-LCR	Platelet large cell ratio
PCT	Plateletcrit value

[†]The number of reported parameters may vary according to species.

[‡]The ProCyt Dx measures platelets and red blood cells in both the impedance and optical channels. The reported value is dependent on the algorithm.

Body Fluid Parameter	Description
TNCC	Total nucleated cell count
AGRAN#	Agranulocyte count
AGRAN%	Agranulocyte percent
GRAN#	Granulocyte count
GRAN%	Granulocyte percent
RBC-BF	Total number of erythrocytes (red blood cell count)

Additional Parameters

Parameter	Description
RBC-O	Red blood cell count optics channel
PLT-O	Platelet count optics channel
PLT-I	Platelet count impedance

Compatible Species

The ProCyt Dx analyzer can analyze blood from the following species:

- Canine
- Feline
- Equine
- Bovine
- Ferret
- Guinea pig
- Hamster
- Pig
- Mini pig
- Mouse
- Rat
- Goat
- Dolphin
- Nonhuman primate (NHP)
- Rabbit
- Gerbil
- Camel
- Alpaca
- Sheep
- Other[‡]

[‡]The “Other” species was incorporated for research purposes. The algorithms for “Other” are based on the canine species and therefore not validated for other animal species. The canine algorithm incorporates known cellular size, scatter pattern, and unique distributions customized for that species. This mode can be used by experienced professionals who have knowledge of hematology scatter plots and can make visual updates to the displayed pattern of the scatter plot.

B Using the ProCyt^e Dx^{*} Analyzer

Overview

Before using the ProCyt^e Dx analyzer each day:

- Tap the **Remaining Reagent Volume** icon on the Main menu to ensure there is a sufficient amount of reagent for the number of samples to be analyzed that day.
- Check the tubing and cables attached to the analyzer. Ensure the tubing is not bent and that the power cord is securely plugged into the outlet.

Changing the Tube Adapter

Before you begin collecting a patient sample and processing it in the ProCyt^e Dx analyzer, be sure you have the correct tube adapter loaded in the sample drawer of the analyzer. The ProCyt^e Dx analyzer has three sample tube adapters so you can use various tube sizes, if necessary.

The ProCyt^e Dx analyzer is capable of running most EDTA blood collection tubes. There are numerous standard (13 x 75 mm) hematology tube manufacturers. We recommend that you only use tubes from a reliable and trustworthy source. If you have any questions or concerns about EDTA tube selection, IDEXX recommends and supports the use of 2-mL draw BD standard EDTA tubes and IDEXX VetCollect^{*} tubes.



Regular Adapter

Use with standard 13 x 75 mm diameter tubes (such as IDEXX VetCollect tubes and BD Vacutainer^{*} 13 x 75 mm [2.0 mL] tubes with a Hemogard^{*} closure)



Micro Adapter

Use with micro tubes in the following sizes: 10.25 x 50 mm, 10.25 x 64 mm, or 1.3 mL (such as Sarstedt 1.3 mL tubes; other tubes that can be secured in the adapter can also be used.)

Important: Remove tube cap before analysis.



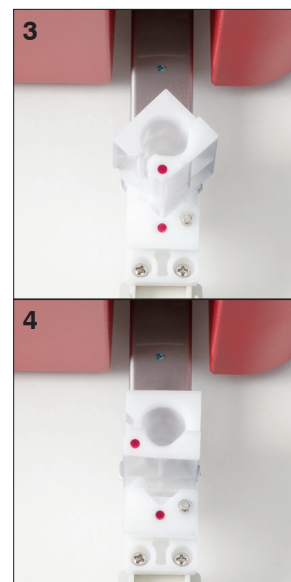
QC Adapter

Use with e-CHECK^{*} (XS) quality control blood samples.

To Install the Tube Adapter

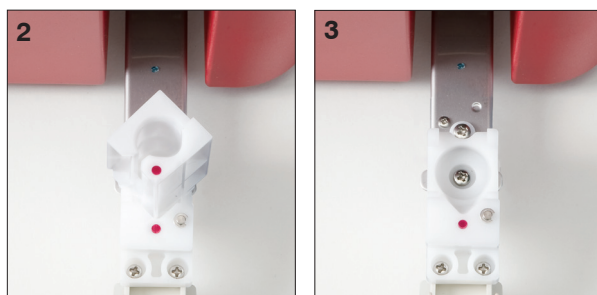
1. If the sample drawer is not open, press the **Open/Close** button on the ProCyte Dx analyzer to open the sample drawer.
2. Select the sample tube adapter that is appropriate for the sample tube you are using.
3. Place the sample tube adapter in the sample position area of the sample drawer.
4. Align the red mark on the adapter with the red mark on the drawer.
5. Turn the adapter to the right until you hear a click (about 45°); this ensures the adapter is properly installed.

Note: If you are using a micro tube, you must remove the cap before beginning the sample analysis process.



To Remove the Tube Adapter

1. If the sample drawer is not open, press the **Open/Close** button on the ProCyte Dx analyzer to open the sample drawer.
2. Turn the sample tube adapter to the left (45°) until the red mark on the adapter and the red mark in the sample position area of the drawer line up.
3. Lift the tube adapter to remove it.



Analyzing Samples

The ProCyte Dx analyzer produces a complete blood count (CBC) analysis for each patient blood sample it processes.

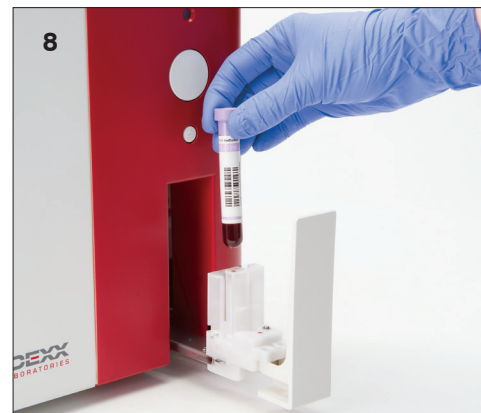
To Analyze a Sample Using the Analyze Sample Button

1. Double-click the **Manual Sample No.** icon on the Main menu.
2. Enter the appropriate sample number.
Note: ProCyte Dx will increment the last digits in the sample number automatically.
3. Select the appropriate Species, Category, and Mode from the available drop-down lists.
4. Enter any additional comments in the Comment text boxes.
5. Click **OK**.

6. Ensure the appropriate tube adapter is in the sample position area of the sample drawer.
7. Prepare the sample. **Gently invert the sample 10 times** to ensure it is well mixed.
8. Immediately place the sample in the tube adapter.

Important: If you are using a micro tube, remove the cap before placing the tube in the tube adapter.

9. Press the **Start** button on the analyzer. The sample drawer automatically closes and the analyzer begins processing the sample.



Viewing Test Results

To view data, histograms, and scatter plots, click the **Browser** button.

To view data only, click the **Explorer** button.

Printing Test Results

You can print a batch of results using the Report menu.

Note: Ensure the Last20 button is not activated before you start.

To Print Test Results

1. Click the **Explorer** button.
2. Select all of the sample results you wish to print.
3. From the Report menu, click **Report** to print the data, histograms, and scatter plots.
OR
From the Report menu, click **Ledger** to print the data.
OR
From the Report menu, click **Report For Lab. Use Only** to print the data (including research parameters), histograms, and scatter plots with a "for laboratory use only" watermark.

Modifying the Sample ID

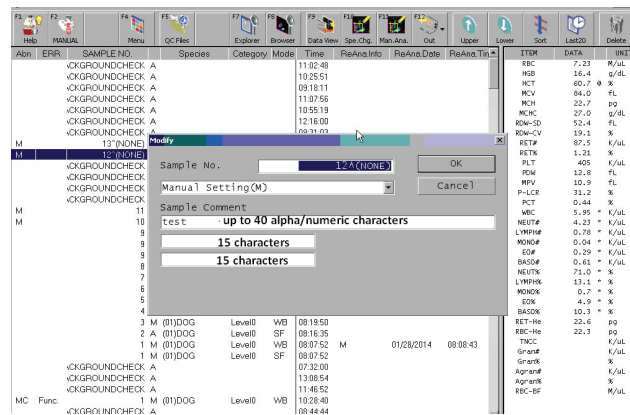
You can modify the sample ID if it was originally typed incorrectly or if it just needs to be changed.

Note: Ensure the Last20 button is not activated before you start.

To Modify the Sample ID

1. Select the sample with the ID you want to modify.
2. From the **Edit** menu, click **Modify**. The Modify dialog box displays.
3. Edit the sample number as needed.

Note: You can also add a comment, if desired.



4. Click **OK**.

Modifying the Sample Mode

Follow these steps if you would like to modify the sample mode (i.e., body fluid vs. blood).

Note: Ensure the Last20 button is not activated before you start.

To Modify the Sample Mode

1. Click the **Explorer** button.
2. If you are planning to reanalyze multiple samples, sort the list by species.
3. Select up to 80 samples from the same species that you want to reanalyze. To multi-select, hold the SHIFT key while clicking the first and last sample in the list.
Note: Only samples listed as “other” or specific samples can be reanalyzed.
4. From the **Edit** menu, click **Mode.Chg**. The Mode Select dialog box displays.
5. Select the applicable mode and click **OK**.
6. If you are reanalyzing multiple samples, do one of the following:
 - To overwrite current data with new data, click **OverWrite Save** and then click **OK**.
 - To keep the original data and create a new entry with the reanalyzed data, click **NewWrite Save**, enter the sample number and any related comments, and then click **OK**.

The reanalyzed sample will display on the Explorer screen with an “M” in the ReAna.Info column, with the date the sample was reanalyzed in the ReAna.Date column, with the time the sample was reanalyzed in the ReAna.Time column, and with the new category level in the Mode column. In the Browser window, you’ll see an “M” to the right of the species name.

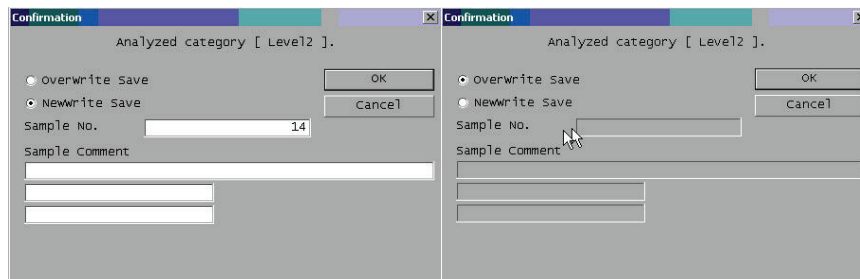
Modifying the Sample Category

Follow these steps if you would like to modify the sample category (i.e, reference interval) for a particular algorithm (you can modify up to 4 categories per algorithm).

Note: Ensure the Last20 button is not activated before you start.

To Modify the Sample Category

1. Click the **Explorer** button.
 2. If you are planning to reanalyze multiple samples, sort the list by species.
 3. Select up to 80 samples from the same species that you want to reanalyze. To multi-select, hold the SHIFT key while clicking the first and last sample in the list.
- Note:** Only samples listed as “other” or specific samples can be reanalyzed.
4. From the **Edit** menu, click **Cate.Chg**. The Category Select dialog box displays.
 5. Select the applicable category and click **OK**.
 6. If you are reanalyzing multiple samples, do one of the following:
 - To overwrite current data with new data, click **OverWrite Save** and then click **OK**.
 - To keep the original data and create a new entry with the reanalyzed data, click **NewWrite Save**, enter the sample number and any related comments, and then click **OK**.



The reanalyzed sample will display on the Explorer screen with a “C” in the ReAna.Info column, with the date the sample was reanalyzed in the ReAna.Date column, with the time the sample was reanalyzed in the ReAna.Time column, and the new category level in the Category column. In the Browser window, you’ll see a “C” to the right of the Species name.

Reanalyzing Results with a Different Algorithm

You may want to reanalyze results with a different algorithm if the samples were originally run under an incorrect species, if manual gating was done, or if you want to reanalyze a sample with a new algorithm released via a software update.

Note: Ensure the Last20 button is not activated before you start.

To Reanalyze Results with a Different Algorithm

1. Click the **Explorer** button.
2. If you are planning to reanalyze multiple samples, sort the list by species.
3. Select up to 80 samples from the same species that you want to reanalyze. To multi-select, hold the SHIFT key while clicking the first and last sample in the list.

Note: Only samples listed as “other” or specific species can be reanalyzed.

4. Click the **Spe.Chg.** button. The Measure Species Select dialog box displays.
5. Select the applicable species and click **OK**.
6. Select **OverWrite Save** to overwrite current data with new data and then click **OK**.
OR
Select **NewWrite Save** to keep the original data and create a new entry with the reanalyzed data and then click **OK**.

Reanalyzed data displays with an “S” in the ReAna.Info column in the Explorer window and next to the species name in the Browser window.

Naming an Algorithm

To Name an Algorithm

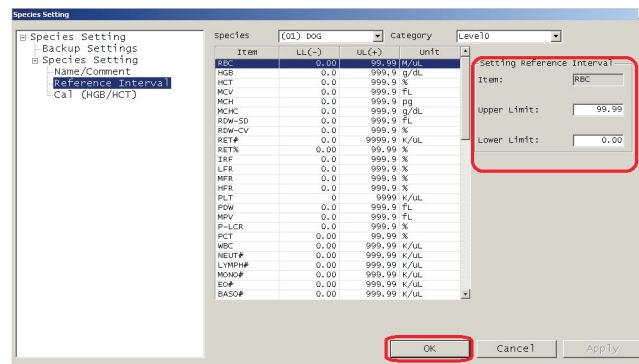
1. From the **Setting** menu, click **Species**.
2. To edit the name or comments for an algorithm, select **Name/Comment** on the left side of the screen, edit the information in the Name Setting and Comment Setting text boxes as needed, and then click **OK**.

Note: The Name Setting text box is not available for editing for all algorithms.

Creating Reference Intervals

To Create Reference Intervals

1. Select **Reference Interval** on the left side of the screen.
2. Select the desired species from the **Species** drop-down list.
3. Select the reference interval to be edited from the **Category** drop-down list.
4. Select the **parameter** you want to edit and enter the desired upper and lower limits.
5. Click **OK**.



The Data Browser screen will show green and red plots for each parameter. If a parameter is shown as red, it is either high (shown with a "+" next to the parameter) or low (shown with a "-" next to the parameter).

Manual Gating

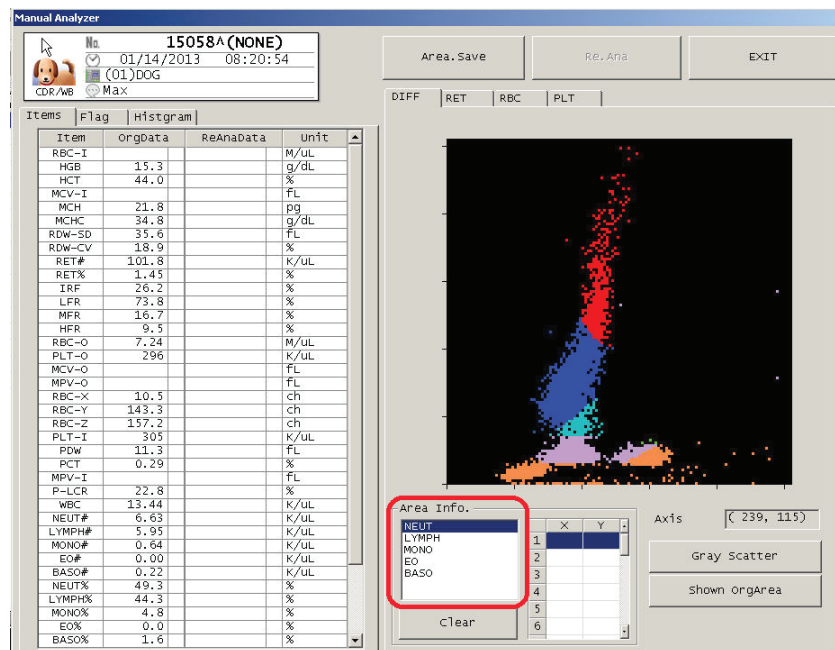
The manual gating feature allows you to create a new species based on an algorithm for an existing species which can then be saved and reused. This can be quite powerful for research applications, and for running unsupported species.

Note: Ensure the Last20 button is not activated before you start.

IMPORTANT: Users are responsible for the results generated by profiles they create. It is recommended that the sample data used to create a new analysis profile be examined carefully and thoroughly compared to reference data.

To Perform Manual Gating

1. Click the **Explorer** button.
2. Select the sample that you want to manually gate.
3. Click the **Man.Anal.** button. The Manual Analyzer dialog box displays.
4. Select the appropriate scattergram/histogram to be manually gated.
5. Click a point close to the selected population and drag it to the end of the appropriate selecting. Once you have encircled and the lines meet, double-click. Repeat this step for each parameter. An asterisk (*) on the appropriate tab when the gating is complete.



Tip: Tap Gray Scatter to more easily see population cuts in the scattergram.

6. Select the next parameter in the Area Info list on the bottom of the screen (all parameters must be manually gated).
7. Click the **Re.Anal.** button.
8. Repeat steps 4–7 for each tab you want to manually gate.
9. Click the **Area.Save** button. The Area Info Save dialog box displays.
10. Highlight the species number that you want to use to save gating information and click **OK**.
11. If necessary, rename the algorithm (for more information, see *Naming an Algorithm* on page B-7).

C Managing Reagents and Stains

Overview

The ProCyte Dx* analyzer uses self-contained reagents and stains to process patient samples. This section describes the contents of each reagent kit and stain pack and how to use them properly with the ProCyte Dx analyzer.

All ProCyte Dx analyzer reagents and stains are for veterinary use only.

Important: Reagent kits and stain packs must be brought to room temperature (15°C–30°C/ 59°F–86°F) before being connected to the analyzer. Kits/packs that are not connected should be stored at 2°C–30°C (36°F–86°F).

IDEXX ProCyte Dx* Reagent Kit

The IDEXX ProCyte Dx Reagent Kit contains 3 reagent bottles (Lytic Reagent, Reticulocyte Diluent, and HGB Reagent), System Diluent, and a waste container. The reagent kit connects to the analyzer via the Quick-Connect Top.

Inside of the reagent kit, the reagent shelf is both color- and number-coded to indicate placement of each reagent, the System Diluent, and the waste container. Instructions for changing a reagent kit can be found later in this section.

Important: To ensure both customer safety and optimal system performance, IDEXX recommends that all reagent kits be placed next to or below the analyzer. Reagent kits cannot be placed above the analyzer.

Quick-Connect Top

The Quick-Connect Top was designed to make changing reagents a simple and efficient process. The top has 5 probes that are designed to fit into the bottles and containers in the reagent kit. **The Quick-Connect Top is reused each time you change the reagent kit.**

IDEXX ProCyte Dx* Stain Pack

The IDEXX ProCyte Dx Stain Pack consists of one Leukocyte Stain pouch and one Reticulocyte Stain pouch that are fused together. Instructions for changing a stain pack can be found later in this section.

Changing a Reagent Kit/Stain Pack

An alert displays when the reagent kit/stain pack is empty or expired.

Important: DO NOT pour the remaining liquid from the old kit/pack into the new kit/pack. Pouring leftover liquid into the new kit/pack can compromise the quality of the reagent/stain.

Note: Be sure to review the warnings and precautions for each reagent/stain before handling these materials. For more information, see the reagent and stain descriptions on pages C-4–C-7.

Important: Disposal procedures should be compliant with local disposal laws.

To Change the Reagent Kit in Response to an Alert

1. Press F1 on the keyboard.
2. Select the error and click **Execute**.
3. Ensure CAPS LOCK is off on your keyboard and then scan the bar code on the new reagent kit.
4. Open the top of a new reagent kit and place it next to the kit you are replacing.
5. Remove the caps from the 3 reagent bottles, the System Diluent, and the waste container in the new reagent kit and set them aside. If the plastic ring around the top of the System Diluent or waste container is resting below the cardboard shelf, gently pull it up so the ring rests on the shelf.



Important: Ensure the 3 reagent bottles are placed in the correct location (match the color of the bottle label to the color on the kit shelf).

6. Remove the Quick-Connect Top from the old reagent kit and position it onto the new reagent kit, ensuring the probes are inserted into the 3 reagent bottles, the System Diluent, and the waste container.
7. Ensure the Quick-Connect Top is placed securely on the reagent kit and click **Execute**. The 4 reagent lines will be primed and the waste counter will be reset to zero.



Important: It is essential that the Quick-Connect Top is placed securely on the reagent kit when priming reagents.

8. Carefully remove each reagent bottle from the old reagent kit and dispose of the contents of each bottle according to applicable local disposal laws.

Note: Contact IDEXX Technical Support to receive a copy of the MSDS information.

9. Place the caps from the bottles in the new reagent kit onto the bottles in the old reagent kit.
10. Tap **Close**.

To Change the Reagent Kit (Without an Alert)

1. Click the **Reagents Replacement** icon on the Main menu.
2. Ensure CAPS LOCK is off on your keyboard and then scan the bar code on the new reagent kit.
3. Open a new reagent kit and place it next to the kit you are replacing.
4. Remove the caps from the 3 reagent bottles, the System Diluent, and the waste container in the new reagent kit and set them aside. If the plastic ring around the top of the System Diluent or waste container is resting below the cardboard shelf, gently pull it up so the ring rests on the shelf.

Important: Ensure the 3 reagent bottles are placed in the correct location (match the color of the bottle label to the color on the kit shelf).

5. Remove the Quick-Connect Top from the old reagent kit and position it onto the new reagent kit, ensuring the probes are inserted into the 3 reagent bottles, the System Diluent, and the waste container.
6. Ensure the Quick-Connect Top is placed securely on the reagent kit and click **Execute**. The 4 reagent lines will be primed and the waste counter will be reset to zero

Important: It is essential that the Quick-Connect Top is placed securely on the reagent kit when priming reagents.

7. Carefully remove each reagent bottle from the old reagent kit and dispose of the contents of each bottle according to applicable local disposal laws.
8. Place the caps from the bottles in the new reagent kit onto the bottles in the old reagent kit.
9. Tap **Close**.

To Change the Stain Pack in Response to an Alert

1. Press F1 on the keyboard.
2. Select the error and click **Execute**.
3. Ensure CAPS LOCK is off on your keyboard and then scan the bar code on the new stain pack.
4. Open the stain compartment cover and unscrew the empty stain pack from the caps/probes.
5. Remove the caps from a new stain pack and set them aside.
6. Screw a new stain pack into the caps in the stain compartment, ensuring each probe is inserted into the correct pouch (match the color of the probe caps to the color on the pouch labels).
7. Place the caps from the new stain pack onto the empty stain pack. Dispose of the stain pack according to applicable local disposal laws.
8. Place the new stain pack into the compartment, ensuring the cords are in front of the stain pack inside the compartment. Then close the cover.
9. Tap **Execute**.
10. Tap **Close**.

To Change the Stain Pack (Without an Alert)

1. Click the **Reagents Replacement** icon on the Main menu.
2. Ensure the **Exchange** check box is selected.
3. Ensure CAPS LOCK is off on your keyboard and then scan the bar code on the new stain pack.
4. Open the stain compartment cover and unscrew the empty stain pack from the caps/probes.
5. Remove the caps from a new stain pack and set them aside.
6. Screw a new stain pack into the caps in the stain compartment, ensuring each probe is inserted into the correct pouch (the cords are color coded).
7. Repeat steps 4–6 for the other stain pouch.
8. Place the caps from the new stain pack onto the empty stain pack. Dispose of the stain pack according to applicable local disposal laws.
9. Place the new stain pack into the compartment, ensuring the cords are in front of the stain pack inside the compartment. Then, close the cover.
10. Tap **OK**.

Viewing Reagent/Stain Information

You can view the fill status and expiration information for your reagent kit and stain pack through the user menu. A log is also available to view current and historical reagent/stain information.

To View Reagent/Stain Fill Status and Expiration Information

Tap the **Remaining Reagent Volume** icon on the Main menu.

Reagent Kit Components

The reagent kit has an unopened stability of 12 months from date of manufacture. Once opened, the product stability is 45 days or until the date of expiration (whichever comes first). Reagent kits must be kept at room temperature (15°C–30°C/59°F–86°F) when connected to the analyzer. Kits that are not connected should be stored at 2°C–30°C (36°F–86°F).

System Diluent

Intended Use

Diluent for use in the ProCyt Dx Hematology Analyzer.

Active Ingredients

Sodium chloride	6.38 g/L
Boric acid	1.0 g/L
Sodium tetraborate	0.2 g/L
EDTA-2K	0.2 g/L

Methodology

System Diluent is a ready-to-use diluent for photoelectrical analysis of whole blood.

Warning and Precautions

Do not ingest; avoid skin and eyes. In case of contact, flush with plenty of water immediately. Consult with physician in case of ingestion and/or contact with eyes.

Lytic Reagent**Intended Use**

Reagent used to selectively lyse red blood cells from a sample, leaving white blood cells for analysis.

Active Ingredients

Nonionic surfactant	0.18%
Organic quaternary ammonium salts	0.08%

Methodology

Lytic Reagent is a ready-to-use reagent for analyzing white blood cells by photometric measurement.

Warning and Precautions

Do not ingest and avoid skin and eyes. In case of contact, flush with plenty of water immediately. Consult with physician in case of ingestion and/or contact with eyes.

Reticulocyte Diluent**Intended Use**

Diluent used to determine the reticulocyte count and reticulocyte percent in blood.

Active Ingredients

Tricine buffer	0.18%
----------------	-------

Methodology

Reticulocyte Diluent is a ready-to-use diluent used for analyzing reticulocytes in blood.

Warning and Precautions

Wear gloves and a lab coat for protection. Avoid contact with skin and eyes. In case of skin contact, rinse immediately with plenty of water. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. If swallowed, induce vomiting and seek medical advice.

HGB Reagent**Intended Use**

The HGB Reagent is used to determine the hemoglobin concentration of blood.

Active Ingredients

Sodium lauryl sulfate	1.7 g/L
-----------------------	---------

Methodology

The HGB Reagent is a clear, azide-free and cyanide-free, low-toxicity reagent. Hemoglobin measurement using the HGB Reagent is based on the sodium lauryl sulfate method developed by Iwao Oshiro et al (SLS-hemoglobin method). In the SLS-hemoglobin method, an anionic surfactant, sodium lauryl sulfate (SLS) lyses the red blood cell membrane, releasing hemoglobin. The same SLS reagent subsequently combines with the released hemoglobin to form a stable hemichrome. The concentration of hemoglobin is then quantified by colorimetry using a filter photometer. The HGB Reagent has an advantage over other cyanide-free methods in that it is able to measure the hemoglobin derivatives deoxyhemoglobin, oxyhemoglobin, carboxyhemoglobin, and methemoglobin.

Warnings and Precautions

Do not ingest. Avoid contact with skin and eyes. For skin contact, flush the area with water. If eyes are affected, flush with copious amounts of water and contact a physician. If ingestion occurs, give ematic (warm normal saline) until vomit fluid is clear and contact a physician.

Literature References

Oshiro I, Takenata T, Maeda J. New method for hemoglobin determination by using sodium lauryl sulfate (SLS). *Clin Biochem*. 1982;15:83–88.

Stain Pack Components

The stain pack has an unopened stability of 12 months from date of manufacture. Once opened and installed in the instrument, it is stable for 180 days or until expiration, whichever comes first. Stain packs must be kept at room temperature (15°C–30°C/59°F–86°F) when connected to the analyzer. Packs that are not connected should be stored at 2°C–30°C (36°F–86°F).

Leukocyte Stain

Intended Use

The Leukocyte Stain is used to stain the leukocytes in diluted and lysed blood samples for determination of the five-part differential count with the ProCyte Dx Hematology Analyzer.

Active Ingredients

Polymethine dye	0.002%
Methanol	3.0%
Ethylene glycol	96.9%

Methodology

A sample volume of a whole blood specimen is introduced into the analyzer where a portion of it is automatically diluted with and lysed by the Lytic Reagent. The Leukocyte Stain is then added, and the entire dilution is maintained at a constant temperature for a defined time period in order to stain the nucleated cells in the sample. The stained sample is then introduced into the laser flow cytometer, where side scatter light and side fluorescent emission are measured, allowing the neutrophil (NEUT) count and percentage, the lymphocyte (LYMPH) count and percentage, the monocyte (MONO) count and percentage, the eosinophil (EO) count and percentage, and the basophil (BASO) count and percentage to be computed.

Warnings and Precautions

Wear gloves and a lab coat for protection. Avoid contact with skin and eyes. In case of skin contact, rinse immediately with plenty of soap and water. In case of contact with eyes, rinse immediately with water or normal saline, occasionally lifting upper and lower lids until no evidence of dye remains. Obtain medical attention. If swallowed, induce vomiting and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately.

Reticulocyte Stain**Intended Use**

Reticulocyte Stain is used to stain the reticulocyte population of cells for the assay of reticulocyte count and reticulocyte percent in blood with the ProCyt Dx Hematology Analyzer.

Active Ingredients

Polymethine dye	0.03%
Methanol	7.1%
Ethylene glycol	92.8%

Methodology

A sample volume of a whole blood specimen is introduced into the analyzer where a portion of it is automatically diluted with Reticulocyte Diluent (from the IDEXX ProCyt Dx Reagent Kit). Reticulocyte Stain is then added, and the entire dilution is maintained at a constant temperature for a defined time period in order to stain the reticulocytes present in the sample. The stained sample is then introduced into the laser flow cytometer, where forward light scatter and side fluorescent emission are measured allowing for the reticulocyte count (RET) and the reticulocyte percent (RET%) to be computed.

Warnings and Precautions

Wear gloves and a lab coat for protection. Avoid contact with skin and eyes. May produce irritation and discoloration of skin. In case of skin contact, wash affected area with soap and water. Polymethine dyes may result in irritation or injury to the eye. In case of contact with eyes, rinse immediately with water or normal saline, occasionally lifting upper and lower lids, until no evidence of dye remains. Obtain medical attention. If swallowed, induce vomiting and seek medical advice. Do not breathe vapor. In case of accident or if you feel unwell, seek medical advice immediately.

D Sample Collection and Preparation

Overview

The quality of your reference laboratory and in-house testing results is impacted by the quality of the sample you provide the laboratory/analyzer. Therefore, it is important that you always prepare samples properly. This chapter provides instructions for preparing quality samples, the recommended order of draw, and more.

We recommend that you familiarize yourself thoroughly with the following guidelines. If you have any questions about sample preparation, contact IDEXX Technical Support and we will be happy to assist you (for more information, see “IDEXX Technical Support Contact Information” on pages I-8–I-9).

- **Do not recycle syringes and needles**—Dull needles can cause trauma to the blood vessel, leading to cell destruction, hemolysis and platelet activation, especially in cats.
- **Choose the appropriate blood vessel and needle size**—Use a blood vessel that allows enough blood to collect within the tube or syringe selected. Select the appropriate needle size for the species.
- **Be gentle on the blood draw**—Exceeding the normal blood flow can collapse the blood vessel, which can be painful to the animal and cause hemolysis.
- **Mix the sample with EDTA as soon as possible**—When using a syringe and needle, remove the needle from the syringe before dispensing the blood. Remove the cap on the tube and fill the tube to its appropriate level.

Important: Replace the cap on the tube and immediately mix the EDTA sample at least 10 times by gentle inversion.

- **Make sure the sample-to-EDTA ratio is appropriate**—Fill the tube to its appropriate level for adequate mixing with EDTA. Overfilling will result in clotting; underfilling will alter the hematocrit and hemoglobin values. Refer to the manufacturer’s package insert for appropriate fill volumes.
- **Analyze the sample as soon as possible**—For best results, we recommend preparing and testing the sample within 4 hours. Even when refrigerated, blood samples will become less viable after 4 hours.
- **Discard severely hemolyzed samples**—If hemolysis is due to improper sample collection, discard the sample and redraw. If hemolysis is persistent, it may be due to a disease state.
- **Discard clotted samples and redraw**—The presence of clots will invalidate any results obtained, with the exception of the hematocrit.

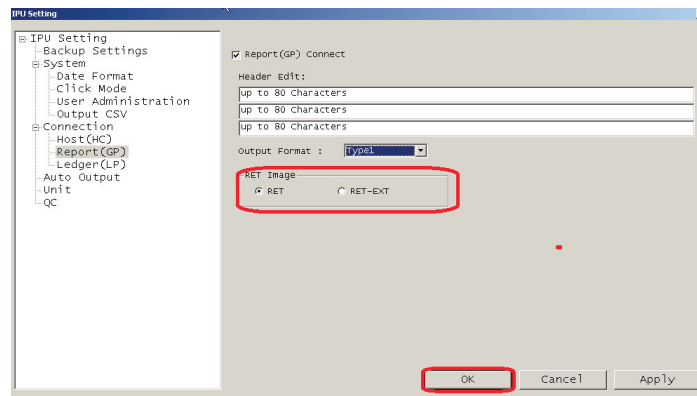
E Customizing the Settings

Modifying Printed Report Settings

To Modify Printed Report Settings

1. From the **Setting** menu, select the **Report (GP)** option on the left side of the screen.
2. Enter the desired header information in the **Header Edit** text box.
3. From the **Output Format** drop-down list, select the report type you want to generate.
 - Type 1: Displays all parameters as well as scattergrams and histograms
 - Type 2: Displays all parameters without scattergrams or histograms
 - Type 3: Displays RBC, HGB, HCT, MCV, MCH, MCHC, RET, PLT, WBC, NEUT, LYMPH, MONO, EO, and BASO as well as scattergrams and histograms
 - Type 4: Displays RBC, HGB, HCT, MCV, MCH, MCHC, RET, PLT, WBC, NEUT, LYMPH, MONO, EO, and BASO without scattergrams or histograms
4. Select if you want the report to include a RET Scattergram (**RET**) or RET-EXT Scattergram (**RET-EXT**).

Note: RET Scattergram is provided by default.



5. Click **OK**.

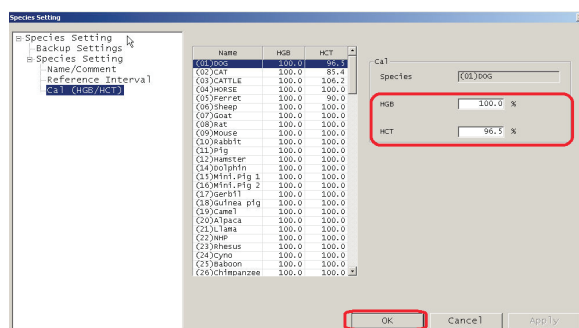
Calibrating HGB and HCT for a Species

Calibration should be performed on an average of 5–10 fresh normal samples and be able to be traced back to reference methods.

IMPORTANT: Please notify IDEXX Customer Support prior to completing this procedure so that a precision check can be performed to ensure there are no instrument issues.

To Calibrate the HGB

1. From the **Setting** menu, click **Species**.
2. Select **Cal/(HGB/HCT)** on the left side of the screen, select the species that needs to be calibrated, edit the calibration factor, and then click **OK**.



3. Rerun the same 5–10 samples used for the calibration to ensure that the mean from the reference method is clinically insignificant from the mean of the same samples run after calibration.

Backing Up or Restoring the Settings

If you change the IPU, Species, or ProCyt Dx settings, it is recommended that you back them up in a secure location (and not on the IPU).

To Back Up the Settings

1. From the **Setting** menu, click the setting that you want to back up (**IPU**, **Species**, or **PC Dx**).
2. Ensure Backup Setting is selected on the left side of the screen and then click **Backup**.
3. Browse to the location where you want to save the file and then click **Save**.
4. Click **OK** to exit the settings dialog box.

To Restore the Settings

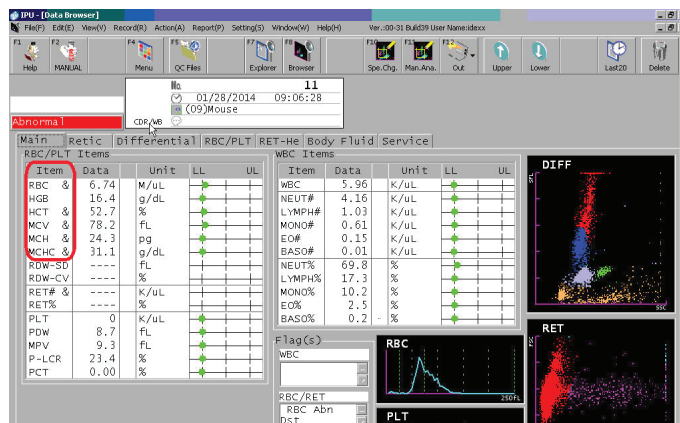
1. From the **Setting** menu, click the setting that you want to restore (**IPU**, **Species**, or **PC Dx**).
2. Ensure Backup Setting is selected on the left side of the screen and then click **Restore**.
3. Click **OK** to confirm that you want to restore the settings.
4. Browse to the location where you want to save the settings and then click **Open**.
5. Click **OK**.

Switching RBC and PLT

When RBC or PLT switching occurs, an ampersand (&) displays next to the parameter that was switched from the impedance value to the optical value.

Note: RBC and/or PLT switching is only available in the species where both technologies (impedance and Optical) have been determined to be reliable (e.g., the feline species reports out the PLT-O value as the impedance value has been determined to be unreliable). In this case, PLT switching would be turned off for this species.

- RBC switching is unavailable for the following species: goat, sheep, camel, llama, and alpaca.
- PLT switching is unavailable for the following species: feline, goat, sheep, camel, llama, alpaca, and dolphin.



Customizing the Sample Door Settings

You can customize the sample door settings to open the sample door as soon as the sample has been aspirated or keep it closed until the open/close button is pressed:

To Change the Sample Door Settings

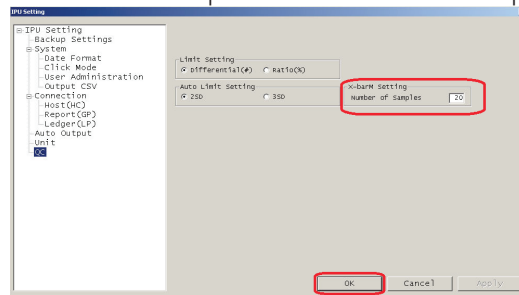
1. From the **Setting** menu, click **PC Dx**.
2. Select **Sample Position** (on the left side of the screen) and then select one of the following:
 - **Open**—The door will open automatically after the sample has been aspirated by the analyzer (20–30 seconds after pressing the Start button), allowing you to use the remaining sample for any additional tests.
 - **Close**—The door will remain closed until the open/close button is pressed.
3. Click **OK**.

Enabling/Disabling the X-barM Feature

You can use the X-barM feature to collect batches of results and use a weighted average algorithm (developed by Dr. Brian Bull) to smooth and trim the data.

To Enable the X-barM Feature

1. From the **Setting** menu, click **IPU**.
2. Select **QC** (on the left side of the screen) and then enter the number of samples to be included in each plot in the Number of Samples area, and then click **OK**.



3. Double-click the **Controller** icon on the Main menu.
4. Double-click the **X-barM** icon.
5. Select **On** to enable X-barM.
6. Click **OK**.

To Disable the X-barM Feature

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **X-barM** icon.
3. Select **Off** to disable X-barM.
4. Click **OK**.

Setting Upper and Lower Limits on X-barM

Before you can perform this procedure, you will need to determine the upper and lower ranges for the patient population.

To Set the Upper and Lower Limits on X-barM

1. Double-click the **QC Files** icon on the Main menu.
2. Select the appropriate X-barM species on the left side of the screen.
3. Click the **Input** button.
4. Select the parameter that you want to edit.
5. Under Manual Setting, enter the **Target** and **Limit Range (#)**.

Note: Leave any parameters that will not be utilized at default values. By default, all lower limits are 0.00 and upper limits are 99.99/999.99/9999.9.

6. Click **OK**.

F Quality Control

Overview

The purpose of quality control (QC) is to monitor the ProCyt Dx* analyzer's performance over time. QC also ensures the reliability of the analyzer and reagent system. Quality control should be run on a monthly basis (at a minimum). It may be necessary to run quality control for troubleshooting purposes.

Quality Control Materials

e-CHECK* (XS) is the quality control material used to monitor the performance of the ProCyt Dx analyzer. Do not use any other quality control materials on the analyzer.

The e-CHECK (XS) control is a stabilized whole blood matrix designed for statistical process control of the ProCyt Dx analyzer. This product is for veterinary use only, by laboratory professionals or appropriately trained personnel.

e-CHECK (XS) can be used until the expiration date found on the product packaging.

Adding a Quality Control Lot

Approximately every other month, IDEXX releases new lots of e-CHECK (XS) control for sale. The reference ranges and targets for each lot are available in a log sheet and a QVM software file that will load the new lot information into the ProCyt Dx software. QVM files should be downloaded from idexxbioresearch.com. The file can be downloaded to the IPU directly (Internet connection required on the IPU) or to a virus-free USB drive (which can then be transferred to the IPU).

1. Download the most current QVM files (U.S. users: download from idexxbioresearch.com/research-analyzer-resources; other users: download from idexxbioresearch.eu/resources-instruments/).
 - If you downloaded the files directly to the IPU, proceed to step 2.
 - If you downloaded the files to a USB drive, follow these steps:
 - a. Insert the flash drive into the IPU and then open it with Windows* Explorer.
 - b. Create a folder on the IPU desktop called **QVM** (if one does not already exist).
 - c. Copy the two files from the flash drive into the QVM folder and remove the flash drive from the IPU.
2. Double-click the **QC Files** icon on the Main menu.
3. Select a QC file that has no information in it.
4. Click the **Input** button.
5. Click **Read File**.
6. Click **Browse**, select the QVM folder on your desktop, and click **OK**.
7. Select one of the files and click **OK**.
8. Click **OK**.
9. Repeat steps 3–8 for the second QC file.

Running Quality Control

This procedure should be run monthly to ensure optimum performance of your analyzer.

1. Double-click the **Manual Sample No** icon on the Main menu.
2. Click **QC**.
3. Select the applicable QC lot information and click **OK**.
4. Warm an e-CHECK (XS) vial to room temperature (18°C–25°C [64°F–77°F]) for at least 15 minutes. Do not leave the vial(s) at room temperature for more than 1 hour or let the vial(s) exceed room temperature.

Note: Do not warm the vial in your hand.

5. Verify the cap is secure and gently invert the e-CHECK (XS) vial to mix until the cell button in the bottom of the vial is completely suspended. **Do not place e-CHECK (XS) on a mechanical mixer or rocker.**
6. Ensure the QC adapter is in place in the sample drawer.
7. Immediately place the e-CHECK (XS) vial in the tube adapter.
8. Press the **Start** button on the analyzer.
9. Return the e-CHECK (XS) vial to the refrigerator.

Note: e-CHECK (XS) is stable for 14 days once the cap is pierced.



Viewing and Printing Quality Control Results

1. Double-click the **QC Files** icon on the Main menu.
2. Select the QC lot information that you want to view. Radar charts display on the right side of the screen, providing a quick visual for the QC results.
3. Double-click the QC file you want to view/print.
4. If you want to view the standard deviation, mean, and CV for a previous date, drag the green vertical bar to the appropriate date.
5. To print:
 - To print charts, click **Report** and then click **Report** again.
 - To print data, click **Report** and then click **Ledger**.

Viewing Quality Control Lot Information

1. Double-click the **QC Files** icon on the Main menu.

Overview

A variety of maintenance and diagnostic procedures allow you to maintain and service the ProCyt^e Dx^{*} analyzer. For your convenience, a maintenance log sheet is provided at the end of this section.

Note: Some of these tasks must be completed with assistance from an IDEXX Technical Support representative. Contact IDEXX Technical Support when prompted (see “IDEXX Technical Support Contact Information” on pages I-8–I-9).

Upgrading the Software

IDEXX will provide you, at no charge, updated instrument software on a periodic basis. These updates may include new features. Be sure to read the software notes contained within each new release.

Running the Daily Shutdown Procedure

The Shutdown procedure should be initiated daily. When Shutdown mode is exited, the analyzer performs a background check to determine if the analyzer is ready to run or if it needs to be cleaned or requires maintenance. The analyzer should be put into Shutdown mode once every 24 hours. It takes approximately 8 minutes to exit Shutdown mode.

Note: If you do not plan to use the analyzer on a particular day, do not exit Shutdown mode.

Important: Failure to run the Shutdown procedure may yield inaccurate results. IDEXX recommends that you place the analyzer in Shutdown mode at the end of each day's analyses or at least once every 24 hours if running the instrument continuously.

To run the Shutdown procedure when the analyzer is active:

1. Double-click the **Shutdown** icon on the Main menu.
2. Click **Execute**.

To exit Shutdown mode:

1. Click the **Restart** button on the Main menu.
2. Click **OK**. The Startup process automatically begins on the ProCyt^e Dx analyzer and a background check is initiated. When these procedures are finished (after approximately 8 minutes), the ProCyt^e Dx analyzer is ready to begin processing samples.

To shutdown the analyzer for more than 2 weeks:

If the analyzer will not be used for more than 2 weeks, please contact IDEXX Technical Support to discuss reagent management and system options.

Powering Off the Analyzer Weekly

It is recommended that you power off the analyzer and IPU once per week (for additional maintenance tasks, see the *Maintenance Log* at the end of this section).

Running the Monthly Rinse Procedure

The Monthly Rinse procedure:

- Washes contaminants from the optical detector block flow cell
- Automatically initiates the Auto Rinse procedure
- Generates a background check

The Monthly Rinse procedure takes approximately 15–17 minutes to complete. To ensure optimal analyzer performance, IDEXX recommends that you perform this procedure each month. Upon completion of the monthly rinse procedure, the analyzer will be in Shutdown mode.

For this procedure, if you do not have IDEXX Hydro-Clean, you must prepare a 5% bleach solution by combining filtered, unscented bleach with distilled/deionized water. The ratio of bleach to distilled/deionized water varies depending on the concentration of the bleach (for example, Clorox* Regular Bleach has a 8.25% concentration, so the solution should include 2.0 mL of Clorox Regular Bleach and 1.0 mL of distilled/deionized water).

Important: Only use filtered and unscented bleach without surfactants. DO NOT USE scented bleaches or generic versions of regular bleach. DO NOT USE tap water. The solution can be used up to one week after it is made.

To run the Monthly Rinse procedure (without an alert):

1. Double-click **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click the **Monthly Rinse** icon.
4. If you do not have IDEXX Hydro-Clean, prepare a 5% bleach solution by combining filtered, unscented bleach with distilled/deionized water. The ratio of bleach to distilled/deionized water varies depending on the concentration of the bleach (for example, Clorox* Regular Bleach has a 8.25% concentration, so the solution should include 2.0 mL of Clorox Regular Bleach and 1.0 mL of distilled/deionized water).
5. Dispense 2 mL of IDEXX Hydro-Clean (or the 5% bleach solution) into a 13 x 75 mm (untreated or treated and rinsed) tube and insert the tube into the sample drawer on the analyzer.
6. Press the **Start** button on the analyzer to begin the Monthly Rinse procedure. When the procedure is complete, the analyzer will be in Shutdown mode.
7. Restart the analyzer by clicking **Restart** on the IPU and then clicking **OK**.

Cleaning the Case

Always disconnect the power cable before cleaning the analyzer.

Clean the outside of the analyzer with a damp (not wet) lint-free cloth. A mild disinfectant or liquid soap will remove grease. Do not use any of the following near the analyzer: organic solvents, ammonia-based cleaners, ink markers, sprays containing volatile liquids, insecticides, polish, or room freshener.

Care should be taken not to spill any samples, chemicals, cleaning agents, water, or other fluids on/in the analyzer.

Note: Dust and animal hair can lead to analyzer failures. Routinely dust off the analyzer and surrounding surfaces with a damp cloth.

Cleaning the Fan Filter

The analyzer's fan filter should be cleaned monthly.

The analyzer should be powered off when cleaning the fan filter. As a result, it is recommended that you clean the fan filter during the weekly reboot process, when the analyzer and the IPU are both powered off.

To clean the fan filter:

1. Ensure the analyzer is powered off.
2. Open the analyzer's right side cover.
3. Remove the fan filter.
4. Rinse the filter and then pat it dry with a clean cloth.
5. Replace the fan filter and close the right side cover.

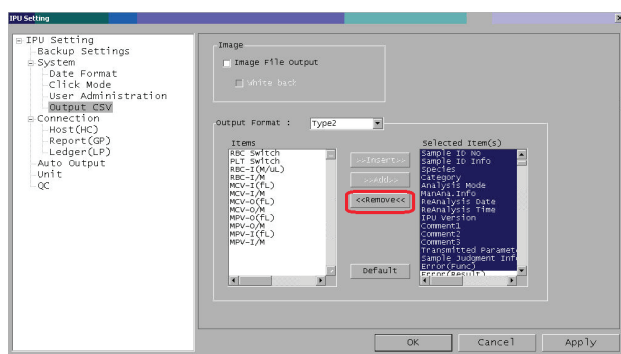


Setting Up CSV Files

You can create up to 4 CSV templates (Type1, Type 2, Type3, and Type4).

To Set Up CSV Files

1. From the **Setting** menu, click **IPU**.
2. Select **Output CSV** (on the left side of the screen).
3. Select an **Output Format** from the available drop-down list.
4. Under Selected Items, select any parameters that you want to remove and then click **Remove**.



5. Under Items, select any parameters that you want to add and then click **Add**.
6. Click **OK**.
7. Repeat steps 3–6 for each template you want to set up.

Managing Data

Note: Ensure the Last20 button is not activated before you start.

To Output CSV Files

1. Click the **Explorer** button.
2. Select all of the sample results you wish to print.
3. From the Record menu, click **Output (csv format)**.
4. Browse to the location where you want to save the .csv file and then click **Save**.

Note: The .csv file cannot be viewed on the IPU.

CSV File Key

Note: Parameters not on this list are typically used for troubleshooting or informational purposes.

Parameter	Description	Notes
Agran#(K/uL)	For Body fluids	
Agran%(%)	For Body fluids	
Analysis Date	Date sample was analyzed	
Analysis Mode	WB (Whole Blood), SF (Synovial Fluid), PF (Peritoneal Fluid), AF (Abdominal Fluid), TF (Thoracic Fluid) or OF (Other Fluid)	
Analysis Time	Time sample was analyzed	
Any header that is .../M	Either Blank or has a symbol	*=value suspect due to flag being generated or @= value out of linearity or +=out high via RI, or -= out low via RI or & for optical switching
BASO %(%)	Basophil Ratio (%)	
BASO#(K/uL)	Basophil (K/uL)	
Category	Reference Interval setting	Can be 4 different reference interval settings per algorithm
Comment1	Additional comment line	Maximum 40 characters
Comment2	Additional comment line	Maximum 15 characters
Comment3	Additional comment line	Maximum 15 characters
Delta-PLT(PLT-O/PLT-I)	Delta of PLT-O divided by PLT-I	May be useful when RET-CH/PLT-O error is generated
Delta-RBC(RBC-O/RBC-I)	Delta of RBC-O divided by RBC-I	May be useful when RET-CH/PLT-O error is generated
EO %(%)	Eosinophil Ratio (%)	

Parameter	Description	Notes
EO#(K/uL)	Eosinophil (K/uL)	
EoBaBoundaryCount	EO/BASO boundary count in Diff channel	Used for WBC flagging
Error (Func)	Blank or Func	
Error (Result)	Type of result error	
Gran#(K/uL)	For Body fluids	
Gran%(%)	For Body fluids	
GsBaBoundaryCount	Ghost(unlysed RBC)/BASO boundary count in Diff channel	Used for WBC flagging
GsEoBoundaryCount	Ghost(unlysed RBC)/EO boundary count in Diff channel	Used for WBC flagging
GsNeBoundaryCount	Ghost(Unlysed RBC)/Neut boundary count in Diff channel	Used for WBC flagging
HCT (%)	Hematocrit (%)	
HFR(%)	Reticulocyte High Fluorescence Region (%)	Most immature reticulocytes
HGB(g/dL)	Hemoglobin (g/dL)	
Instrument ID	Analyzer Serial Number	
IP ABN (XXX)	0 if not positive for this flag and 1 if positive for this flag	
IP SUS (XXX)	0 if not positive for this flag and 1 if positive for this flag	
IPU Version	Software version sample was run on or that species change was performed on	
IRF (%)	Immature Reticulocyte Fraction (%)	MFR and HFR values added together
LFR(%)	Reticulocyte Low Fluorescence Region (%)	Most mature reticulocytes
L-MCV	In Dimorphic population, large/upper MCV value	If Dimorphic population/ right population
L-RBC	In Dimorphic population, large/upper MCV value	If Dimorphic population/ right population
L-RDW	In Dimorphic population, large/upper MCV value	If Dimorphic population/ right population
LyBaBoundaryCount	Lymph/BASO boundary count in Diff channel	Used for WBC flagging
LyGsBoundaryCount	Lymph/Ghost(Unlysed RBC) boundary count in Diff channel	Used for WBC flagging
LyMoBoundaryCount	Lymph/Mono boundary count in Diff channel	Used for WBC flagging

Parameter	Description	Notes
LYMPH % (%)	Lymphocyte Ratio (%)	
LYMPH# (K/uL)	Lymphocyte (K/uL)	
LyNeBoundaryCount	Lymph/Neut boundary count in Diff channel	Used for WBC flagging
ManAna Info	Blank unless customer performed Species, Mode or Category Change	
MCH (pg)	Mean Corpuscular Hemoglobin (pg)	
MCHC (g/dL)	Mean Corpuscular Hemoglobin Concentration (g/dL)	
MCV (fL)	Reported Mean Cell Volume (fL)	
MCV-I (fL)	MCV from Impedance channel	
MCV-O (fL)	MCV from Optical channel	
MFR (%)	Reticulocyte Medium Fluorescence Region (%)	
MoEoBoundaryCount	Mono/EO boundary count in Diff channel	
MONO % (%)	Monocyte Ratio (%)	
MONO# (K/uL)	Monocyte (K/uL)	
MPV (fL)	Reported Mean Platelet Volume (fL)	
MPV-I	Mean Plt Volume from Impedance channel	
MPV-O	Mean Plt Volume from optical channel	
NeBaBoundaryCount	Neut/BASO boundary count in Diff channel	Used for WBC flagging
NeEoBoundaryCount	Neut/EO boundary count in Diff channel	Used for WBC flagging
NeMoBoundaryCount	Neut/Mono boundary count in Diff channel	Used for WBC flagging
NEUT % (%)	Neutrophil Ratio (%)	
NEUT# (K/uL)	Neutrophil (K/uL)	
PCT (%)	Platelet Hematocrit (%)	
PDW (fL)	Platelet Distribution Width (fL)	
P-LCR (%)	Platelet Large Cell Ratio (%)	% of PLT's above the 12fL
PLT Switch	0 or 1	0 if did not switch and 1 if switched
PLT (K/uL)	PLT (K/uL)	This could be either the value from the Impedance or optical.

Parameter	Description	Notes
PLT-I(K/uL)	Platelet value generated by Impedance Method (K/uL)	
PLT-LD	PLT lower discriminator set point	
PLT-O	PLT value generated by optical method	This is where you find this value when a RET-CH/PLT-CH error is generated and the PLT-O value is dashed out
PLT-O(K/uL)	Platelet value generated by optical method (K/uL)	
PLT-UD	PLT upper discriminator set point	
RBC Switch	0 or 1	0 if did not switch and 1 if switched
RBC(M/ μ L)	Red Blood cell reported could be Impedance or optical	
RBC-BF(M/uL)	RBC Count For Body fluids	
RBC-He(pg)	Total HGB minus Ret-He	
RBC-I(M/ μ L)	RBC from Impedance channel	
RBC-LD	RBC-Lower discriminator set point	
RBC-MD	RBC – middle discriminator set point	
RBC-O	RBC value generated by optical method	This is where you find this value when a RET-CH error is generated and the RBC-O value is dashed out
RBC-O(M/uL)	RBC value generated by optical method (M/uL)	
RBC-UD	RBC-Upper discriminator set point	
RDW-CV (%)	Red Blood Cell Distribution Width -Coefficient of Variance (%)	
RDW-SD(fL)	Red Blood Cell Distribution Width -Standard Deviation(fL)	
Reanalysis Date	Date Species change was performed	Blank unless customer performed Species, Mode or Category Change
Reanalysis Time	Time Species change was performed	Blank unless customer performed Species, Mode or Category Change
RET % (%)	Reticulocyte(%)	Retic % value
RET# (K/uL)	Reticulocyte(K/uL)	Retic absolute value
RET-He(pg)	Retic hemoglobin	

Parameter	Description	Notes
Sample ID Info	M or A	A= sample number or species auto incremented. M=sample number or species manually entered
Sample ID No	Sample number	
Sample Judgment Info	Blank, Error or Abnormal	
Seq.	Sample sequence number	Number is reset after each startup or power on
S-MCV	In Dimorphic population, small/lower MCV value	If Dimorphic population/ left population
Species	Species as entered by customer	Default at power on is always Dog
S-RBC	In Dimorphic population, small/lower RBC count	If Dimorphic population/ left population
S-RDW	In Dimorphic population, small/lower RDW value	If Dimorphic population/ left population
TNCC(K/uL)	Total Nucleated Cell Count	For Body fluids
Transmitted Parameters	GH	G=printer H=Host once sent to printer or host then the G or H would disappear
WBC(K/uL)	White Blood Cell(K/uL)	

Maintenance Log

Month: _____

[illegible]

Overview

Some of these tasks must be completed with assistance from an IDEXX Technical Support representative. Contact IDEXX Technical Support when prompted (see “IDEXX Technical Support Contact Information” on pages I-8–I-9).

Important: The ProCytex Dx* analyzer must have a Ready status to run a maintenance procedure. Most on-demand diagnostic and maintenance tasks are accessible from the Controller screen on the IPU.

Differences in Results

With a Commercial Laboratory or Other Instrument

Comparing results from different laboratories that may be using different equipment or methods is imprecise at best. Any comparisons should be performed on the same sample that has been “split,” stored under like conditions, and tested at approximately the same time. If too much time elapses between drawing and running a sample, the sample can age. For example, after 8 hours, MCV values change as cells tend to swell. Compare each result to the reference interval stated by IDEXX or the commercial laboratory (as appropriate). Each result should have the same relationship to its method’s reference interval. For instance, a sample giving a ProCytex Dx analyzer result that is slightly below the reference interval should produce a laboratory result slightly below the laboratory’s reference interval.

With Your Own Expectations

If you receive results that are not what you expected for a particular patient, consider the following:

- Were there any abnormalities noted in the sample taken (e.g., hemolysis, lipemia, stress) that could cause the changes seen?
- How far outside the reference interval is the result? The more narrow the reference interval, the more important minor changes become.
- Would any treatments or drugs the patient may be taking alter the results?
- Do clinical findings support the results? Unexpected abnormal results are usually accompanied by other evidence.
- Is the result biologically significant or possibly so?
- What other tests or procedures might be used to confirm or reject this result?

All laboratory results should be interpreted in light of the case history, the clinical signs, and the results of ancillary tests.

Accessing the ProCytex Dx Maintenance Menu

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.

Running the Auto Rinse Procedure

The Auto Rinse procedure cleans the detector chamber and the dilution line. It also performs a background check. This procedure takes approximately 4 minutes to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Auto Rinse**.

Running the Rinse Waste Chamber Procedure

The Waste Chamber Rinse procedure uses a 5% bleach solution to rinse the waste chamber in the ProCyt Dx analyzer. This procedure takes approximately 10 minutes to complete and should be performed when prompted.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Rinse Waste Chamber**.
4. If you do not have IDEXX Hydro-Clean, prepare a 5% bleach solution by combining filtered, unscented bleach with distilled/deionized water. The ratio of bleach to distilled/deionized water varies depending on the concentration of the bleach (for example, Clorox* Regular Bleach has a 6% concentration, so the solution should be 5 parts Clorox Regular Bleach and 1 part distilled/deionized water).

Important: Only use filtered and unscented bleach without surfactants. DO NOT USE scented bleaches or generic versions of regular bleach. DO NOT USE tap water. The solution can be used up to 1 week after it is made.

5. Dispense 2 mL of IDEXX Hydro-Clean (or the 5% bleach solution) into a 13 x 75 mm (untreated or treated and rinsed) tube and insert the tube into the sample drawer on the analyzer.
6. On the ProCyt Dx analyzer, press the **Start** button to begin the Rinse Waste Chamber procedure. The procedure takes approximately 10 minutes.

Running the Rinse Flowcell Procedure

The Rinse Flowcell procedure washes contaminants from the optical detector block flow cell. This procedure takes approximately 6 minutes to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Rinse Flowcell**.
4. If you do not have IDEXX Hydro-Clean, prepare a 5% bleach solution by combining filtered, unscented bleach with distilled/deionized water. The ratio of bleach to distilled/deionized water varies depending on the concentration of the bleach (for example, Clorox* Regular Bleach has a 6% concentration, so the solution should be 5 parts Clorox Regular Bleach and 1 part distilled/deionized water).

Important: Only use filtered and unscented bleach without surfactants. DO NOT USE scented bleaches or generic versions of regular bleach. DO NOT USE tap water. The solution can be used up to 1 week after it is made.

5. Dispense 2 mL of IDEXX Hydro-Clean (or the 5% bleach solution) into a 13 x 75 mm (untreated or treated and rinsed) tube and insert the tube into the sample drawer on the analyzer.
6. On the ProCyt Dx analyzer, press the **Start** button to begin the Rinse Flow Cell procedure. The Rinse Flow Cell procedure takes approximately 6 minutes.

Running the Drain Reaction Chamber Procedure

The Drain Reaction Chamber procedure, which takes less than 1 minute to complete, drains accumulated reagents out of the reaction and dilution chamber. Total time for both procedures to complete is approximately 1 minute.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Drain Reaction Chamber**. The window closes automatically when the procedure is complete.

Running the Drain RBC Isolation Chamber Procedure

The Drain RBC Isolation Chamber procedure, which takes approximately 3 minutes to complete, drains accumulated reagents out of the RBC isolation chamber.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Drain RBC Isolation Chamber**. The window closes automatically when the procedure is complete.

Running the Drain Waste Fluid Procedure

When draining the waste fluid, the waste chamber drainage sequence can be run to drain accumulated waste out of the waste chamber. The Drain Waste Fluid message box is displayed while the sequence is running.

Note: For the Drain Waste Fluid sequence to run, the ProCyt Dx must be in Ready status. If a process is attempted while the analyzer is in any other status, an error warning will be sounded on the analyzer and the Drain Waste Fluid message box will not appear.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Drain Waste Fluid**. The window closes automatically when the procedure is complete.

Running the Air Pump Procedure

The Air Pump procedure takes approximately 2 minutes to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Air Pump**. The window closes automatically when the procedure is complete.

Running the Aspiration Unit Motor Procedure

The Aspiration Motor procedure takes less than 1 minute to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Aspiration Unit Motor**. The window closes automatically when the procedure is complete.

Running the Sheath Motor Procedure

The Sheath Motor procedure takes less than 1 minute to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Sheath Motor**. The window closes automatically when the procedure is complete.

Running the Tube Holder Motor Procedure

The Tube Holder Motor procedure takes less than 1 minute to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Tube Holder Motor**. The window closes automatically when the procedure is complete.

Running the WB Aspiration Motor Procedure

The WB Aspiration Motor procedure takes less than 1 minute to complete.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **WB Aspiration Motor**. The window closes automatically when the procedure is complete.

Running the Remove Clogs Procedure

The Remove Clogs procedure, which takes approximately 1 minute to complete, eliminates clogs from the RBC detector.

1. Double-click the **Controller** icon on the Main menu.
2. Double-click the **Maintenance** icon.
3. Double-click **Remove Clogs**. The window closes automatically when the procedure is complete.

Running the Pinch Valve Procedure

The Pinch Valve procedure takes approximately 1 minute to complete.

1. Double click **Controller** on the Main menu.
2. Double-click **Maintenance**.
3. Double-click **Pinch Valve**. The window closes automatically when the procedure is complete.

Smart Flags*

Automated cell counters have two main objectives. First, they must examine the various components of a blood sample and return the appropriate red blood cell count, white blood cell count, platelet count, and various cellular indices. Second, they must prompt the user with a message in the event that the accuracy of these cellular evaluations may be compromised. For example, if the blood sample being analyzed contains white blood cells with markedly abnormal morphology, the analyzer may not be able to provide full characterization and the device will return a message suggesting a blood film should be reviewed for confirmation.

The flagging for the ProCyt Dx analyzer signals the user that an abnormal cell or group of cells is present and it cannot be characterized in the normal hemogram. An asterisk (*) indicates the analyzer is questioning the presence of the cellular population. A hash mark (-- --) indicates the analyzer was unable to return a result for a particular parameter. In either case, a blood film should be consulted. These message flags act as internal controls to remind the doctor that a sample must be examined under a microscope. In the vast majority of cases, this microscopic review process will take less than 1–3 minutes. A manual leukocyte differential will be needed only rarely.

Flag	Displays when any of the following parameters is flagged with an asterisk (*) or hash marks (-- --)		Description	Action Required
WBC Abnormal Scattergram	WBC NEUT# LYMPH# MONO# EO# BASO#	NEUT% LYMPH% MONO% EO% BASO%	The patient's white blood cell morphology made it difficult to separate individual populations.	Evaluate the blood film to confirm the values.
RBC Abnormal Distribution	RBC HCT MCV MCH	MCHC RDW RET# RET%	Abnormal distribution of the size, shape, or numbers of the patient's red blood cells.	
RETIC Abnormal Scattergram	RET# RET%		Abnormal distribution of the size, shape, or numbers of the patient's reticulocytes.	
PLT Abnormal Distribution and PLT Abnormal Scattergram	PLT MPV	PDW PCT	Abnormal distribution of the size, shape, or numbers of the patient's platelets or too few platelets available for accurate assessment.	
PLT Clumps? and PLT Clump(s)?	PLT MPV PDW PCT WBC NEUT# LYMPH# MONO# NEUT#	MONO# NEUT% LYM% MONO% EO# BASO [†] EO% BASO% [†]	The patient's platelets may be clumped and interfere with accurate platelet parameters, as well as with basophil and eosinophil distribution.	

[†]For feline species, BASO and %BASO cannot be determined; a result of "-- --" will be reported.

Flag	Displays when any of the following parameters is flagged with an asterisk (*) or hash marks (--,--)		Description	Action Required
Left Shift [‡]	NEUT% NEUT# MONO%	MONO# LYMPH% LYMPH#	Immature Neutrophils suspected	Evaluate the blood film to confirm the values.
nRBC [§]	WBC NEUT% NEUT# LYMPH% LYMPH#	MONO% MONO# EO% EO# BASO% BASO#	Nucleated Red Blood cells suspected	Evaluate the blood film and confirm the white blood cell count is not inflated by the presence of nRBCs.

[‡]This flag is only reported when running canine, feline, equine, and bovine samples.

[§]This flag is only reported when running canine and feline samples.

Responding to an Alert

If an analyzer experiences a problem, an alert message appears on the screen.

To Clear an Alert

1. Press F1 on the keyboard. All errors are listed on the Help screen and are sorted from high to low priority.
2. Follow the on-screen instructions to resolve the error.

Note: If the error isn't resolved, click **Close**. If the error persists, call IDEXX Technical Support.

I Appendices

Installing the ProCyte Dx* Analyzer

- The ProCyte Dx analyzer weighs approximately 55 pounds (25 kg). It may require multiple people to lift the instrument. Be sure to use a table or desk that can support the weight of the analyzer.
- Position the analyzer so that the power switch and power cord are easily accessible.
- To secure the space required for maintenance, install the keyboard, monitor, and computer on the right side of the ProCyte Dx analyzer.
- The analyzer should be installed in a well-ventilated location, away from water, dust, and direct sunlight. Do not place the analyzer in a location where it can be splashed by water. It should be located in a space large enough to be used safely, including when the sample drawer is open. If additional equipment is to be attached/connected to it, additional desk space will be required.
- The analyzer should be placed on a level surface with a minimum of 2 inches (5 cm) between the back of the analyzer and any wall.
- Do not install in an area of elevated temperature and vibration.
- Do not install this instrument in places where chemicals are stored or gas can develop.
- Do not use this instrument in any operating environment that has electroconductive or flammable gases, including oxygen, hydrogen, and anesthesia.
- The power cable for this instrument is approximately 6 feet (1.8 m) long. Use a nearby outlet that is designed for it.

Installation checklist:

Installation Parts:

- | | | | |
|---|--|---|---|
| ☐ ProCyte Dx analyzer | ☐ IPU | ☐ Mouse | ☐ Bar code scanner |
| ☐ ProCyte Dx accessories | ☐ IPU accessories | ☐ Printer (optional) | ☐ Operator's Guide |
| ☐ Calibration CD | ☐ Monitor | ☐ USB printer cable (optional) | |
| | ☐ Keyboard | ☐ Ethernet cables | |

Reagents and QC:

- | | | |
|--|--------------------------------------|-------------------------------------|
| ☐ L1/L2 quality control | ☐ Reagent kit | ☐ Stain pack |
|--|--------------------------------------|-------------------------------------|

Installation Programs:

- | | |
|--|--|
| ☐ ID changer tool | ☐ QVM files (2) |
|--|--|

Installation:

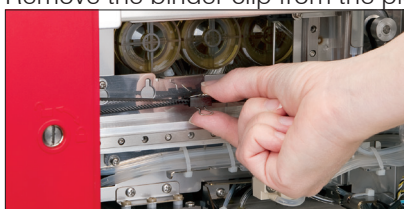
- | | | | |
|--|---|---|--|
| ☐ ProCyte Dx installed per installation procedure | ☐ Two levels of QC run | ☐ All QC parameters are within specified ranges and histograms look normal | ☐ Print function operating properly |
|--|---|---|--|

To install the analyzer:

1. Before you unpack the analyzer, choose an optimum location for the instrument. Choose a well-ventilated area away from obvious sources of heat, direct sunlight, cold, humidity, or vibrations. For optimum results, room temperature should be at 15°C–30°C (59°F–86°F) and relative humidity at 30%–85%.
2. Unpack the analyzer.
3. Using the flat blade screwdriver provided, unlock and open the right side door.



4. Remove the binder clip from the piercer belt.



5. Remove the piece of tape on the protection plate.



6. Remove the piece of tape on the impedance cover.



7. Close and lock the right side door.
8. Open the stain compartment (remove the tape) and remove the stain probes from the plastic bag. Do not remove the plastic tubing at the ends of the stain probes.



9. Remove the caps from a new stain pack and set them aside.

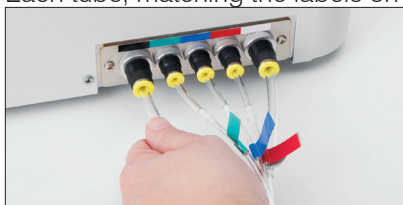
10. Screw a new stain pack into the caps in the stain compartment, ensuring each probe is inserted into the correct pouch (match the color of the probe caps to the color on the pouch labels).



11. Place the caps from the new stain pack onto the empty stain pack. Dispose of the stain pack according to applicable local disposal laws.
12. Place the new stain pack into the compartment, ensuring the cords are in front of the stain pack inside the compartment. Then, close the cover.



13. Connect the ends of the tubes on the Quick-Connect Top to the back of the analyzer. Each tube, matching the labels on the tubes and on the back of the analyzer.



14. Open a reagent kit, remove the caps from the 3 bottles, System Diluent, and the waste container and place the Quick-Connect Top over the kit so that the probes are inserted into the 3 bottles, System Diluent, and the waste container.



15. Ensure the analyzer is powered off and then connect the power cable to the analyzer and to a properly grounded electrical outlet.

Warning:

- Be sure to ground this analyzer. Improper grounding may cause electrical shock.
- The analyzer's power supply cord uses a 3-prong plug. When the power supply socket is provided with grounding, simply plug it to the socket.
- Be sure not to exceed socket capacity. Failure to do so may cause a fire.

To Connect the ProCyte Dx Analyzer to the IPU

1. Connect the Ethernet end of the shielded Ethernet cable into the USB-to-Ethernet adaptor and then into the ProCyte Dx analyzer.

Note: This cable should ONLY be used to connect the ProCyte Dx analyzer to the IPU.

2. Connect the USB end of the shielded Ethernet-to-USB converted cable into an available USB port on the back of the IPU.
3. Power on the ProCyte Dx analyzer.

Using Antivirus Software on the IPU

If you choose to install antivirus software on the IPU, we recommend that you set it up to scan when the instrument is not in use. If your policy is to run real-time scans, the antivirus software must exclude these folders from the scan to avoid an extended sample run time:

- C:\Database
- C:\Program Files\Sysmex
- C:\Program Files\Sysmex Work
- S:\
- C:\Program Files\Agent SmartService

Updating the IPU Operating System

If you perform Microsoft* operating system updates, we recommend that you only allow critical security updates. Allowing other updates could impact the performance of the system.

Technical Specifications

Dimensions and Weight

Main Unit Dimensions	Width: 12.6" (320 mm)
	Height: 15.8" (403 mm)
	Depth: 16.26" (413 mm)
Main Unit Weight	Approximately 55 lb (25 kg)

Performance Specifications and Throughput

Throughput	CBC+DIFF+RETIC: approximately 30 samples/hour	
Ambient temperature	15°C–30°C (59°F–86°F)	
	Optimum: 23°C (73.4°F)	
Relative humidity	30%–85%	
Power supply	100–240 V AC, 50/60 Hz	
Power consumption	210 VA or less	
Display range	WBC	0.00–999.99 K/ μ L
	RBC	0.00–99.99 M/ μ L
	HGB	0.0–35.0 g/dL
	HCT	0.0%–100.0%
	PLT	0–9999 K/ μ L
	RET%	0.00%–99.99%
	RET	0–9999 K/ μ L
Background limits	WBC	0.1 K/ μ L
	RBC	0.02 M/ μ L
	HGB	0.1 g/dL
	PLT	10 K/ μ L
	PLT-O	10 K/ μ L
Precision Precision data generated by a trained professional running 6 instruments across five days. Ten replicates of normal level control were gathered each day for a total of 300 precision runs.	WBC	3.0%
	RBC	1.5%
	HGB	1.5%
	HCT	1.5%
	PLT-I	4.0% (100 K/ μ L or more)
	NEUT%	8.0%
	LYMPH%	8.0%
	MONO%	11.0%
	RET	15% (RBC 3.00 M/ μ L or more, %RETIC 1%–4%)
	RET%	15% (RBC 3.00 M/ μ L or more, %RETIC 1%–4%)
Analysis Parameters	See pages A-10–A-11	

Accuracy[†] Analysis was generated from 250 total samples (50 of each species) and compared to the Sysmex XT-V	WBC	R ≥ 0.95
	RBC	R ≥ 0.95
	HGB	R ≥ 0.95
	HCT	R ≥ 0.95
	PLT	R ≥ 0.90
	RET	R ≥ 0.90
	RET%	R ≥ 0.90
	NEUT%	R ≥ 0.90
	LYMPH%	R ≥ 0.60
	MONO%	R ≥ 0.60
	EO%	R ≥ 0.70
	BASO%	R ≥ 0.45
Linearity Data generated using both whole blood panels and commercially available linearity controls.	WBC	0–310 K/ μ L R ≥ 0.95
	RBC	0.00–16.00 M/ μ L R ≥ 0.95
	HGB	0.0–25.0 g/dL R ≥ 0.95
	HCT	0.0%–60.0% HCT R ≥ 0.95
	PLT	0–2000 K/ μ L R ≥ 0.95
	RET%	0.0%–23% R ≥ 0.90
	RET	0.00–3.0 M/ μ L R ≥ 0.90
Carryover	WBC	1.0% or less
	RBC	1.0% or less
	HGB	1.0% or less
	HCT	1.0% or less
	PLT	1.0% or less
Aspiration Volume	30 μ L	
Sample Volume Required for Proper Aspiration	VetCollect* sample tube: Minimum of 500 μ L Micro sample tube: Minimum of 90 μ L (dependent on the tube manufacturer's recommendations)	
Data Storage Capacity	Data is stored on the IPU, which stores up to 3000 records.	
Storage Condition (Transportation)	Ambient temperature: -10°C–60°C (14°F–140°F)	
	Relative humidity: 10%–90% or less (no condensation/keep dry)	

Laser	Class 1 device, 635 nM, 15 mW capability adjusted to 5.5 ± 0.1 mW This equipment complies with: • FDA Standard 21 CFR 1040.10 • IEC 60825-1, 2nd Ed., 2007 Safety of Laser Products Part I: Equipment Classification and Requirements
Reagent kit and stain pack operating and storage temperatures	Operating temperature: 15°C–30°C (59°F–86°F) Storage temperature: 2°C–30°C (36°F–86°F)

IDEXX Technical Support Contact Information

IDEXX Sales Representative: _____

Telephone/Voice Mail: _____

United States

IDEXX Laboratories, Inc.
One IDEXX Drive
Westbrook, Maine 04092 USA

Toll-Free Technical Support 1-800-544-5205
Main Telephone Number 1-207-556-0300
Toll-Free Fax 1-800-248-3010
idexxbioresearch.com

The Netherlands

IDEXX Europe B.V.
Scorpius 60 Building F
2132 LR Hoofddorp
The Netherlands

Toll-Free Technical Support 00800 1234 3399
Telephone (31) 23 558 7000
Toll-Free Fax 00800 1234 3333
Fax (31) 23 558 7233
www.idexx.nl

France

IDEXX S.A.R.L.
Bâtiment Floride - Eragny Parc
11 Allée Rosa, Luxembourg
95610 Eragny, sur Oise
France

Toll-Free Technical Support 0800 433 999
Telephone (33) 1 34 32 62 00
Fax (33) 1 34 30 02 08
www.idexx.fr

Germany

IDEXX GmbH
Mörkestraße 28/3
D-71636 Ludwigsburg
Germany

Toll-Free Technical Support 00800 1234 3399
Fax 0800 6645627
www.idexx.de

Italy

IDEXX Laboratories Italia, S.r.l.
Via Guglielmo Silva ,
36 – 20149 Milano (MI)
Italy

Toll-Free Technical Support 00800 1234 3399
Telephone (39) 02 319 20 31
Fax (39) 02 319 20 347
www.idexx.it

Spain

IDEXX Laboratorios, S.L.
c/ Plom, n° 2–8, 3°
08038 Barcelona
Spain

Toll-Free Technical Support 00800 1234 3399
Telephone (34) 93 414 26 08
Fax (34) 93 414 74 78
www.idexx.es

United Kingdom

IDEXX Laboratories Ltd.
Milton Court, Churchfield Road
Chalfont St Peter
Buckinghamshire SL9 9EW
United Kingdom

Toll-Free Technical Support 00800 1234 3399
Telephone (44) 01753 891 660
Fax (44) 01753 891 520
www.idexx.co.uk

Australia

IDEXX Laboratories Pty. Ltd.
Metro Centre
Unit 20, 30-46 South Street
Rydalmere, New South Wales 2116
Australia

Toll-Free Technical Support 1300 44 33 99
Telephone (61) 2 9898 7300
Fax (61) 2 9898 7302
www.idexx.com.au

Canada

IDEXX Laboratories Canada Corporation
C/O Apple Express
5055 Satellite Drive, Unit 5
Mississauga, ON L4W 5K7
Canada

Toll-Free Technical Support 1-800-544-5205
Telephone 1-905-602-9499
Toll-Free Fax 1-800-248-3010
Fax..... 1-905-602-6640
idexx.com

Japan

IDEXX Laboratories KK
3-3-7 Kitano, Mitaka-shi, Tokyo
181-8608 Japan

Toll-Free Technical Support 0120-71-4921
Telephone (81) 422 71 4921
Fax..... (81) 422 71 4922
www.idexx.co.jp

