ProcessMaster

Adaptive Process Timer

Instructions for use

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RH Designs
Greystones, Burtersett, Hawes, North Yorkshire DL8 3PH
Tel / fax: 01442 864114
e-mail: info@rhdesigns.co.uk World Wide Web: http://www.rhdesigns.co.uk

IMPORTANT POWER INFORMATION

The ProcessMaster is designed to operate from a 9v supply using a 9v PP3 / 6F22 / MN1604 type battery or from a plug-in DC power supply module. Suitable power supplies are available from electrical retailers. See page 16 for further information.

Turn to page16 for full details of power supply options and battery information.

Incorrect voltage or polarity may cause extensive damage to the unit which will not be covered by the guarantee - please take great care when using a non-RH Designs power supply.

The power supply connector is on the lower rear panel of theunit - refer to the illustration below. Do not change the battery or plug in or unplug a power supply while the ZoneMaster II is switched on. Doing so may damage the sensitive electronics in the unit.

Rear Panel view

Standby Mode

The ProcessMaster incorporates a standby mode which it will automatically enter after 30 seconds after the last button was pressed. This saves battery life by turning off the display. To wake up the timer, press any key. While the ZoneMaster II is in standby, the decimal point of the Step display will flash. The keypad illumination remains lit. Standby mode can be disabled via User Options.

GUARANTEE

This equipment is guaranteed against faulty components or manufacture for a period of two years from the date of original purchase. Should a fault develop within this period, please telephone us for advice before returning the unit. If there is a fault, we will repair or replace (at our option) the equipment at no charge. This guarantee does not affect your statutory rights. Damage due to misuse of the equipment, and any consequential loss arising out of the use or misuse of the equipment are not covered by this guarantee.

CE *This product is designed and constructed in accordance with applicable European Standards*

Contents

Introduction

Thank you for choosing the ProcessMaster, the versatile photographic process timer designed by photographers. The ProcessMaster can be used to monitor all types of photographic processes (film and paper development etc.) as well as many other processes that require a controlled sequence of time periods. A footswitch is provided allowing you to start and stop the timer while keeping your hands free for pouring chemicals etc.

Please spend a little time familiarising yourself with this manual and with the ProcessMaster's controls before installing it in your darkroom, this will maximise your chances of early success with the product.

We have laid out this manual as a series of operations, beginning with the basic operation of the timer, and then progressing through the more advanced functions such as compensating development. Each operation is described diagrammatically, with detailed notes to accompany the basic description.

The following notation is used:

① Press the indicated key briefly and release

❶ Press and hold the indicated key until the display responds, then release

☞ See note regarding this key

Safety Information

Since the ProcessMaster is designed for use for photographic processing it is envisaged that it will be used in wet areas of the darkroom, and may be operated by persons with wet fingers or become splashed with liquids from time to time. The keypad and display is therefore sealed, and if the timer is operated from its internal battery supply it is inherently safe. If however you operate the unit from an external power supply, this must carry the usual safety approvals (such as a CE mark) and must be plugged into a wall outlet located away from the wet areas of the darkroom so that it is not at risk from liquid splashes or spillage.

If the keypad is splashed, wipe it clean as soon as possible with a damp cloth or absorbent tissue to minimise the possibility of damage. Mild household cleaners such as washing-up liquid can be used to assist removal of stains, but do not use solvent or abrasive cleaners as these will damage the keypad surface. Do not use excessive pressure over the display window or the key areas to prevent damage.

Ensure that no liquids enter the enclosure via the temperature probe or power sockets; should this occur it is possible that the internal electronics could be damaged, and such damage will not be covered by the guarantee.

Features

Programmable 8 process, 10 step timer

The ProcessMaster can store up to eight different processes in its internal memory, and each process can have up to ten steps. Each step can range from 5 seconds to 60 minutes in length. All programmed information is retained when the ProcessMaster is switched off. Audible beeps prompt for chemical agitation, and an audible countdown sounds during the last ten seconds of a step.

As despatched from the factory the ProcessMaster is preset with a time of 5 minutes in each step of each process. These can quickly be changed to suit your own requirements. For example you may wish to use Process 1 for b/w printing, Process 2 for E6 film processing, etc. Once you have programmed the timer with your choice of processes, you simply select the particular process you wish to use at any time. Any step can be changed temporarily if required without affecting the stored process.

Tables are provided on pages 14-15 for you to fill in as a reminder of your programmed processes.

Pause / resume / continue functions

Each time step can be paused and resumed at will. In addition, the ProcessMaster can be set to run a programme continuously so that no operator intervention is needed between steps, or to pause between steps in which case the subsequent step is initiated by a press of the Start key / footswitch.

"Egg Timer" mode

In "Egg Timer" mode, timing continues after timeout and the display shows by how much the programmed time has been exceeded. This can be useful if you want to add some time to a step.

External Temperature Probe

A Temperature Probe can be plugged into the socket on the front of the Process-Master and used as a digital thermometer. Temperature is displayed in Celcius to within 0.1 degrees over a range of +10 to +50 degrees, and the probe can be calibrated to match your own reference thermometer if you wish. At any time during a process a reading can be taken from the probe to check chemical temperature.

Factorial Development

The ProcessMaster can be used to control "factorial development" of prints, a method of maintaining consistent print densities as the developer is used up. This method is also known as the "Watkins factor" after its inventor.

Compensating Development

The ProcessMaster can adjust development times in percentages, allowing easy implementation of Zone System adjustments and compensation for temperature changes during film development. Compensation of -100% to +100% is possible.

User Options

You can customise many of the ProcessMaster's features. The display brightness can be changed, the audible beeps switched on or off, and the power saving standby mode disabled if required.

Terminology

The following frequently used expressions are defined here:

Step: a single time period such as 30 seconds or 5 minutes, which forms part of a *process*. Such a step might be development time, fixing time etc.

Process: a sequence of time *steps* defining an operation. For example, a typical black and white paper process comprises four steps - develop, stop, fix, wash.

Compensation: an adjustment to a *step*, expressed as a percentage, used to compensate for changes in temperature, contrast etc. For example "20% more development".

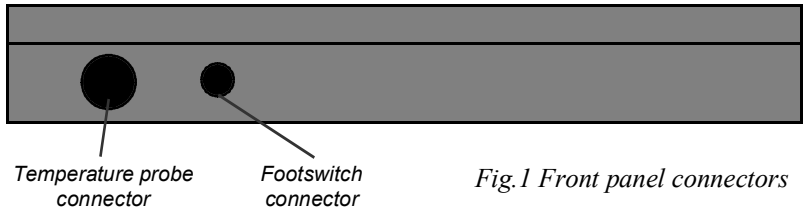

Fig.1 Front panel connectors

Setting up

Plug the temperature probe and footswitch, if required, into their respective sockets on the front panel of the ProcessMaster. If you are using an external power supply (see page16) plug its output connector into the ProcessMaster *before* plugging the power supply into the wall socket. Switch on at the wall socket if necessary. Switch the ProcessMaster on by pressing in the on/off switch situated on the rear panel. This is a press-on press-off switch - press the switch again to switch off. If you are using an external power supply we recommend that you switch off at the mains or unplug the power supply when not using your ProcessMaster.

Do not plug or unplug any external connectors while the ProcessMaster is switched on as this may damage the sensitive electronics in the unit.

Basic Use

In everyday use, operation is generally restricted to selecting the required process using the Process key, then executing it using the Start/Stop and (if required) Pause keys. However, prior to first use you will need to programme your desired process(es) into the timer as shown in the following sections.

The Keypad and Display

The display has four digits. The leftmost digit shows the process step number, the right hand three digits display the time. In addition, all four digits are used to display messages when necessary.

Fig.2 The keypad and display

The keypad comprises eight tactile keys. Most keys have more than one function depending on the operating mode of the ProcessMaster but in normal operation only the primary function is used. The eight keys are:

1. ⏸ Pause key
2. ▶ Start/Stop key
3. ▲ Increase Time key
4. ▽ Decrease Time key
5. ✗ Clear/Exit key
6. ✧ User Options key
7. °C Measure Temperature key
8. 🗐 Process key

The footswitch exactly duplicates the operation of the Start/Stop key.

The keys are described with their actions in the following sections.

Time setting and display

For steps 0 - 4 of any process, time can be set in intervals of 5 seconds up to a maximum of 120 minutes (2 hours). The display can only show three digits so above 9 minutes 55 seconds (shown as 9.55 on the display) the last seconds digit is not displayed. A time display of (for example) 11.4 therefore indicates 11 minutes 40 (or 45) seconds. Due to this limitation, when setting times above 10 minutes be aware that two key presses will be required to change the display, the first press advances the time by 5 seconds as usual but this will not be shown on the display.

For steps 5 - 9 of any process, time can be set in intervals of one minute up to a maximum of 120 minutes (2 hours).

If any step is set to zero time, it will be skipped. If a process comprises fewer than 10 steps, setting all the unused ones to zero will cause the timer to reset to step 0 automatically after the final step has been completed.

During countdown, the time display decimal point flashes to indicate that timing is in progress. Above 99 minutes, the display will change once a minute as it can show only whole minutes. Between 10 minutes and 99 minutes, the rightmost digit of the display changes once every 10 seconds. Below 10 minutes, the display changes every second.

Selecting a Process

❶. Press and hold 🗐 until the display shows n PRG where "n" is a number between 0 and 7 indicating the currently selected process. Release the key.

②. Using ▲ and/or ▽ step through the eight different processes until the leftmost digit of the display shows the desired process number.

③. Press ✗ to select the process and exit to normal operation. The process will remain selected until you change to a different process number, even when the unit is switched off.

Programming a Process

①. Press 🗐 briefly. The display shows n PRG briefly (where "n" is the selected Process Number). The Step display shows 0 and the decimal point flashes to indicate programming mode. The time display shows the currently set time for step 0, the first step of the process.

②. Using ▲ and/or ▽, change the time until the desired time is displayed.

③. Press 🗐 to advance to the next step and repeat ② as necessary.

④. Repeat ② and ③ until all desired steps have been programmed.

⑤. Press ✗ to exit and return to normal operation.

Notes:

The currently displayed step can be run by pressing ▶. To set continuous or paused operation, see "User Options" on page 10.

Running a Process

①. Select the desired process (see Selecting a Process, page 8). The step display shows 0 and the time display shows the length of the first step.

②. Select continuous or paused mode if required (see User Options, page10).

③. Press ▶ or the footswitch briefly and release. The ProcessMaster times the first step. If the sounder is turned on (see User Options, page 10) it will beep every thirty seconds to prompt for agitation if required. During the last ten seconds of the step an audible countdown is sounded as an alert.

④. To pause the countdown at any time, press II. To resume, press ▶ or the footswitch. To abort the countdown press ✗. The current step is aborted and the ProcessMaster waits for the ▶ key to start the next step (note that even when Continuous mode is selected, aborting a step causes the unit to wait for ▶ before continuing).

⑤. At the completion of each step the ProcessMaster pauses and waits for the ▶ key to start the next step, unless Continuous mode is selected when the next step will start automatically.

⑥. To repeat the process, whenever the ProcessMaster is paused between steps press ✗ to reset to step 0. The process can then be run from the beginning using ▶.

Using the Temperature Probe

①. Place the probe into the liquid whose temperature is to be measured.

②. Press °C briefly. If the timer is not counting down the display shows the measured temperature (in degrees Celcius, range +10 to +50 degrees) continuously at a rate of approximately one reading per second. Press ✗ to exit temperature mode. If °C is pressed during timing, temperature will be displayed for approximately 3 seconds after which the display reverts to time countdown.

Notes:

Like all thermometers the probe requires some time to settle before reaching a steady reading so if the timer is running set the probe in place some time before you need a reading. To check if the reading has settled, take subsequent readings at intervals of approximately 10 seconds.

The temperature probe can be used during a countdown without affecting the timing.

Temperature Reading Adjustment

No two thermometers (apart from expensive laboratory standards!) are the same so the ProcessMaster offers a facility to adjust its readings to match an existing thermometer you may have used previously to establish your standard development settings.

To match ProcessMaster to your existing thermometer:

①. Place the Temperature Probe and your thermometer into the same liquid; the liquid temperature should be approximately that which you normally use for development.

②. Wait at least one minute for the readings to settle.

❸. Press and hold °C for one second to enter the adjustment mode.

④. Read the temperature from your thermometer, and use ▲ and ▽ to remeasure and adjust the ProcessMaster's reading until the display matches the reading from your thermometer.

⑤. Press ✗ to store the adjustment and return to normal mode. The adjustment is retained even when ProcessMaster is switched off.

User Options

Several ProcessMaster features can be customised, and the settings will be retained when the unit is switched off. These option settings apply to all processes, not just that which is currently selected.

To review and / or change the User Options, press ✧ briefly. The display shows USER. The available options are:

▶ Selects Continuous or Paused operation. The display shows CONT or STOP as appropriate. In Continuous mode the ProcessMaster starts timing the subsequent step as soon as the current step has finished. In Paused mode, the timer stops at the end of each step and waits for ▶ to start the next step.

II Selects "Egg Timer" or normal operation. The display shows EGG OFF or EGG ON as appropriate. In "Egg Timer" mode, when the countdown reaches zero timing will continue and the display will show the time elapsed since zero. This can be useful for example if you decide part way through a process that you want to add some more time to a step. If this mode is enabled and the display is counting up, press ▶ when you are ready for the next step.

🗐 Switches the sounder off or on. The display shows BEEP ON or BEEP OFF as appropriate. If sound is turned on, agitation reminders occur every 30 seconds and an audible countdown sounds during the last ten seconds of every step. The unit also beeps when a key is pressed.

✧ Enables or disables the power save feature. The display shows SAVE OFF or SAVE ON as appropriate. If power save is on, the ProcessMaster "goes to sleep" after 30 seconds of inactivity; the keypad illumination remains lit, and pressing any key will wake the unit up again. If you're using a mains power supply with your ProcessMaster we recommend you turn this feature off, otherwise leave it enabled to prolong battery life.

ºC Selects bright or dim display.

✗ Saves the current option settings and returns the unit to normal mode.

Other keys, ▲ ‡↙% ▽, have no option settings associated with them.

Advanced Features

Factorial print development

Factorial development is a method of print processing which improves consistency as the developer exhausts or with changes in temperature. Development time is expressed as a multiple (the "Factor") of the time taken for the image first to appear in the developer. So for example if the factor is 4 and it takes 30 seconds for the first signs of an image, the required development time is 4x30 seconds, or two minutes. If, later in the session, the time taken for the first signs of an image is 40 seconds, total development time would be 4x40 seconds, and so on. Factorial development is generally useful only with fibre-based black and white papers as they do not have developer in their emulsions.

The ProcessMaster can work out the total development time based on your preferred Factor which can be in the range 2 to 9. To set your preferred Factor:

①. Press 🗐 briefly to enter Program mode.

②. Press ✧ to review the current setting. The display shows FAC N where n is the current setting. Using ▲ and ▽, set your chosen Factor. If you want to

switch off Factorial Development, choose a Factor of 1 (shown as three horizontal bars on the display).

③. Press ✗ to save your settings and return to program mode. Press ✗ again to return to normal mode.

To use Factorial Development mode, start the development step as usual and as soon as the image starts to appear, press ▶ or the footswitch. The display briefly shows FAC N and then countdown continues with the new time calculated according to the time elapsed so far multiplied by the Factor.

Note that Factorial timing can be used on any of the first five steps of any process but not on the subsequent steps, and can not be used in conjunction with Compensation Mode.

Compensating film development

It is often necessary to adjust film development times to account for changes in temperature, push or pull development or for Zone System contrast compensation. Such adjustments are usually expressed in percentages. The ProcessMaster incorporates a useful Compensation Mode in which the remaining time of a step is displayed as a percentage of the programmed time making it easy to stop development at, say, 20% less than the programmed time. When the programmed time has expired the count continues and the display shows the percentage increase in time again, making it easy to give for example 10% more development. The count automatically stops at 100% i.e. double the programmed time but can be halted at any time by pressing ▶ or the footswitch.

Note that Compensation mode can be used on any of the first five steps of any process but not on the subsequent steps, and cannot be used together with Factorial mode.

To use Compensation Mode:

①. Press 🗐 briefly to enter Program mode.

②. Press 🗐 again if necessary to select the step in which you want to use Compensation.

③. Press °C to set Compensation Mode on or off. The display shows C ON or C OFF as appropriate. As a reminder, when a step is in Compensation Mode the step number display is replaced by C.

④. Press ✗ to save your settings and return to program mode. Press ✗ again to return to normal mode.

If a step is set to use Compensation, the display initially starts at -100, quickly changing to -99 and then counts down to 0. The rate at which the display changes will obviously depend on the programmed time as each change takes 1/100th of that time. When 0 is reached, the count starts increasing until it reaches 100 at which point the timer stops automatically.

Why doesn't the ProcessMaster use the Temperature Probe to compensate automatically for temperature changes?

Simply because every film and developer combination is different and would require a different adjustment setting. Unlike some other products which claim to be automatic, the ProcessMaster gives you complete control. The Compensation mode can also be used for push processing and Zone System adjustments. Some suggested Compensation figures for temperature and Zone System compensations are given in the tables below.

Suggested Zone System Compensation (measured over Z II to Z VIII) (Except TMax films)

N-2	N-1	N	N+1	N+2
-60%	-30%	0	35%	70%

Suggested Zone System Compensation (measured over Z II to Z VIII) (TMax films only)

N-2	N-1	N	N+1	N+2
-30%	-15%	0	20%	40%

Suggested Temperature Compensation (Except TMax films)

18ºC	19ºC	20ºC	21ºC	22ºC
25%	12%	0	-10%	-20%

Suggested Temperature Compensation (TMax films only)

18ºC	19ºC	20ºC	21ºC	22ºC
16%	8%	0	-11%	-22%

Process Memo

Fill these tables in as a ready reference for your programmed processes.

Process 0: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 1: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 2: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 3: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 4: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 5: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 6: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Process 7: Name _____

	Step	Temp	Time
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

Battery and Power Supply Information

Low battery indication

A low battery is indicated when the keypad LEDs start to dim. When only the II and ▶ keys remain illuminated, this indicates that the battery requires changing as soon as possible; further use may result in unexpected behaviour!

Changing the Battery

The ProcessMaster is powered by an internally fitted 9v battery, type PP3 or equivalent (MN1604, 6F22). Alkaline types will give the longest life but re-chargeable types can be used if preferred.

To gain access to the battery, firstly ensure the unit is switched off, then remove the four screws on the base of the main console. Place the unit right way up and gently lift the lid section away from the base taking care not to place undue strain on any of the wiring. The battery can now be changed. Carefully remove the old battery from its holder and discard (observing any local regulations regarding disposal). Fit the new battery into the holder, observing correct polarity.

To refit the lid assembly to the base, firstly locate the front of the lid on the base and ensure the sensor connector fits in the hole in the front of the base. Taking care not to trap any wiring, fully mate the two sections and replace the screws.

Using a mains power supply

For optimum performance and reliability we suggest you use a plug-in power supply. These are available from electrical retailers such as Dixons or Currys and normally provide a selection of output voltages and polarity. Types which have an AC output are not suitable and will damage the ProcessMaster.

If you have a suitable power supply it should be set to 6 - 9v DC, centre pin positive, and the connector is a 2.1mm type. INCORRECT VOLTAGE OR POLARITY CAN CAUSE EXTENSIVE DAMAGE TO THE PROCESSMASTER WHICH WILL NOT BE COVERED BY THE GUARANTEE.

The power connector is located on the rear panel of the unit as shown below.

Rear Panel view