XFP-01 FluxPenser®

Automatic flux dispenser

Operating & Instruction Manual

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KP9100A Rev 0

Thank you for having chosen the XFP-01 flux dispenser from Katanax. To enjoy years of reliable, efficient and safe use of this time-saving instrument, please read this manual thoroughly and keep it in a safe and handy place for future reference.

Should you have any questions regarding the use, maintenance or repair of your instrument, kindly contact Katanax directly for assistance (see page 25 for contact details).

Signed by:
Jean-Francois Malo ing.
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Section 1 - Warranty Information

LIMITED WARRANTY

All Katanax® instruments have been carefully inspected and tested before shipping and are warranted to be free from defects in parts, material and workmanship for a period of 1-year from date of shipment.

During the warranty period, Katanax® guarantees the product against defective workmanship and material, provided the equipment has been installed according to the manufacturer's instructions. This warranty does not apply to any product which has been altered, damaged, tampered with, or subjected to misuse or abuse including substituting parts or accessories of other manufacturers without the written consent of Katanax®. Minor adjustments are not covered by warranty.

Katanax® disclaims any responsibility for misuse, misapplication, negligence or improper installation and maintenance of equipment. Katanax® makes no warranty or representation regarding the fitness for use or the application of its products by the purchaser.

Katanax® is not liable for costs incurred in installation, removal or unauthorized repair of the product or for damage of any type, including incidental or consequential damage.

At its option, Katanax® will repair or replace any defects that are exhibited under proper and normal use. Replacement parts are covered for one month after shipping. All customs- and freight-related charges are customer’s responsibility: items returned to Katanax® for any reason shall be via freight prepaid, while parts sent to customer will be either sent collect, or shipping charges will be invoiced.

Katanax® reserves the right to make changes to the design or to make additions or improvements with respect to its product without incurring any obligation to modify or install the same on previously manufactured products.

Section 2 - Main features of the Katanax® XFP-01

Accuracy

- Real-time weight display

Safety

- No strain on workers due to keeping the same position

Versatility

- Weight or ratio modes
- Fully customizable weight

Productivity

- Automatic operation

Durability

- Sturdy industrial-grade modular electronics
- Industrial interface
- Dedicated PLC-based programming (not Windows® dependent)
- Low-maintenance

Simplicity

- Easy installation, easy use
- Intuitive keypad with LCD screen
- Easy navigation
- Multilingual interface
- Easy component access
- 1-year limited warranty

Section 3 - What Is Included

The instrument comes with its essential accessories. In addition to optional items you might have ordered, the box should contain:

- Controller module
- Dispenser module
- Analytical balance with weighing plate
- Flux hopper
- Communication cable
- Power supplies (two: one for scale, one for controller)
- Rubber mat
- This instruction manual

Section 4 - Installation

Congratulations on your acquisition of the XFP-01 flux dispenser, from Katanax. Please read the following section for proper commissioning of your instrument. Do not hesitate to contact Katanax with any questions you might have about this crucial step.

LOCATION

The counter on which the instrument is to be used must be very stable to obtain fast and accurate weight measurements. In some industrial environments, installing the unit on a vibration-dampening table may be necessary.

It is recommended to use the instrument from a standing position and adjust table height accordingly.

Environmental condition

The XFP-01 is designed for indoor use at altitudes not exceeding 2000 meters. Ambient operating temperature should be kept between 5 and 40°C. The maximum relative humidity is 80% below 31°C and decreases linearly to 50% at 40°C. The applicable pollution degree is classified as Level 2, meaning the environment where the instrument is used has a moderate level of contamination. The instrument is built to handle occasional moisture-related conductivity issues.

LEVELING

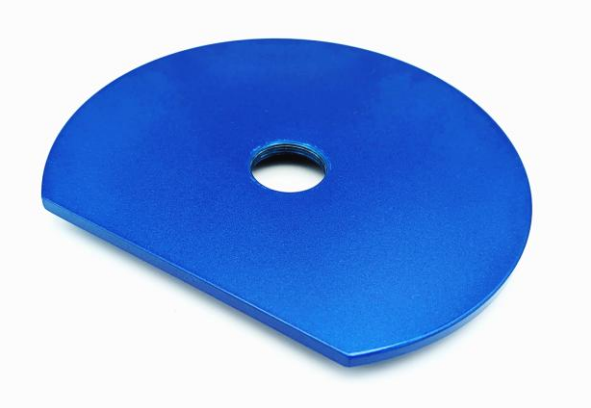
In order to obtain good results, the balance must be manually levelled. Refer to the balance instructions for this operation.

CONNECTION

The power supplies of the XFP-01 accept 100-240 VAC, 50/60 Hz connections. Connect the instrument to a mains power with a protective earth connection. The equipment is designated as Transient Overvoltage Category 2 (OVC-II). The instrument intended to be supplied from the building wiring. Please contact us to get all the details to proceed (see page 25, Contacting Katanax®).

PARTS NOMENCLATURE

A. Base:



B. Head compartment:

C. Head compartment post:

D. Base post:

E. Weighing post:

F. Spill plate:

G. Crucible holder:

H. Flux hopper

ASSEMBLY INSTRUCTIONS

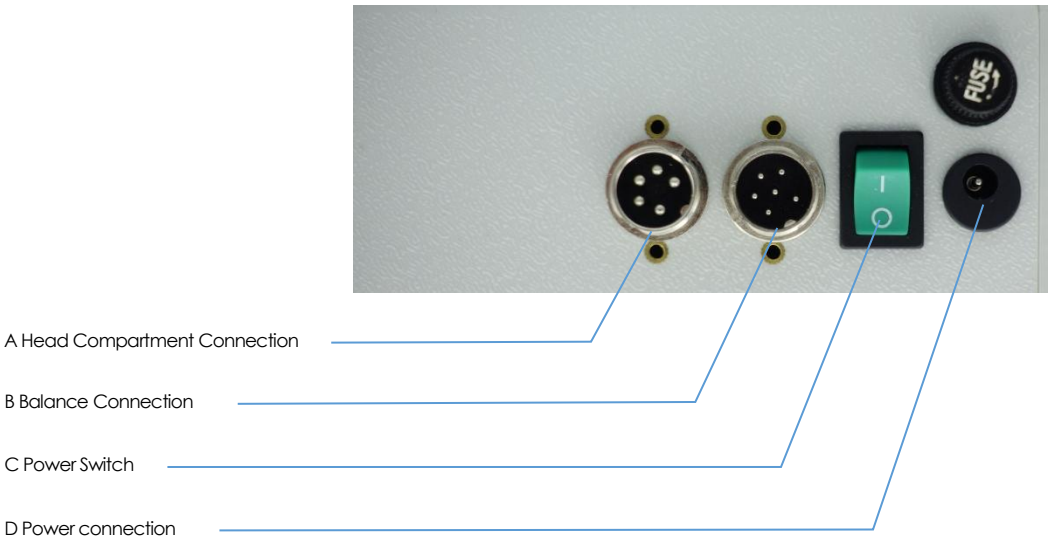
To assemble the XFP-01, follow these steps:

1. Screw the Base post into the Base.

2. Screw the Head compartment post in the Head compartment.

3. Thread the Head compartment cable into the Base post and Base.

4. Adjust the height.
5. Screw the flux hopper on the Head compartment.
6. Install this assembly on the provided rubber mat, on a stable, vibration-free table.
7. Locate and identify the connectors at the back of the control unit:

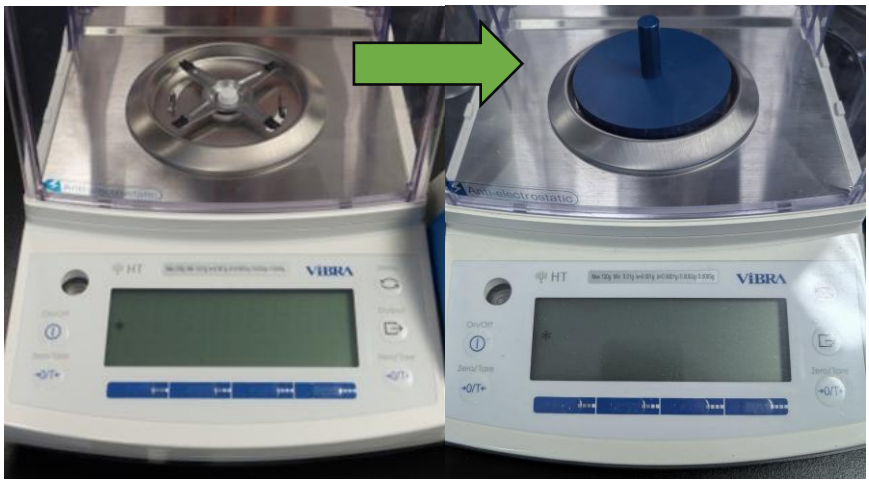


8. Connect the mechanical head compartment cable (5-conductor) into connector A.

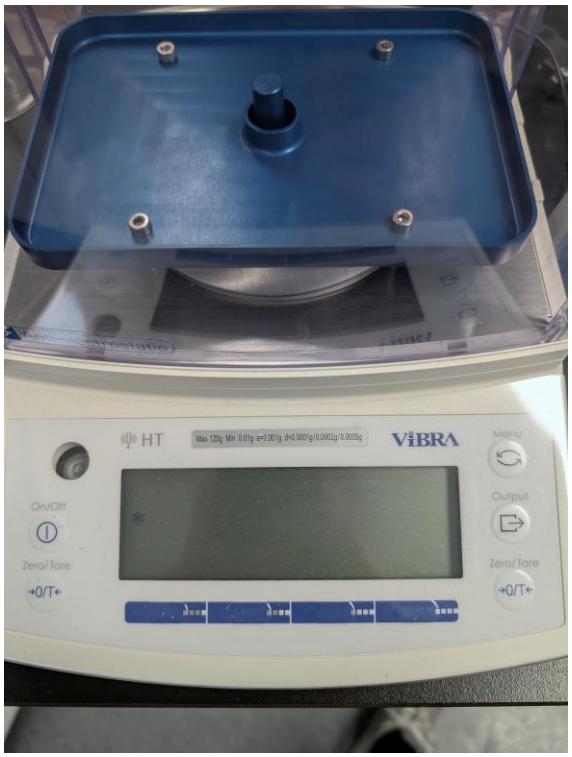
9. Connect the balance connection cable (6-conductor) into connector B.

10. Connect the power supply into connector D.
11. Follow the scale manufacturer's instructions to assemble the analytical balance.

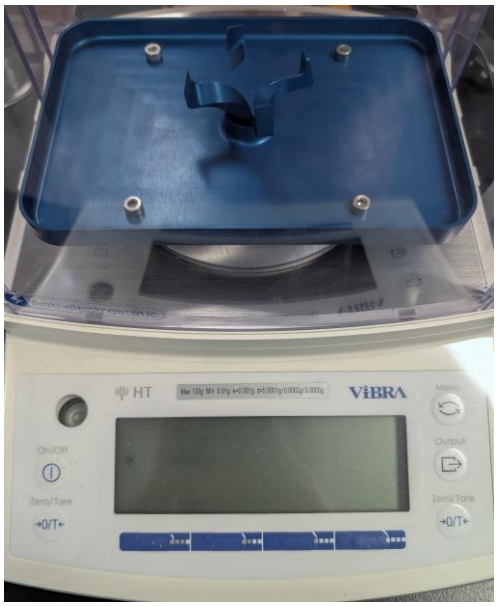
12.On the scale weighing sensor, carefully lay the weighing post:



13.Then place the spill plate:



14.And finally the crucible holder:



15.Your setup should now look like this:

16.Flip the switch C to turn the unit on.

QUESTIONS?

Should you have any questions regarding the proper installation and start-up of your instrument, please contact Katanax directly (see information on page 25) for assistance.

Section 5 - Cautions and Warnings

READ MANUAL

This documentation must be consulted before operating this unit.

RISK OF SLIPPING

Some flux types are made up of spherical micro-beads, which are very slippery when spilled on a floor. Promptly clean up any flux spill to prevent hazardous situations.

ORIGINAL ACCESSORIES

For your safety, use only the original power supply and Katanax-approved peripherals to this equipment.

FLUX HANDLING WARNING

Flux used in the XFP-01 has a high bulk density and a spherical, bead-like physical shape, which makes it naturally prone to clogging inside the dispensing module. If not properly managed, this behavior can lead to bridging, flow obstruction, inconsistent dosing, and general operational issues within the instrument.

To minimize these risks, the following precautions must always be observed:

Plug Installation on the Dispensing Tube

When the instrument is not in use, the plug must always be installed on the extremity of the dispensing tube.

This prevents humidity ingress, airborne contamination, and accidental flux discharge, all of which can worsen clogging and affect future weighing accuracy.

Purging After Periods of Inactivity

If the instrument will not be used for more than one week, it is strongly recommended to purge the entire flux content from the hopper, and Empty the dispensing module completely

Flux left inside for extended periods is more likely to compact, absorb moisture, and form blockages that can impair operation or require maintenance intervention.

Section 6 - Introduction

This section intends to introduce the basic flux dispensing techniques and to familiarize users with the XFP-01.

FLUX WEIGHING BASICS

When preparing samples for XRF by fusion, the spectrometer will measure the concentration of the sample atomic components in the flux matrix. This means that the matrix itself must be accurately known and prepared.

This assumption means that there are two methods to dispense the sample and flux: an “absolute” (fixed weights) method and a “relative” (ratio) method.

In the absolute method, both the sample and the flux are dispensed in pre-established amounts, e.g. 7.0000g flux and 0.2000g sample. This is the traditional method, when both the sample and the flux are weighed by hand.

In the ratio method, the sample is weighed first, and then the flux is added in an accurate proportion. In the previous example, the ratio is 7:0.2. If the amount of sample weighed is 0.1980g then the amount of flux should

be 6.9300g to maintain the desired ratio. As long as the ratio is maintained, there will be no analytical difference, but that requires manual calculations, unless an automatic dispenser is used.

AUTOMATIC DISPENSERS

Because of the risk of human errors, and to increase productivity, many laboratories are now adopting automated flux dispensers as the standard equipment to weigh the fusion flux.

Furthermore, while the XFP-01 does not dispense the sample, it can dispense the flux as a function of the sample amount, which does not need to be accurate as the dispenser will ensure that the desired ratio is maintained.

Section 7 - The XFP-01

GENERAL VIEW

Enter the XFP-01, the flux weighing machine that combines the accuracy of an analytical balance with the convenience of an automatic dispensing system.

THE LCD SCREEN AND KEYPAD

Upon turning the instrument on, the system will boot up and be ready to accept commands from the user.

A. Cancel/ Move to the left
B. Move up
C. Move down
D. Enter / Move to the right

SETTING THE COMMUNICATION PARAMETERS

Select the right model according to the connected balance.

To allow connection and data exchange, please make sure the settings below are used in the scale:

- Baud Rate: 2400

- Data Bits: 8 bits
- Parity: No Parity
- Stop Bit: 1 Stop Bit
- Handshake: No Handshake

If the scale was provided with the flux dispenser, these parameters have been adjusted in factory. Otherwise, your balance must be pre-registered in the Balance Menu.

Section 8 - How the unit works

DISPENSING MODES

This instrument offers two (2) very different operation modes. The choice of the mode will depend on internal laboratory procedures, as well as on the type of intended analysis.

Fixed-weight mode

When preparing a sample for fusion, the laboratory protocols often call for a fixed amount of sample to be mixed with a fixed amount of flux.

This instrument can be set to deliver accurate fixed amounts of flux. Every time the user will activate the dispensing, the same weight will be dispensed in the crucible.

Ratio mode

When preparing a sample for fusion with a view to analyze the results by XRF (X-ray fluorescence), the analytical instrument will measure the concentration of the elements present in the flux-and-sample mix.

Once the sample has been weighed, its mass can be recorded internally and then automatically multiplied by a ratio, to ensure a consistent sample-to-flux ratio at every dispensing.

Example: with a sample/flux ratio set at 1/8

- If the amount of sample is 1 g, then the amount of flux will be 8 g.
- If the amount of sample is 1.1 g, then the amount of flux will be 8.8 g.

As long as the ratio is the same, the XRF spectrometer will not “see” any difference in the concentration of the sample.

This gives a tremendous advantage, as this allows the operator to weigh the sample quickly and fairly approximately, while the unit takes care of adjusting the ratio perfectly.

Section 9 - Using the XFP-01

THE MAIN RUNNING SCREEN

After turning the unit on, the following display will appear, allowing the user to change parameters or start a dispensing.

AMOUNT OF FLUX AND SAMPLE TO USE

Today's market has seen a proliferation of various mold diameters. Consequently, one must adapt the amount of flux and sample to obtain a full disk that will not overflow out of the mold.

Our recommendation is to measure the actual inner diameter on the bottom of the mold and apply the following formula, to obtain the total mass of sample and flux:

$$\text{Total mass [g]} = \frac{(\text{Mold diameter [mm]})^2}{150}$$

Thus, for a 32-mm inner diameter mold (recommended diameter), we obtain $32^2 / 150 = 6.827$ g, which we can round up to 7 g.

There are also molds on the market that are very shallow (despite the thickness of the metal they are made of). Those molds will require less flux to fill correctly but using the right amount of releasing agent and properly leveling the mold are more critical.

INSTALLING THE CRUCIBLE

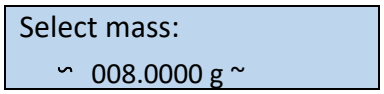
When the system prompts you to do so, place the crucible (or other suitable weighing container) on the crucible holder under the flux chute, and close the door.

DISPENSING THE FLUX

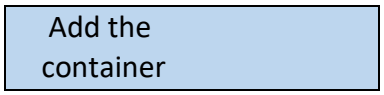
Fixed-weight mode

This mode will dispense the flux based on the weight selected by the user ("absolute" mode).

1. Using the Left/Right/Up/Down arrows, set the needed weight. (In our example, we are using 8 g of flux)



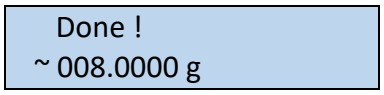
2. Then, press Enter (Right arrow). The following screen will appear:



3. Add the crucible or the container which will be used for weighing and close the plastic door.
4. The weighing of the flux will start.

NOTE: In the case of a non-stable environment, a difficulty to tare could occur. In that case, cancel the process and restart it.

5. In the end, the screen shows the message: “Done !”. It will also display the exact mass dispensed.

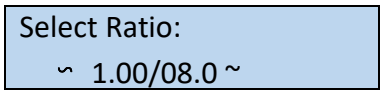


6. Remove the dosed crucible.
7. Wait for the message saying to Add the container before installing the next one.
8. If the same weight is used for the next dispensing, no further action will be required than installing the crucible or the container.

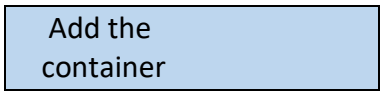
Ratio mode

This mode will dispense the flux based on the selected ratio of Sample/Flux (“relative” mode).

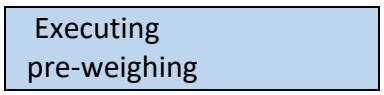
1. Using the Left/Right/Up/Down arrows, set the needed ratio. (In our example, we are using 1 g of sample to 8 g of flux)



2. Then, press Enter. The following screen will appear:

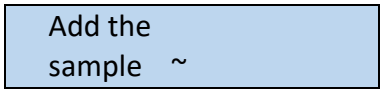


3. Add the crucible which will be used for the weighing.
4. Press Enter; the pre-weighing of the flux will start.



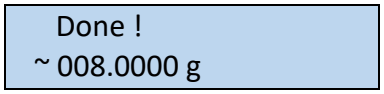
NOTE: In the case of a non-stable environment, a difficulty to tare could occur. In that case, cancel the process and restart it.

5. After the pre-weighing, the instrument will record the actual amount of dispensed flux, and then tare the balance, ready for the next step.



6. Manually add the sample into the crucible. (Leave the crucible on the balance.)
7. Confirm the sample mass with the “Enter/Right arrow” button.

8. Again, the instrument will record the mass of sample. It will then multiply this amount with the requested ratio to obtain the total mass of flux needed. However, since a pre-weighing has been done, that mass will be subtracted to obtain the final amount to be added.
9. The instrument will dispense the needed amount of flux.
10. In the end, the screen shows the message: “Done.”



11. Remove the dosed crucible.
12. After a few seconds, the system will be ready to start another dispensing with the same parameters.

MANUAL MIXING

Once all the components have been weighed into the crucible, some manual mixing is typically recommended, to improve contact between the various reagents.

In particular, very fine sample particles have been observed to agglomerate, and a manual mixing will help to break the lumps that might have formed during and after weighing.

Two notable exceptions to this general rule are high-carbonate samples and when using powder oxidizers. In those special cases, we want to first add the flux on the bottom of the crucible and then add the sample (and oxidizer) on top. Manual mixing would ideally just be done with the sample and oxidizer, because we want to have the most intimate contact between the sample and the oxidizer. Flux will merely act as a shield at first, protecting the crucible from alloying with the sample. In the case of high carbonate samples, it is best to add the sample on top of the flux and not mix; the gases will escape more freely.

A COMPLETE DISPENSING PROCEDURE

1. Turn the units on (scale and dispenser)
2. Make sure the balance is in standard weighing mode. (On a Vibra scale, use the Function button to toggle modes.)
3. Select the appropriate dispensing mode (fixed-weight or ratio)
4. Set the current weight (or ratio) and press Enter
5. Follow instructions on display and wait for the process to be completed
6. Manually mix the flux with the sample, as needed
7. Add other reagents, as needed
8. Proceed to fusion

Section 10 - Advanced parameters

When a specific flux type does not seem to be easily dispensed by the unit with the preset parameters, it is necessary to manually edit those, to optimize accuracy and dispensing times.

ACCESSING THE “HIDDEN” ADVANCED PARAMETERS

Once dispensing parameters are optimized for a given flux type, they should normally not be tampered with. That is why the menu to access those is “hidden”.

To access the “hidden” advanced parameters:

1. Use the arrows to navigate to the Config menu.
2. Use the arrows to select and display the Build version.
3. Press twice on the “up” arrow and then twice on the “down” arrow.

4. You are now in the advanced parameters menu.

The main reason to change the dispensing parameters would be when the unit must be used with a flux that has different flowing characteristics. This is the case when switching from a micro-bead (spherical particles) flux to a granular (crystalline particles) flux.

The respective basic parameters for those two main flux types for your specific unit (s/n #_____) are as follows:

Flux type:	Micro-bead (spherical)	Granular (crystalline)
1 Base Duty		
2 Fine Thold.		
3 Vib. Thold.		
4 Vib. Tries		
5 Step.size		
6 Serial Out	LIMS	
7 Prep.revs	16	

If you find that the basic parameters could use some further optimization, here is the meaning of each:

Base Duty

This is the general amount of vibration for dispensing during the whole dispensing process. Use a larger amount for light fluxes that do not flow freely; use a smaller amount for dense and free-flowing fluxes.

Fine Thold

This represents the offset in tenths of milligrams at which the dispenser will switch from the Coarse mode (with spring auger rotation) to the Fine mode.

If you find that the unit overshoots in coarse mode, increase this parameter. Conversely, if the unit switches too early to fine mode (and thus takes longer to dispense), then lower this parameter.

Vib. Thold

This represents the offset in tenths of milligrams at which the dispenser will switch from the Fine mode to the Vibration burst mode (short vibration bursts with spring auger rotation controlled by Step.size parameters).

If you find that the unit overshoots in fine (continuous vibration) mode, increase this parameter. Conversely, if the unit switches too early to vibration burst mode (and thus takes longer to dispense), then lower this parameter.

Vib Tries

This parameter should be left at 1.

Step.size

This parameter controls the amount of spring auger rotation during the vibration burst mode. A value of 200 represents a full rotation. It helps to dispense with the vibration a precise and repeatable small amount of flux. A smaller value will reduce the quantity per try.

Serial Out

This parameter allows selecting the output mode of the XFP-01. The default mode is LIMS. The other modes are reserved for manufacturing use.

Prep. revs

This represents the number of spring auger rotations before the user is prompted to add the sample, in ratio mode.

BUZZER

On, Off or Partial (will only buzz during the weighing).

DISPLAY CONTRAST

Backlight - 0-100% power

BALANCE SELECTION

Should you need to use a different balance than the one that was provided with the XFP-01, another model may be selected from a list of pre-registered units.

TOLERANCE

The tolerance defines the acceptable accuracy of the dispensing. Acceptable tolerance is ±1.0 mg to ±99.9 mg

The larger the acceptable tolerance, the faster the dispensing will be done.

BUILD VERSION

This menu will display the current firmware version.

SERIAL PARAMETERS

The serial communication parameters on the balance shall be set with the following values. (Refer to the manual of your balance to see where you can change those.)

- Baud Rate: 2400
- Data Bits: 8 bits
- Parity: No Parity
- Stop Bit: 1 Stop Bit
- Handshake: No Handshake

Section 11 - Service operations

This section describes tasks that are performed on a regular basis, and are performed to adjust or repair a malfunctioning system of the instrument.

BALANCE COMMUNICATION TEST

To verify if the dispensing unit is communicating properly with the balance, press the PRINT button on the balance; the red light on the XFP-01 keypad should light.

If the light does not turn on, please follow the steps:

1. Check if all the cables are plugged.
2. Check if the selected balance is the right one (Menu > Settings > Balance).
3. Check if the balance is properly settled.

STEPPER MOTOR TEST

To check if the stepper motor of the dosing shaft is working properly, go to Menu>Settings>Test

Press ENTER, and if the shaft still doesn't make turns freely, the stepper motor needs to be repaired.

Section 12 - X-100 Maintenance

This instrument requires some regular checking, which is very important to keep your instrument up and running.

Katanax® knows that a broken instrument in a laboratory setting causes sample back-up and unnecessary costs. That is why this manual comprises not only a Periodic inspection section, but also a Service operations chapter (see page22), which guides the user in a step-by-step fashion through operations that sometimes need to be performed on-site.

If unsure, do not hesitate to get in touch with a Katanax® technician (see page 25, Contacting Katanax®). Assistance by phone or email is always free of charge.

Note that no modifications of the instrument are allowed, except those explicitly described and permitted in this manual. Any undue modification automatically cancels the warranty and could endanger the user's life.

INSPECTION SCHEDULE TABLE

Frequency	Checkpoint	Description	Action (if problem found)	Page
Every use	Flux spillage on plate	Check for flux spill	Clean	12
1 week	Flux spillage on scale	Remove plate and look for flux spill	Clean	12
1 month or bottle change	Flux hopper	Check for flux build up	Clean	9
	Head compartment	Check for flux build up	Clean	9
	Flux state	Check if flux absorbed moisture	Replace flux	23

Section 13 - Accessories, Consumables and Services

Fluxes	Platinum	Polishing kit	Flux penser
			
Full range of high-quality fusion fluxes	Full range of high-quality Crucibles and molds	All-inclusive solution for restoring the shiny finish to platinumware.	Automatic flux dispensing machine

METHOD DEVELOPMENT

Katanax® offer a service of method development. This service provides help to develop fusion methods for your samples. Use the following link to access the form required to access this service.

BUY SCRAP

Katanax® offers to buy scrap platinum accessories. Use the following link to access additional information on this service.

Section 14 - Appendix A – Technical specifications

ELECTRICAL

Power supply input ..... 100-240VAC, 50-60 Hz
Power supply output ..... 12 VDC, 2.5A
Main fuses 250 VAC,1A
(F1A250V –fast acting type – 5X20mm)

PHYSICAL

Total weight ..... 6 kg (13 lbs)

Weighing unit:

Width ..... 20 cm (8 in)
Depth ..... 45 cm (18 in)

Controller:

Width ..... 20 cm (8 in)
Depth ..... 20 cm (8 in)

Total footprint:

Width ..... 50 cm (18 in)
Depth ..... 50 cm (18 in)

Section 15 - Contacting Katanax®

Katanax® sales and technical staff can be reached at the following address:

Katanax® inc.
2500, Jean-Perrin, suite 100
Quebec, QC
Canada G2C 1X1

Tel.: (+1) 418-915-4848

E-mail: info@katanax.com
Web: www.katanax.com

When contacting us, kindly have the serial number of the instrument at hand.

Customers are invited to visit our web site regularly, since useful information is periodically added.

An illustrated online parts browser is also available; kindly contact us to register.