PANTONE®
Formula Scale 3*i*

PC Programmable

Operating
Manual

Models: PFS3i-5-12, PFS3i-10-12
PFS3i-5-22, PFS3i-10-22

Introduction

The **PANTONE Formula Scale 3*i*** is a microprocessor controlled digital weighing scale, specifically designed for fast, accurate mixing of printing inks to match defined colors, in particular the range of PANTONE Colors.

The scales are ready programmed with the formulas for mixing all of the colors found in the **PANTONE formula guide *printer edition*** (and PANTONE formula guide *designer edition*), the **PANTONE metallic guide + chips** *(coated)*, and the **PANTONE pastel guide + chips** *(coated/uncoated)*. These are the standard formulas to be used for mixing conventional litho inks to match PANTONE Colors using PANTONE Basic Color Inks, and are permanently stored in the scale memory.

A key feature of this model is the ability to use other sets of formulas, which can be downloaded from a database held on a PC. The formulas may be for producing colors in ink systems other than standard Litho, e.g. Flexo, UV, Screen, etc., which use their own ranges of base inks. Once downloaded, the formulas are stored in the scale memory, and may be used for mixing the colors.

Also, users may key in formulas for their own custom color mixes using any of the stored base ink systems. Up to 100 custom mixes can be entered and held in the scale memory.

The PANTONE Formula Scales can be used for mixing inks using any of the formulas stored in the scale. Once the required color has been selected, and quantity of ink required entered, the scale will compute the exact amounts of each of the base inks needed.

During the weighing sequence, the weight of each of the constituent bases required for the mix is shown as an amount to add. Also, to simplify and speed up operation, a progress bar monitors addition of the bases. By following the simple weighing sequence, an accurate formulation is assured.

The PANTONE Formula Scales are ruggedly constructed and will withstand the wear and tear of normal use. However, as with all precision weighing instruments, reasonable care should be exercised to ensure long and trouble free operation.

Preparation For Use

Unpacking and Assembly

Unpack the scale carefully, and retain the packing carton in case it should be needed again.   Please read this Operating Manual carefully before attempting to use the scale.

Locate the weigh pan centrally on the four rubber mounts protruding through the top of the scale case.   It is important that there is no direct contact between the weighpan and the scale case.

Siting

For best results the scale should be placed on a firm, level surface, which is free from vibration, away from air currents and sources of heat.   This is particularly important when using the high resolution weighing mode.

As with all precision weighing scales, best results are achieved after the scale has been switched on for a period of time.   It is therefore good practice to leave the scale switched on between periods of use.

Electrical Connection

Check that the electrical supply meets the specifications shown at the rear of the scale before connecting to the supply.

IMPORTANT – THIS EQUIPMENT MUST BE EARTHED

USA & Canada – Models PFS3i-5-12 and PFS3i-10-12

Supply requirements are 120 Volts, 60 Hz, 0.25 Amps. Use the detachable power lead supplied.   Should it ever become necessary to replace the plug, it must be wired according to the following convention:

Black	-	Live
White	-	Neutral
Green	-	Ground

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FCC Notice This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Europe – Models PFS3i-5-22 and 3i-10-22

Supply requirements are 230 Volts, 50 Hz, 0.25 Amps. Use one of the detachable power leads supplied, either the UK (square pin) or European (round pin) type, as appropriate. The plug fitted to the UK lead must be fused at 3 Amps. Should it ever become necessary to replace the plug, it must be wired according to the following convention:

Brown	-	Live
Blue	-	Neutral
Green and Yellow	-	Earth

CE Notice The C€ mark on this equipment indicates that it complies with the Electrical Equipment (Safety) Regulations 1994 (S.I. 1994/3260) and Electromagnetic Compatibility Directives EN 50081-1 (Emissions) and EN 61000-6-2 (Immunity).

Applying Power

Switch on the scale using the power ON/OFF switch. The scale will go through an initial start-up sequence, during which information screens will be displayed. In particular, the Model Number and Firmware Version and scale Serial Number will be displayed for reference.

The scale will automatically set zero weight and display the color selection screen. It will then be ready to use.

Keyboard Operation

The keyboard is used to control the operation of the scale, and for inputting data. Keys are divided into three groups: Main Functions, Alphanumeric Keys, and 'Soft' Keys (where operation depends on the function selected and is software controlled).

Main Function Keys

There are twelve function keys, which control operation of the scale. These are color coded and identified by text indicating their use:

Menu   Selects the setup menu, used to determine how the scale will operate. Pressing again returns to the previous function.

Info   Displays information about the current mix. Repeated pressing will step through available pages then return to the previous function.

System   Displays a list of the enabled ink systems, so that one can be selected to use for mixes.

Custom   Enables custom mixes to be entered, edited or deleted.

Recalc   Causes the current mix in progress to be recalculated when too much of one of the bases has been added.

High Accuracy   Selects high accuracy weighing mode.

Weigh   Selects the weighing function, which allows the scale to be used as a conventional digital weighing scale.

Set Zero   Sets zero weight on the display. This key only operates in weighing mode and can be used to tare off the weight of a container.

Guide   Displays the color guides available for the current ink system so that one can be selected.

Color   Enables a color to be selected from the currently selected color guide.

Quantity   For entering the quantity of ink required for the mix, using the numeric keypad.

numeric keypad.

Start Starts the mixing sequence. This key may also be used to step
Mix on to the next ink during the mixing sequence.

Alphanumeric Keypad

The number keys are used to select colors from a range where they are identified by number, e.g. PANTONE Number, and to input data for custom formulas.

The number keys also function to allow letter entry, used for naming and recalling custom formulas. Multiple presses of a key step through the letters and number allocated to it. Pressing another key, or a delay of about a second will start a new letter. Errors can be corrected by pressing the **[Esc]** key. Completed entries are confirmed by pressing **[Enter]**.

The **[Esc]** and **[Enter]** keys are also used in conjunction with the function keys when making selections. In general, pressing **[Enter]** will confirm a change, whereas pressing **[Esc]** will go back to the previous state.

Soft Keys

At the side of the display, there are three keys marked **[F1] - ↑** (up arrow), **[F2] - ↓** (down arrow) and **[F3] - [SEL]** (select). The use of these keys changes under software control, depending on the scale function selected.

When menu lists are displayed, these keys are used to highlight and select items from menu lists. Use the ↑ (up arrow) and ↓ (down arrow) keys to highlight the required item and then press **[SEL]** to select.

The **[Esc]** and **[Enter]** keys are also used in conjunction with these keys. In general, pressing **[Enter]** will be the same as pressing **[SEL]** and will confirm a change, whereas pressing **[Esc]** will close the menu leaving the selection unchanged.

At other times, the **[F1]**, **[F2]** and **[F3]** keys may be assigned other functions, which will be described by the text on the screen adjacent to them.

Color Ink Formulation

First, you must define the mix by selecting the ink system and the color you require from one of the available color guides, then entering the quantity of ink needed. Next, step through the weighing sequence, adding the correct amount of each base ink as indicated. At the end of the mix, the accuracy of each component will be checked against pre-set accuracy levels, virtually eliminating the possibility of mistakes.

Ink System

Press the **[System]** function key to select the ink system you wish to use. You will be shown a list of the available ink systems. This list will include standard PANTONE Litho, and any other ink systems that have been downloaded. Use the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the one required.

Color Guide

Press the **[Guide]** function key to select the color guide that contains the color you require. You will be shown a list of all the color guides available for the ink system you are using. Use the ⬆ (up arrow) and ⬇ (down arrow) keys to move the highlight to select the one required.

Color Selection

Press the **[Color]** function key to choose a color from the currently selected guide. The way the color is selected will depend on the available colors: -

Number Reference Guides Colors are identified by a number, up to 4 digits, and may be selected by entering the number directly using the alphanumeric keypad. Normally, PANTONE Colors can be selected by simply entering the 3 or 4 digit PANTONE Number.

Number reference guides may also have some **Special Colors**, which are identified by name. For convenience, these are organised into **Special Groups**, which are also given names for easy identification. The PANTONE formula guide contains some special groups of colors that are not referenced by a simple number, e.g. PANTONE Base Colors, PANTONE Warm Grays, etc. Downloaded number reference guides may also contain special colors.

When special colors are available within a guide, the legend **'Special'** will appear alongside function key **[F1]**. Press this key to show a drop down list of available groups of colors; then use the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the one required and press **[SEL]** or **[Enter]** to select. This will show all the named colors in the selected group as a further drop down list. Use these keys again to select the color you require.

Name Reference Guides Colors are identified by name. Press the **'Select'** function key **[F1]** to show the list of colors. Use the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the one required, then press **[SEL]** to select. If there are a large number of colors, you can move quickly through the list by entering the first few letters of the name, using the alphanumeric keys.

Custom Folder Press the **'Select'** function key **[F1]** to show a list of the named custom color mixes stored in the scale for the currently selected ink system. These are formulas that have been entered into the scale by the user. Select the required color as described above.

Quantity

Press the **[Quantity]** key to enter the amount of ink required for the mix, using the numerical keypad. Depending on the scale settings, this may be in kilograms, grams, or pounds.

Mixing Sequence

The mix parameters have now been defined, and the scale will automatically calculate the amounts of each of the base inks required, presented in the best order for weighing them out. Place a suitable container for the ink onto the weigh pan.

Start the mixing sequence by pressing the **[Start Mix]** key. The required quantities for the base inks are checked automatically to ensure that they can be weighed out accurately in standard weighing resolution. Normally, the screen will show the first base ink to add, the quantity required and the empty progress bar.

As the first base ink is added, the amount still required to add will reduce, and the progress bar will move along to provide a visual representation of how the addition is progressing. Continue to add the ink until the progress bar is full and the display shows zero.

Press the **'Next'** function key **[F1]**, or the **[Start Mix]** key to step on to the next base ink in the mix. Once again, add the ink until the display shows zero. Repeat for all of the components of the mix.

The progress of the mix can be checked at any time by pressing the **[Info]** key. Press the key repeatedly to step through the available pages of information and then return to the mixing sequence.

When all of the components have been added, press the **'End'** function key **[F2]**. The mix will be checked against the pre-set accuracy level, and a message will warn of any error, so that it can be corrected.

High Accuracy

Sometimes a mix will require a very small quantity of one or more base ink, which cannot be weighed out in standard weighing resolution with sufficient accuracy to ensure that the mix will be correct. The scale has a high accuracy mode to cope with small or difficult mixes. This can be selected by pressing the **[High Accuracy]** key.

When the **[Start Mix]** key is pressed at the start of a mix, any small components will be identified, and if necessary you will be prompted to start the mix in high accuracy mode by pressing the **[High Accuracy]** key. Alternatively, if you have a small mix that you know is likely to have small components, you can start the mix directly in high accuracy mode by pressing the **[High Accuracy]** key.

Correcting Mixing Errors

Sometimes too much of one or more base inks may be added in error. The display will change from **'Add'** to **'Remove'** and show the excess quantity. For the first component the excess can easily be removed, but this may not be possible for subsequent base inks.

Should this problem occur, the scale is able to recalculate the mix quantity required to just use up the excess. Press the **[Recalc]** key, or function key **[F3],** which will be active whenever too much of any of the bases has been added. You can then confirm the new quantity and continue with the mixing sequence.

Other Features

Weighing

Press the **[Weigh]** key to use the PANTONE Formula Scale as a conventional digital electronic weighing scale in standard resolution. The scales are suitable for weighing up to 6 kg /12 lb with standard resolution of 1 gram / 0.001 lb.

Depending on the option selected using the Setup Menu, the scale will display weight either in kilograms, grams or pounds.

The **[Set Zero]** key may be pressed to reset zero weight, or to tare off any weight on the weighpan. Note that this key only functions when weight is being displayed.

The scale also has a high accuracy weighing mode, which enables smaller quantities to be weighed with 0.1 gram / 0.0002 lb resolution. Press the **[High Accuracy]** key to select this option.

Custom Folder

The scale can store up to 100 user-defined formulas as custom color mixes. Press the **[Custom]** function key to add, edit or delete custom mixes. Note that you can only access mixes in the currently selected ink system.

Use the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the action required, then press **[SEL]** to select.

Add Mix Selecting this option creates a new mix with no components. Use the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight each of the required bases in the formula, and the number keys to enter the percentages alongside. You can press the **[Info]** key at any time to see a summary of the data entered, and total of the percentages.

When all of the components have been entered, press the **[Enter]** key to save the mix. If the total of the components is not 100%, you will be warned so you are able to correct any errors. If you wish, the scale can adjust the components to add up to 100% and maintain the correct ratios.

You will then be prompted to enter a name for the new color mix, which you can also do using the alphanumeric keypad. When complete, the data can be saved by pressing the **[Enter]** key.

Edit Mix This option allows you to change mix information that has already been saved. First identify the mix by using the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the mix name, and then press **[SEL]** to select. If there are a large number of mixes, you can move quickly through the list by entering the first few letters of the name, using the alphanumeric keypad.

Once the mix has been selected, the edit screen will be displayed showing the previously entered formula. Edit this by using the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the required bases, and the number keys to alter the percentages.

When completed, press the **[Enter]** key to save the mix. You will be prompted with the mix name to confirm. Press the **[Enter]** key again to replace the previously saved mix. If you change the mix name, the formula will be saved as a new color mix, and the original named mix will be left unchanged.

Delete Mix This allows you to remove a mix that is no longer required. Identify the mix as before using the ⬆ (up arrow) and ⬇ (down arrow) keys, then press **[SEL]** to delete it.

Copy Mix This allows you to quickly modify the formula of the color mix currently selected on the scale, and save it in the custom folder. The original formula will not be affected.

Setup Menu

The scale provides the user with a number of options, which can be changed to suit particular requirements. Press the **[Menu]** key to access the Setup Menu. Use the ⬆ (up arrow) and ⬇ (down arrow) keys to highlight the item you wish to change, then press **[SEL]** or **[Enter]** to select. Use these keys again to select the option you require.

When you have finished, you can exit the Setup Menu by pressing any of the main function keys. The new settings will be remembered, even when the scale is turned off.

Contrast This allows you to adjust the display contrast for optimum viewing conditions.

Backlight The scales have a built-in display backlight, which will make the display easier to read under most viewing conditions. This may be turned off if preferred.

Weighing Units This option determines whether weight will be displayed in kilograms, grams or pounds.

Beep Operation of the keys may be confirmed by a short audible tone. This may be turned off if preferred.

Accuracy Checking This option selects the level of the accuracy check which is applied at the end of each mix. Maximum accuracy requires that all components of the mix be reduced to zero.

Enable Systems The scale may be programmed with downloaded data for many ink systems. Unwanted systems may be disabled to avoid errors and to speed up operation. Enabled systems are indicated with a tick on the left hand side. Use the ↑ (up arrow) and ↓ (down arrow) keys to highlight systems, and press **[SEL]** to enable or disable as required. When you have finished, press the **[Enter]** key to save the new selection.

Communications Mode This selection allows the scale to communicate with a PC via a serial data link, using the connector at the rear of the scale. In this mode, normal operation is suspended. Using the PC software (where provided), new formulation data may be downloaded and stored in the scale. Press **[Esc]** on the scale to return the scale to normal operation when the download has been completed.

Compact Custom Folder Frees up space to enter more colors in the custom folder, by removing unwanted custom formulas from the scale memory.

Language This option selects the language to be used for all of the on-screen messages.

Context Sensitive Information

From any of the main function screens, pressing the **[Info]** key will display context sensitive information.

Repeat pressing of the key will step through the available information pages if there is more than one, and then return to the original function.

Warning Messages

The PANTONE Formula Scale is continuously monitoring its operation to ensure that an accurate ink formulation is achieved. Below is a list of some of the more common warning messages, together with suggested remedies:

Number not found Either an error has been made entering a number, or the number does not exist in the selected color guide. Press **[Esc]**, then re-enter the correct number or change to the correct color guide.

Invalid Quantity The mix quantity entered is either zero or outside the mixing capacity of the scale. Press **[Esc]**, then enter a new quantity.

Container Too Heavy You have attempted to start a mix for which the combined weight of the container on the weighpan and the ink mix will exceed the weighing capacity of the scale. Use a lighter container or reduce the mix quantity.

Quantity Too Small You have attempted to start a mix in which one or more of the component bases is too small to weigh accurately in the weighing resolution selected. Press **[Esc]**, then **[Info]** to examine the mix and see the problem. Try selecting high accuracy weighing mode. If there is still a problem, increase the mix quantity so that the smallest component is at least 5 scale divisions.

Mix Outside Accuracy Limits At the end of a mix, one or more of the bases added is outside the pre-set accuracy level. Press **[Enter]** then resume the mix to correct the problem.

Recalculation Failed You have added too much of a component to a mix, and attempted to recalculate a new quantity to use it up. The recalculated quantity of ink will result in the finished mix exceeding the weighing capacity of the scale. To continue, you must remove some of the excess component.

Too Much Ink Added You are in the middle of a mix and have added too much of one of the components, so that the combined weight of the container on the weighpan and the rest of the ink mix will exceed the weighing capacity of the scale. Press **[Esc]** to go back and remove the excess.

Maintenance

The scale has no moving parts and requires no routine maintenance. In the unlikely event of a fault developing, switch the scale off and disconnect from the mains power supply. Contact your supplier with details of the problems.

Repairs to the scale must only be carried out by an authorised service engineer.

Cleaning

Any accidental spillage of ink onto the scale should be wiped up immediately with a dry cloth. If further cleaning is necessary, first disconnect from the mains supply, then wipe with a soft cloth that has been lightly moistened with a suitable solvent.

WARNING: Many solvents and proprietary press cleaners are very aggressive and should only be used with great caution. These may permanently damage the keyboard and case, especially with repeated application. If in doubt, test the cleaner you intend to use on a small area. Do not use if there is any sign of solvent attack on the case or keyboard materials.

Specifications

PFS3i-5-xx	kg	g	lb
Maximum Capacity: -	6.0 kg	6,000 g	12 lb
Ink Mixing Capacity: -	5.0 kg	5,000 g	10 lb
Scale Division (standard): -	0.001 kg	1 g	0.001 lb
Scale Division (high res.): -	0.000 1kg	0.1 g	0.0002 lb
Accuracy: -		±0.05% ±1 Division	

PFS3i-10-xx	kg	g	lb
Maximum Capacity: -	12.0 kg	12,000 g	25 lb
Ink Mixing Capacity: -	10.0 kg	10,000 g	20 lb
Scale Division (standard): -	0.001 kg	1 g	0.001 lb
Scale Division (high re.): -	0.0002 kg	0.2 g	0.0005 lb
Accuracy: -		±0.05% ±1 Division	