

Optimizer™ PCR Workstations



Single UV Bulb Workstations

P-030-02, P-030-02-SS

P-036-02, P-036-02-SS

P-048-02, P-048-02-SS

Dual UV Bulb Workstations

P-030-202, P-030-202-SS

P-036-202, P-036-202-SS

P-048-202, P-048-202-SS

INSTRUCTION MANUAL

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IMPORTANT USER INFORMATION

This Instruction Manual will explain how to use this product safely and effectively. Please read and carefully follow the instruction manual in its entirety.



The triangle/exclamation mark symbol alerts the user of the product to important operational, maintenance, and/or warranty requirements.



The triangle/lightning bolt symbol alerts the user of the product to potentially hazardous electrical exposure.





Failure to adhere to the instructions could result in personal and/or laboratory hazards, as well as invalidate any warranty. Always turn off the DC power source prior to disconnecting power cords from the product. Disconnect power cords from the power source first and then from the product. For maximum safety, always operate this system in an isolated, low traffic area, not accessible to unauthorized personnel. Never operate damaged or leaking equipment.

WARRANTY AND LIABILITY

This product was produced utilizing the highest practical standards of materials, workmanship, and design. C.B.S. Scientific warrants that the product has been tested and will meet or exceed published specifications. This warranty is valid only if the product has been operated and maintained according to the instructions provided.

C.B.S. Scientific warrants this product to be free from defects in materials and workmanship under normal service for one year from date of shipment. If the product proves defective during this period, C.B.S. Scientific will repair or replace it at our option, free of charge, if returned to us postage prepaid. This warranty does not cover: damage in transit, damage caused by carelessness, misuse or neglect, normal wear through frequent use, damage caused by solvent corrosion, damage caused by improper handling or user alteration, nor unsatisfactory performance as a result of conditions beyond our control. C.B.S. Scientific shall in no event be liable for incidental nor consequential damages, including without limitation, lost profits, loss of income, loss of business opportunities, loss of use and other related damages, however caused, nor any damage arising from the incorrect use of the product.

<p>FRANÇAIS INFORMATION IMPORTANTE À L'USAGE DES UTILISATEURS</p> <p>Le présent manuel d'utilisation explique la manière de se servir efficacement du produit en conditions de sécurité. Il est recommandé de soigneusement lire la totalité du manuel, avec ses consignes et ses instructions.</p> <p> Le triangle avec point d'exclamation est un symbole destiné à avertir l'utilisateur du produit de l'importance de certaines exigences relatives au fonctionnement, à l'entretien et/ou à la garantie.</p> <p> Le triangle avec flèche en zigzag est un symbole destiné à avertir l'utilisateur du produit de la possibilité d'exposition à des décharges avec danger de secousses électriques.</p> <p> Tout manquement à l'observation des consignes et des instructions peut exposer les personnes et les biens à des dommages corporels et/ou matériels et peut annuler toute garantie. Il faut toujours interrompre l'alimentation de courant continu avant de déconnecter les cordons d'alimentation du produit. Déconnecter d'abord les cordons d'alimentation branchés sur la source de tension (alimentation de secteur) puis ceux branchés sur le produit. Pour une sécurité maximum, il faut toujours faire fonctionner ce système dans un lieu isolé, peu fréquenté, où le personnel non autorisé n'a pas accès. Ne jamais faire fonctionner un matériel endommagé ou affecté par des fuites.</p> <p>GARANTIE ET RESPONSABILITÉ</p> <p>Le produit a été fabriqué conformément aux normes applicables les plus exigeantes en matière de matériaux, de main d'œuvre, de conception et d'ingénierie. C.B.S. Scientific garantit que le produit a subi des essais et que ses performances rempliront les conditions des spécifications publiées ou leur seront même supérieures. La présente garantie n'est valide que si le produit a fonctionné et a été entretenu conformément aux consignes et instructions fournies.</p> <p>C.B.S. 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Scientific ne pourra en aucun cas être tenue responsable de dommages indirects, y compris, de manière non limitative, la perte de bénéfices, le manque à gagner, la perte d'occasions d'affaires, l'impossibilité d'usage ou tous autres dommages associés, quelle qu'en soit la cause, ni de dommages résultant de l'usage incorrect du produit.</p>	<p>ESPAÑOL INFORMACIÓN IMPORTANTE PARA EL USUARIO</p> <p>El presente instructivo explica la manera de usar este producto en forma segura y efectiva. Sírvase leerlo en su totalidad y seguir detenidamente las indicaciones que contiene.</p> <p> El símbolo del triángulo con exclamación llama la atención del usuario a requisitos importantes para el uso y mantenimiento del producto, así como para la validez de la garantía.</p> <p> El símbolo del triángulo con rayo llama la atención del usuario a la posibilidad de riesgos eléctricos.</p> <p> El incumplimiento de las instrucciones aquí señaladas podría dar lugar a riesgos a la persona, al laboratorio o a ambos y podría anular toda garantía. Siempre apague la fuente de corriente continua antes de desenchar los cables eléctricos del producto. Primero desconecte los cables de la fuente de energía y después del producto. Para mayor seguridad, siempre use este sistema en un área aislada, de poco movimiento de personas e inaccesible a personal no autorizado. Jamás use equipo que presenta algún daño o fuga.</p> <p>GARANTÍA Y RESPONSABILIDAD</p> <p>Este producto fue fabricado de acuerdo con las normas más estrictas que sean factibles en cuanto a materiales, mano de obra y diseño. C.B.S. Scientific garantiza que se sometió el producto a pruebas y que cumplirá o excederá las especificaciones publicadas. Esta garantía será válida únicamente si se usa y se da servicio de mantenimiento al producto de acuerdo con las instrucciones señaladas.</p> <p>C.B.S. Scientific garantiza que este producto se encontrará libre de defectos de materiales y mano de obra por un período de servicio normal de un año a partir de la fecha de embarque. Si el producto resulta defectuoso durante este período, C.B.S. Scientific lo reparará o lo repondrá, a criterio de C.B.S., libre de cargos, si se devuelve el producto a C.B.S. porte pagado. Esta garantía no cubre daños sufridos en tránsito, daños provocados por descuido, mal uso o negligencia, desgaste normal como consecuencia del uso excesivo, daños atribuibles a corrosión provocada por solventes, daños causados por el uso indebido o alteraciones realizadas por el usuario ni rendimiento insatisfactorio atribuible a circunstancias fuera del control de C.B.S. Scientific. C.B.S. Scientific en ningún caso asumirá responsabilidad por daños incidentales o subsiguientes, incluyendo, en forma no limitativa, la pérdida de utilidades, de ingresos, de oportunidades comerciales o del uso del producto y otros daños afines, fuere cual fuere su origen, ni por daños derivados del uso incorrecto del producto.</p>
<p>DEUTSCH WICHTIGE INFORMATION FÜR DEN BENUTZER</p> <p>Diese Bedienungsanleitung beschreibt wie man dieses Produkt sicher und wirksam benutzt. Bitte lesen und befolgen Sie alle Anweisungen in dieser Anleitung.</p> <p> Das Dreieck mit Ausrufezeichen weist den Benutzer des Produktes darauf hin, daß wichtige Bedienungs-, Wartungs- und/oder Garantievorschriften zu beachten sind.</p> <p> Das Dreieck mit Zickzackblitz warnt den Benutzer des Produktes vor möglichen Gefahren durch elektrische Spannungen.</p> <p> Nichtbeachtung dieser Anweisungen kann zu persönlichen und/oder labortechnischen Schäden führen und gleichzeitig alle Garantien als nichtig erklären. Die DC Stromzufuhr muß immer, vor dem Enternen der Stromkabel vom Produkt, abgeschaltet werden. Die Stromzufuhrkabel müssen zuerst von der Steckdose und erst dann vom Produkt entfernt werden. Um höchste Sicherheit zu gewährleisten sollte dieses System in einem abgesonderten und besonders ruhigen Bereich eingesetzt werden und vor Unbefugten sicher sein.</p> <p>GARANTIE UND HAFTUNG</p> <p>Dieses Produkt wurde unter Anwendung von Produkten mit höchster Qualität und aus Materialien mit bester Verarbeitung und modernstem Design hergestellt. C.B.S. Scientific garantiert, daß das Produkt getestet wurde und alle publizierten Spezifikationen übertrifft. Diese Garantie ist jedoch nur gültig, wenn das Produkt nach der beigelegten Bedienungsanleitung bedient und gewartet wurde.</p> <p>C.B.S. Scientific garantiert, daß dieses Produkt bei normaler Bedienung aus fehlerfreiem Material besteht und fehlerfrei in der Ausführung ist. Diese Garantie gilt für ein Jahr ab Lieferdatum. Sollte das Produkt in diesem Zeitraum fehlerhaft werden, bietet C.B.S. Scientific eine kostenlose Reparatur bzw. kostenlosen Ersatz, einschließlich freiem Rückporto. Diese Garantie schließt folgendes aus: Transportschaden, Schaden durch Nachlässigkeit, Mißbrauch oder Vernachlässigung, normale Abnutzung durch regelmäßigen Gebrauch, Schaden durch Säureangriff, Schaden durch falsche Handhabung, Veränderung des Produktes durch den Benutzer, oder unzureichende Leistungen die sich nicht im Verantwortungsbereich von C.B.S. Scientific befinden. C.B.S. Scientific kommt unter keinen Umständen für folgende Schäden auf: Sachschadensverlust, Einkommensverlust, Verlust von Geschäftsmöglichkeiten, Verlust der Anwendung und andere damit verbundene Schäden die auf irgend eine Art und Weise entstanden sind, oder Schäden die aus falscher Anwendung des Produktes entstanden sind.</p>	<p>ITALIANO INFORMAZIONI IMPORTANTI PER L'UTENTE</p> <p>Questo manuale spiega come utilizzare questo prodotto in maniera sicura ed efficiente. Si preghi di leggere e seguire con cautela le istruzioni di ogni parte di questo manuale.</p> <p> Il triangolo contenete il simbolo di un punto esclamativo avverte l'utente di importanti requisiti relativi al funzionamento, manutenzione e/o garanzia del prodotto.</p> <p> Il triangolo contenete il simbolo di un lampo avverte l'utente del prodotto della possibilità di pericoli dovuti a corrente elettrica.</p> <p> La mancata osservanza delle istruzioni può essere causa di pericolo alla propria persona ed al laboratorio, oltre a poter annullare la garanzia. Prima di distaccare il cordone d'alimentazione dal prodotto, spegnere sempre la sorgente di corrente continua. Distaccare i cordoni d'alimentazione prima dal lato della sorgente di tensione e poi dal lato del prodotto. Per maggior sicurezza, mettere sempre in funzione il prodotto in un'area isolata con poco traffico che non sia accessibile al personale non autorizzato. Non mettere mai in funzione un'apparecchiatura che sia danneggiata o abbia perdite.</p> <p>GARANZIA E RESPONSABILITÀ</p> <p>Questo prodotto è stato fabbricato seguendo gli standard più elevati per i materiali, la manodopera e la progettazione. La C.B.S. Scientific garantisce il prodotto è stato sottoposto a prova e raggiunge o supera i valori pubblicati per i dati tecnici. Questa garanzia è valida solo se il prodotto è messo in esercizio e soggetto a manutenzione secondo le istruzioni fornite.</p> <p>La C.B.S. Scientific garantisce che questo prodotto è libero di difetti di materiali e manodopera, in normali condizioni d'esercizio, per la durata di un anno dalla data di spedizione. Se, in questo periodo, il prodotto si dimostrerà difettoso, la C.B.S. Scientific, a suo giudizio, lo riparerà o sostituirà. 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General Information

1.1 Introduction

The Optimizer PCR Workstation is designed to provide an optimal environment for performing PCR amplification reactions. The Workstation interior can be irradiated prior to use, blocking replication of potentially contaminating DNA sequences (1,2). The protected area within the Workstation limits exposure of the experimental set-up to the open lab environment, decreasing the chances of cross or airborne contamination.

The PCR Workstation is available in six different models. The 3 sizes available are 2 feet deep x 2 feet high, with widths of 30, 36 or 48 inches. Each size can be ordered with either a single or dual UV light built into the ceiling. All Optimizer Workstations are equipped with a safety interlock that automatically turns off the UV lights if either the door(s) or glass screen is opened inadvertently. For added convenience, a twelve-hour timer controls the UV irradiation dosage, and can be set to a pre-determined time for decontamination. The PCR Workstation can be placed on a lab bench, or turned into a moveable work area by ordering an accessory cart with locking casters.

1.2 Intensity of UV Light (254nm) for Single and Dual UV Bulb PCR Workstation

Some labs may require the intensity of the Dual UV Bulb PCR Workstation to adequately decontaminate their hood. The Dual Bulbs deliver twice the intensity of UV light than that of the single, and will help irradiate areas that might otherwise be inaccessible. The Dual UV Bulb format is recommended when the researcher desires to use the Workstation to decontaminate apparatus and reagents. The light from one bulb may not adequately access shadowed areas created by these items and the intensity of reflected UV light is greatly weakened. To help solve this problem, the two UV bulbs are mounted apart from each other on the ceiling, maximizing the contents of the Workstation that will receive direct UV irradiation as opposed to reflected. The Dual UV Bulb PCR Workstation may also be required to deliver the sufficient UV dosage needed to prevent replication of certain types of contaminating DNA. For example, inactivation of dry DNA requires more UV exposure than that of DNA in solution. To determine the best suitable UV irradiation dosage for the type of DNA being used please refer to table 3.2. on page 10, combined with the values given in *Fairfax et al* (3).

1.3 Specifications

Constructions:

Workstation body	Acrylic/FR ABS
Work surface	Acid resistant Formica or Stainless Steel
Closure doors	Acrylic
Glass screen	Tempered Safety Glass/Aluminum ANSI Z97.1--1984
Power cord	Continental Europe, CEE 7/7 250VAC/ 6A, 65° C, 3x0.75mm ³ conductor UK & Ireland BS1363, 240VAC 50Hz, 5A, 70° C, 3x0.75mm ³ conductor U.S./PR, 16awg, 3 conductor, 60° C, SJT
Socket	Continental Europe, ECC 7/7 250VAC/50Hz, 16A UK & Ireland, BS1363, 240VAC 50Hz, 13A U.S., NEMA 5-15, 120VA/60Hz, 15A
Germicidal Lamp(s)	G15T8, 15 watts (P-030-02 & P-036-02) G30T8, 30 watts (P-048-02)
Fixture/Ballast	120VAC/60Hz/0.35A or 240VAC/50Hz/0.17A
Fluorescent lamp	F20T12CW (P-030-02 & P-036-02) F30T12CWRS (P-048-02)
Fixture/Ballast	120VAC/0.6A/60Hz or 240VAC/0.3A/50Hz
Safety Certification	EN61010-1-1993, EN 61326-1/1998, EN55011/1999, CISPR 11 (1997), EN61000-4-2/1995, -4-3/1995, -4-4/1995, -4-6/1996, -4-8/1994, -4-11/1994

1.4 PCR Workstation Overall Sizes and Shipping weight

	P-030-02 Single UV Bulb Workstation	P-036-02 Single UV Bulb Workstation	P-048-02 Single UV Bulb Workstation	P-030-202 Dual UV Bulb Workstation	P-036- 202 Dual UV Bulb Workstation	P-048- 202 Dual UV Bulb Workstation
Shipping weight	160 lb.	165 lb.	200 lb.	160 lb.	165 lb.	200 lb.
Overall size (inches)	36x30x30	42x30x30	54x30x30	36x30x30	42x30x30	54x30x30
Overall size (cm)	91.5x76x76	107x76x76	137x76x76	91.5x76x76	107x76x76	137x76x76

1.5 Intended Uses and Safety Warnings

The PCR Workstation is intended for use in research laboratories or clinics by qualified personnel. Power or Mains voltage is supplied to the PCR Workstation from the wall outlet at the voltage and current listed on the rear of the unit. Power cords, sockets and voltage ratings are country specific and are manufactured to point of destination requirements.



WARNING: UV light can be harmful to unprotected eyes and skin. Make sure of the following before using the UV light:



- a) Glass screen is down in resting position (glass blocks UV transmission).
- b) Door closure(s) are in place. (Acrylic blocks UV transmission).

SECTION 2

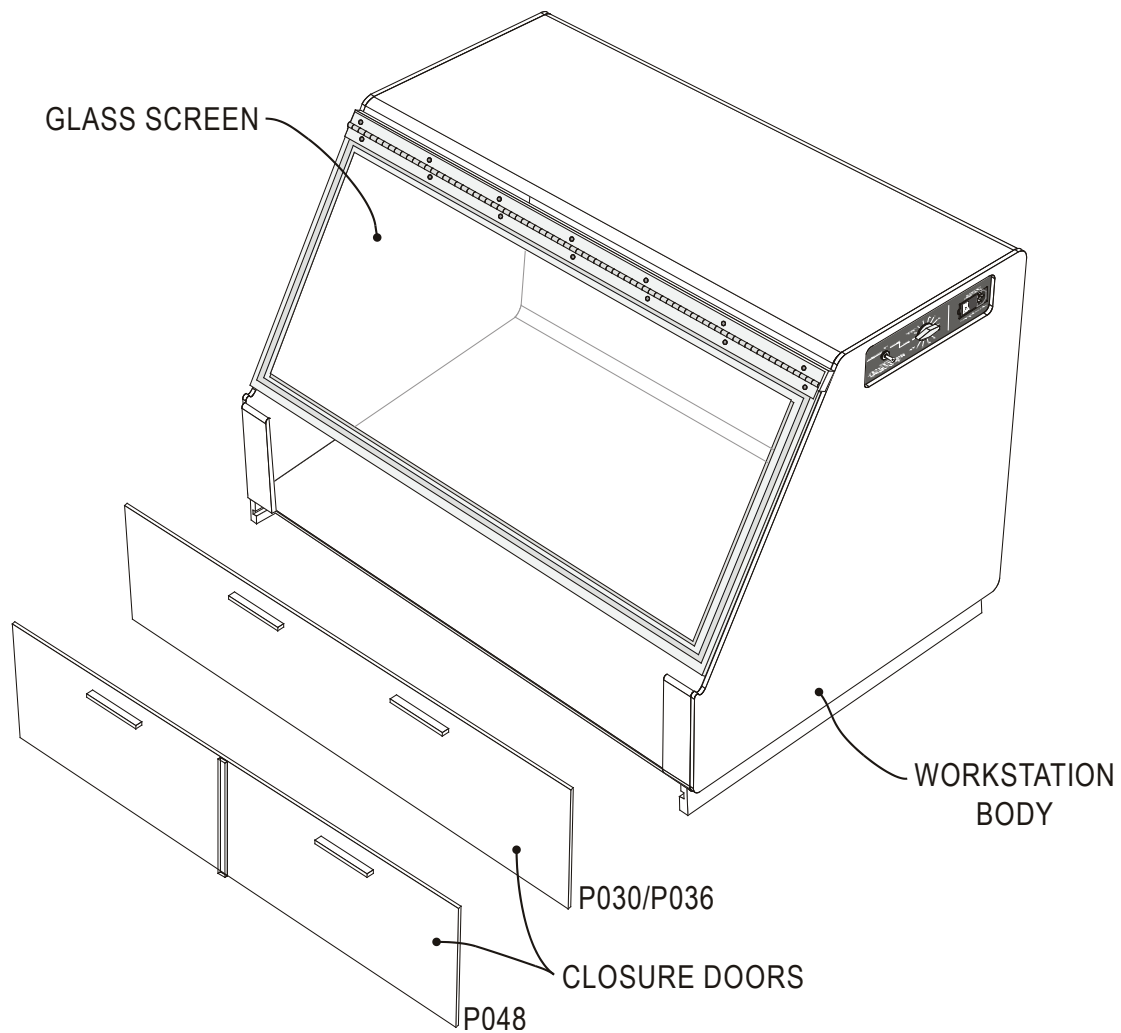
Description of Parts

2.1 Unpacking

Please verify that your unit comes complete with the following components:

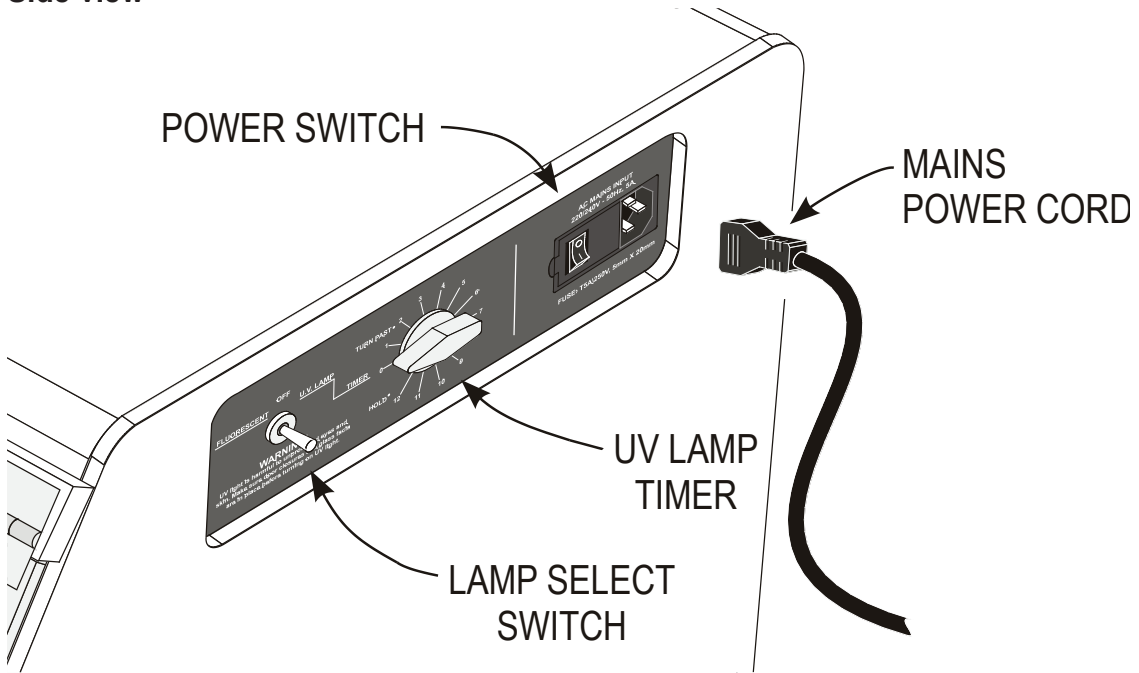
- Single or dual door closure
- Timer
- 2 fluorescent lights (shipped in place)
- 1 or 2 germicidal light(s) (shipped in place)
- Power cord

2.2 Components and Assembly---Front view



2.2 Components and Assembly---side view

Side view



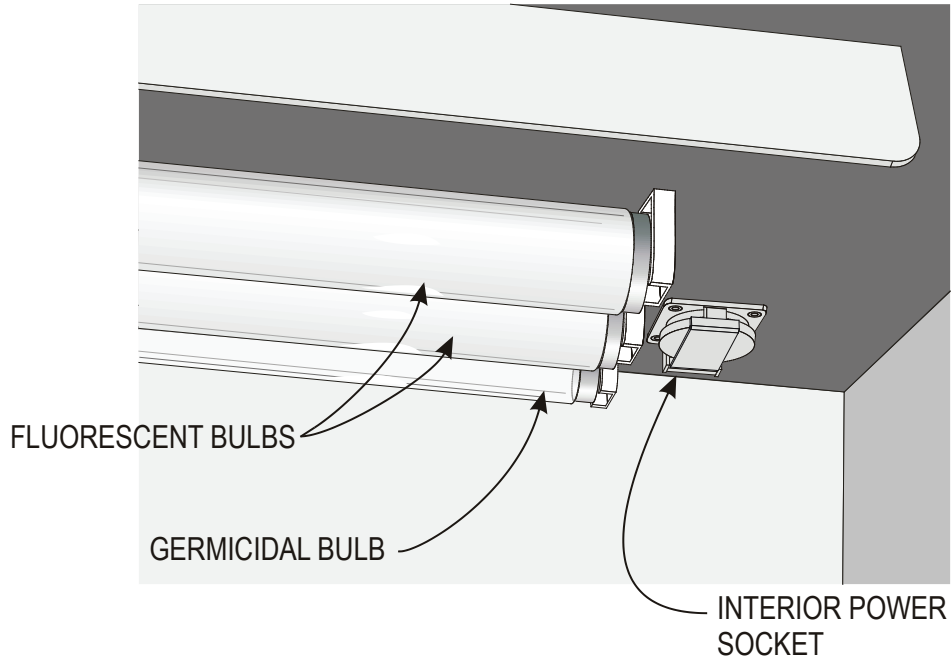
2.2 Components and Assembly---closed position. Door closure must have handles at TOP to complete interlock circuit



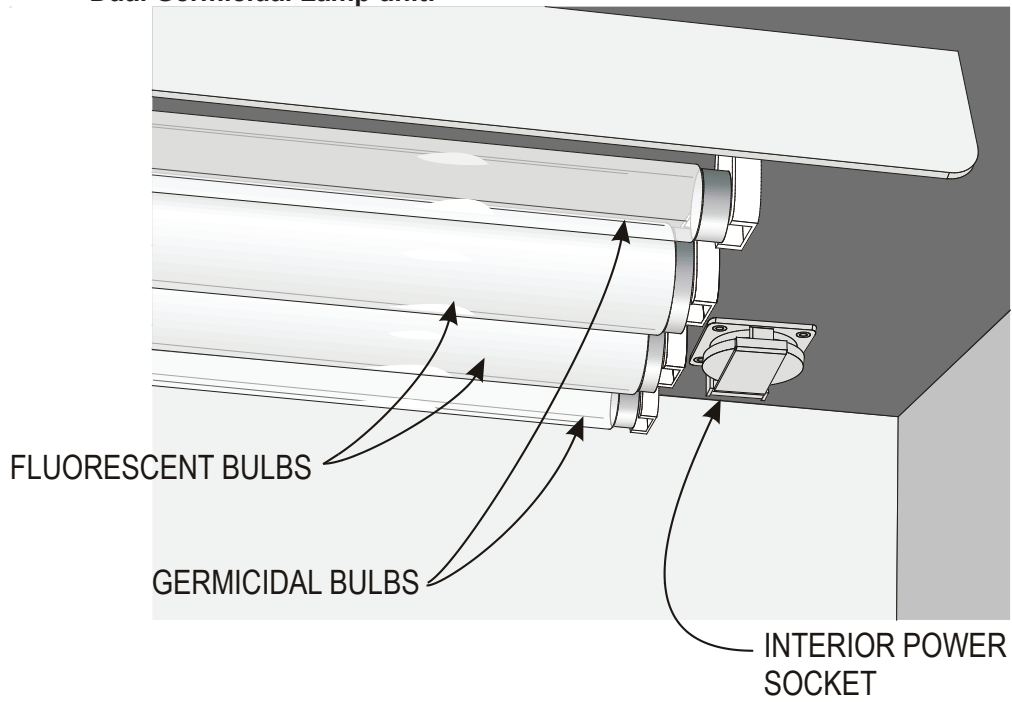
NOTE: For proper interlock function handles must be in the up position

2.2 Components and Assembly---continued

Single Germicidal Lamp unit:



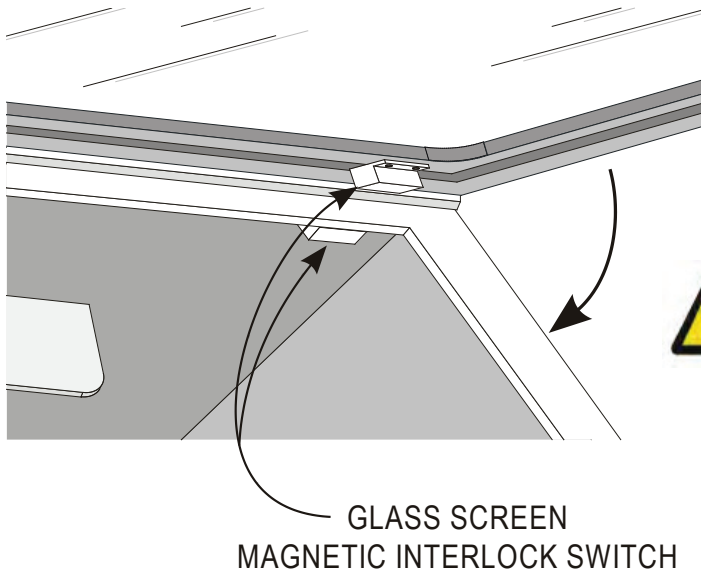
Dual Germicidal Lamp unit:



2.3 UV Light Safety Interlock

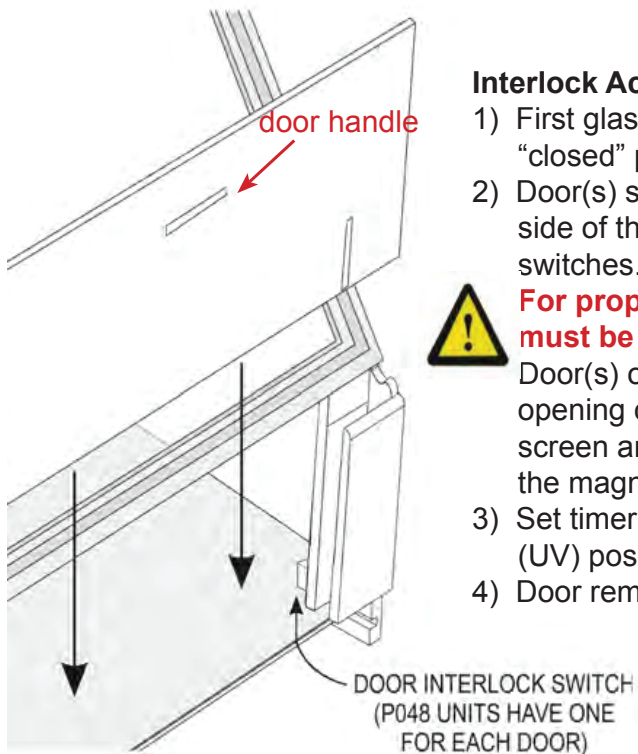
An electrical interlock is factory installed on all Optimizer PCR Workstations. This interlock will prevent accidental or inadvertent exposure to UV radiation. The door(s) and glass screen are fitted with electrical sensors. The UV light will only work if the door(s) and screen are closed. If the UV light is “ON” and the door(s) or screen is opened the interlock will turn the UV light “OFF”.

Glass Screen Interlock Switches:



GLASS SCREEN MUST BE CLOSED AND DOOR(S) MUST BE IN PLACE BEFORE UV LIGHT WILL TURN ON!

Door Interlock Switches:



Interlock Activation

- 1) First glass screen **MUST** be placed in the “closed” position.
- 2) Door(s) should be placed into slots on either side of the Workstation to engage micro-switches.



For proper interlock function handles must be in the up position

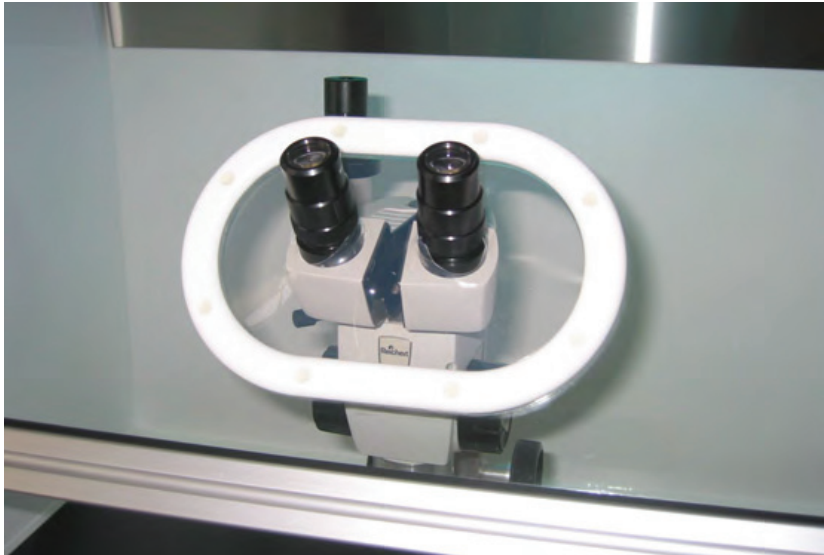
Door(s) once placed will physically block opening of the glass screen. Both glass screen and doors must be closed to engage the magnetic switches.

- 3) Set timer for desired duration and select (UV) position for toggle switch.
- 4) Door removal will turn UV light off.

2.4 Ocular Fitting for Microscope Placement within PCR Workstation (Optional)

P-Ocular: Customized ocular fitting for microscope.

This customized ocular fitting allows a microscope to be placed in the PCR Workstation while maintaining the integrity of UV protection and preserving the sterility of the workstation environment. A small oval cut-out is removed from the tempered glass fascia to accommodate the oculars, which is then covered in silicone. The silicone permits transmittance of only negligible amounts of UV light, and is cut to securely wrap the oculars. The silicone also protects the sterility of the microscope stage area by preventing contaminating DNA from entering through the ocular cut-out.



2.5 Workstation Table (Optional) and Locking Casters (Optional)

White-top, steel frame powder-coated table with foot rest and leveling feet. Can be ordered with a set of 4 factory mounted accessory locking swivel casters to transform the PCR Workstation into moveable work area.



SECTION 3

Instructions for Use

3.1 PCR Workstation Set-up



1. Place the Workstation on a level work surface in an authorized work area. Clean the PCR Workstation using a soft cloth or Kaydry® moistened with water. Wipe the Workstation surfaces to remove dust or particulates inside and out. (The glass facia may be conveniently lifted to rest up and out of the way against top portion of Workstation. This position can be used for easy access of interior for cleaning or for placement or removal of large items.)
2. Wipe the Workstation a second time using a solution of 50% EtOH and water.
3. The fluorescent and germicidal lights are installed prior to shipment. The germicidal lamp(s) is in the single fixture (on either side of the dual fluorescent light fixture) and should not be touched with your hands because the oils from your fingers can degrade the bulb. Instead use a cloth to remove or install a germicidal lamp.



WARNING: UV light can be harmful to unprotected eyes and skin. Make sure of the following before using the UV light:

- a) Glass facia is down in resting position (glass blocks UV transmission)
- b) Door closure(s) are in place. (Acrylic blocks UV transmission)

3.2 PCR Workstation Experimental Set-up

1. The PCR Workstation is supplied with a 12 hour timer which allows you to turn the 254nm UV germicidal lamp on for desired length of time. Typical protocols suggest UV irradiation of the Workstation interior as well as reagents or apparatus for 30 minutes up to 8 hours prior to use. Please refer to the table below and Reference (3) to determine the length of exposure time required to adequately decontaminate your Workstation. To use the UV timer, make sure that the toggle switch on the Workstation is pre-set to UV, then turn the dial for desired exposure interval.



WARNING: For your safety, close the door and glass facia **before** turning on the UV light.

2. After the timed exposure, switch the toggle back to fluorescent and the Workstation is ready for use.
3. The PCR Workstation is equipped with an ultraviolet lamp which emits light with a 254nm wavelength. When solubilized DNA is exposed to this radiation adjacent thymine bases will be induced to form cyclobutane pyrimidine dimers by the condensation of two ethylene groups at C-5 and C-6. Additionally, adjacent thymines can be linked between the C-4 residue and the C-6 of its neighbor. In either case, a “kink” is introduced into the DNA. Therefore, by pre-exposing the PCR work area with UV radiation, all DNA present will be photo-damaged and will not be amplified by DNA polymerase (despite retaining the ability to be primed). Consequently, these photo-damaged sequences will not contaminate your PCR amplification product. (4).

NOTE: It is recommended that the intensity of the germicidal bulb be tested weekly with a UV meter. Intensity of the germicidal bulb will diminish over time, and exposure time should be adjusted as a result. See section 4.2.

Table 3.2 Intensity of UV light for Single and Dual UV Bulb PCR Workstation

Using these values and the information supplied in Ref. 3 (Section 3.3), it is possible to calculate desired exposure times considering the type and source of contaminating DNA. To confirm UV dosage refer to Section 4.2

	P-030-02 Single UV Bulb Workstation	P-036-02 Single UV Bulb Workstation	P-048-02 Single UV Bulb Workstation	P-030-202 Dual UV Bulb Workstation	P-036- 202 Dual UV Bulb Workstation	P-048- 202 Dual UV Bulb Workstation
$\mu\text{W}/\text{cm}^2$	200	200	400	400	400	800

3.3 References

1. Sakar, G., and Sommer, S, (1990) *Nature* 343 p. 27.
2. Ou, C-Y, Moore, J.L. and Schochetman, G *Biotechniques* (1991) 10:4 p. 442-445.
3. Fairfax, M.R., Metcalf, M.A., Cone, R.W., (1991). PCR *Methods and Applications*. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York. 1:142-143.
4. Lehninger, A.L., Nelson D.L., and Cox, M.M., (1993) *Principals of Biochemistry*. Worth Publishers, New York, NY pages, 342, 816, 832, 837

SECTION 4

Maintenance of Equipment

4.1 Care and Handling

The plastic components of the PCR Workstation are fabricated from acrylic. As with any laboratory instrument, adequate care ensures consistent and reliable performance. After each use, wipe black formica or stainless steel base with 50% ethanol. Wipe down interior space with 25% ethanol. Wipe dry with a soft cloth or paper towel, or allow to air dry. Whenever necessary, all components may be washed gently with water and a non-abrasive detergent, and rinsed and dried as above. **Never** use abrasive cleaners, glass cleaning sprays or scouring pads to clean the components, as these will damage the unit and components. UV exposure may over time result in slight discoloration of the workstation and equipment decontaminated in the workstation. This is a cosmetic change, and will not affect the functionality of the equipment.

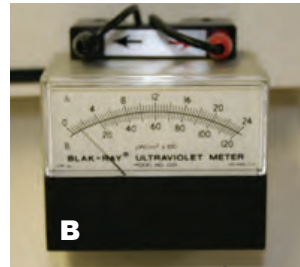
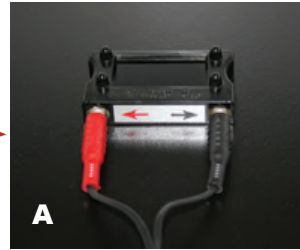
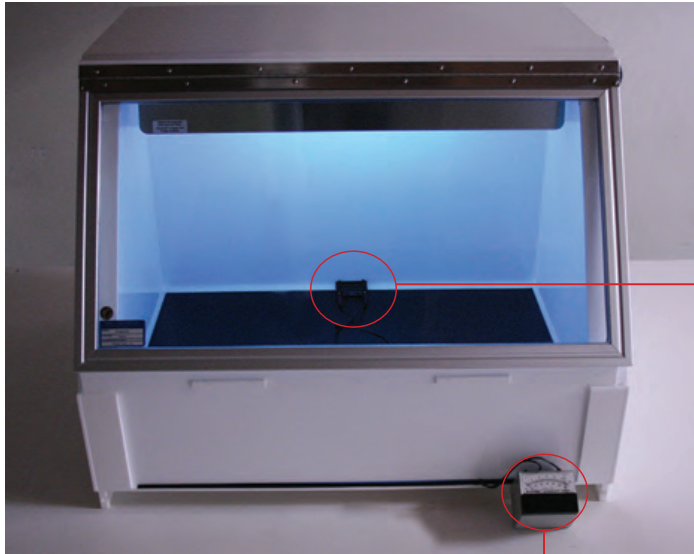


Additional precautions:

- Do not autoclave or dry-heat sterilize the apparatus or components.
- Do not expose the apparatus or components to phenol, acetone, benzene, halogenated hydrocarbon solvents or undiluted alcohol's.
- Do NOT treat with diethylpyrocarbonate (DEPC)-treated water for extended periods at 37°C. A brief rinse with DEPC-water is sufficient after a thorough wash, followed by a quick rinse in 70% ethanol.

4.2 Measuring Strength of UV Bulbs using a UV Meter

1. The life span of a new UV bulb is approximately 1,000 hours. However, bulb life varies depending on several factors such as number of starts, duration of illumination and original condition. The best way to determine UV dosage at any place in the workstation is to measure UV output with a simple metering device.



CAUTION: Always make sure PCR door is in place and glass fascia is closed before turning on UV light

2. To make a UV light reading please follow these directions and refer to the photo above.
 - a) Place sensor (A) inside PCR Workstation and meter (B) outside Workstation where it can be read easily.
 - b) Insert PCR Workstation door into place so that it rests gently on top of the sensor chord.
 - c) Close glass fascia of PCR Workstation
 - d) Turn on UV light and read meter.
 - e) Turn OFF UV light BEFORE removing sensor.
 - f) Multiply meter reading by $100\mu\text{W}/\text{cm}^2$
3. Compare UV dosage to table 3.2. If any value is less than listed for your particular PCR Workstation, you have 2 choices:
 - a) Replace the old bulb.
 - b) Extend the time of UV exposure. For instance, if the meter reading is $350\mu\text{W}/\text{cm}^2$ (instead of 400 for a new bulb in the P-048-202), you can achieve the required dosage by leaving the UV light on longer.
 - c) Please refer to the references #1 and #3 to determine exposure time.



4.3 Maintenance



The following inspection and maintenance procedures will help maintain the safety and reliable performance of the PCR Workstation. Replacement parts can be ordered by calling 1-858-755-4959 or by contacting your local distributor.



- Power cords should be inspected regularly. If they become loose or do not feel friction tight replace the plugs or power cords.
- Should power cord assemblies (connectors, wire or shrouds) show any signs of wear or damage (e.g. cracks, nicks, abrasions, or melted insulation), replace them immediately.

SECTION 5

Installation of Replacement Parts

5.1 PCR Workstation Replacement Timer Installation

1. You will need the following:
 - 2 Flathead screwdrivers
 - * Phillips head screwdriver
 - 5/16" nut driver or socket wrench
2. Unplug PCR Workstation and carefully remove all bulbs.
3. Remove the timer knob from the outside of the hood using 2 flathead screwdrivers to pry open with equal pressure on the two sides of the knob.
4. Turn workstation over onto a padded surface (such as a towel) and using Phillips head screwdriver remove screws that retain ceiling and white shield and stainless steel screw retaining outlet cover. Remove ceiling.
5. Unscrew 2 stainless steel screws in front of aluminum box. You will be able to raise the aluminum cover of the overturned hood, exposing the wiring inside the aluminum box.
6. The timer, toggle switch, and on-off switches are on the left of the overturned hood. Using 5/16" nut driver remove 2 nuts attaching timer.
7. There are two wires connected to the timer. One to the light ballast and one to the toggle switch. Note their positions, then disconnect them.
8. Remove the timer and replace with new one. Reconnect ballast and toggle switch. Replace nuts to hold timer in place and tighten.
9. Reinstall aluminum cover and ceiling with bulb shield and replace bulbs. Return hood carefully to upright position.
10. Replace timer knob on the exterior of hood by lining up with timer and pushing into place.

5.2 PCR Workstation Fuse Replacement

1. You will need the following:
 - Flathead screwdriver
 - Replacement fuse 5A/250V, 5 x 20mm
2. Locate fuse housing to left of AC mains input



3. Use small screwdriver to pry open fuse access door



4. Use screwdriver to release fuse holder from housing.



5. Remove red fuse holder from housing. Fuses 5A/250V, 5 x 20mm can now be inspected or replaced



SECTION 6 ORDERING INFORMATION

Optimizer PCR Workstation and Accessories

Cat. #	Item
P-030-02	PCR Workstation CE-Single UV Bulb , with single door closure. Dimensions are 24" x 24" x 30". Includes Formica working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, one UV bulb, integral 12 hour timer and duplex outlet.
P-030-02-SS	PCR Workstation CE-Single UV Bulb , with single door closure. Dimensions are 24" x 24" x 30". Includes stainless steel working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, one UV bulb, integral 12 hour timer and duplex outlet.
P-036-02	PCR Workstation CE-Single UV Bulb , with single door closure. Dimensions are 24" x 24" x 36". Includes Formica working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, one UV bulb, integral 12 hour timer and duplex outlet.
P-036-02-SS	PCR Workstation CE-Single UV Bulb , with single door closure. Dimensions are 24" x 24" x 36". Includes stainless steel working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, one UV bulb, integral 12 hour timer and duplex outlet.
P-048-02	PCR Workstation CE-Single UV Bulb , with dual door closure. Dimensions are 24" x 24" x 48". Includes Formica working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, one UV bulb, integral 12 hour timer and duplex outlet.
P-048-02-SS	PCR Workstation CE-Single UV Bulb , with dual door closure. Dimensions are 24" x 24" x 48". Includes stainless steel working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, one UV bulb, integral 12 hour timer and duplex outlet.
P-030-202	PCR Workstation CE-Dual UV Bulb , with single door closure. Dimensions are 24" x 24" x 30". Includes Formica working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, two UV bulb, integral 12 hour timer and duplex outlet.
P-030-202-SS	PCR Workstation CE-Dual UV Bulb , with single door closure. Dimensions are 24" x 24" x 30". Includes stainless steel working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, two UV bulb, integral 12 hour timer and duplex outlet.
P-036-202	PCR Workstation CE-Dual UV Bulb , with single door closure. Dimensions are 24" x 24" x 36". Includes Formica working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, two UV bulb, integral 12 hour timer and duplex outlet.
P-036-202-SS	PCR Workstation CE-Dual UV Bulb , with single door closure. Dimensions are 24" x 24" x 36". Includes stainless steel working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, two UV bulb, integral 12 hour timer and duplex outlet.
P-048-202	PCR Workstation CE-Dual UV Bulb , with dual door closure. Dimensions are 24" x 24" x 48". Includes Formica working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, two UV bulb, integral 12 hour timer and duplex outlet.
P-048-202-SS	PCR Workstation CE-Dual UV Bulb , with dual door closure. Dimensions are 24" x 24" x 48". Includes stainless working surface, safety interlock, hinged glass face shield, single access closure, two fluorescent lights, two UV bulb, integral 12 hour timer and duplex outlet.
P-Ocular	Customized Ocular Fitting for microscope placement in PCR Workstation.
TCV	Vacuum Valve
TCG	Gas Valve
TAH	Access holes with plugs (for tubing feed-through)

Tables

Cat. #	Item
T-030-28	Workstation Table, 28" high for PCR Workstation P-030-02. White-top steel frame power-coated table with foot rest and leveling feet.
T-030-36	Workstation Table, 36" high for PCR Workstation P-030-02. White-top steel frame power-coated table with foot rest and leveling feet.
T-036-28	Workstation Table, 28" high for PCR Workstation P-036-02. White-top steel frame power-coated table with foot rest and leveling feet.
T-036-36	Workstation Table, 36" high for PCR Workstation P-036-02. White-top steel frame power-coated table with foot rest and leveling feet.
T-048-28	Workstation Table, 28" high for PCR Workstation P-048-02. White-top steel frame power-coated table with foot rest and leveling feet.
T-048-36	Workstation Table, 36" high for PCR Workstation P-048-02. White-top steel frame power-coated table with foot rest and leveling feet.
TC-400	Table Casters, set of 4. Locking swivel casters.

Replacement components

Cat. #	Item
P-030-Door	Replacement door for 30" (w) PCR Workstation
P-036-Door	Replacement door for 36" (w) PCR Workstation
P-048-DoorR	Replacement door for 48" (w) PCR Workstation, right
P-048-DoorL	Replacement door for 48" (w) PCR Workstation, left
P-Timer-12	Replacement 12 hour timer
P-Timer-30	Replacement 30 minute timer
P-Starter-2	Replacement Starter for 30" & 36" (w) PCR Workstations (FS2)
P-Starter-4	Replacement Starter for 48" (w) PCR Workstations (FS4)

Replacement Bulbs

To avoid confusion , please note diameter of bulb and length when ordering a replacement!

PCR Workstation	Fluorescent Replacement Bulb LARGER DIAMETER STYLE 1.5" diameter		Fluorescent Replacement Bulb THINNER DIAMETER STYLE 0.94" diameter		Germicidal Replacement Bulb	
Cat. #	Cat. #	Length	Cat. #	Length	Cat. #	Length
P-030-02 or -202	CWB-F20T12CW	23.75" (l)	CWB-F17T8	23.75" (l)	GB-G15T8	17.75" (l)
P-036-02 or -202	CWB-F20T12CW	23.75" (l)	CWB-F17T8	23.75" (l)	GB-G15T8	17.75" (l)
P-048-02 or -202	CWB-F30T12CW	35.25" (l)	CWB-F25T8	35.25" (l)	GB-FG6132C2	35.75" (l)

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