

# HP Modular Cooling System Maintenance and Service Guide



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### **Intended audience**

This guide is for an experienced service technician. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

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# Customer self repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service providers or service partners) identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- **Mandatory**—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- **Optional**—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

**NOTE:** Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement CSR part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about HP's Customer Self Repair program, contact your local service provider. For the North American program, refer to the HP website (<http://www.hp.com/go/selfrepair>).

## Parts only warranty service

Your HP Limited Warranty may include a parts only warranty service. Under the terms of parts only warranty service, HP will provide replacement parts free of charge.

For parts only warranty service, CSR part replacement is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

## Réparation par le client (CSR)

Les produits HP comportent de nombreuses pièces CSR (Customer Self Repair = réparation par le client) afin de minimiser les délais de réparation et faciliter le remplacement des pièces défectueuses. Si pendant la période de diagnostic, HP (ou ses partenaires ou mainteneurs agréés) détermine que la réparation peut être effectuée à l'aide d'une pièce CSR, HP vous l'envoie directement. Il existe deux catégories de pièces CSR:

- **Obligatoire** - Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.
- **Facultatif** - Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

**REMARQUE:** Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

Les pièces CSR sont livrées le jour ouvré suivant, dans la limite des stocks disponibles et selon votre situation géographique. Si votre situation géographique le permet et que vous demandez une livraison le jour même ou dans les 4 heures, celle-ci vous sera facturée. Pour bénéficier d'une assistance téléphonique, appelez le Centre d'assistance technique HP. Dans les documents envoyés avec la pièce de rechange CSR, HP précise s'il est nécessaire de lui retourner la pièce défectueuse. Si c'est le cas, vous devez le faire dans le délai indiqué, généralement cinq (5) jours ouvrés. La pièce et sa documentation doivent être retournées dans l'emballage fourni. Si vous ne retournez pas la pièce défectueuse, HP se réserve le droit de vous facturer les coûts de remplacement. Dans le cas d'une pièce CSR, HP supporte l'ensemble des frais d'expédition et de retour, et détermine la société de courses ou le transporteur à utiliser.

Pour plus d'informations sur le programme CSR de HP, contactez votre Mainteneur Agréé local. Pour plus d'informations sur ce programme en Amérique du Nord, consultez le site Web HP (<http://www.hp.com/go/selfrepair>).

## Service de garantie "pièces seules"

Votre garantie limitée HP peut inclure un service de garantie "pièces seules". Dans ce cas, les pièces de rechange fournies par HP ne sont pas facturées.

Dans le cadre de ce service, la réparation des pièces CSR par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

## Riparazione da parte del cliente

Per abbreviare i tempi di riparazione e garantire una maggiore flessibilità nella sostituzione di parti difettose, i prodotti HP sono realizzati con numerosi componenti che possono essere riparati direttamente dal cliente (CSR, Customer Self Repair). Se in fase di diagnostica HP (o un centro di servizi o di assistenza HP) identifica il guasto come riparabile mediante un ricambio CSR, HP lo spedisirà direttamente al cliente per la sostituzione. Vi sono due categorie di parti CSR:

- **Obbligatorie** – Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.
- **Opzionali** – Parti la cui riparazione da parte del cliente è facultativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese addizionali a seconda del tipo di garanzia previsto per il prodotto.

**NOTA:** alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

In base alla disponibilità e alla località geografica, le parti CSR vengono spedite con consegna entro il giorno lavorativo seguente. La consegna nel giorno stesso o entro quattro ore è offerta con un supplemento di costo solo in alcune zone. In caso di necessità si può richiedere l'assistenza telefonica di un addetto del centro di supporto tecnico HP. Nel materiale fornito con una parte di ricambio CSR, HP specifica se il cliente deve restituire dei componenti. Qualora sia richiesta la resa ad HP del componente difettoso, lo si deve spedire ad HP entro un determinato periodo di tempo, generalmente cinque (5) giorni lavorativi. Il componente difettoso deve essere restituito con la documentazione associata nell'imballo di spedizione fornito. La mancata restituzione del componente può comportare la fatturazione del ricambio da parte di HP. Nel caso di riparazione da parte del cliente, HP sostiene tutte le spese di spedizione e resa e sceglie il corriere/vettore da utilizzare.

Per ulteriori informazioni sul programma CSR di HP contattare il centro di assistenza di zona. Per il programma in Nord America fare riferimento al sito Web HP (<http://www.hp.com/go/selfrepair>).

## Servizio di garanzia per i soli componenti

La garanzia limitata HP può includere un servizio di garanzia per i soli componenti. Nei termini di garanzia del servizio per i soli componenti, HP fornirà gratuitamente le parti di ricambio.

Per il servizio di garanzia per i soli componenti è obbligatoria la formula CSR che prevede la riparazione da parte del cliente. Se il cliente invece richiede la sostituzione ad HP, dovrà sostenere le spese di spedizione e di manodopera per il servizio.

## Customer Self Repair

HP Produkte enthalten viele CSR-Teile (Customer Self Repair), um Reparaturzeiten zu minimieren und höhere Flexibilität beim Austausch defekter Bauteile zu ermöglichen. Wenn HP (oder ein HP Servicepartner) bei der Diagnose feststellt, dass das Produkt mithilfe eines CSR-Teils repariert werden kann, sendet Ihnen HP dieses Bauteil zum Austausch direkt zu. CSR-Teile werden in zwei Kategorien unterteilt:

- **Zwingend** – Teile, für die das Customer Self Repair-Verfahren zwingend vorgegeben ist. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.
- **Optional** – Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

**HINWEIS:** Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No“ bzw. „Nein“ gekennzeichnet.

CSR-Teile werden abhängig von der Verfügbarkeit und vom Lieferziel am folgenden Geschäftstag geliefert. Für bestimmte Standorte ist eine Lieferung am selben Tag oder innerhalb von vier Stunden gegen einen Aufpreis verfügbar. Wenn Sie Hilfe benötigen, können Sie das HP technische Support Center



anrufen und sich von einem Mitarbeiter per Telefon helfen lassen. Den Materialien, die mit einem CSR-Ersatzteil geliefert werden, können Sie entnehmen, ob das defekte Teil an HP zurückgeschickt werden muss. Wenn es erforderlich ist, das defekte Teil an HP zurückzuschicken, müssen Sie dies innerhalb eines vorgegebenen Zeitraums tun, in der Regel innerhalb von fünf (5) Geschäftstagen. Das defekte Teil muss mit der zugehörigen Dokumentation in der Verpackung zurückgeschickt werden, die im Lieferumfang enthalten ist. Wenn Sie das defekte Teil nicht zurückschicken, kann HP Ihnen das Ersatzteil in Rechnung stellen. Im Falle von Customer Self Repair kommt HP für alle Kosten für die Lieferung und Rücksendung auf und bestimmt den Kurier-/Frachtdienst.

Weitere Informationen über das HP Customer Self Repair Programm erhalten Sie von Ihrem Servicepartner vor Ort. Informationen über das CSR-Programm in Nordamerika finden Sie auf der HP Website unter (<http://www.hp.com/go/selfrepair>).

## Parts-only Warranty Service (Garantieservice ausschließlich für Teile)

Ihre HP Garantie umfasst möglicherweise einen Parts-only Warranty Service (Garantieservice ausschließlich für Teile). Gemäß den Bestimmungen des Parts-only Warranty Service stellt HP Ersatzteile kostenlos zur Verfügung.

Für den Parts-only Warranty Service ist das CSR-Verfahren zwingend vorgegeben. Wenn Sie den Austausch dieser Teile von HP vornehmen lassen, werden Ihnen die Anfahrt- und Arbeitskosten für diesen Service berechnet.

## Reparaciones del propio cliente

Los productos de HP incluyen muchos componentes que el propio usuario puede reemplazar (*Customer Self Repair*, CSR) para minimizar el tiempo de reparación y ofrecer una mayor flexibilidad a la hora de realizar sustituciones de componentes defectuosos. Si, durante la fase de diagnóstico, HP (o los proveedores o socios de servicio de HP) identifica que una reparación puede llevarse a cabo mediante el uso de un componente CSR, HP le enviará dicho componente directamente para que realice su sustitución. Los componentes CSR se clasifican en dos categorías:

- **Obligatorio:** componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.
- **Opcional:** componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

**NOTA:** Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

Según la disponibilidad y la situación geográfica, los componentes CSR se enviarán para que lleguen a su destino al siguiente día laborable. Si la situación geográfica lo permite, se puede solicitar la entrega en el mismo día o en cuatro horas con un coste adicional. Si precisa asistencia técnica, puede llamar al

Centro de asistencia técnica de HP y recibirá ayuda telefónica por parte de un técnico. Con el envío de materiales para la sustitución de componentes CSR, HP especificará si los componentes defectuosos deberán devolverse a HP. En aquellos casos en los que sea necesario devolver algún componente a HP, deberá hacerlo en el periodo de tiempo especificado, normalmente cinco días laborables. Los componentes defectuosos deberán devolverse con toda la documentación relacionada y con el embalaje de envío. Si no enviara el componente defectuoso requerido, HP podrá cobrarle por el de sustitución. En el caso de todas sustituciones que lleve a cabo el cliente, HP se hará cargo de todos los gastos de envío y devolución de componentes y escogerá la empresa de transporte que se utilice para dicho servicio.

Para obtener más información acerca del programa de Reparaciones del propio cliente de HP, póngase en contacto con su proveedor de servicios local. Si está interesado en el programa para Norteamérica, visite la página web de HP siguiente (<http://www.hp.com/go/selfrepair>).

## Servicio de garantía exclusivo de componentes

La garantía limitada de HP puede que incluya un servicio de garantía exclusivo de componentes. Según las condiciones de este servicio exclusivo de componentes, HP le facilitará los componentes de repuesto sin cargo adicional alguno.

Para este servicio de garantía exclusivo de componentes, es obligatoria la sustitución de componentes por parte del usuario (CSR). Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

## Customer Self Repair

Veel onderdelen in HP producten zijn door de klant zelf te repareren, waardoor de reparatieduur tot een minimum beperkt kan blijven en de flexibiliteit in het vervangen van defecte onderdelen groter is. Deze onderdelen worden CSR-onderdelen (Customer Self Repair) genoemd. Als HP (of een HP Service Partner) bij de diagnose vaststelt dat de reparatie kan worden uitgevoerd met een CSR-onderdeel, verzendt HP dat onderdeel rechtstreeks naar u, zodat u het defecte onderdeel daarmee kunt vervangen. Er zijn twee categorieën CSR-onderdelen:

- **Verplicht:** Onderdelen waarvoor reparatie door de klant verplicht is. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.
- **Optioneel:** Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.

**OPMERKING:** Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievooraarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

Afhankelijk van de leverbaarheid en de locatie worden CSR-onderdelen verzonden voor levering op de eerstvolgende werkdag. Levering op dezelfde dag of binnen vier uur kan tegen meerkosten worden aangeboden, indien dit mogelijk is gezien de locatie. Indien assistentie gewenst is, belt u een HP Service Partner om via de telefoon technische ondersteuning te ontvangen. HP vermeldt in de documentatie bij het vervangende CSR-onderdeel of het defecte onderdeel aan HP moet worden geretourneerd. Als het defecte onderdeel aan HP moet worden teruggezonden, moet u het defecte onderdeel binnen een bepaalde

período, geralmente cinco (5) dias úteis, retornar ao HP. A peça defeituosa deve ser enviada com a documentação correspondente no material de transporte fornecido. Caso contrário, o HP poderá cobrar a reposição. Para as peças de reparo feito pelo cliente, o HP paga todas as despesas de transporte e de devolução da peça e determina a transportadora/serviço postal a ser utilizado.

Para obter mais informações sobre o programa de reparo feito pelo cliente da HP, entre em contato com o fornecedor de serviços local. Para o programa norte-americano, visite o site da HP (<http://www.hp.com/go/selfrepair>).

## Garantieservice "Parts Only"

Het is mogelijk dat de HP garantie alleen de garantieservice "Parts Only" omvat. Volgens de bepalingen van de Parts Only garantieservice zal HP kosteloos vervangende onderdelen ter beschikking stellen.

Voor de Parts Only garantieservice is vervanging door CSR-onderdelen verplicht. Als u HP verzoekt deze onderdelen voor u te vervangen, worden u voor deze service reiskosten en arbeidsloon in rekening gebracht.

## Reparo feito pelo cliente

Os produtos da HP são projetados com muitas peças para reparo feito pelo cliente (CSR) de modo a minimizar o tempo de reparo e permitir maior flexibilidade na substituição de peças com defeito. Se, durante o período de diagnóstico, a HP (ou fornecedores/parceiros de serviço da HP) concluir que o reparo pode ser efetuado pelo uso de uma peça CSR, a peça de reposição será enviada diretamente ao cliente. Existem duas categorias de peças CSR:

- **Obrigatória** – Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.
- **Opcional** – Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

**OBSERVAÇÃO:** Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

Conforme a disponibilidade e o local geográfico, as peças CSR serão enviadas no primeiro dia útil após o pedido. Onde as condições geográficas permitirem, a entrega no mesmo dia ou em quatro horas pode ser feita mediante uma taxa adicional. Se precisar de auxílio, entre em contato com o Centro de suporte técnico da HP para que um técnico o ajude por telefone. A HP especifica nos materiais fornecidos com a peça CSR de reposição se a peça com defeito deve ser devolvida à HP. Nos casos em que isso for necessário, é preciso enviar a peça com defeito à HP dentro do período determinado, normalmente cinco (5) dias úteis. A peça com defeito deve ser enviada com a documentação correspondente no material de transporte fornecido. Caso contrário, o HP poderá cobrar a reposição. Para as peças de reparo feito pelo cliente, a HP paga todas as despesas de transporte e de devolução da peça e determina a transportadora/serviço postal a ser utilizado.

Para obter mais informações sobre o programa de reparo feito pelo cliente da HP, entre em contato com o fornecedor de serviços local. Para o programa norte-americano, visite o site da HP (<http://www.hp.com/go/selfrepair>).

## Serviço de garantia apenas para peças

A garantia limitada da HP pode incluir um serviço de garantia apenas para peças. Segundo os termos do serviço de garantia apenas para peças, a HP fornece as peças de reposição sem cobrar nenhuma taxa.

No caso desse serviço, a substituição de peças CSR é obrigatória. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

## 顧客自己修理保証サービス

修理時間を短縮し、故障部品の交換における高い柔軟性を確保するために、HP製品には多数の顧客自己修理（CSR）部品があります。診断の際に、CSR部品を使用すれば修理ができるとHP（HPまたはHP正規保守代理店）が判断した場合、HPはその部品を直接、お客様に発送し、お客様に交換していただきます。CSR部品には以下の2通りがあります。

- 必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。
- 任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、別途費用を負担していただくことなく保証サービスを受けることができます。

注： HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

部品供給が可能な場合、地域によっては、CSR部品を翌営業日に届くように発送します。また、地域によっては、追加費用を負担いただくことにより同日または4時間以内に届くように発送することも可能な場合があります。サポートが必要なときは、HPの修理受付窓口に電話していただければ、技術者が電話でアドバイスします。交換用のCSR部品または同梱物には、故障部品をHPに返送する必要があるかどうかが表示されています。故障部品をHPに返送する必要がある場合は、指定期限内（通常は5営業日以内）に故障部品をHPに返送してください。故障部品を返送する場合は、届いた時の梱包箱に関連書類とともに入れてください。故障部品を返送しない場合、HPから部品費用が請求されます。顧客自己修理の際には、HPは送料および部品返送費を全額負担し、使用する宅配便会社や運送会社を指定します。

## 部品のみ保証サービス

HP保証サービスには、部品のみ保証サービスが適用される場合があります。このサービスでは、交換部品は無償で提供されます。

部品のみ保証サービスにおいては、CSR部品をお客様により交換作業していただくことが必須となります。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費はお客様の負担となります。

# 客户自行维修

HP 产品提供许多客户自行维修 (CSR) 部件，以尽可能缩短维修时间和在更换缺陷部件方面提供更大的灵活性。如果在诊断期间 HP (或 HP 服务提供商或服务合作伙伴) 确定可以通过使用 CSR 部件完成维修，HP 将直接把该部件发送给您进行更换。有两类 CSR 部件：

- **强制性的** — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。
- **可选的** — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据为您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

**注：**某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

CSR 部件将在下一个工作日发运 (取决于备货情况和允许的地理范围)。在允许的地理范围内，可在当天或四小时内发运，但要收取额外费用。如果需要帮助，您可以致电 HP 技术支持中心，将会有技术人员通过电话为您提供帮助。HP 会在随更换的 CSR 部件发运的材料中指明是否必须将有缺陷的部件返还给 HP。如果要求您将缺陷的部件返还给 HP，那么您必须在规定期限内 (通常是五 (5) 个工作日) 将缺陷部件发给 HP。有缺陷的部件必须随所提供的发运材料中的相关文件一起返还。如果未能送还有缺陷的部件，HP 可能会要求您支付更换费用。客户自行维修时，HP 将承担所有相关运输和部件返回费用，并指定快递商/承运商。

有关 HP 客户自行维修计划的详细信息，请与您当地的服务提供商联系。有关北美地区的计划，请访问 HP 网站 (<http://www.hp.com/go/selfrepair>)。

## 仅部件保修服务

您的 HP 有限保修服务可能涉及仅部件保修服务。根据仅部件保修服务条款的规定，HP 将免费提供更换的部件。

仅部件保修服务要求进行 CSR 部件更换。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

# 客戶自行維修

HP 產品設計了許多「客戶自行維修」(CSR) 的零件以減少維修時間，並且使得更換瑕疵零件時能有更大的彈性。如果在診斷期間 HP (或 HP 服務供應商或維修夥伴) 辨認出此項維修工作可以藉由使用 CSR 零件來完成，則 HP 將直接寄送該零件給您作更換。CSR 零件分為兩種類別：

- **強制的** — 客戶自行維修所使用的零件是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。
- **選購的** — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

**備註：**某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

基於材料取得及環境允許的情況下，CSR 零件將於下一個工作日以快遞寄送。在環境的允許下當天或四小時內送達，則可能需要額外的費用。若您需要協助，可致電「HP 技術支援中心」，會有一位技術人員透過電話來協助您。不論損壞的零件是否必須退回，HP 皆會在與 CSR 替換零件一起運送的材料中註明。若要將損壞的零件退回 HP，您必須在指定的一段時間內（通常為五 (5) 個工作天），將損壞的零件寄回 HP。損壞的零件必須與寄送資料中隨附的相關技術文件一併退還。如果無法退還損壞的零件，HP 可能要向您收取替換費用。針對客戶自行維修情形，HP 將負責所有運費及零件退還費用並指定使用何家快遞/貨運公司。

如需 HP 的「客戶自行維修」方案詳細資訊，請連絡您當地的服務供應商。至於北美方案，請參閱 HP 網站 (<http://www.hp.com/go/selfrepair>)。

## 僅限零件的保固服務

您的「HP 有限保固」可能包含僅限零件的保固服務。在僅限零件的保固服務情況下，HP 將免費提供替換零件。

針對僅限零件的保固服務，CSR 零件替換是強制性的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

## 고객 셀프 수리

HP 제품은 수리 시간을 최소화하고 결함이 있는 부품 교체 시 더욱 융통성을 발휘할 수 있도록 하기 위해 고객 셀프 수리(CSR) 부품을 다량 사용하여 설계되었습니다. 진단 기간 동안 HP(또는 HP 서비스 공급업체 또는 서비스 협력업체)에서 CSR 부품을 사용하여 수리가 가능하다고 판단되면 HP는 해당 부품을 바로 사용자에게 보내어 사용자가 교체할 수 있도록 합니다. CSR 부품에는 두 가지 종류가 있습니다.

- **고객 셀프 수리가 의무 사항인 필수 부품.** 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.
- **고객 셀프 수리가 선택 사항인 부품.** 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

**참고:** 일부 HP 부품은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 만족스러운 고객 보증을 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다. 이러한 부품들은 Illustrated Parts Catalog에 "No"라고 표시되어 있습니다.

CSR 부품은 재고 상태와 지리적 조건이 허용하는 경우 다음 영업일 납품이 가능하도록 배송이 이루어집니다. 지리적 조건이 허용하는 경우 추가 비용이 청구되는 조건으로 당일 또는 4시간 배송이 가능할 수도 있습니다. 도움이 필요하시면 HP 기술 지원 센터로 전화하십시오. 전문 기술자가 전화로 도움을 줄 것입니다. HP는 결함이 발생한 부품을 HP로 반환해야 하는지 여부를 CSR 교체 부품과 함께 배송된 자료에 지정합니다. 결함이 발생한 부품을 HP로 반환해야 하는 경우에는 지정된 기간 내(통상 영업일 기준 5일)에 HP로 반환해야 합니다. 이 때 결함이 발생한 부품은 제공된 포장 재료에 넣어 관련 설명서와 함께 반환해야 합니다. 결함이 발생한 부품을 반환하지 않는 경우 HP가 교체 부품에 대해 비용을 청구할 수 있습니다. 고객 셀프 수리의 경우, HP는 모든 운송 및 부품 반환 비용을 부담하며 이용할 운송업체 및 택배 서비스를 결정합니다.

HP 고객 셀프 수리 프로그램에 대한 자세한 내용은 가까운 서비스 제공업체에 문의하십시오. 북미 지역의 프로그램에 대해서는 HP 웹 사이트(<http://www.hp.com/go/selfrepair>)를 참조하십시오.

## 부품 제공 보증 서비스

HP 제한 보증에는 부품 제공 보증 서비스가 포함될 수 있습니다. 이러한 경우 HP는 부품 제공 보증 서비스의 조건에 따라 교체 부품만을 무료로 제공합니다.

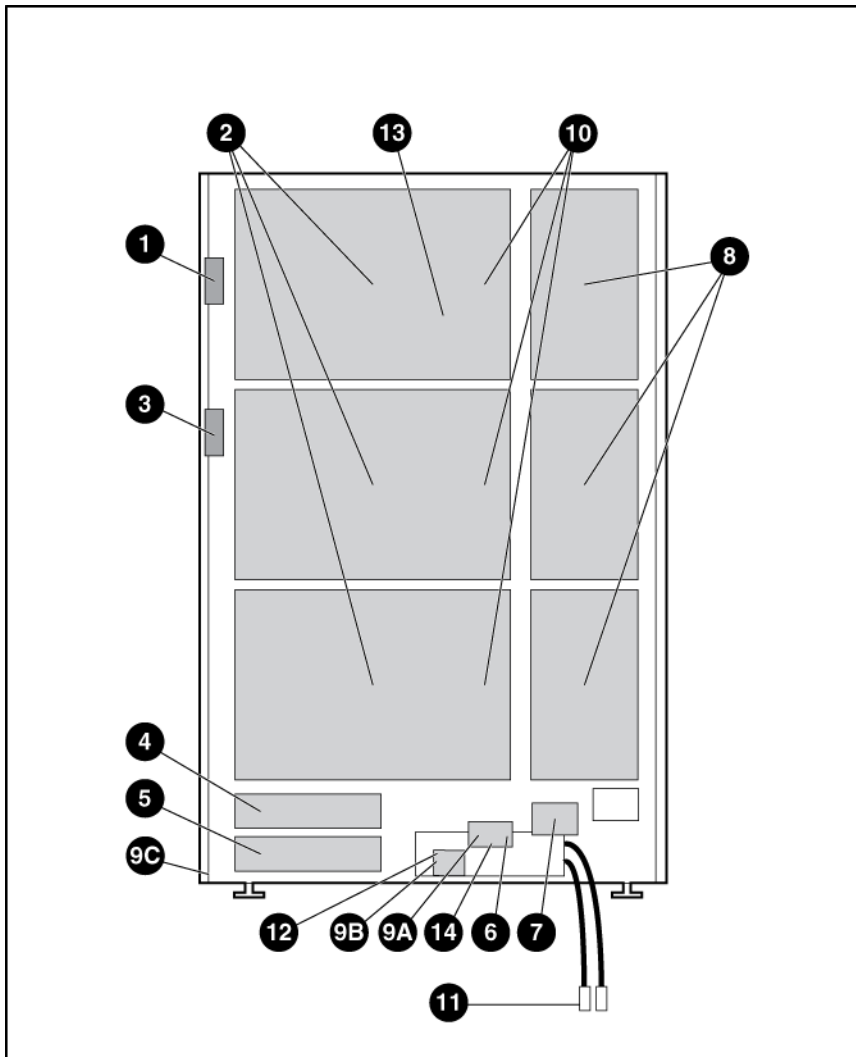
부품 제공 보증 서비스 제공 시 CSR 부품 교체는 의무 사항입니다. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.



# Illustrated parts catalog

## Replaceable spare parts

The replaceable spare parts for the HP Modular Cooling System are listed in the following table.



Item	Description	Spare part number	Customer self repair
1	SPS-DISPLAY, OPERATOR ("Operator display" on page 88)	395774-001	Optional <sup>2</sup>
2	SPS-HEAT EXCHANGER ("Heat exchanger unit (HEX) with coupler" on page 59)	395776-001	Optional <sup>2</sup>
3	SPS-MCS, MGMT, MODULE ("Management module" on page 85)	395772-001	Optional <sup>2</sup>

Item	Description	Spare part number	Customer self repair
4	SPS-TRANSFER SWITCH ("AC transfer switch" on page 26)	395773-001	Optional <sup>2</sup>
5	SPS-CONTROLLER, WATER ("Water group controller" on page 97)	395771-001	Optional <sup>2</sup>
6	SPS-SOLENOID, MAGNETIC VALVE ("Magnetic solenoid valve" on page 82)	399037-001	Optional <sup>2</sup>
7	SPS-CONDENSATE, PUMP & SENSORS ("Condensation pump and sensors" on page 47)	395775-001	Optional <sup>2</sup>
8	SPS-FAN, MAIN ("Fan unit" on page 50)	395777-001	Optional <sup>2</sup>
9	SPS-HARDWARE KIT, MISC ("Miscellaneous hardware kit overview" on page 113)	407165-001	No <sup>3</sup>
	9A) Magnetic valve diaphragm and spring	—	—
	9B) Flow meter	—	—
	9C) Gasket*	—	—
10	SPS-COUPLING, MCS, HEX ("HEX coupling" on page 77)	444000-001	Optional <sup>2</sup>
11	SPS-COUPLING, MCS, INLET ("Water inlet coupling" on page 102)	444001-001	Optional <sup>2</sup>
12	SPS-KIT, FLOW METER, REPAIR ("Flow meter sensor" on page 54)	441821-001	Optional <sup>2</sup>
13	SPS-VALVE, AIR BLEEDER ("Air bleeder valve" on page 31)	446971-001	Optional <sup>2</sup>
14	SPS-SENSORS, TEMP, INLET/OUTLET ("Water temperature sensor" on page 107)	446970-001	Optional <sup>2</sup>
**	SPS-KIT, DOOR RELEASE, AUTOMATIC ("Automatic door release" on page 38)	441822-001	Optional <sup>2</sup>

\* Removal and replacement instructions are not included in this document.

\*\* Not shown

<sup>1</sup>Mandatory—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.

<sup>2</sup>Optional—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

<sup>3</sup>No—Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

<sup>1</sup>Mandatory: Obligatoire—Pièces pour lesquelles la réparation par le client est obligatoire. Si vous demandez à HP de remplacer ces pièces, les coûts de déplacement et main d'œuvre du service vous seront facturés.

<sup>2</sup>Optional: Facultatif—Pièces pour lesquelles la réparation par le client est facultative. Ces pièces sont également conçues pour permettre au client d'effectuer lui-même la réparation. Toutefois, si vous demandez à HP de remplacer ces pièces, l'intervention peut ou non vous être facturée, selon le type de garantie applicable à votre produit.

<sup>3</sup>No: Non—Certaines pièces HP ne sont pas conçues pour permettre au client d'effectuer lui-même la réparation. Pour que la garantie puisse s'appliquer, HP exige que le remplacement de la pièce soit effectué par un Mainteneur Agréé. Ces pièces sont identifiées par la mention "Non" dans le Catalogue illustré.

<sup>1</sup>Mandatory: Obbligatorie—Parti che devono essere necessariamente riparate dal cliente. Se il cliente ne affida la riparazione ad HP, deve sostenere le spese di spedizione e di manodopera per il servizio.

<sup>2</sup>Optional: Opzionali—Parti la cui riparazione da parte del cliente è facoltativa. Si tratta comunque di componenti progettati per questo scopo. Se tuttavia il cliente ne richiede la sostituzione ad HP, potrebbe dover sostenere spese aggiuntive a seconda del tipo di garanzia previsto per il prodotto.

<sup>3</sup>No: Non CSR—Alcuni componenti HP non sono progettati per la riparazione da parte del cliente. Per rispettare la garanzia, HP richiede che queste parti siano sostituite da un centro di assistenza autorizzato. Tali parti sono identificate da un "No" nel Catalogo illustrato dei componenti.

<sup>1</sup>Mandatory: Zwingend—Teile, die im Rahmen des Customer Self Repair Programms ersetzt werden müssen. Wenn Sie diese Teile von HP ersetzen lassen, werden Ihnen die Versand- und Arbeitskosten für diesen Service berechnet.

<sup>2</sup>Optional: Optional—Teile, für die das Customer Self Repair-Verfahren optional ist. Diese Teile sind auch für Customer Self Repair ausgelegt. Wenn Sie jedoch den Austausch dieser Teile von HP vornehmen lassen möchten, können bei diesem Service je nach den für Ihr Produkt vorgesehenen Garantiebedingungen zusätzliche Kosten anfallen.

<sup>3</sup>No: Kein—Einige Teile sind nicht für Customer Self Repair ausgelegt. Um den Garantieanspruch des Kunden zu erfüllen, muss das Teil von einem HP Servicepartner ersetzt werden. Im illustrierten Teilekatalog sind diese Teile mit „No“ bzw. „Nein“ gekennzeichnet.

<sup>1</sup>Mandatory: Obligatorio—componentes para los que la reparación por parte del usuario es obligatoria. Si solicita a HP que realice la sustitución de estos componentes, tendrá que hacerse cargo de los gastos de desplazamiento y de mano de obra de dicho servicio.

<sup>2</sup>Optional: Opcional— componentes para los que la reparación por parte del usuario es opcional. Estos componentes también están diseñados para que puedan ser reparados por el usuario. Sin embargo, si precisa que HP realice su sustitución, puede o no conllevar costes adicionales, dependiendo del tipo de servicio de garantía correspondiente al producto.

<sup>3</sup>No: No—Algunos componentes no están diseñados para que puedan ser reparados por el usuario. Para que el usuario haga valer su garantía, HP pone como condición que un proveedor de servicios autorizado realice la sustitución de estos componentes. Dichos componentes se identifican con la palabra "No" en el catálogo ilustrado de componentes.

<sup>1</sup>Mandatory: Verplicht—Onderdelen waarvoor Customer Self Repair verplicht is. Als u HP verzoekt deze onderdelen te vervangen, komen de reiskosten en het arbeidsloon voor uw rekening.

<sup>2</sup>Optional: Optioneel—Onderdelen waarvoor reparatie door de klant optioneel is. Ook deze onderdelen zijn ontworpen voor reparatie door de klant. Als u echter HP verzoekt deze onderdelen voor u te vervangen, kunnen daarvoor extra kosten in rekening worden gebracht, afhankelijk van het type garantieservice voor het product.

<sup>3</sup>No: Nee—Sommige HP onderdelen zijn niet ontwikkeld voor reparatie door de klant. In verband met de garantievoorwaarden moet het onderdeel door een geautoriseerde Service Partner worden vervangen. Deze onderdelen worden in de geïllustreerde onderdelencatalogus aangemerkt met "Nee".

<sup>1</sup>Mandatory: Obrigatória—Peças cujo reparo feito pelo cliente é obrigatório. Se desejar que a HP substitua essas peças, serão cobradas as despesas de transporte e mão-de-obra do serviço.

<sup>2</sup>Optional: Opcional—Peças cujo reparo feito pelo cliente é opcional. Essas peças também são projetadas para o reparo feito pelo cliente. No entanto, se desejar que a HP as substitua, pode haver ou não a cobrança de taxa adicional, dependendo do tipo de serviço de garantia destinado ao produto.

<sup>3</sup>No: Nenhuma—Algumas peças da HP não são projetadas para o reparo feito pelo cliente. A fim de cumprir a garantia do cliente, a HP exige que um técnico autorizado substitua a peça. Essas peças estão identificadas com a marca "No" (Não), no catálogo de peças ilustrado.

<sup>1</sup>Mandatory: 必須 - 顧客自己修理が必須の部品。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、その修理サービスに関する交通費および人件費がお客様に請求されます。

<sup>2</sup>Optional: 任意 - 顧客自己修理が任意である部品。この部品も顧客自己修理用です。当該部品について、もしもお客様がHPに交換作業を依頼される場合には、お買い上げの製品に適用される保証サービス内容の範囲内においては、費用を負担していただくことなく保証サービスを受けることができます。

<sup>3</sup>No: 除外 - HP製品の一部の部品は、顧客自己修理用ではありません。製品の保証を継続するためには、HPまたはHP正規保守代理店による交換作業が必須となります。部品カタログには、当該部品が顧客自己修理除外品である旨が記載されています。

<sup>1</sup>Mandatory: 强制性的 — 要求客户必须自行维修的部件。如果您请求 HP 更换这些部件，则必须为该服务支付差旅费和人工费用。

<sup>2</sup>Optional: 可选的 — 客户可以选择是否自行维修的部件。这些部件也是为客户自行维修设计的。不过，如果您要求 HP 为您更换这些部件，则根据您的产品指定的保修服务类型，HP 可能收取或不再收取任何附加费用。

<sup>3</sup>No: 否 — 某些 HP 部件的设计并未考虑客户自行维修。为了满足客户保修的需要，HP 要求授权服务提供商更换相关部件。这些部件在部件图解目录中标记为“否”。

<sup>1</sup>Mandatory: 強制的 — 客戶自行維修所使用的零件是強制的。如果您要求 HP 更換這些零件，HP 將會向您收取此服務所需的外出費用與勞動成本。

<sup>2</sup>Optional: 選購的 — 客戶自行維修所使用的零件是選購的。這些零件也設計用於客戶自行維修之用。不過，如果您要求 HP 為您更換，則可能需要也可能不需要負擔額外的費用，端視針對此產品指定的保固服務類型而定。

<sup>3</sup>No: 否 — 某些 HP 零件沒有消費者可自行維修的設計。為符合客戶保固，HP 需要授權的服務供應商更換零件。這些零件在圖示的零件目錄中，被標示為「否」。

<sup>1</sup> Mandatory: 필수 — 고객 셀프 수리가 의무 사항인 필수 부품. 사용자가 HP에 이 부품의 교체를 요청할 경우 이 서비스에 대한 출장비 및 작업비가 청구됩니다.

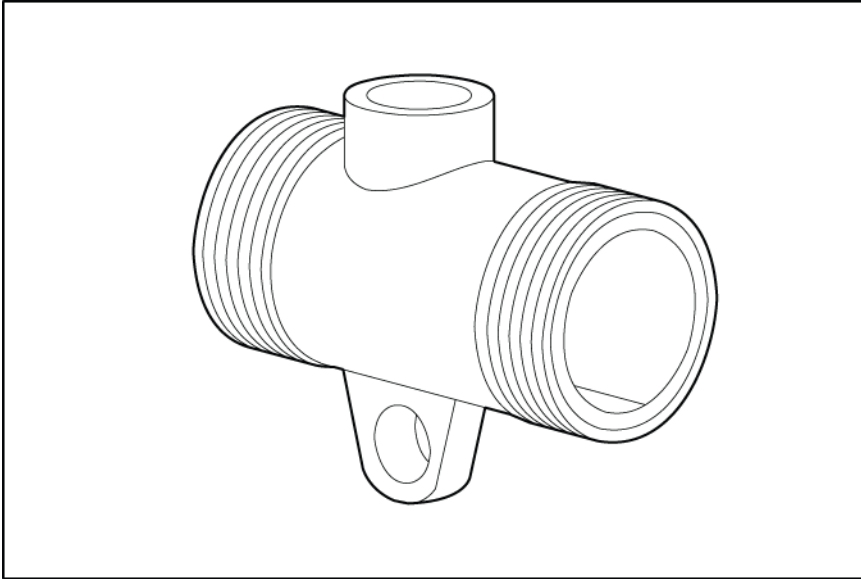
<sup>2</sup> Optional: 옵션 — 고객 셀프 수리가 선택 사항인 부품. 이 부품들도 고객 셀프 수리가 가능하도록 설계되었습니다. 하지만 사용자가 HP에 이 부품의 교체를 요청할 경우 사용자가 구입한 제품에 해당하는 보증 서비스 유형에 따라 추가 비용 없이 교체가 가능할 수 있습니다.

<sup>3</sup> No: No — 고객 셀프 수리가 불가능하도록 설계된 HP 부품. 이 부품들은 고객 셀프 수리가 불가능하도록 설계되었습니다. HP는 고객 보증을 만족시키기 위해 공인 서비스 제공업체를 통해 부품을 교체하도록 하고 있습니다.

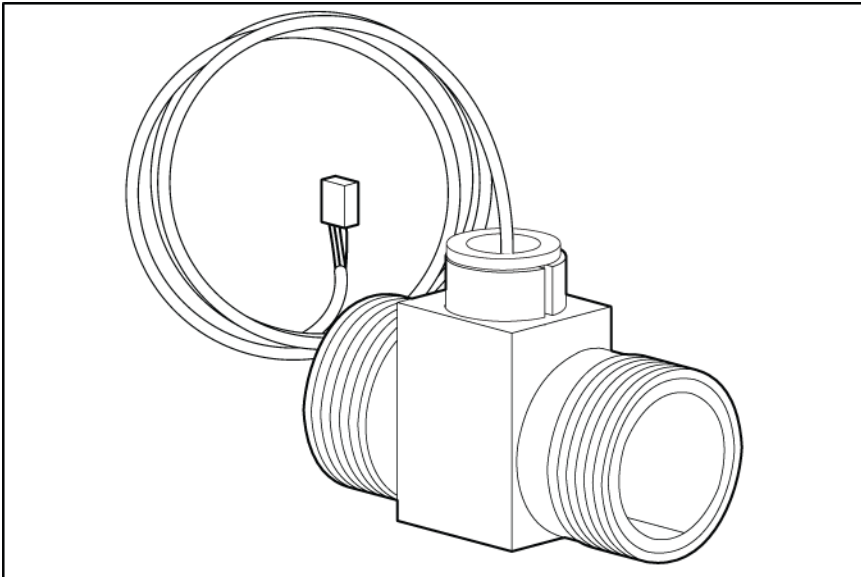
## Flow meter repair

There are two different flow meter types, depending on your MCS model. You should be able to discern which type you have, based on the label on the rear door of your MCS unit.

The Type 1 flow meter has a round body, and is no longer used in current MCS models.



The Type 2 flow meter has a square body and ships installed in all current MCS models.



There are two scenarios when repairing your flow meter:

- You currently have a Type 1 flow meter that you will remove and replace with a Type 2 flow meter. For this type of repair, you will order the Miscellaneous Hardware Kit and have a trained technician complete your repair.
- or-
- You have a Type 2 flow meter and will remove and replace the flow meter paddle-wheel sensor at the top of your flow meter. For this type of repair, you will order the Flow Meter Paddle-Wheel Sensor Kit and can complete the repair yourself.

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# Removal and replacement procedures

## Removal and replacement procedure overview

This section provides guidance for removing and replacing the HP Modular Cooling System (MCS) spare parts.

Follow the instructions carefully to ensure proper installation of the new spare part.



**IMPORTANT:** As you are removing the HP Modular Cooling System components, be sure to retain the screws in a safe place and separate them according to their type.

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## Viewing the spare replacement video

Because of the difficulty of removing and replacing spare parts, HP recommends watching the HP Modular Cooling System Spare Replacement video. This video provides further explanation and detail of replacement strategies and techniques that might be helpful when attempting to remove and replace spare parts. You can access the video on the HP website (<http://www.hp.com/go/mcs>).

1. Select **HP Modular Cooling System**.
2. Under Related Links, select **HP Support and Drivers**.
3. Select **HP Modular Cooling System**.
4. Under Resources for Modular Cooling System, select **Customer self repair steps (videos/animations)**.
5. Select **Remove/Replace Videos**.
6. Select the appropriate spare part from the list on the left-hand side.

## Customer self repair required tools

The following tools are required for each spares kit removal and replacement procedures:

- **AC transfer switch**
  - T-25 Torx driver
  - Small Flathead screwdriver
- **Air bleeder valve**
  - T-25 Torx driver
  - Pliers
  - Water hose fitting wrench (included with your original MCS unit)
  - Counter hold wrench (included with your original MCS unit)
- **Automatic door release**
  - 3-mm Allen wrench

- T-25 Torx driver
- Wire cutters
- **Condensation pump and sensors**
  - T-25 Torx driver
  - Phillips screwdriver
- **Fan unit**
  - T-25 Torx driver
- **Flow meter paddle-wheel sensor**
  - T-25 Torx driver
  - Wire cutters
  - Water hose fitting wrench (included with your original MCS unit)
  - Counter hold wrench (included with your original MCS unit)
- **Heat exchanger unit (HEX) with coupler**
  - T-25 Torx driver
  - Water hose fitting wrench (included with your original MCS unit)
  - Counter hold wrench (included with your original MCS unit)
- **Heat exchanger unit (HEX) with ball valves**
  - Adjustable wrench or pipe wrench
  - T-25 Torx driver
- **HEX coupling**
  - T-25 Torx driver
  - Water hose fitting wrench (included with your original MCS unit)
  - Counter hold wrench (included with your original MCS unit)
  - Flathead screwdriver
  - Utility knife
- **Magnetic solenoid valve**
  - T-25 Torx driver
  - Phillips screwdriver
- **Management module**
  - No tools are required for this procedure.
- **Operator display**
  - 8-mm socket
  - Small Flathead screwdriver
- **Water group controller**
  - T-25 Torx driver
  - Flathead screwdriver
  - 8-mm socket
- **Water inlet coupling**

- 5-mm Allen wrench
- **Water temperature sensor**
  - T-25 Torx driver
  - Phillips screwdriver
  - (2) 18-mm wrench
  - Wire cutters

## Safety considerations

Before performing service procedures, review the following safety information.

### Rack warnings and cautions

Before installing a spare kit, be sure that you understand the following warnings and cautions.



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**WARNING:** You must follow the removal and replacement instructions listed in the site preparation guide, the user guide, and the maintenance and service guide. Failure to follow the instructions listed in these guides can void your warranty and service contract.

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**WARNING:** To reduce the risk of electric shock or damage to the equipment, use extreme caution when removing and replacing components that involve water around the electrical wires and unsecured power inlet box. There is great risk of electrical shock when water is used near electricity.

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**IMPORTANT:** To reduce the risk of the servers overheating, open all of the rack doors of each rack attached to the MCS unit while completing the following procedures in order to increase air flow within the rack.

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**IMPORTANT:** While the most important cautions and warnings have been included in this document, consult the site preparation guide and the user guide provided with the original unit for a complete list of cautions and warnings.

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## Preparation procedures

Before you perform certain service procedures, perform one or both of the following procedures.

### Powering down the MCS unit

1. Open the front MCS door.
2. Turn off the AC1 and AC2 breakers on the AC transfer switch.
3. Open the rear MCS door.

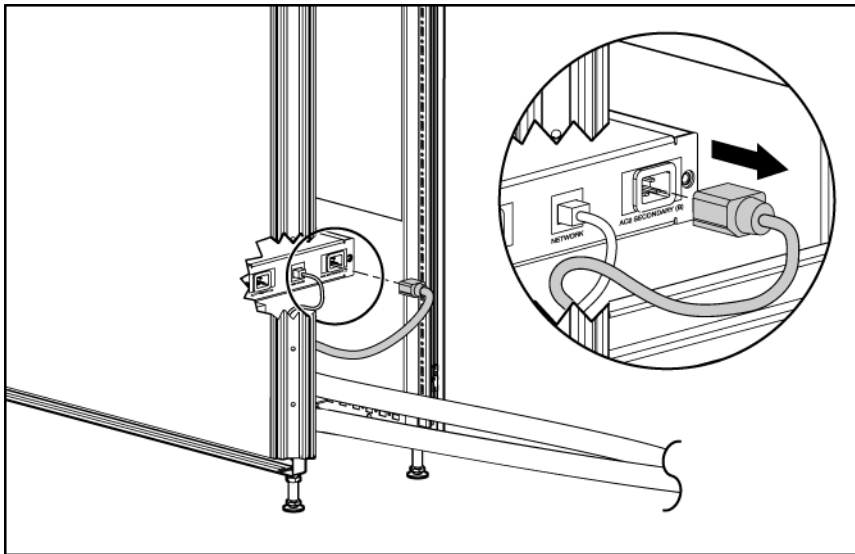




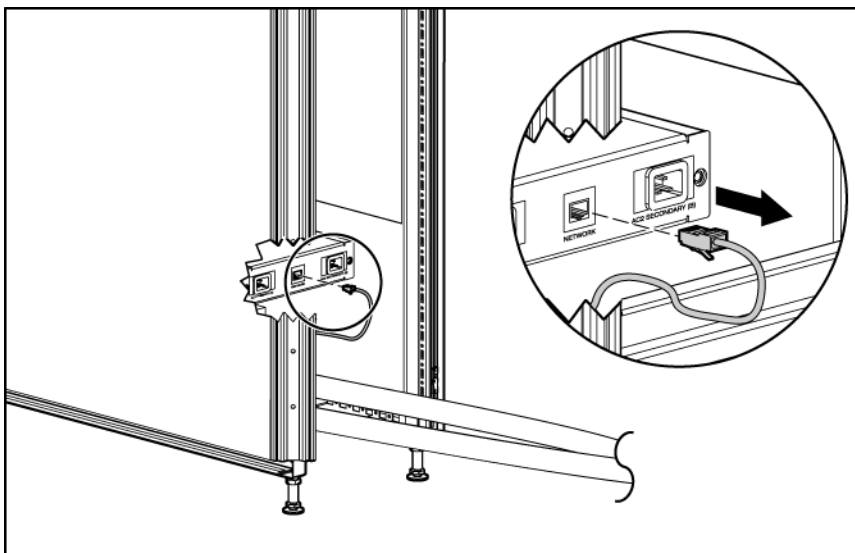
**WARNING:** To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the storage system.

4. Disconnect the two AC power cables from the power connectors, labeled Primary and Secondary, on the power inlet box.



5. Disconnect the network cable from the RJ-45 connector on the power inlet box.



## Shutting off the water

1. Shut off the water flowing into the MCS unit at the facility-side shut-off valve.

2. Confirm that no water is flowing into the MCS unit.

## AC transfer switch

The AC transfer switch is located at the bottom front of the MCS unit.

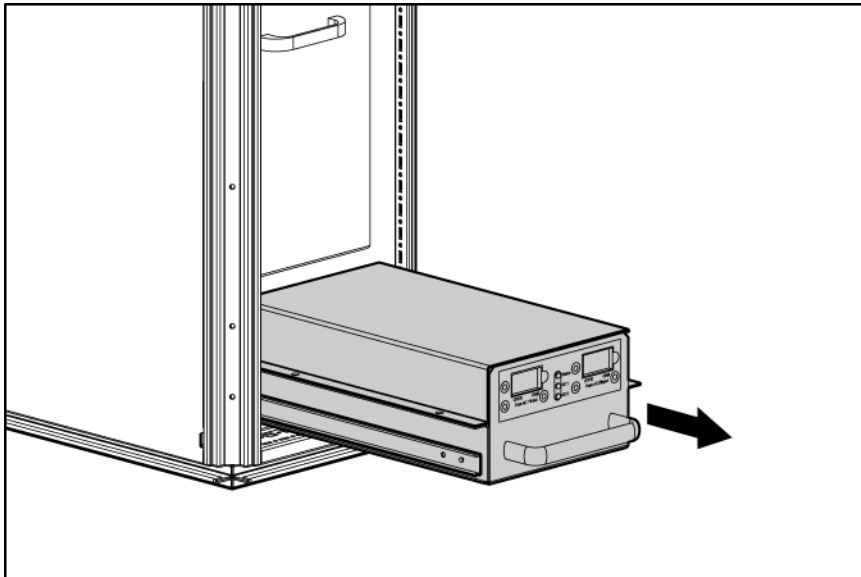


The following tools are required for installation:

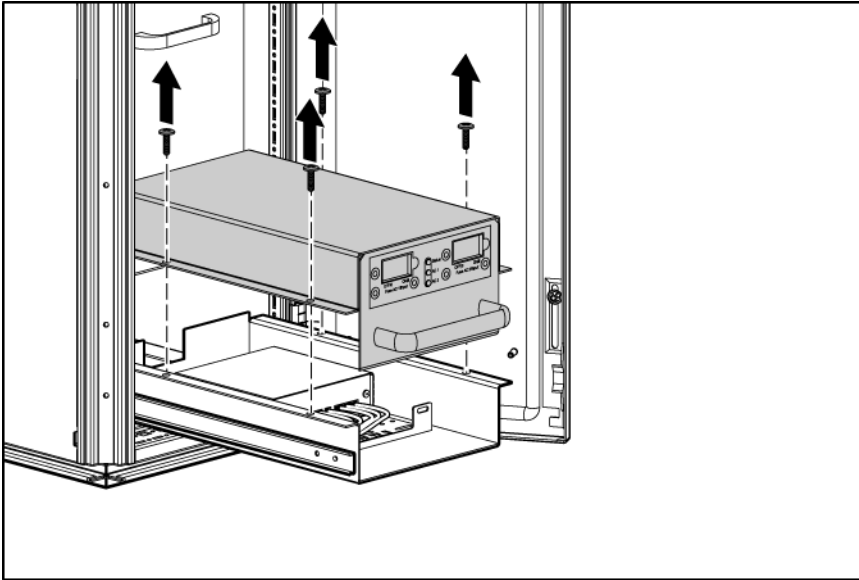
- T-25 Torx driver
- Small Flathead screwdriver

## Removing the AC transfer switch

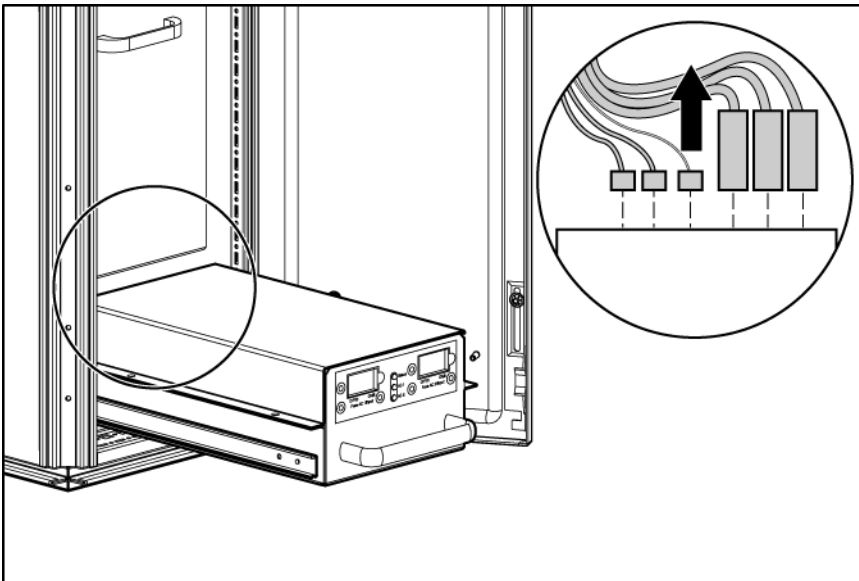
1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).
2. Open the front MCS door.
3. Slide the metal AC transfer switch box out toward you on the sliding rails.



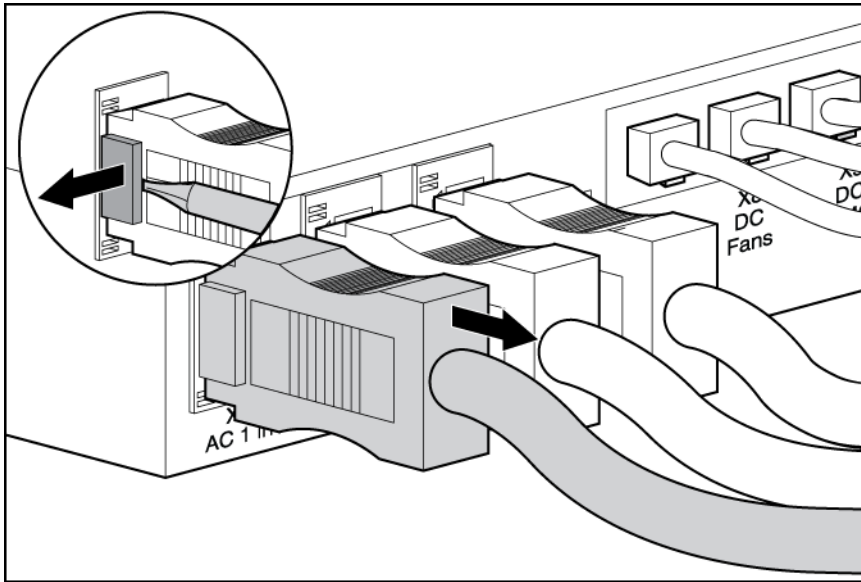
- Using a T-25 Torx driver, remove the four Torx screws securing the AC transfer switch chassis to the water group controller chassis. The transfer switch chassis cannot be completely removed yet because the cables are still connected.



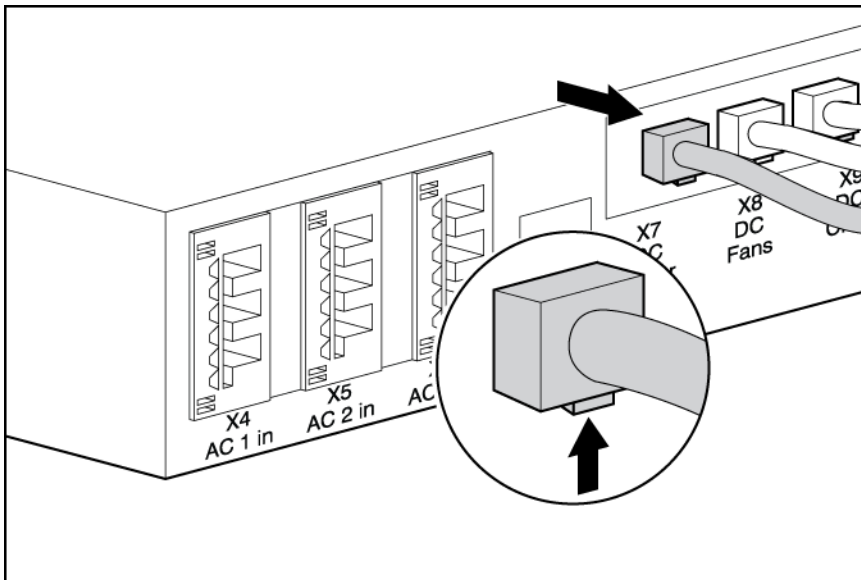
- Disconnect the green and yellow ground bonding wires from the water group controller.
- Disconnect the electrical power cables from the rear of the AC transfer switch.



- a. Disconnect the three large cables, starting from the left and moving to the right, by inserting a small flathead screwdriver in between the cable connection and the latch, and pulling the cable out from the connector.



- b. Disconnect the three small cables, starting from the left and moving to the right, by pressing the small tab on the bottom of each small cable and pulling it out from the connector.



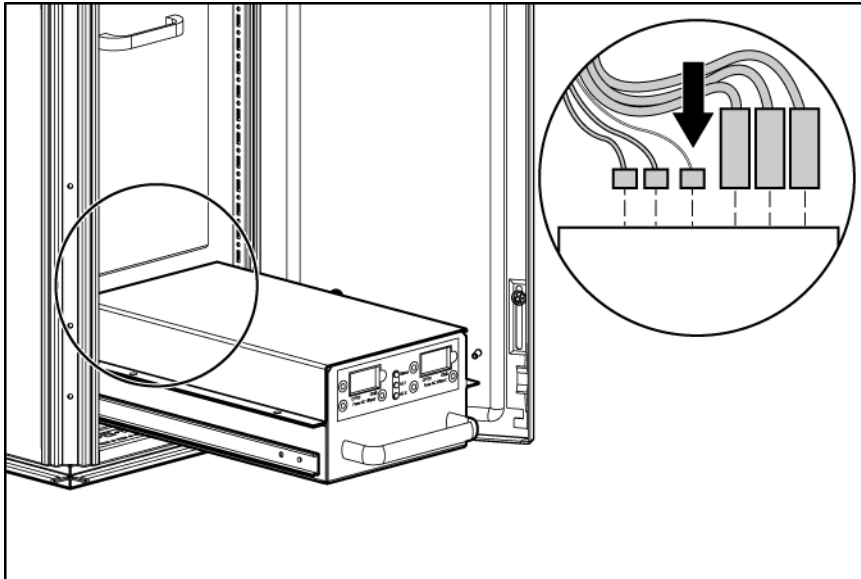
After you have disconnected all of the cables, the transfer switch chassis is free from restraint and can be removed from the water group controller chassis.

To replace this component, see "Replacing the AC transfer switch (on page 28)."

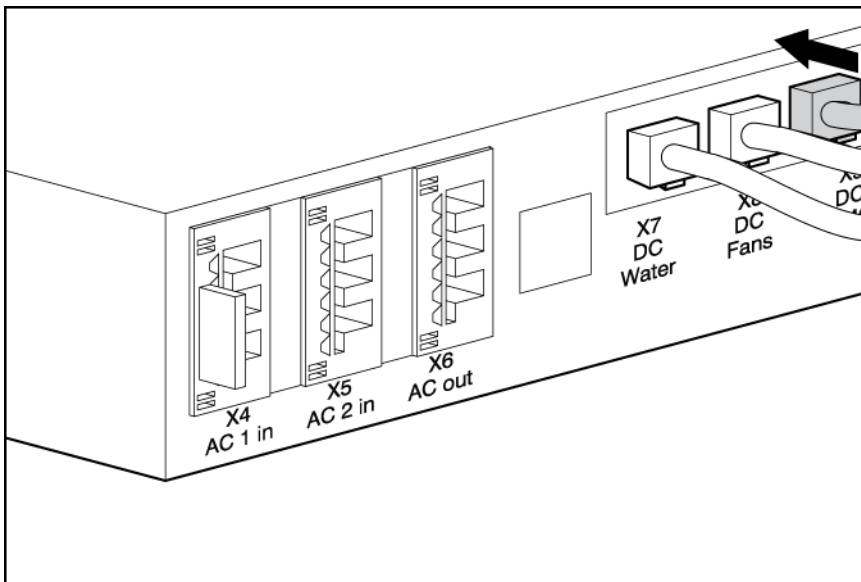
## Replacing the AC transfer switch

1. Connect the green and yellow ground bonding wires to the water group controller.

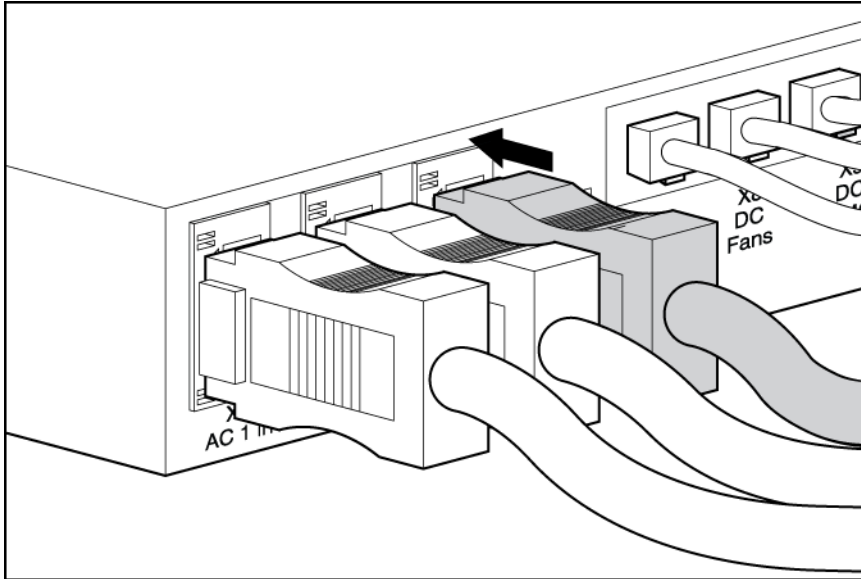
2. Connect the electrical power cables from the MCS unit to the AC transfer switch.



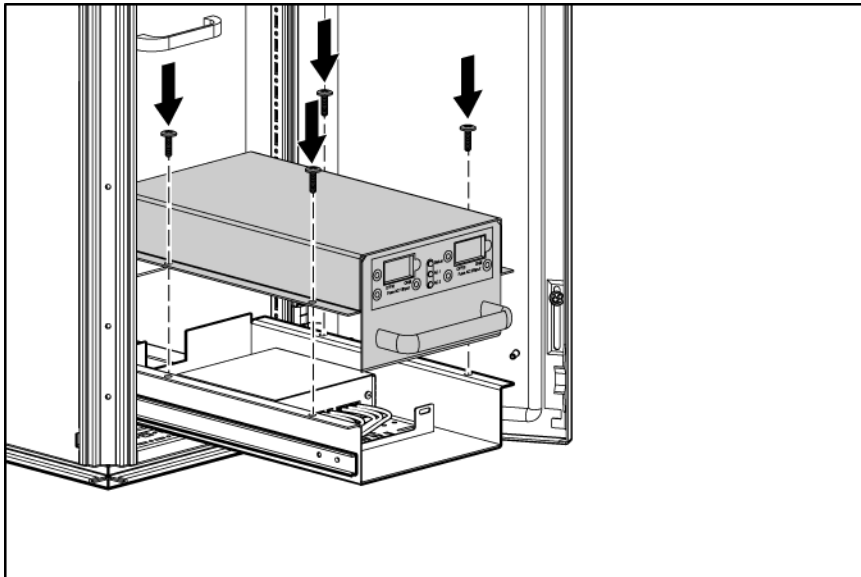
- a. Connect the three small cables, starting from the right and moving to the left, by pressing the tab on the bottom of each cable and pushing it into the connector.



- b. Connect the three large cables, starting from the right and moving to the left, by pushing the cable into the connector.

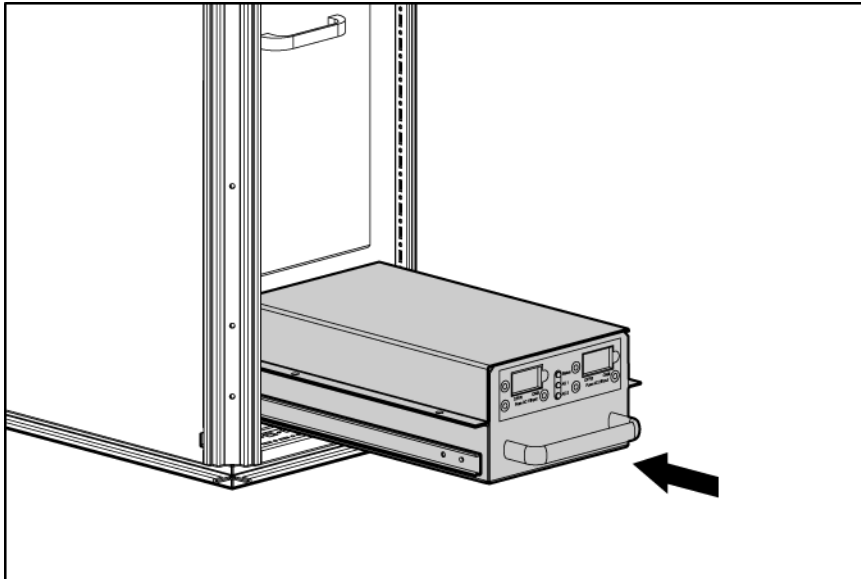


3. Using a T-25 Torx driver, secure the AC transfer switch chassis to the water group controller chassis by inserting four Torx screws.



**CAUTION:** To prevent damage to the cables and ensure proper fit of the transfer switch chassis, be sure to route all cables through the U-shaped opening in the rear of the chassis.

4. Slide the metal AC transfer switch box back into the MCS unit on the sliding rails.



5. Complete the operation checklist (on page 111).

## Air bleeder valve

The air bleeder valve is located inside the MCS unit, centered at the top of the unit.



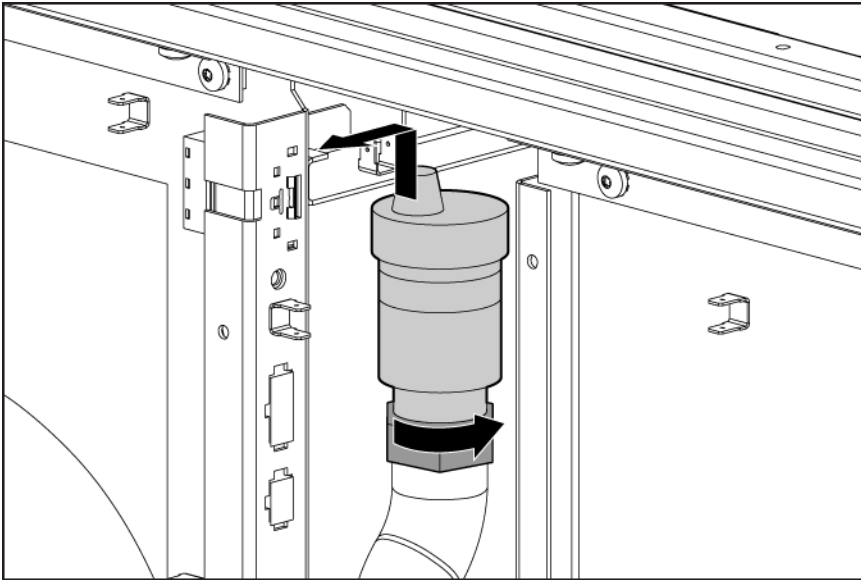
The following tools are required for installation:

- T-25 Torx driver
- Pliers
- Water hose fitting wrench (included with your original MCS unit)
- Counter hold wrench (included with your original MCS unit)

## Removing the air bleeder valve

1. Shut off the water flowing into the MCS unit. ("[Shutting off the water](#)" on page 25)
2. Remove the top fan unit. ("[Removing the fan unit](#)" on page 51)
3. Remove the top heat exchanger unit. ("[Removing the heat exchanger unit with couplers](#)" on page 59)

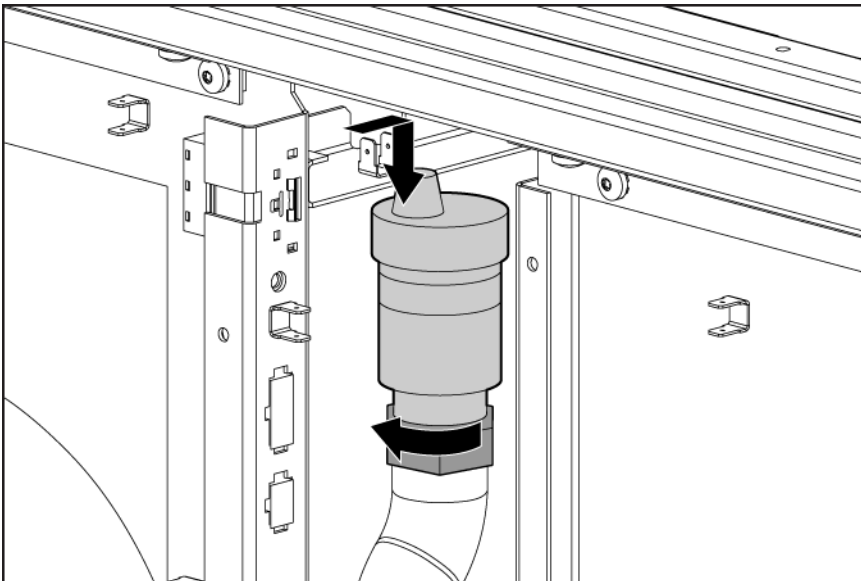
4. Reach into the access panel cut-out.
5. Using a pair of pliers, unscrew the air bleeder valve from the check valve.
6. Remove the air bleeder valve from the MCS unit.



To replace this component, see "Replacing the air bleeder valve (on page 32)."

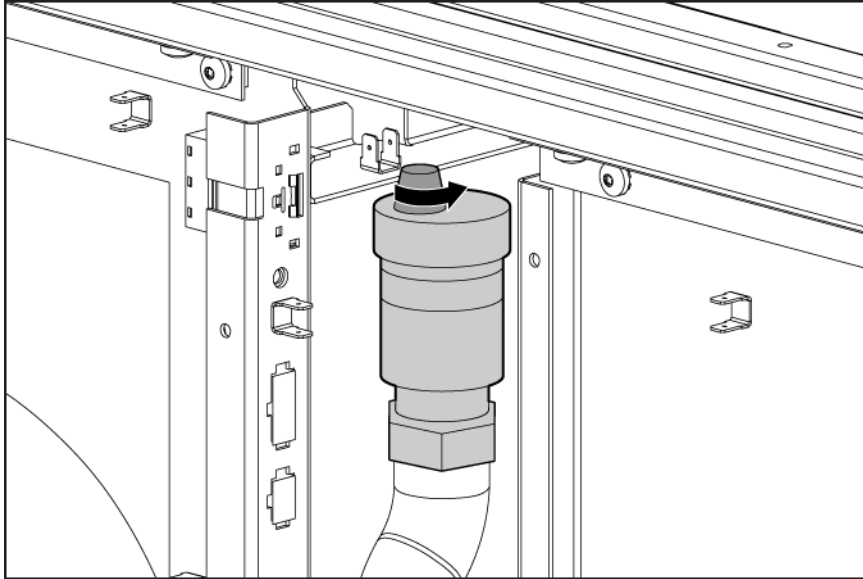
## Replacing the air bleeder valve

1. Reach into the access panel cut-out and align the air bleeder valve to the check valve.
2. Firmly hand-tighten the air bleeder valve.





3. Slightly open the top vent of the air bleeder valve, approximately 3/4 turn, to allow for air flow.



4. Replace the top heat exchanger unit. ("[Replacing the heat exchanger unit with couplers](#)" on page 63)
5. Replace the top fan unit. ("[Replacing the fan unit](#)" on page 52)
6. Restore water flow to the MCS unit. ("[Restoring water flow](#)" on page 112)
7. Complete the operation checklist (on page 111).

## Air deflector plate

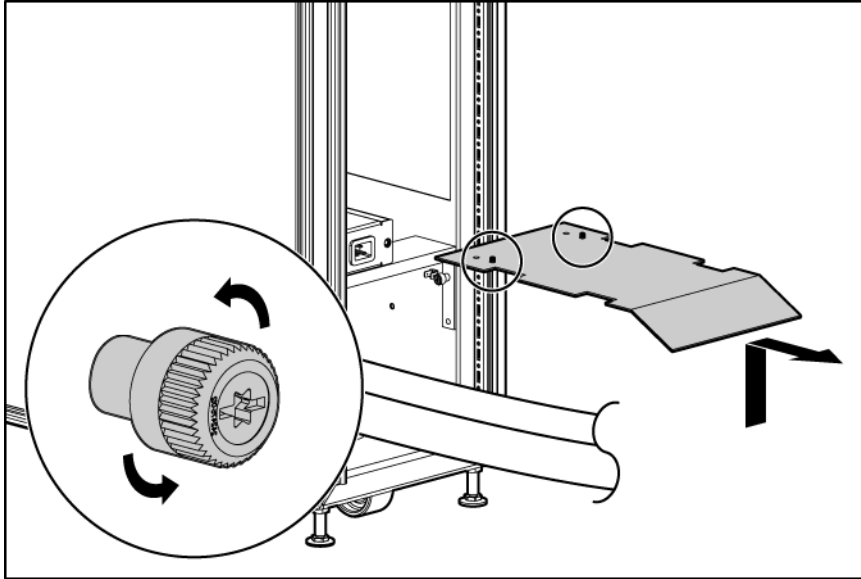
The air deflector plate is not a spare part. The removal and replacement instructions for the air deflector plate are provided so that you can access other components.

No tools are required for this procedure.

## Removing the air deflector plate

1. Loosen the two thumbscrews securing the air deflector plate to the MCS unit.
2. Disconnect the green and yellow ground bonding wire.

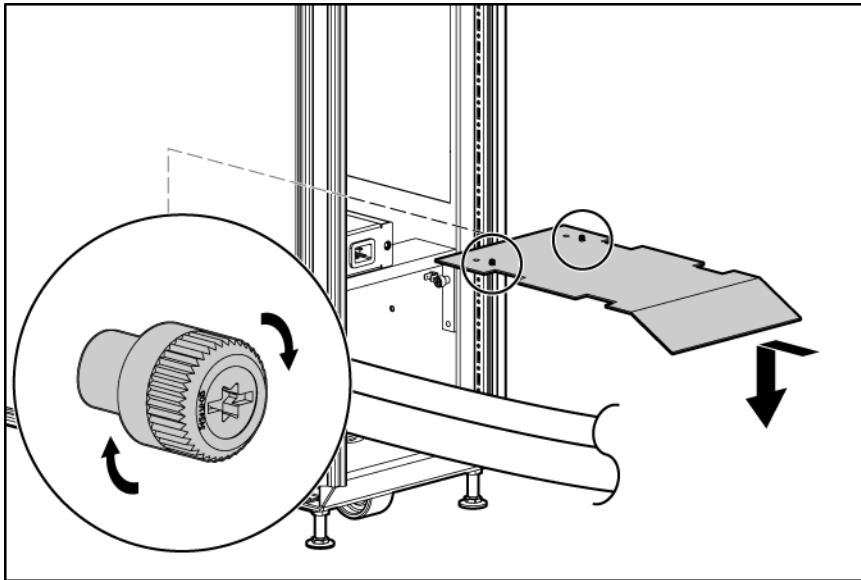
3. Lift the air deflector plate up, tilt it to an angle, and pull it out toward you.



To replace this component, see "Replacing the air deflector plate (on page 34)."

## Replacing the air deflector plate

1. Reattach the ground bonding wires to the air deflector plate.
2. Align the two screw holes on the air deflector plate to the two screw holes inside the MCS unit.
3. Secure the air deflector plate to the MCS unit by tightening the two thumbscrews in the two screw holes.



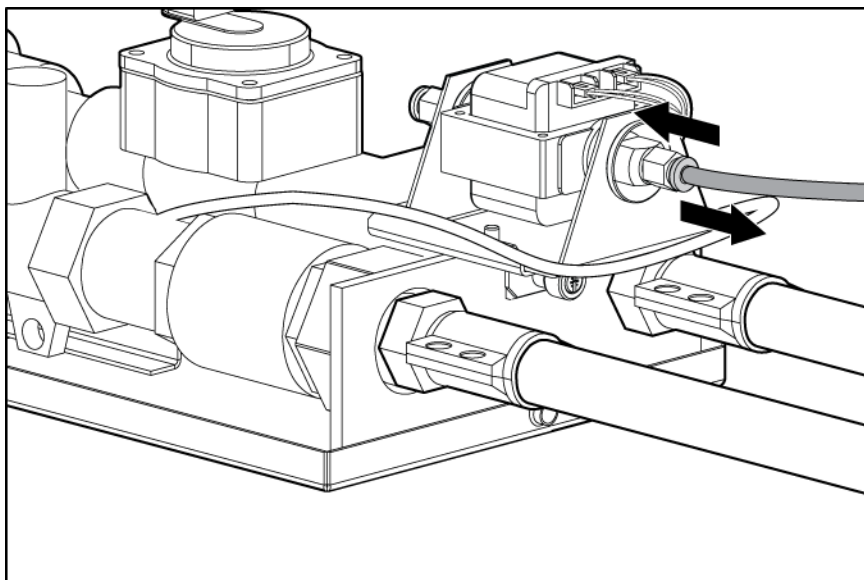
## Air sealing plate

The air sealing plate is not a spare part. The removal and replacement instructions for the air sealing plate are provided so that you can access other components.

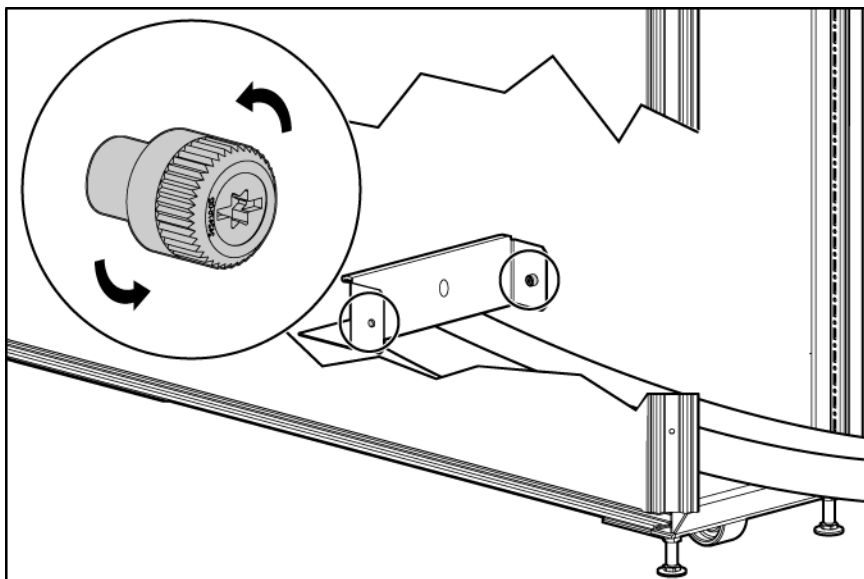
No tools are required for this procedure.

## Removing the air sealing plate

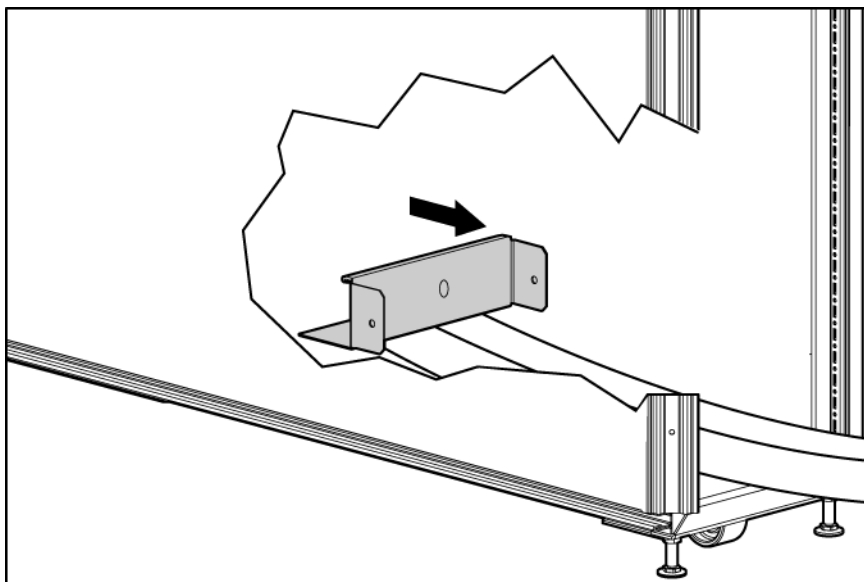
1. Disconnect the condensation hose from the condensation pump by pressing in the plastic collar quick connect on the condensation pump.



2. Loosen the two thumbscrews securing the air sealing plate to the MCS unit.



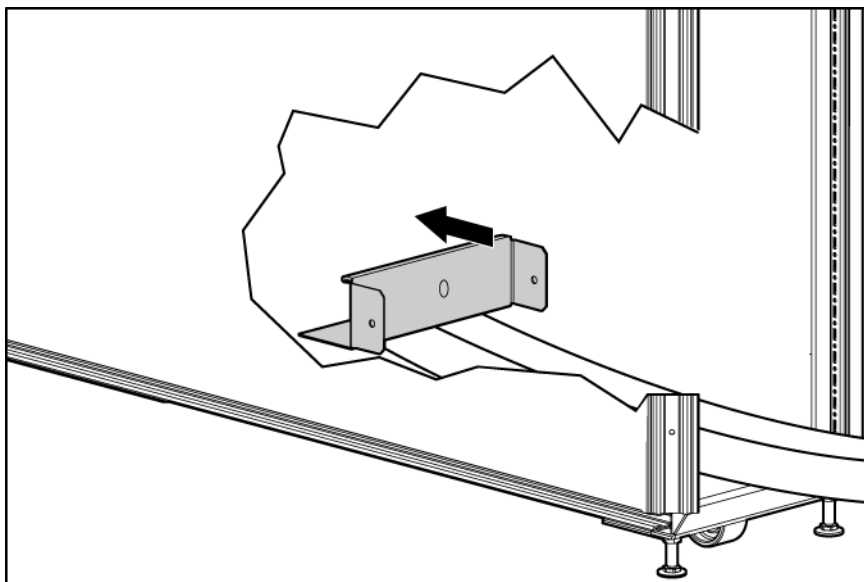
3. Slide the air sealing plate out of the MCS unit.



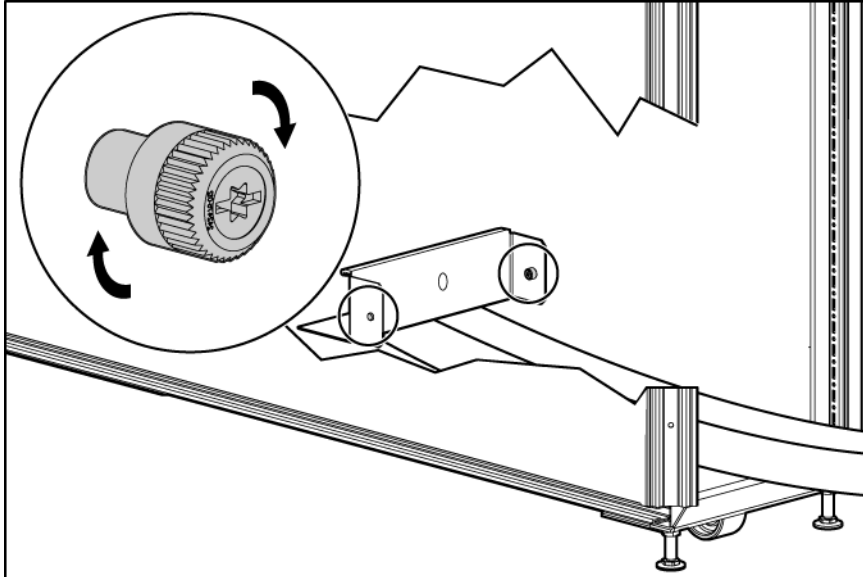
To replace this component, see "Replacing the air sealing plate (on page 36)."

## Replacing the air sealing plate

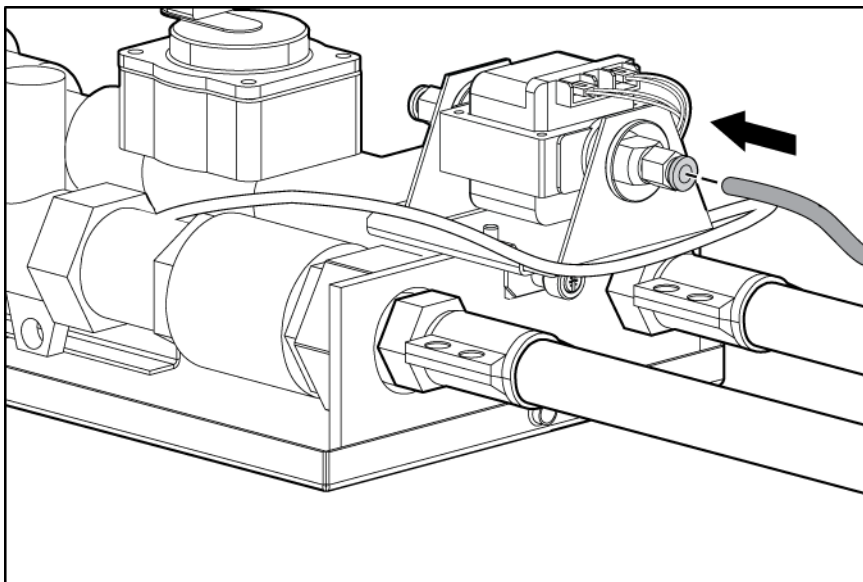
1. Slide the air sealing plate into the MCS unit.



2. Secure the air sealing plate to the MCS unit by tightening the two thumbscrews.



3. Connect the condensation hose to the condensation pump by inserting it into the plastic collar quick connect on the condensation pump.



# Automatic door release

The automatic door release kits are located on the front and rear doors of the rack attached to the MCS unit.

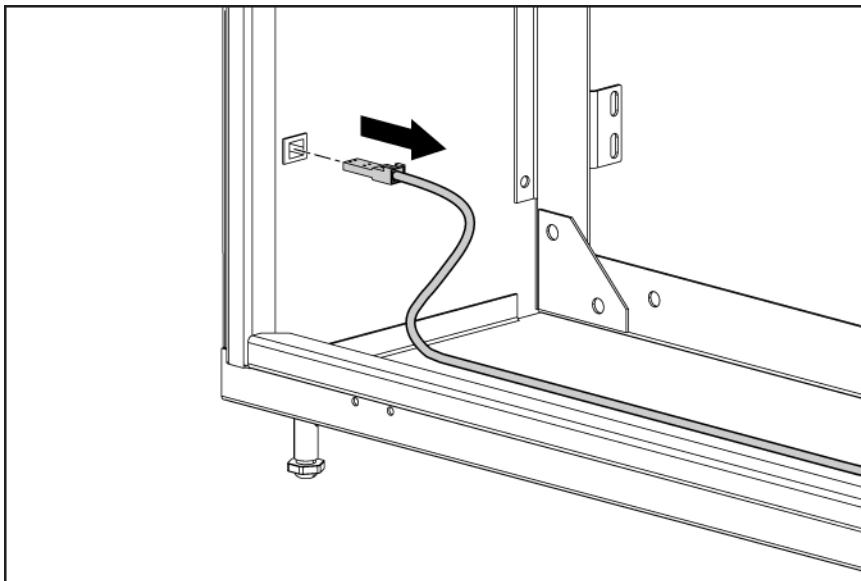


The following tools are required for installation:

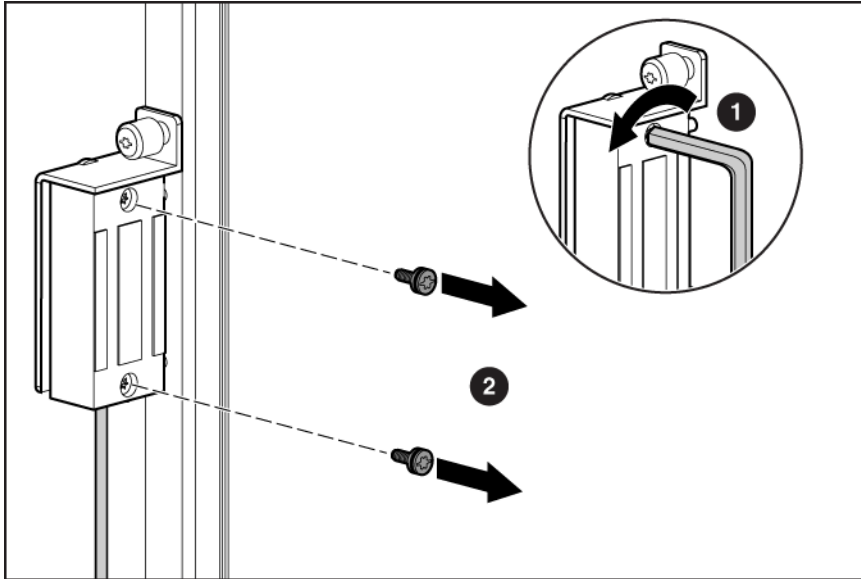
- 3-mm Allen wrench
- T-25 Torx driver
- Wire cutters

## Removing the front automatic door release

1. Unplug the electromagnetic lock cable from the panel connector on the MCS unit.



- Using an Allen wrench, remove the two black cap screws securing the electromagnetic lock to the electromagnetic lock bracket.

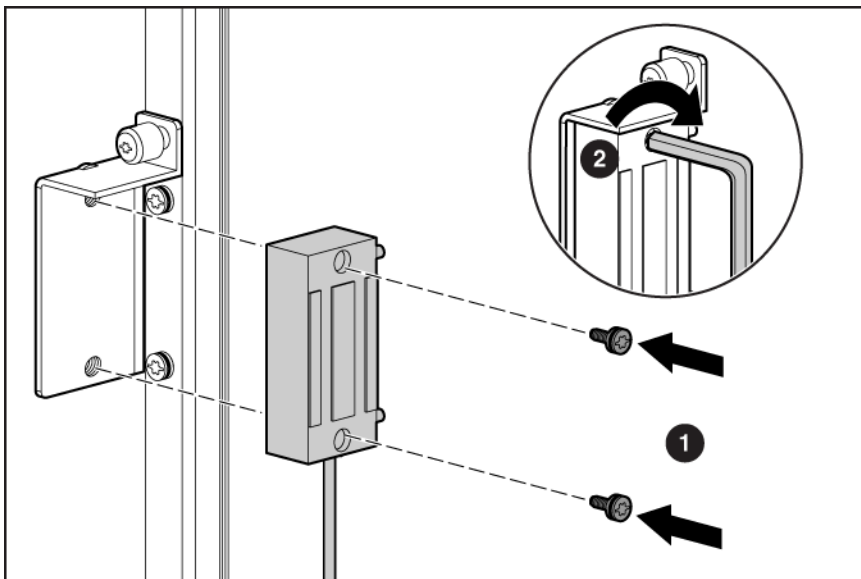


- Remove the electromagnetic lock and cable from the rack.

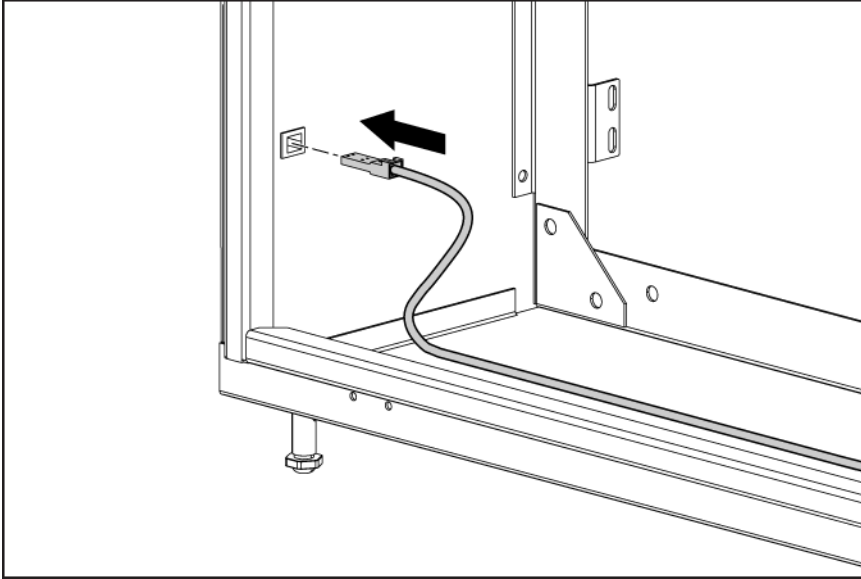
To replace this component, see "Replacing the front automatic door release (on page 39)."

## Replacing the front automatic door release

- Align the electromagnetic lock to the electromagnetic lock bracket.
- Using an Allen wrench, insert and tighten two black cap screws to secure the electromagnetic lock to the electromagnetic lock bracket.



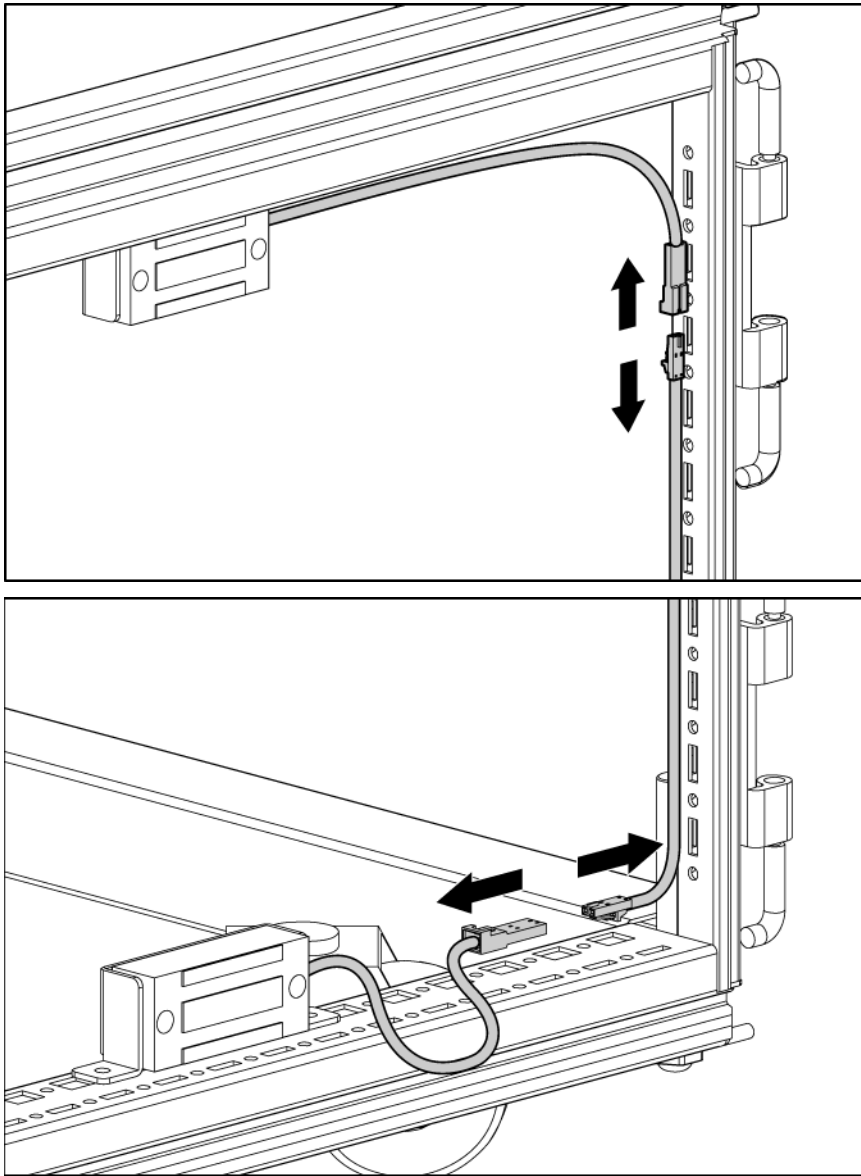
3. Route the magnetic lock cable down through front extension channel, across the front of the rack, and plug it into the panel connector on the MCS unit.





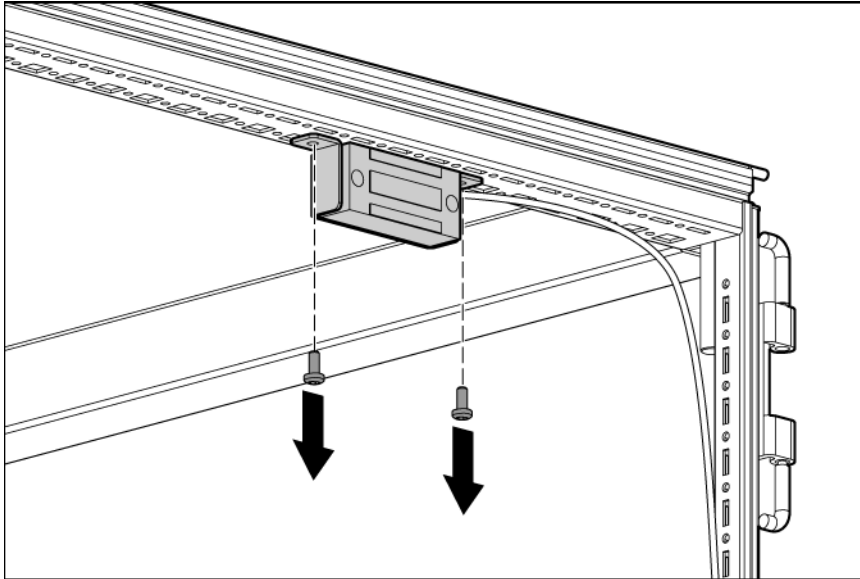
## Removing the rear automatic door release

1. Unplug the top and bottom electromagnetic lock cables from the extension lock cable.

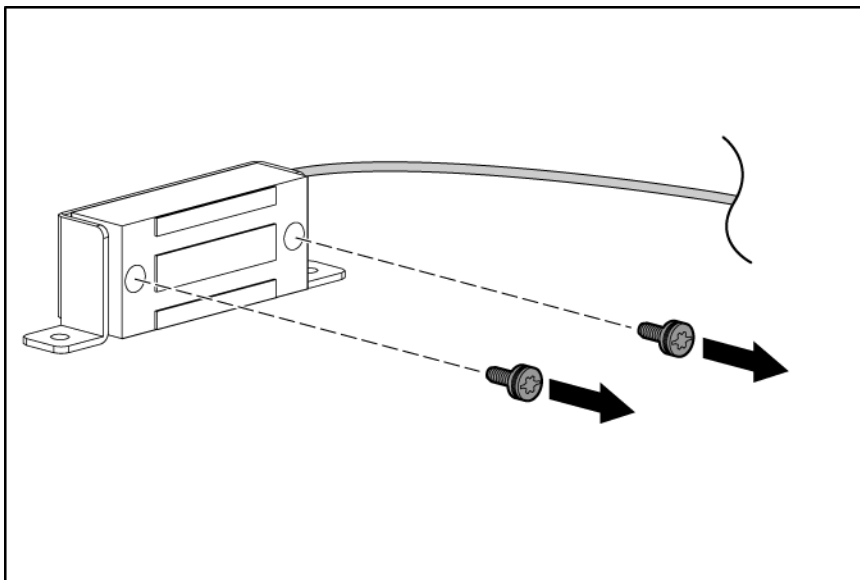


**NOTE:** Be sure to note the location of the electromagnetic brackets prior to removal.

2. Using a T-25 Torx driver, remove the four screws securing the upper and lower electromagnetic lock brackets to the rack chassis.



3. Using an Allen wrench, remove the two black cap screws securing each electromagnetic lock to its electromagnetic lock bracket.

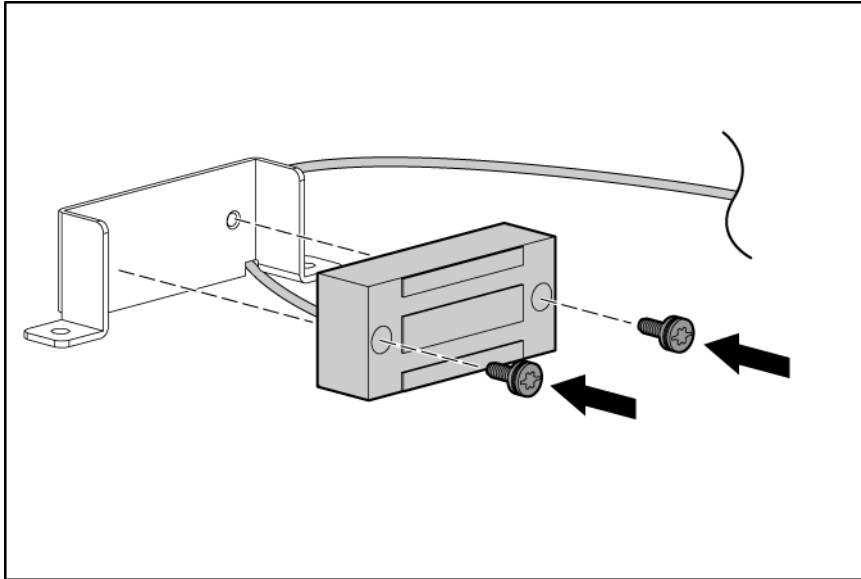


4. Remove the electromagnetic locks and cables from the rack.  
To replace this component, see "Replacing the rear automatic door release (on page 42)."

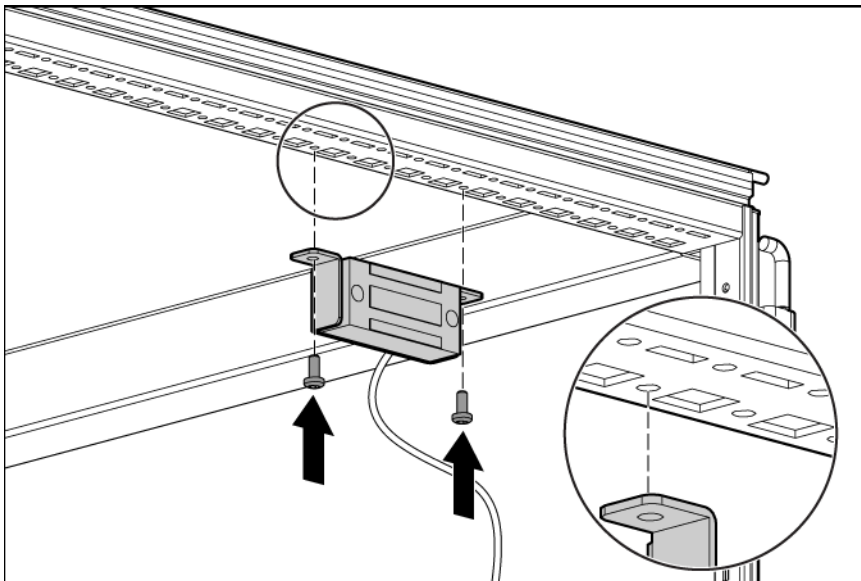
## Replacing the rear automatic door release

1. Align the electromagnetic locks to the electromagnetic lock brackets.

2. Using an Allen wrench, insert and tighten two black cap screws to secure each electromagnetic lock to its electromagnetic lock bracket.

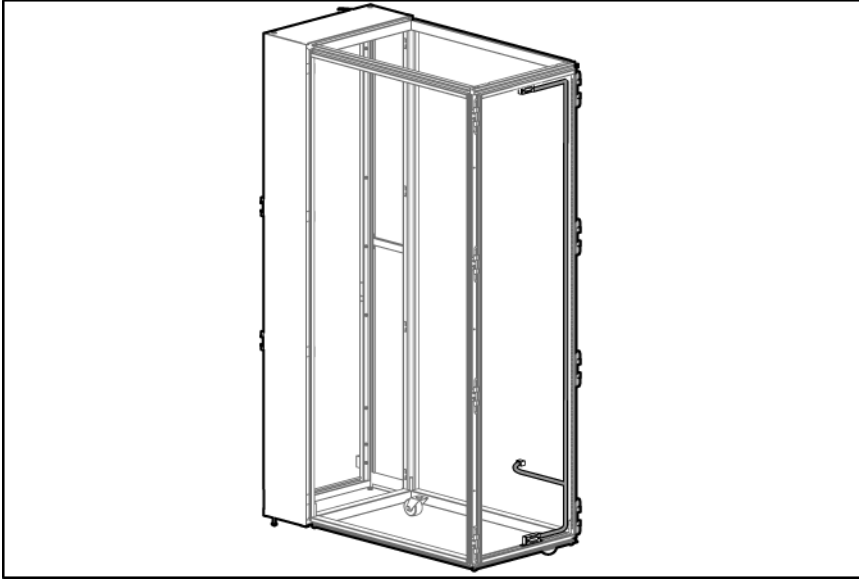


3. Install the top electromagnetic lock bracket to the rack chassis in the location you noted during removal.
  - a. Align the electromagnetic lock assembly to the rack chassis in the location you noted during removal.
  - b. Using a T-25 Torx driver, insert and tighten two M5.5 self-tapping screws into the inner row of rack holes to secure the electromagnetic lock assembly to the rack chassis.



4. Repeat step 3 for the bottom electromagnetic lock bracket.

5. Route the magnetic lock cable through the rear extension channel, across the rack, and plug it into the panel connector on the MCS unit.



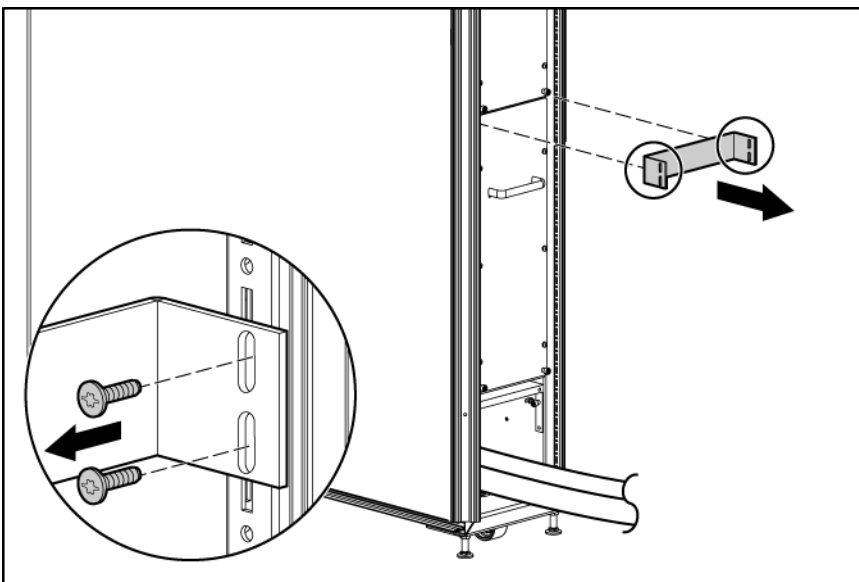
## Bottom fan unit

The removal and replacement instructions for the bottom fan unit are provided so that you can access other components. If you are replacing the fan unit, see Fan unit (on page 50).

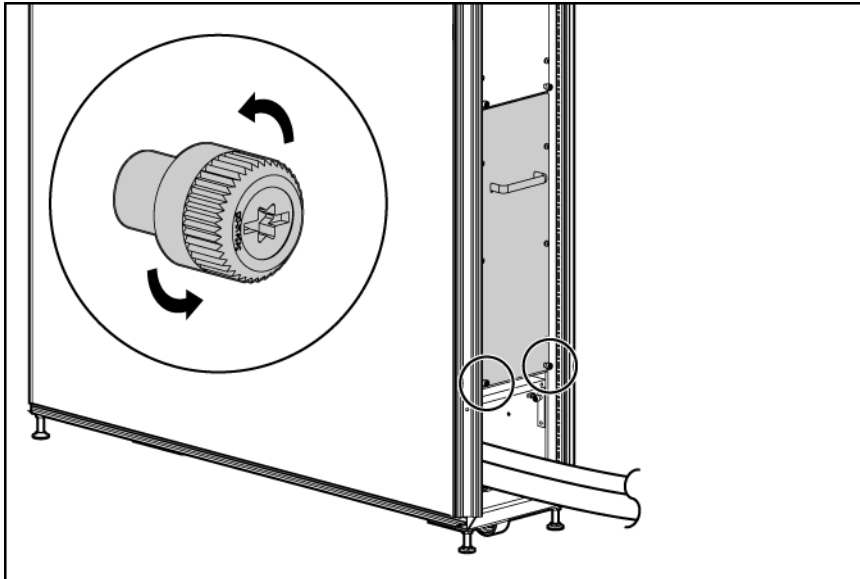
No tools are required for this procedure.

## Removing the bottom fan unit

1. Open the rear MCS door.
2. Using a T-25 Torx driver, remove the four Torx screws securing the horizontal shipping bracket to the MCS frame.

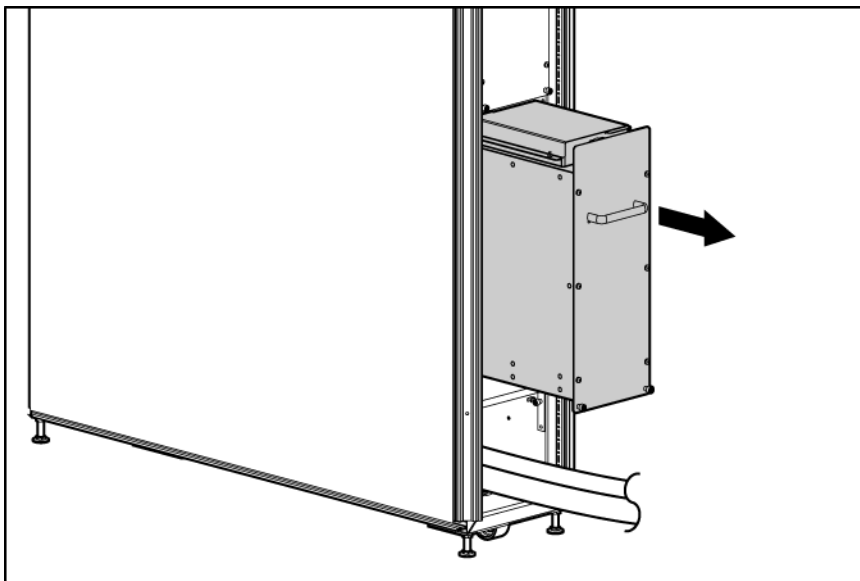


3. Loosen the two thumbscrews on the bottom of the fan unit.



**⚠ CAUTION:** The fan unit weighs 16.8 kg (37 lb). Use extra caution when removing and replacing the top fan unit because it might be higher than your shoulders and is heavy and awkward to lift.

4. Pull the fan unit out toward you, and remove it from the MCS unit.



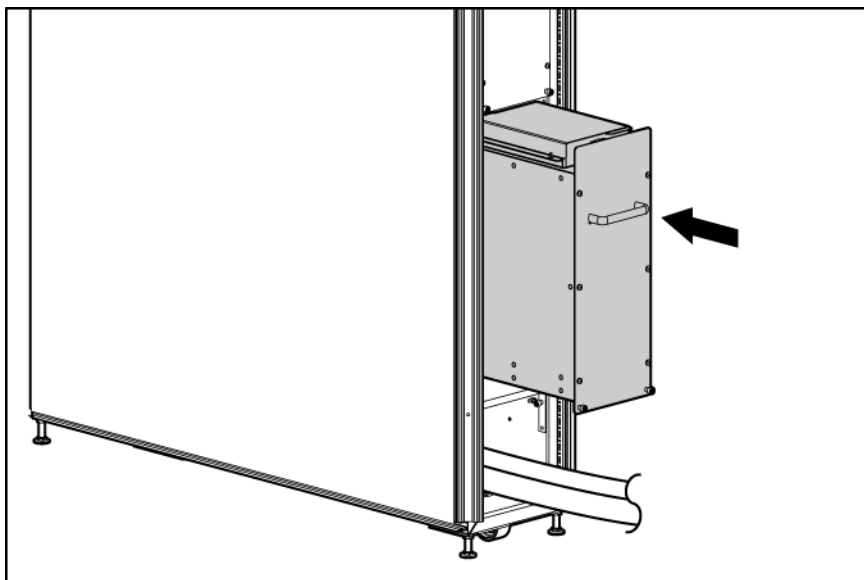
To replace this component, see "Replacing the bottom fan unit (on page 45)."

## Replacing the bottom fan unit

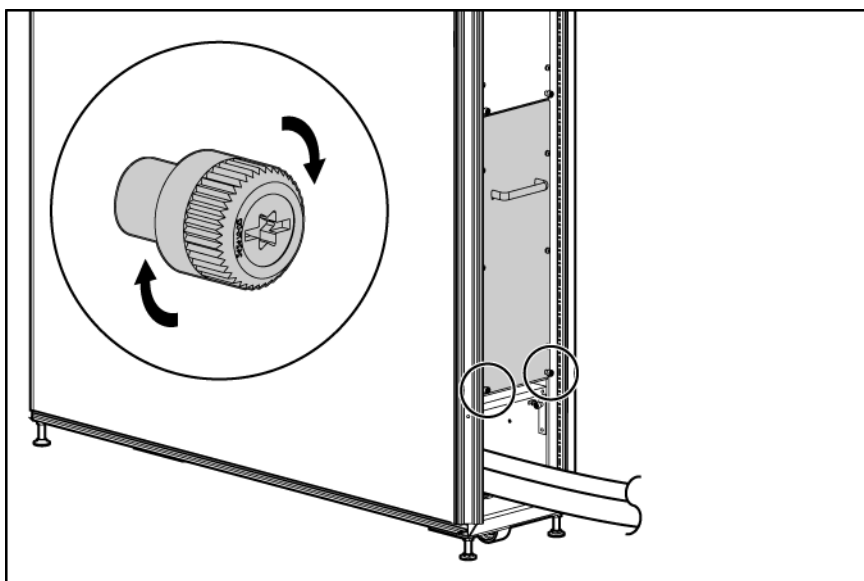
1. Align the fan unit to the sliding rails.

**⚠ CAUTION:** The fan unit weighs 16.8 kg (37 lb). Use extra caution when removing and replacing the top fan unit because it might be higher than your shoulders and is heavy and awkward to lift.

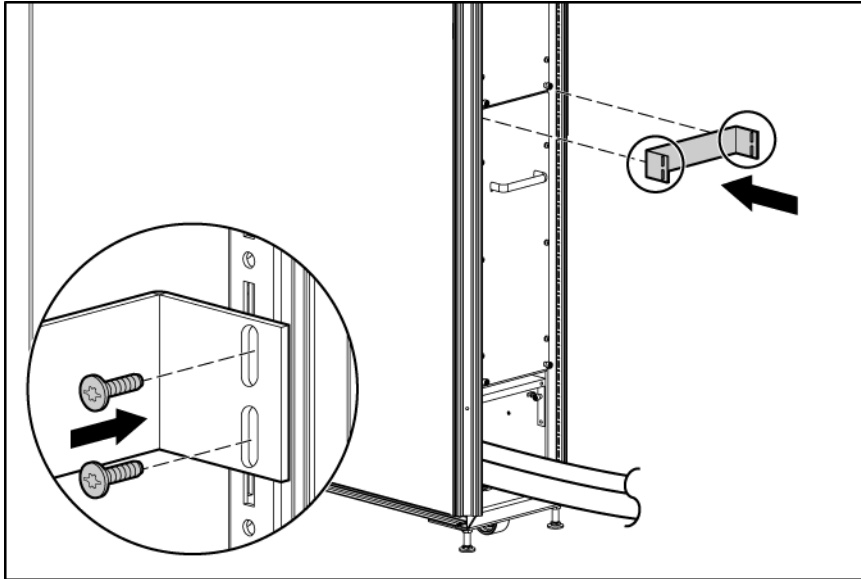
2. Slide the bottom fan unit inside the MCS unit on the sliding rails.



3. Tighten the two thumbscrews to secure the fan unit to the MCS frame.



- Using a T-25 Torx driver, secure the horizontal shipping bracket to the MCS unit by inserting four Torx screws.



## Condensation pump and sensors

The condensation pump and sensors are components of the water group located at the bottom interior of the MCS unit.



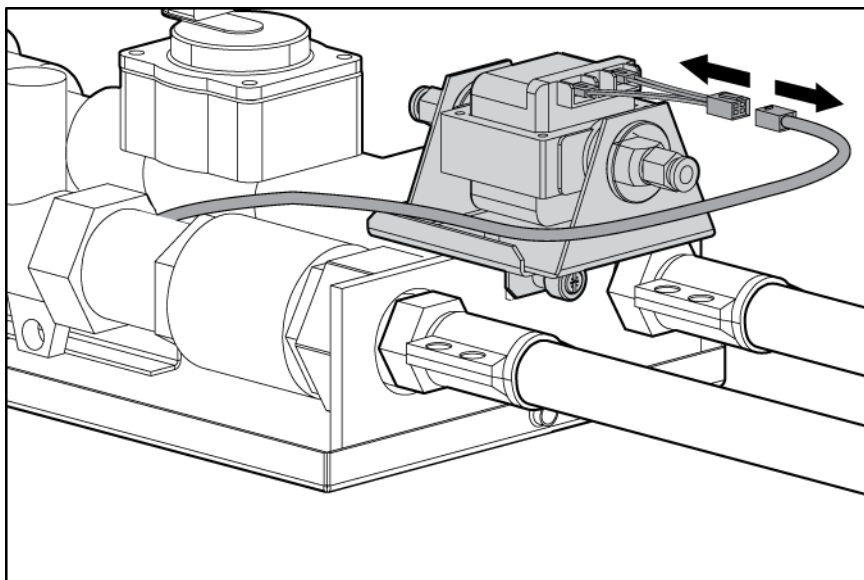
The following tools are required for installation:

- T-25 Torx driver
- Phillips screwdriver

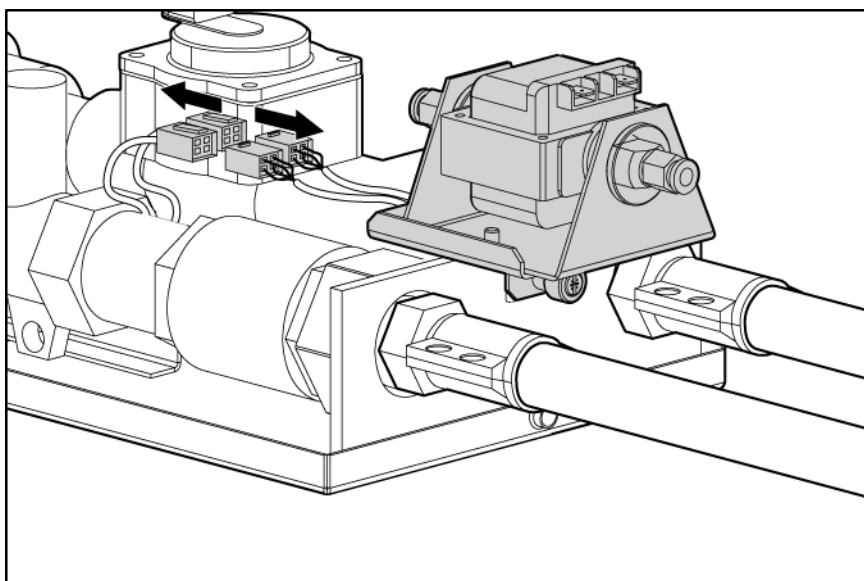
## Removing the condensation pump and sensors

- Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).
- Remove the bottom fan unit ("[Removing the bottom fan unit](#)" on page 44).
- Relocate the power inlet box ("[Relocating the power inlet box](#)" on page 93).
- Remove the air sealing plate ("[Removing the air sealing plate](#)" on page 35).

5. Disconnect the AC power cable from the condensation pump.

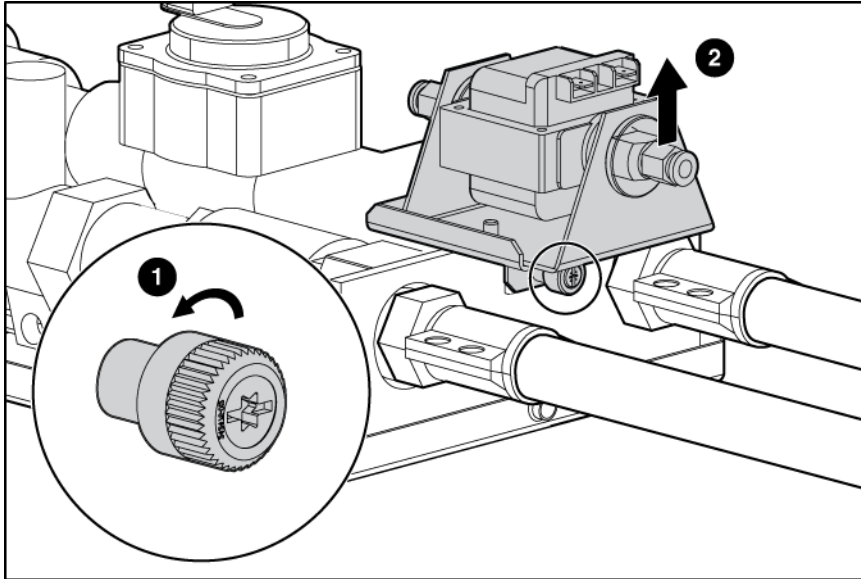


6. Disconnect the two sensor connections from the condensation pump.





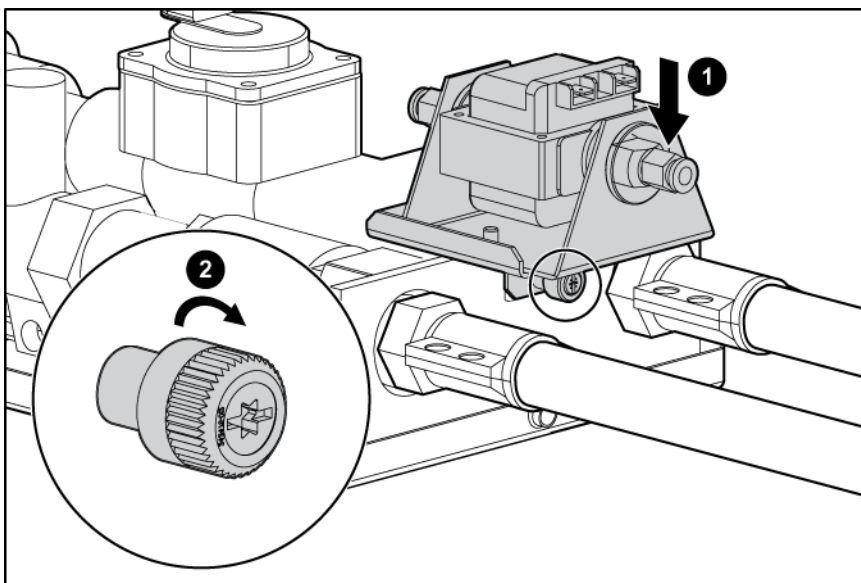
7. Loosen the thumbscrew on the bottom of the condensation pump securing the condensation pump to the MCS unit (1), and lift the condensation pump from the MCS unit (2).



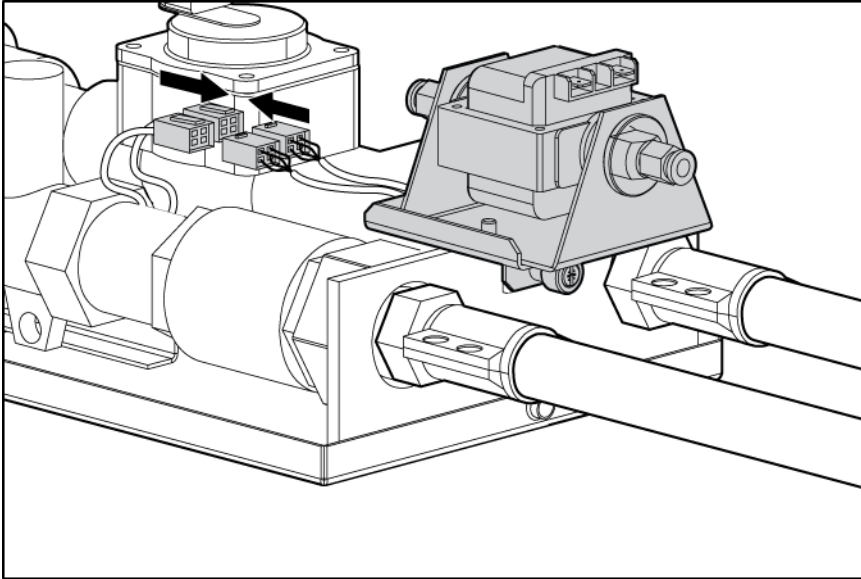
To replace the component, see "Replacing the condensation pump and sensors (on page 49)."

## Replacing the condensation pump and sensors

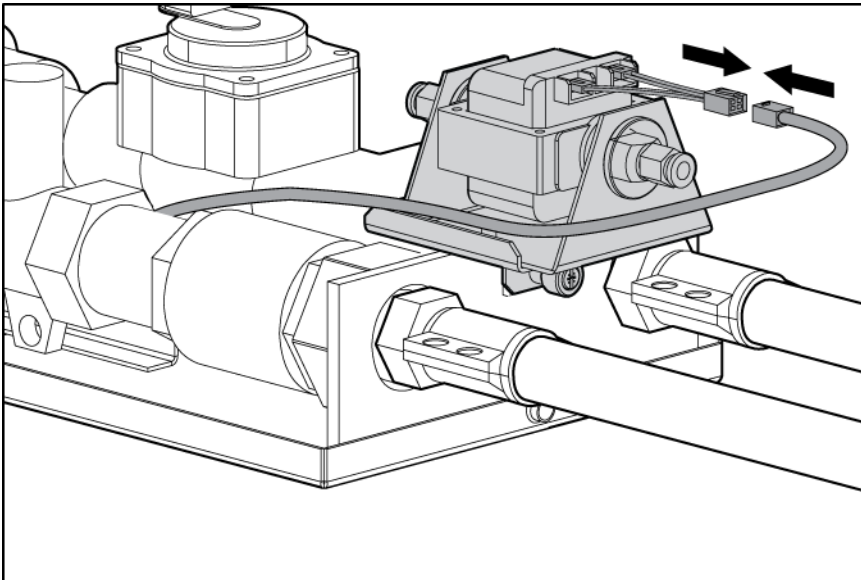
1. Align the condensation pump thumbscrew to the hole inside the MCS unit (1), and tighten the thumbscrew on the bottom of the condensation pump to secure it to the MCS unit (2).



2. Connect the two sensor connectors to the condensation pump.



3. Connect the AC power cable to the condensation pump.



4. Replace the air sealing plate ("[Replacing the air sealing plate](#)" on page [36](#)).
5. Relocate the power inlet box back into position ("[Relocating the power inlet box back into position](#)" on page [95](#)).
6. Replace the bottom fan unit ("[Replacing the bottom fan unit](#)" on page [45](#)).
7. Complete the operation checklist (on page [111](#)).

## Fan unit

The three fan units are located at the rear of the MCS unit.

You can replace the fan units during operation.



The following tools are required for installation:

- T-25 Torx driver

## Removing the fan unit

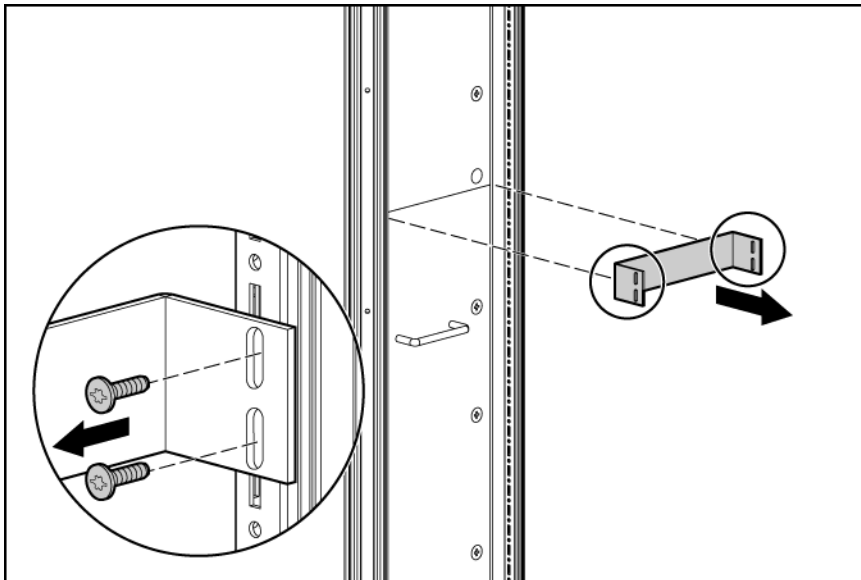
1. Open the rear MCS door.

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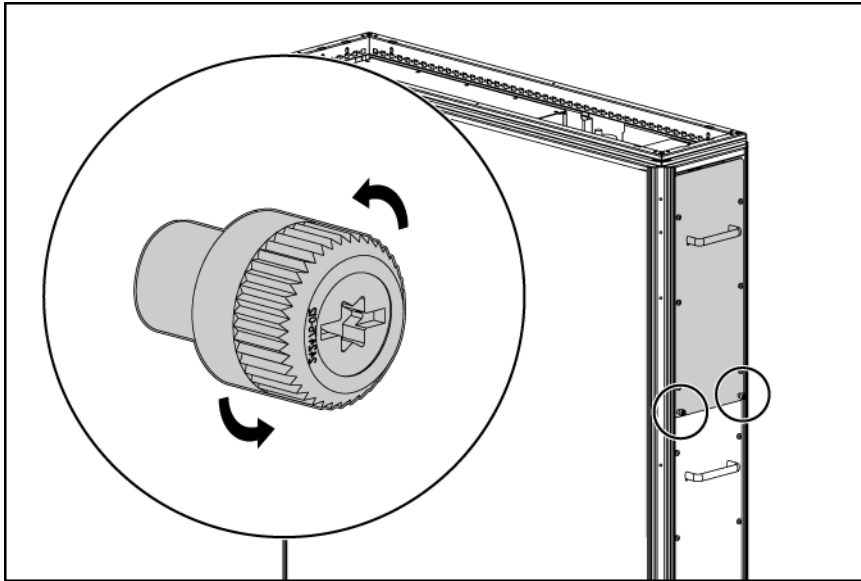
**NOTE:** The number of horizontal brackets varies depending on the position of the fan unit (top, middle, or bottom).

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2. Using a T-25 Torx driver, remove the four Torx screws securing the horizontal shipping bracket to the MCS frame.

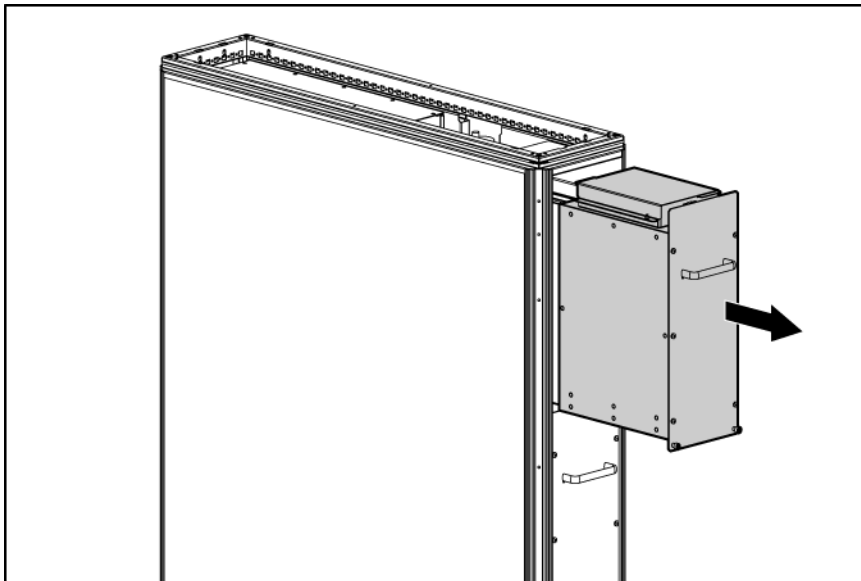


3. Loosen the two thumbscrews on the bottom of the fan unit.



**CAUTION:** The fan unit weighs 16.8 kg (37 lb). Use extra caution when removing and replacing the top fan unit because it might be higher than your shoulders and is heavy and awkward to lift.

4. Pull the fan unit out toward you, and remove it from the MCS unit.



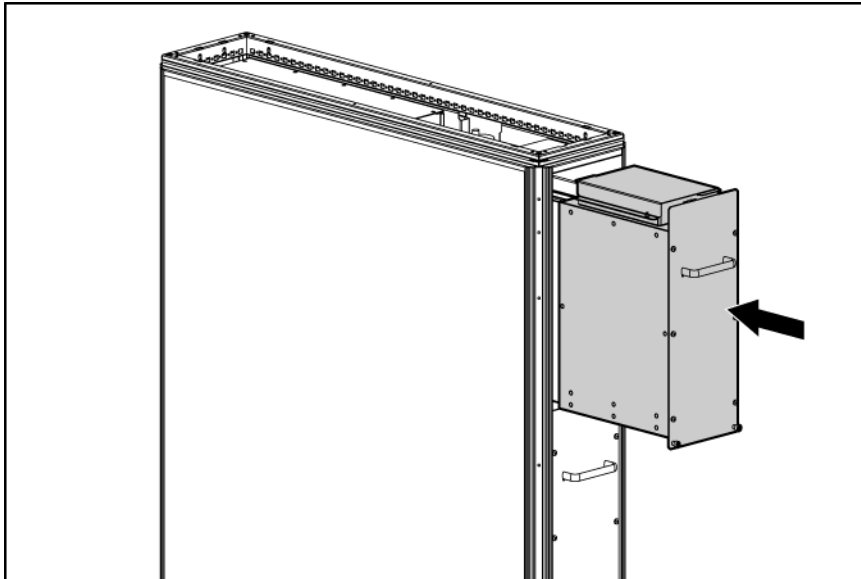
To replace this component, see "Replacing the fan unit (on page 52)."

## Replacing the fan unit

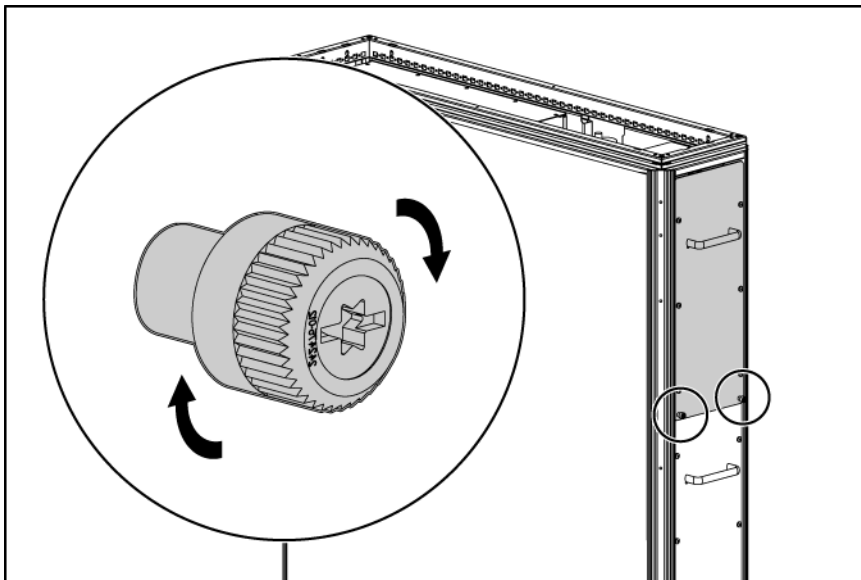
1. Align the fan unit to the sliding rails.

**CAUTION:** The fan unit weighs 16.8 kg (37 lb). Use extra caution when removing and replacing the top fan unit because it might be higher than your shoulders and is heavy and awkward to lift.

2. Slide the fan unit onto the sliding rails inside the MCS unit.

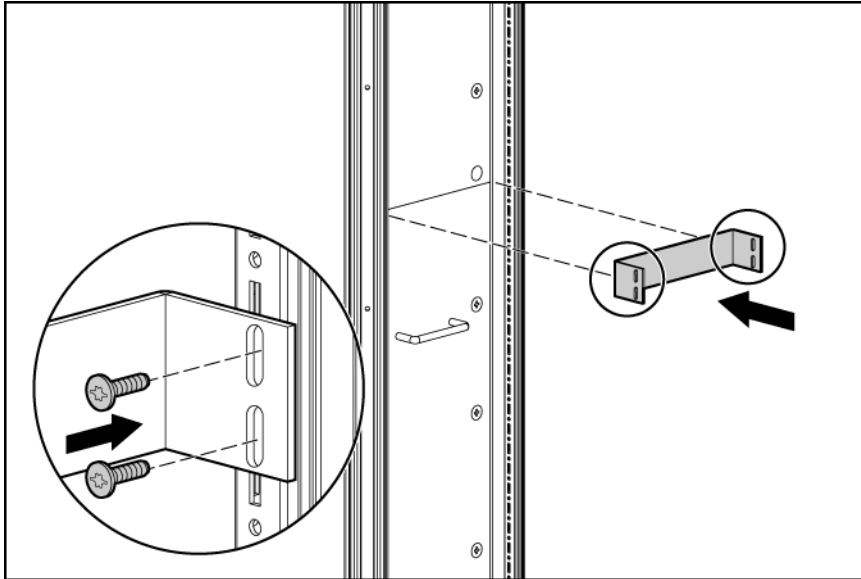


3. Tighten the two thumbscrews to secure the fan unit to the MCS frame.



**NOTE:** The number of horizontal brackets varies depending on the position of the fan unit (top, middle, or bottom).

- Using a T-25 Torx driver, secure the horizontal shipping bracket to the MCS unit by inserting four Torx screws.



- Complete the operation checklist (on page 111).

## Flow meter sensor

The flow meter sensor is a component of the water group located at the bottom interior of the MCS unit.



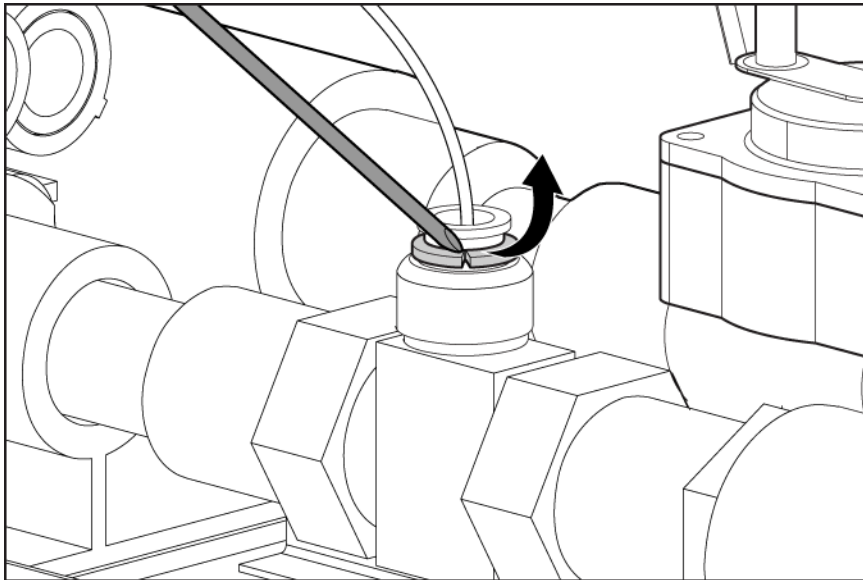
The following tools are required for installation:

- T-25 Torx driver
- Wire cutters
- Water hose fitting wrench (included with your original MCS unit)
- Counter hold wrench (included with your original MCS Unit)

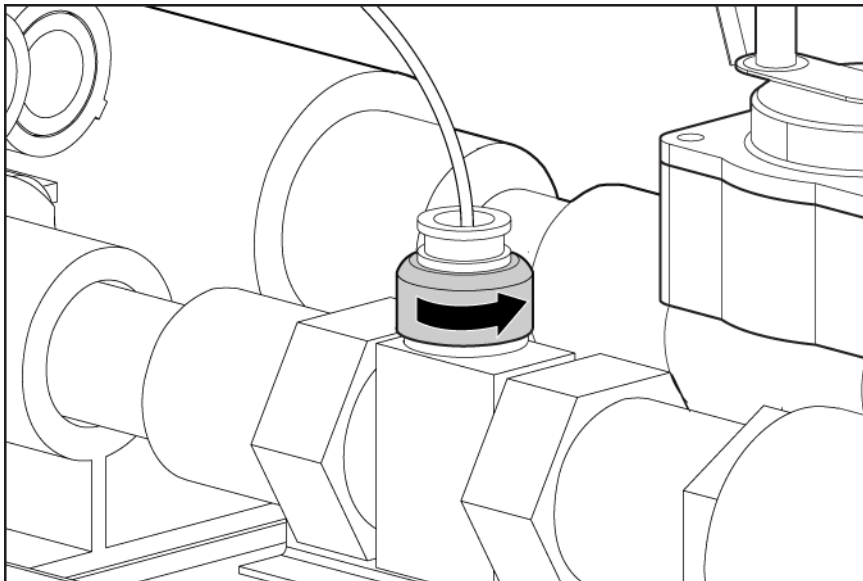
## Removing the flow meter paddle-wheel sensor

- Power down the MCS unit. ("[Powering down the MCS unit](#)" on page 24)
- Shut off the water flowing into the MCS unit. ("[Shutting off the water](#)" on page 25)
- Remove the bottom fan unit. ("[Removing the bottom fan unit](#)" on page 44)

4. Relocate the power inlet box. ("[Relocating the power inlet box](#)" on page 93)
5. Remove the air sealing plate. ("[Removing the air sealing plate](#)" on page 35)
6. Remove the air deflector plate. ("[Removing the air deflector plate](#)" on page 33)
7. Remove the condensation pump and sensors. ("[Removing the condensation pump and sensors](#)" on page 47)
8. Remove the AC transfer switch. ("[Removing the AC transfer switch](#)" on page 26)
9. Remove the plastic lock washer from above the paddle-wheel sensor.

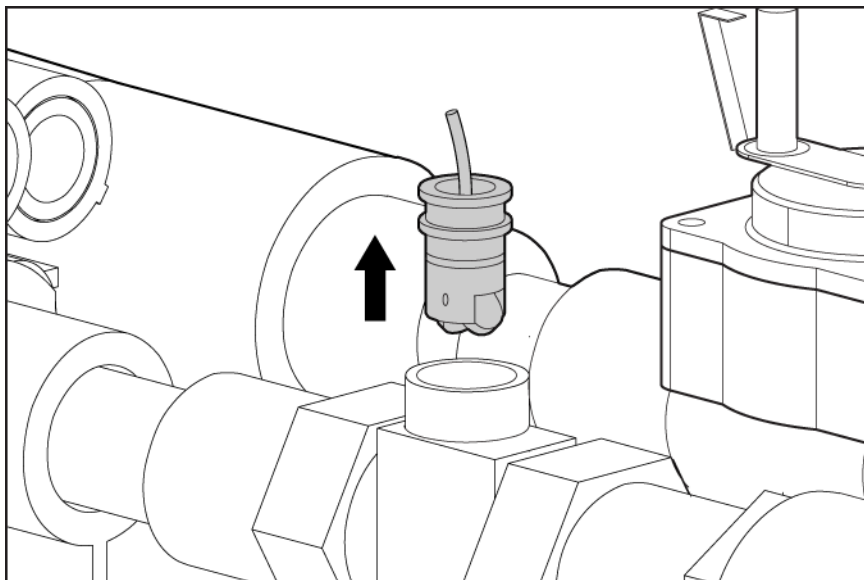


10. Unscrew the plastic screw cap securing the paddle-wheel sensor to the flow meter.

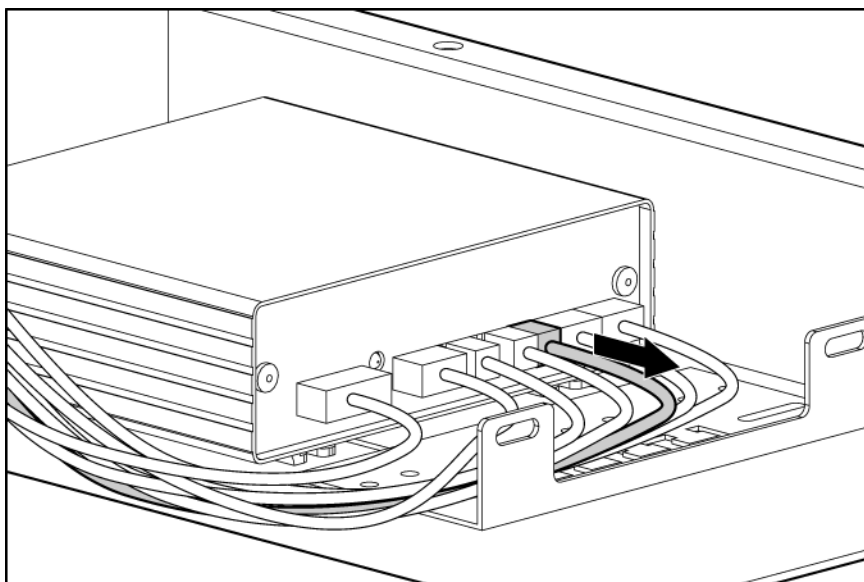


11. Lift the paddle-wheel sensor up and off the flow meter.

12. Using the wire cutters, cut the cable connected to the paddle-wheel sensor and remove the sensor from the MCS unit.



13. Disconnect the paddle-wheel sensor cable connector, labeled X14, from the water group controller and pull the cable completely out of the MCS unit.

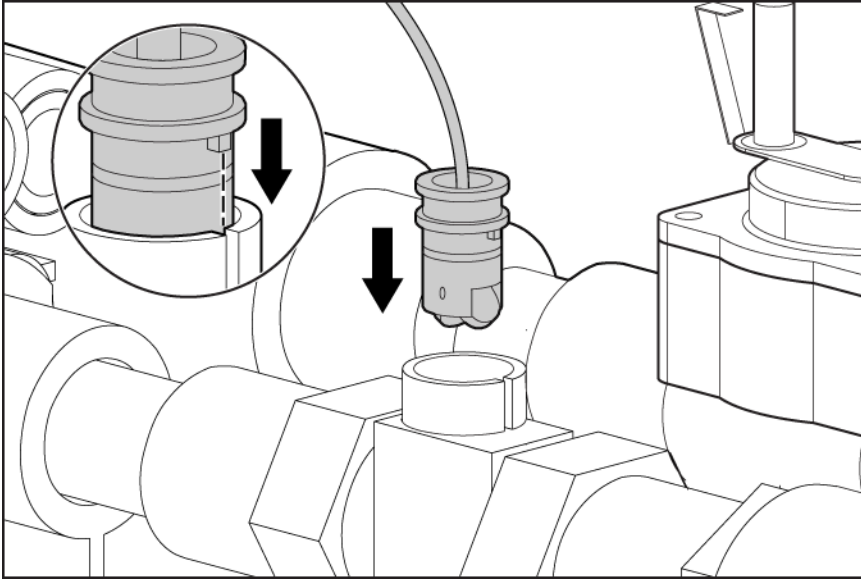


To replace this component, see "Replacing the flow meter paddle-wheel sensor (on page 57)."

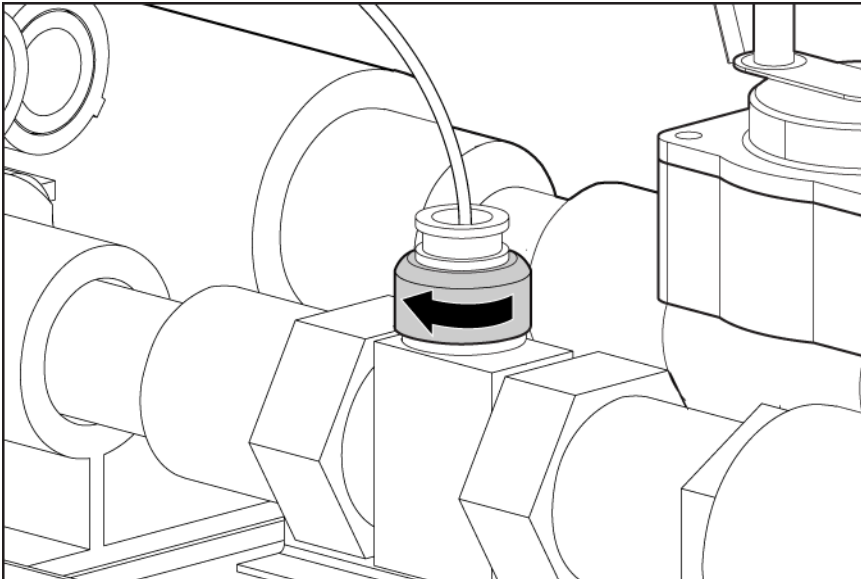


## Replacing the flow meter paddle-wheel sensor

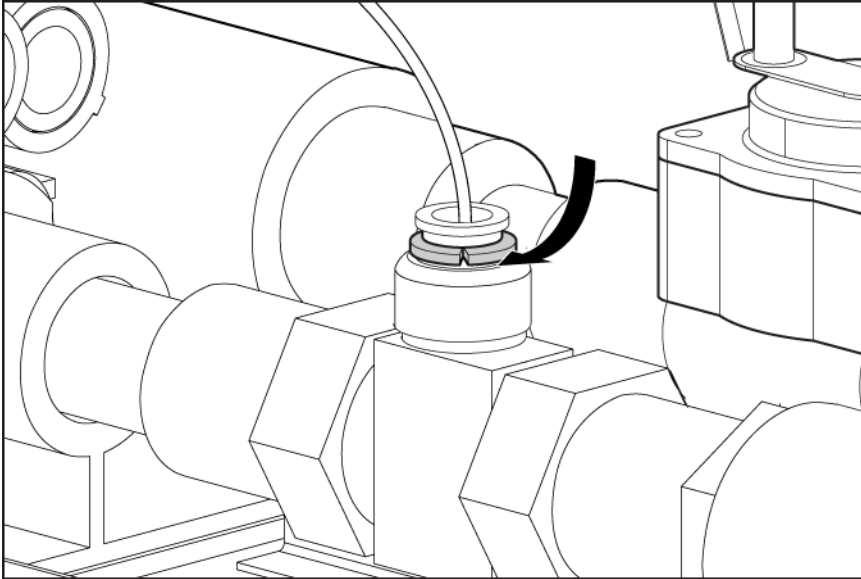
1. Insert the keyed paddle-wheel sensor into the top of the flow meter.



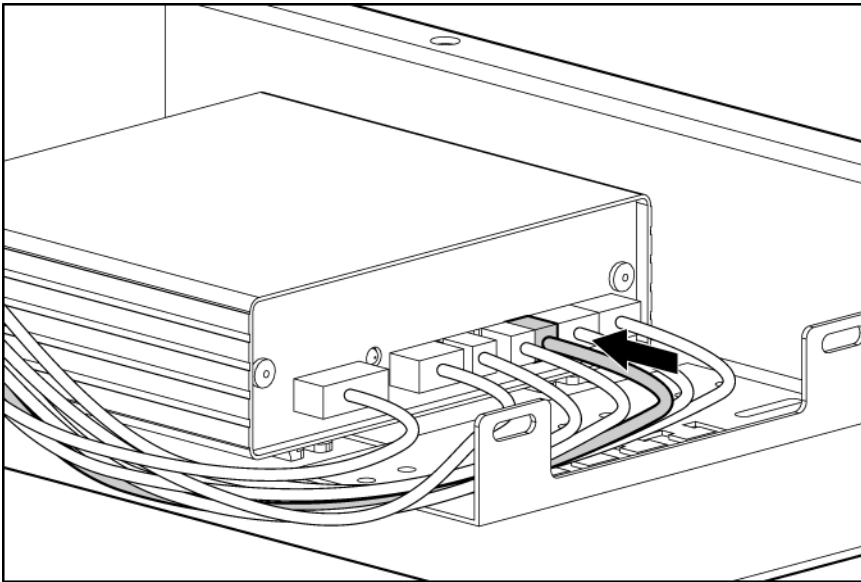
2. Screw on the plastic screw cap to secure the paddle-wheel sensor to the flow meter.



3. Replace the plastic lock washer above the paddle-wheel sensor.



4. Route the paddle-wheel sensor cable through to the front of the MCS unit.
5. Connect the paddle-wheel sensor cable connector to the X14 connector on the water group controller.



6. Replace the AC transfer switch ("[Replacing the AC transfer switch](#)" on page 28).
7. Replace the condensation pump and sensors ("[Replacing the condensation pump and sensors](#)" on page 49).
8. Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
9. Replace the bottom fan unit ("[Replacing the bottom fan unit](#)" on page 45).
10. Restore water flow to the MCS unit ("[Restoring water flow](#)" on page 112).
11. Complete the operation checklist (on page 111).

# Heat exchanger unit (HEX) with coupler

The three heat exchanger units are located on the front of the MCS unit.

You can replace the HEX units during operation.



The following tools are required for installation:

- T-25 Torx driver
- Water hose fitting wrench (included with your original MCS unit)
- Counter hold wrench (included with your original MCS unit)

## Removing the heat exchanger unit with couplers

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**NOTE:** For this procedure, remove the fan unit seated directly behind the heat exchanger unit you will remove.

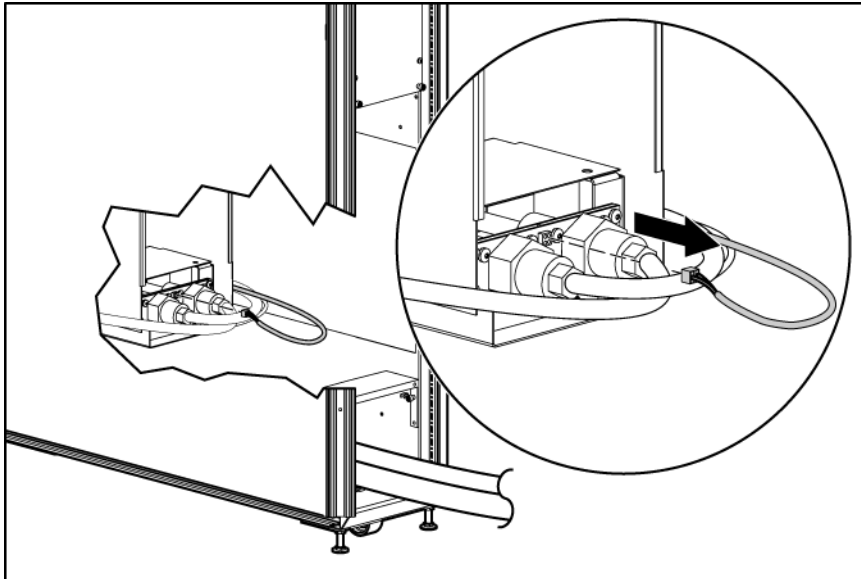
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1. Remove the fan unit ("[Removing the fan unit](#)" on page 51).
  2. Remove the air deflector plate ("[Removing the air deflector plate](#)" on page 33).
- 

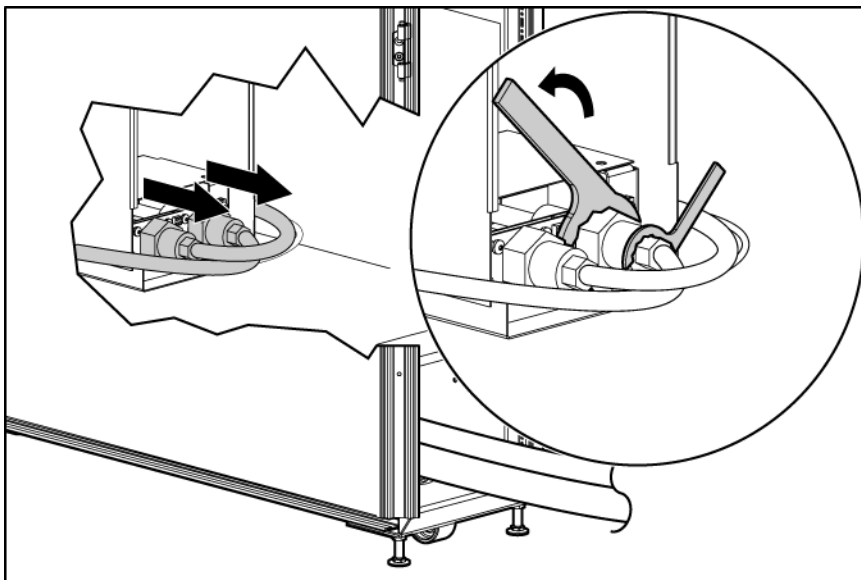
**NOTE:** The heat exchanger units are deep-seated within the MCS unit. To access the connections described in the following steps, extend your arm inside the MCS unit until you come in contact with the appropriate connectors.

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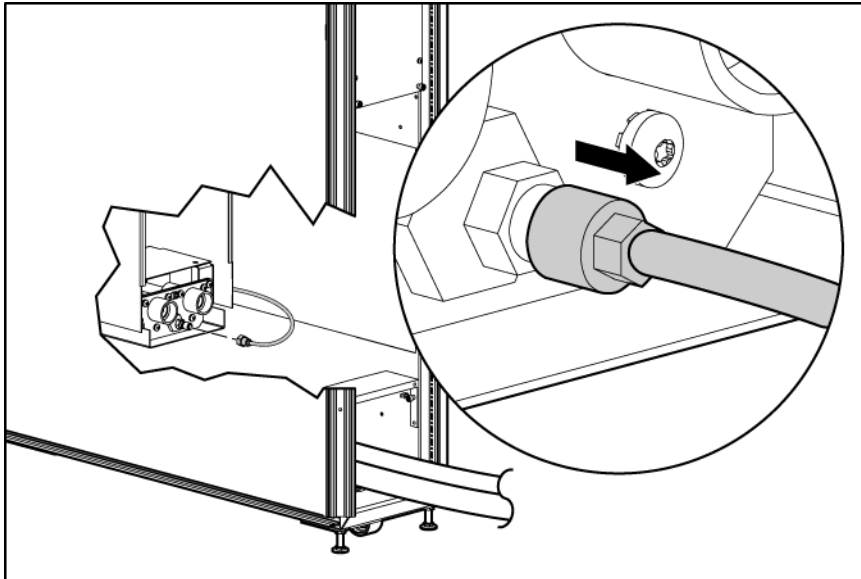
3. Disconnect the temperature sensor connector from the heat exchanger unit.



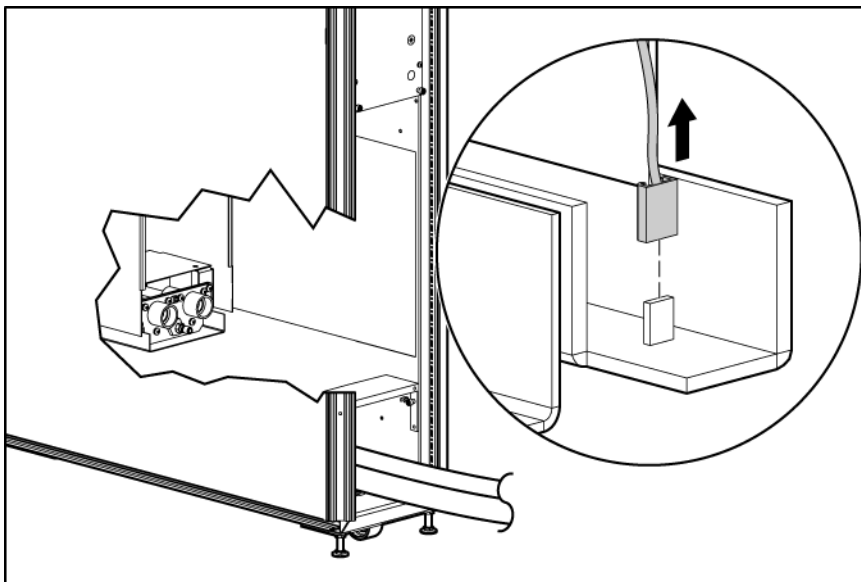
4. Using the counter hold wrench to hold the fitting in place and the water hose fitting wrench to loosen the water hose (both wrenches are included with your original MCS unit), disconnect the In and Out water hoses from the heat exchanger unit.



5. Disconnect the condensation hose from the heat exchanger unit.



6. Disconnect the green and yellow ground bonding wire grounding the heat exchanger unit to the MCS unit.



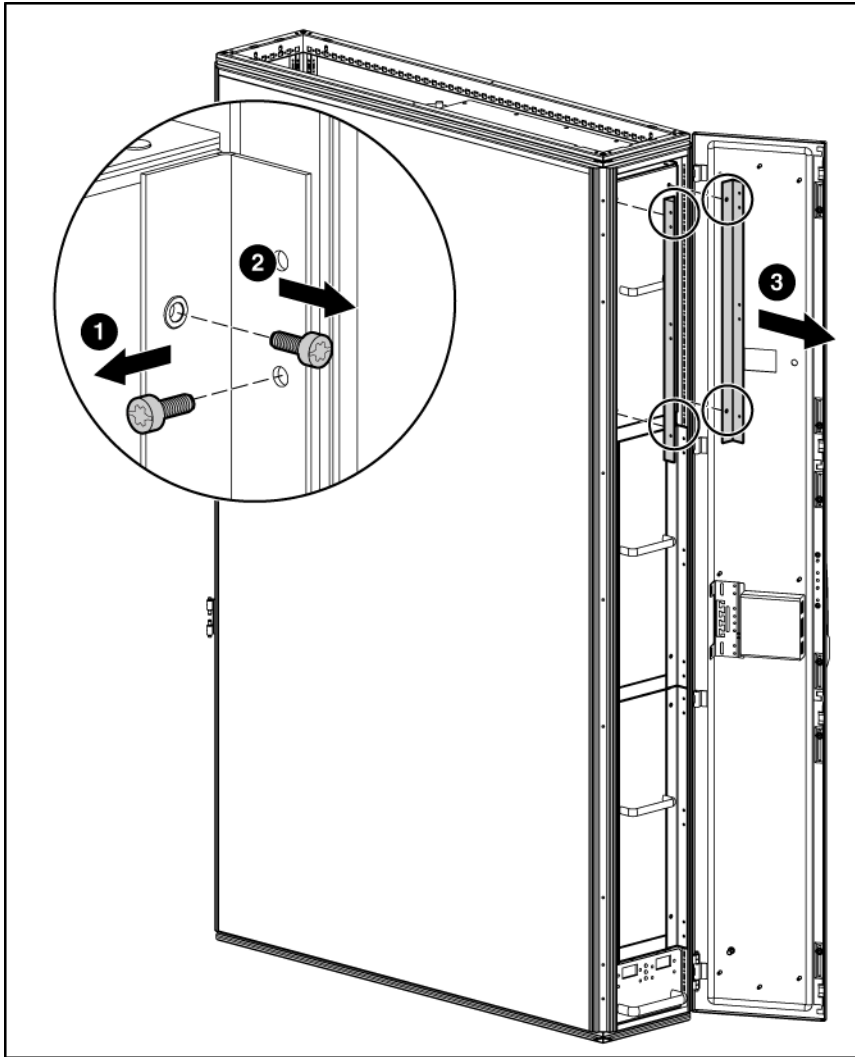
7. Open the front MCS door.



**IMPORTANT:** Keep the Torx screws separated according to their thread type and note which thread type came from which hole location on the shipping bracket.

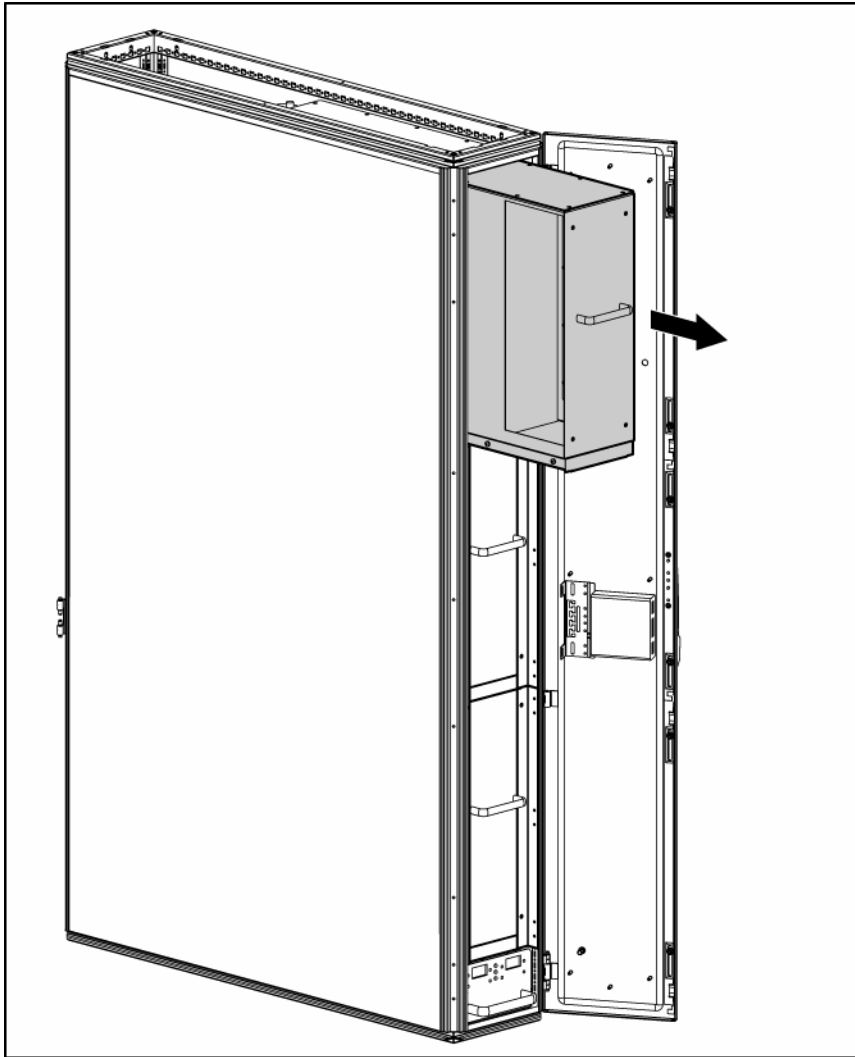
8. Remove the two heat exchanger unit shipping brackets.
  - a. Using a T-25 Torx driver, remove the four Torx screws securing the heat exchanger unit shipping brackets to the MCS frame (1).
  - b. Using a T-25 Torx driver, remove the four Torx screws securing the heat exchanger unit shipping brackets to the heat exchanger unit (2).

- c. Remove the heat exchanger unit shipping brackets from the MCS unit (3).



**⚠ CAUTION:** The heat exchanger unit weighs 23.6 kg (52 lb) with the additional weight of the water. Use extra caution when removing and replacing the top heat exchanger unit because it might be higher than your shoulders and is heavy and awkward to lift.

9. Pull the heat exchanger unit out toward you.

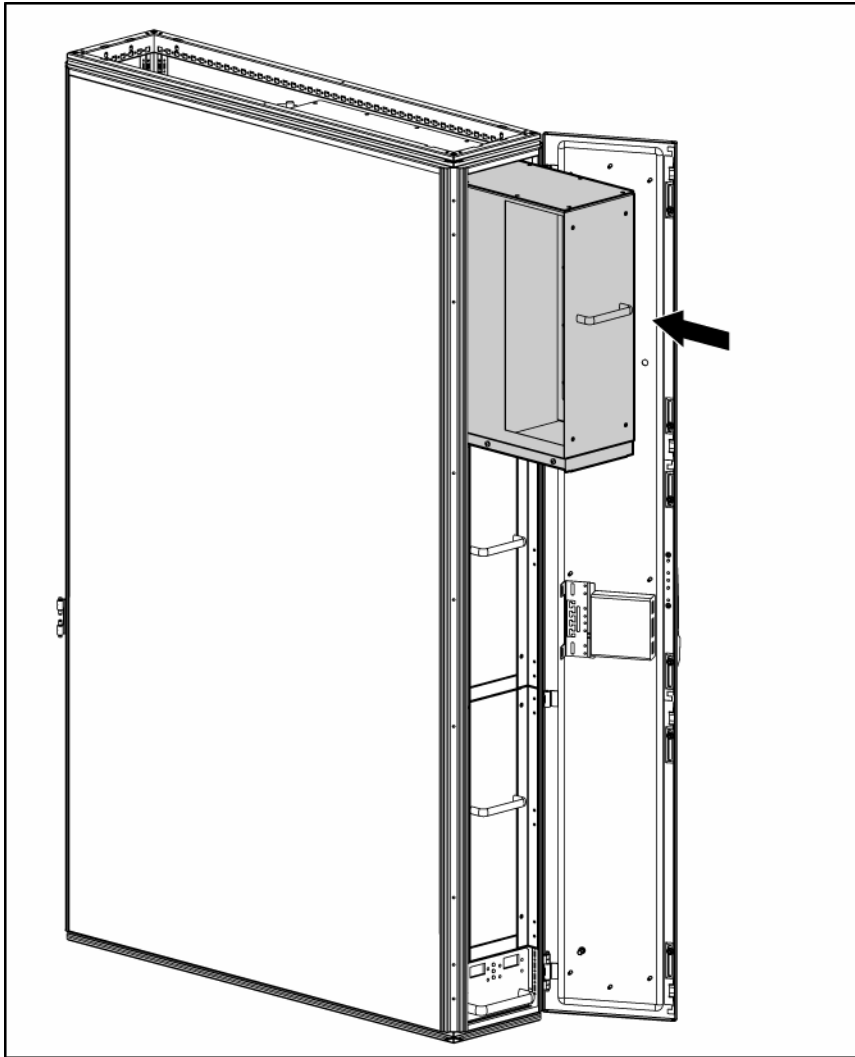


To replace this component, see "Replacing the heat exchanger unit ("[Replacing the heat exchanger unit with couplers](#)" on page 63)."

## Replacing the heat exchanger unit with couplers

- △ **CAUTION:** The heat exchanger unit weighs 23.6 kg (52 lb) with the additional weight of the water. Use extra caution when removing and replacing the top heat exchanger unit because it might be higher than your shoulders and is heavy and awkward to lift.

1. Insert the new heat exchanger unit into the same position as the heat exchanger unit you removed.

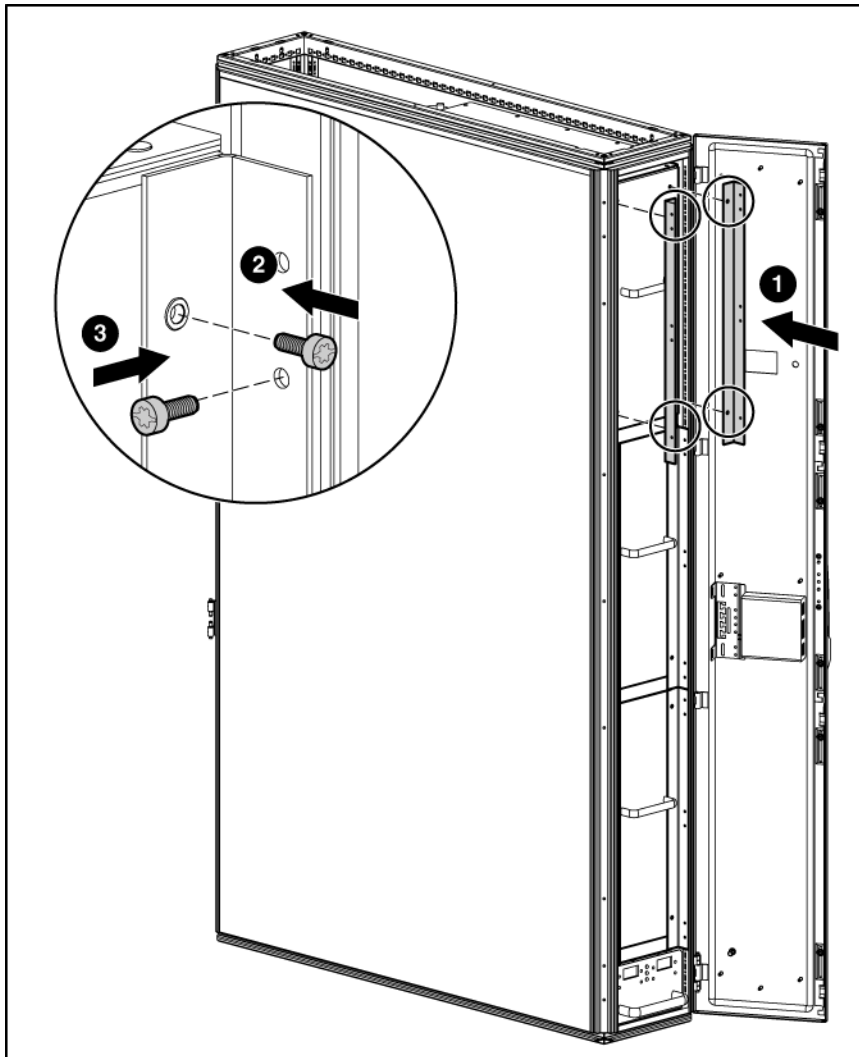


**IMPORTANT:** Keep the Torx screws separated according to their thread type and note which thread type came from which hole location on the shipping bracket.

2. Install the two heat exchanger unit shipping brackets.
  - a. Align the heat exchanger unit shipping brackets to the screw holes on the heat exchanger unit and the MCS frame (1).
  - b. Using a T-25 Torx driver, secure the two heat exchanger unit shipping brackets to the heat exchanger unit by inserting and tightening four Torx screws (2).

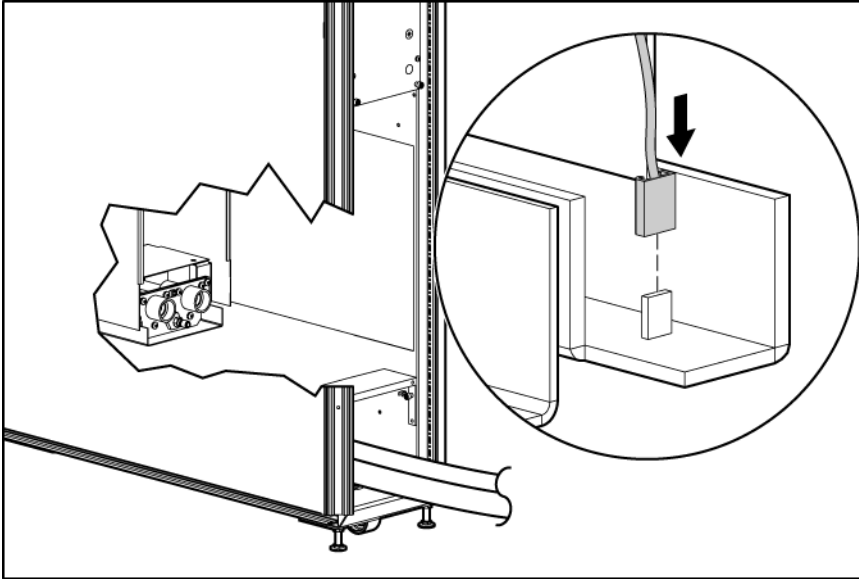


- c. Using a T-25 Torx driver, secure the two shipping brackets to the MCS frame by inserting and tightening four Torx screws (3).

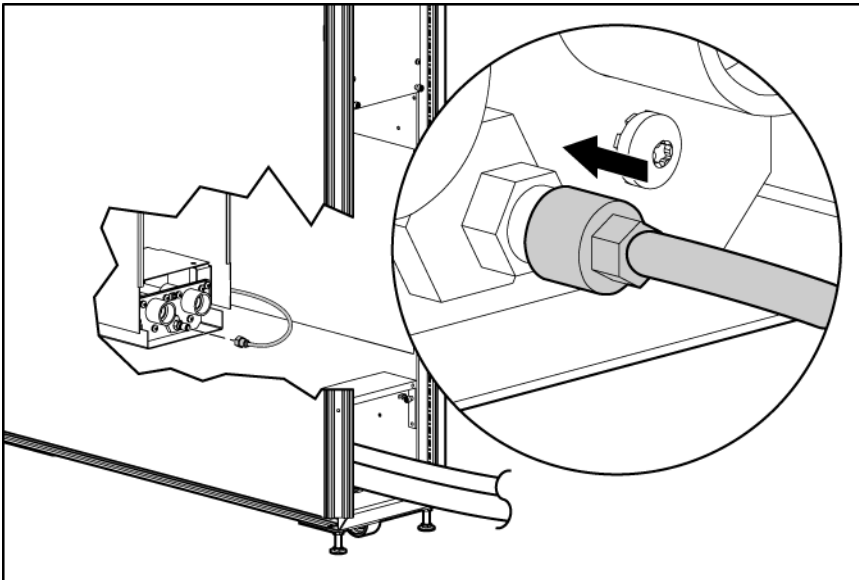


- 3. Open the rear MCS door.

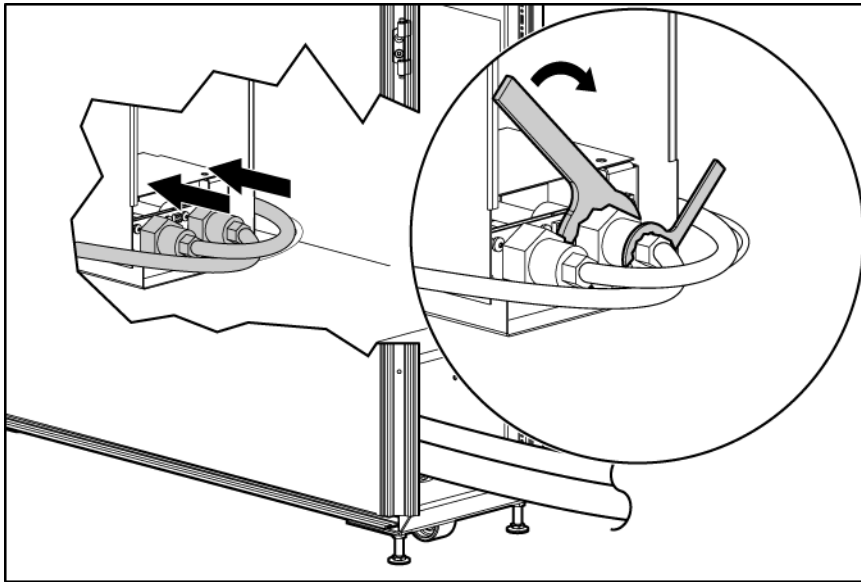
4. Connect the green and yellow ground bonding wire to the heat exchanger unit.



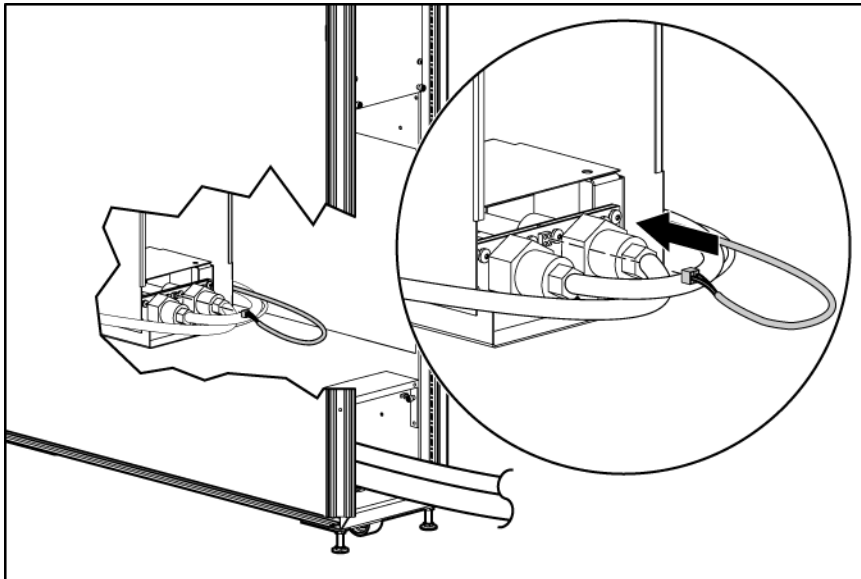
5. Connect the condensation hose to the heat exchanger unit.



- Using the counter hold wrench to hold the fitting in place and the water hose fitting wrench to tighten the water hose (both wrenches are included with your original MCS unit), connect the In and Out water hoses to the heat exchanger unit.



- Connect the temperature sensor connector to the heat exchanger unit.



- Replace the air deflector plate ("Replacing the air deflector plate" on page 34).
- Replace the fan unit ("Replacing the fan unit" on page 52).

Complete the operation checklist (on page 111).

## Heat exchanger unit (HEX) with ball valve

The three heat exchanger units are located on the front of the MCS unit.

You can replace the HEX units during operation.



The following tools are required for installation:

- T-25 Torx driver
- Adjustable wrench or pipe wrench

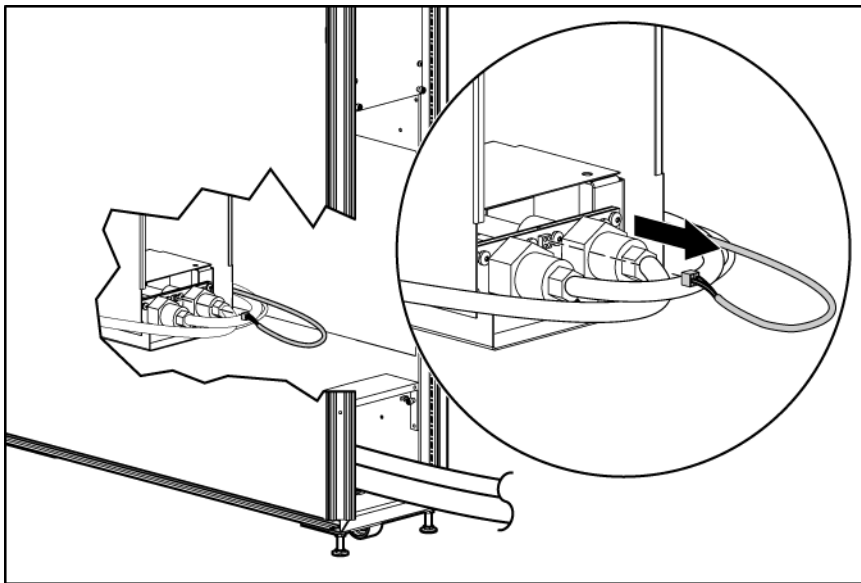
## Removing the heat exchanger unit with ball valves

**NOTE:** For this procedure, remove the fan unit seated directly behind the heat exchanger unit you will remove.

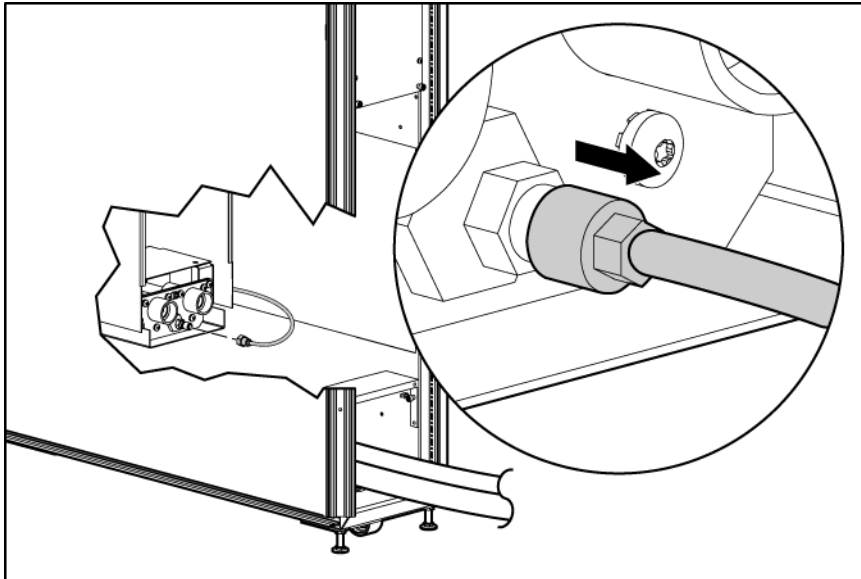
1. Remove the fan unit ("[Removing the fan unit](#)" on page 51).
2. Remove the air deflector plate ("[Removing the air deflector plate](#)" on page 33).

**NOTE:** The heat exchanger units are deep-seated within the MCS unit. To access the connections described in the following steps, extend your arm inside the MCS unit until you come in contact with the appropriate connectors.

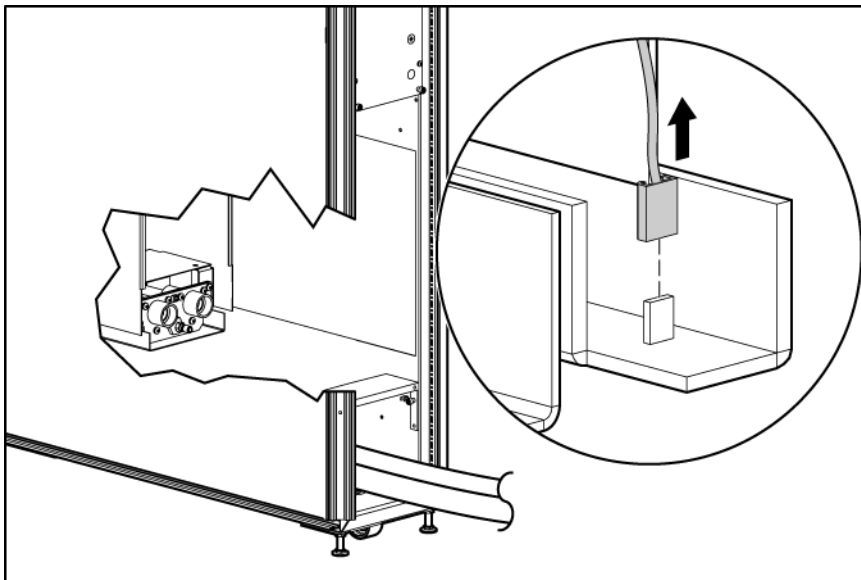
3. Disconnect the temperature sensor connector from the HEX unit.



4. Disconnect the condensation hose from the HEX unit.

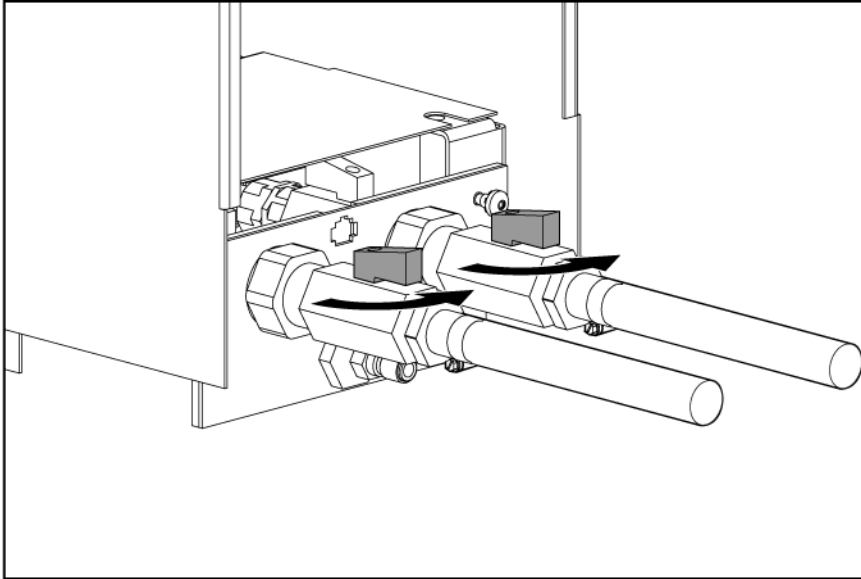


5. Disconnect the green and yellow ground bonding wire grounding the HEX unit to the MCS unit.

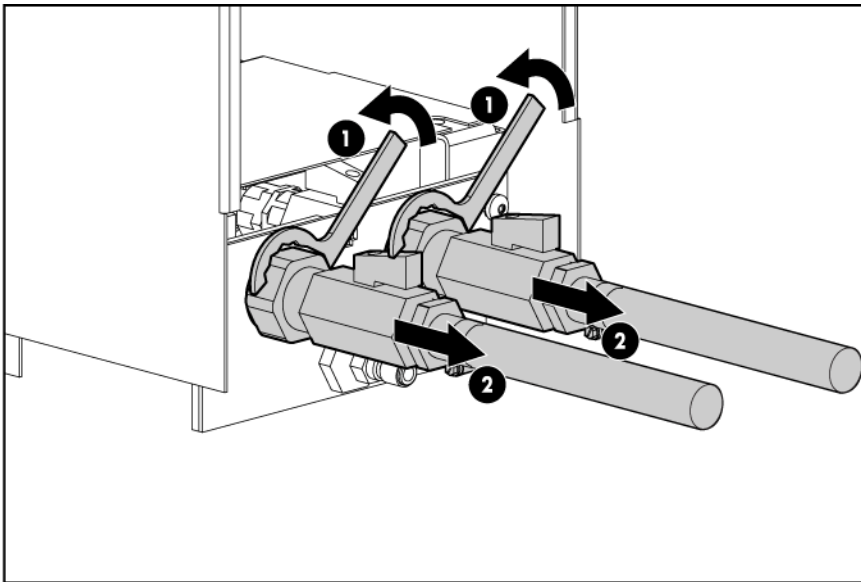


6. Close the two ball valves inside the HEX unit.

7. Close the two ball valves on the hose assemblies attached to the HEX unit.



8. Using an adjustable wrench or a pipe wrench, disconnect the two ball valve hose assemblies from the HEX unit.



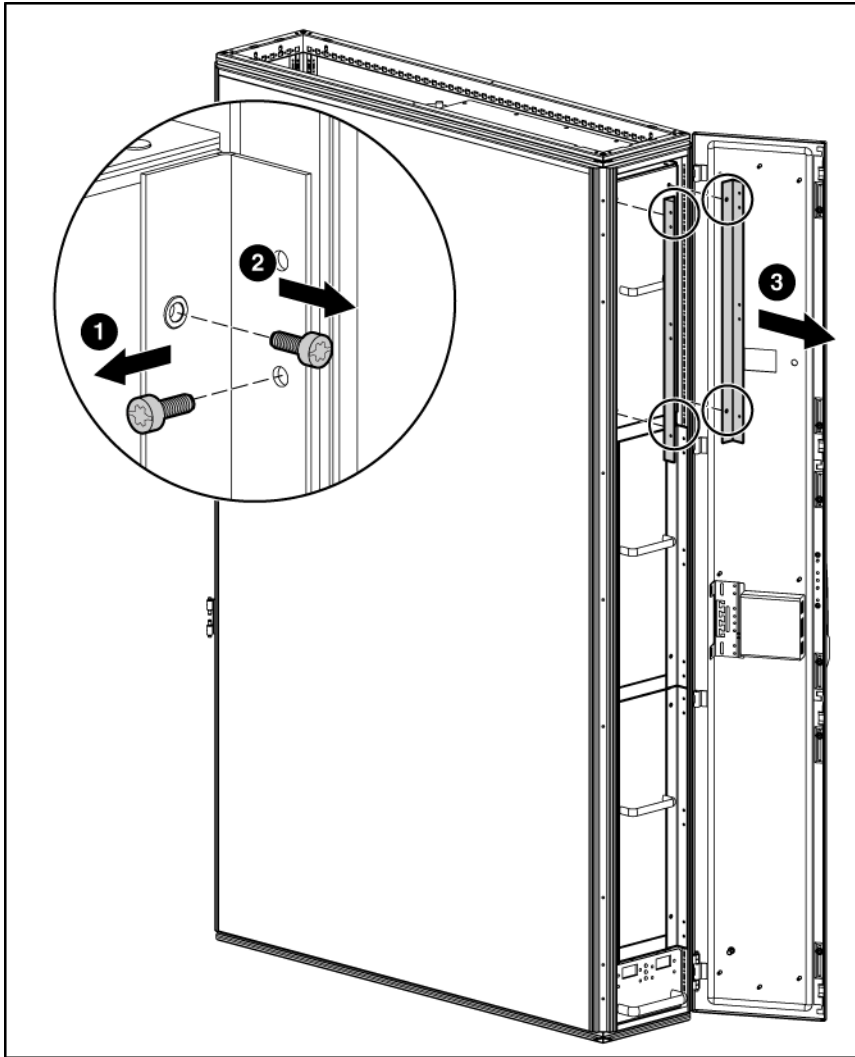
9. Wipe up any excess water from the hoses.
10. Open the front MCS door.



**IMPORTANT:** Keep the Torx screws separated according to their thread type and note which thread type came from which hole location on the shipping bracket.

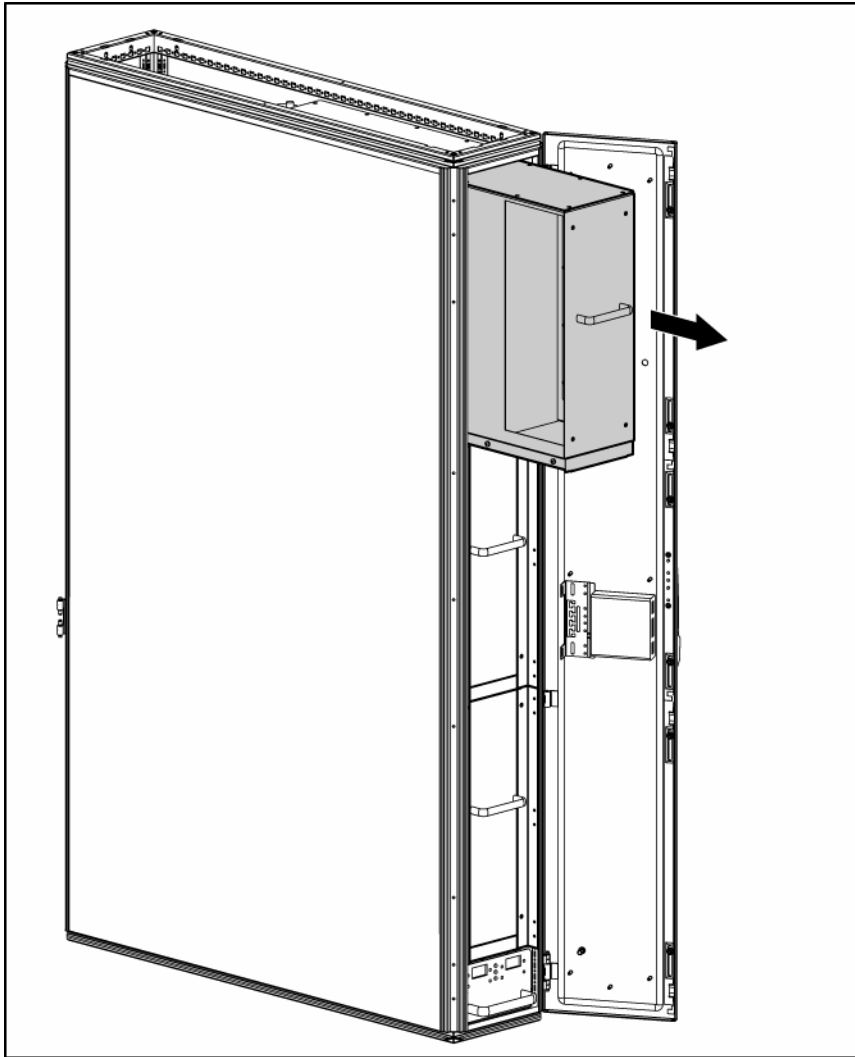
11. Remove the two HEX unit shipping brackets.
  - a. Using a T-25 Torx driver, remove the four Torx screws securing the HEX unit shipping brackets to the MCS frame (1).
  - b. Using a T-25 Torx driver, remove the four Torx screws securing the HEX unit shipping brackets to the heat exchanger unit (2).

- c. Remove the HEX unit shipping brackets from the MCS unit (3).



**⚠ CAUTION:** The heat exchanger unit weighs 23.6 kg (52 lb) with the additional weight of the water. Use extra caution when removing and replacing the top heat exchanger unit because it might be higher than your shoulders and is heavy and awkward to lift.

12. Pull the HEX unit out toward you.



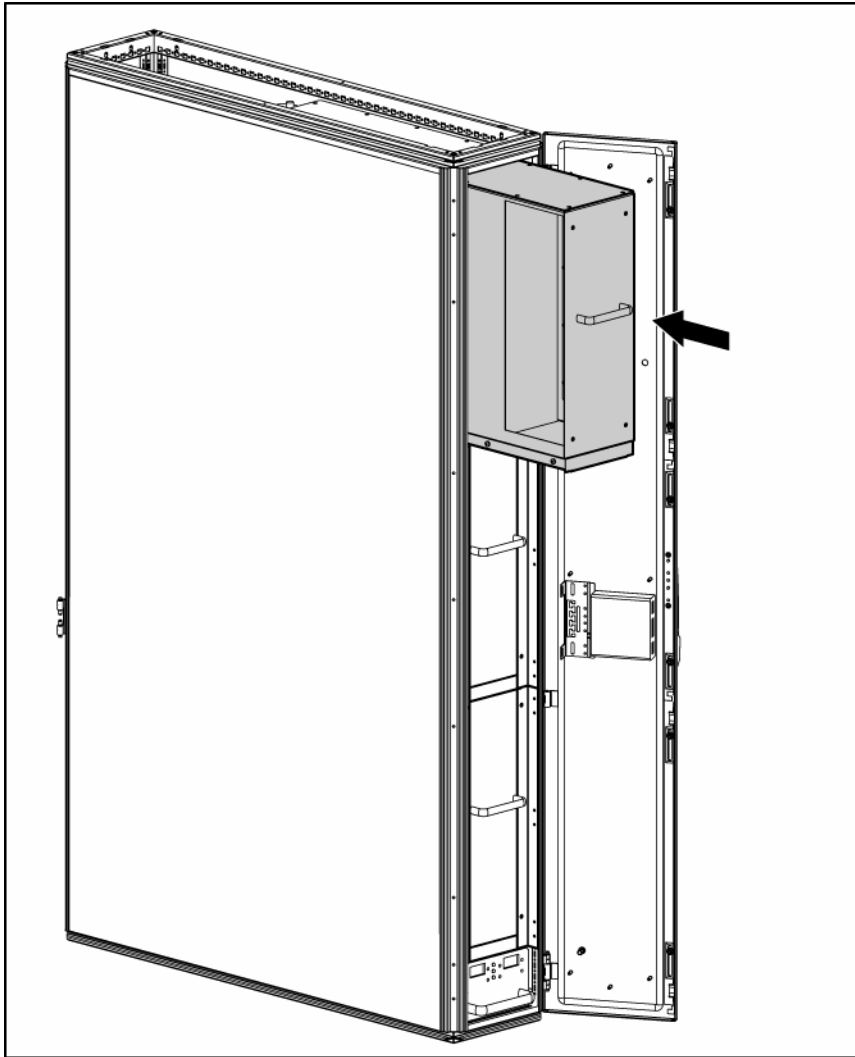
To replace this component, see "Replacing the heat exchanger unit with ball valves (on page 72)."

## Replacing the heat exchanger unit with ball valves

- △ **CAUTION:** The heat exchanger unit weighs 23.6 kg (52 lb) with the additional weight of the water. Use extra caution when removing and replacing the top heat exchanger unit because it might be higher than your shoulders and is heavy and awkward to lift.



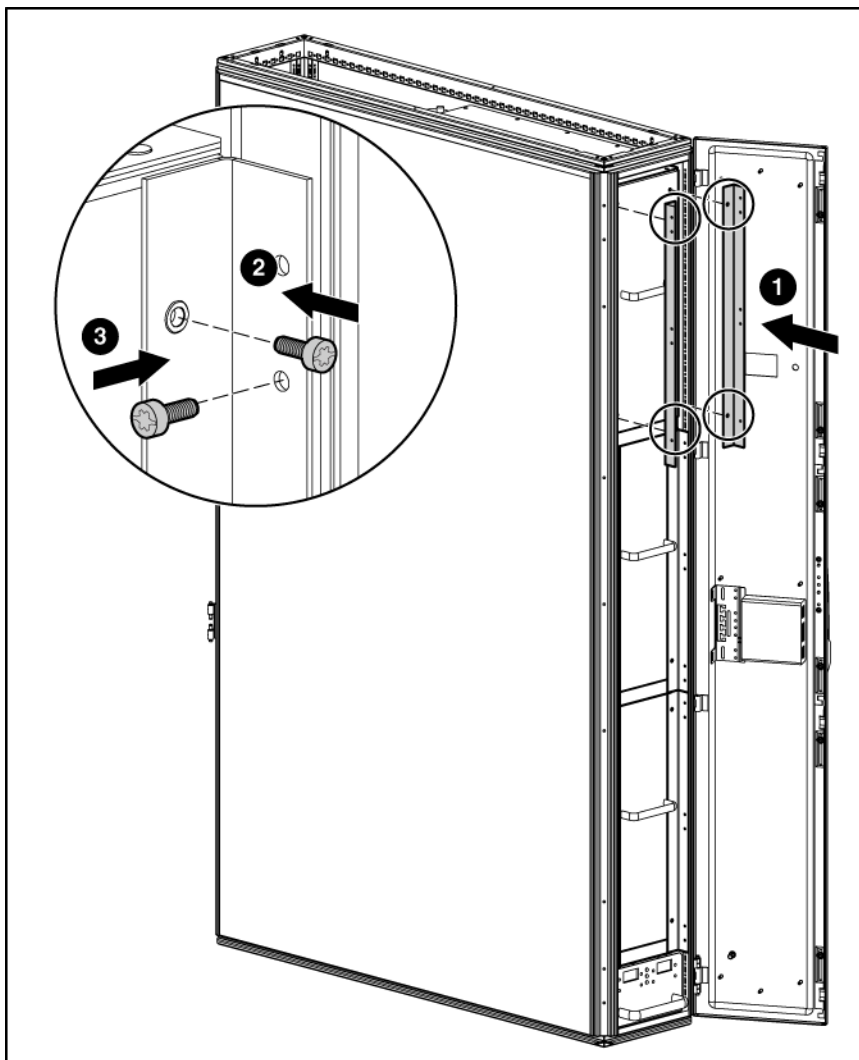
1. Insert the new HEX unit into the same position as the HEX unit you removed.



**IMPORTANT:** Keep the Torx screws separated according to their thread type and note which thread type came from which hole location on the shipping bracket.

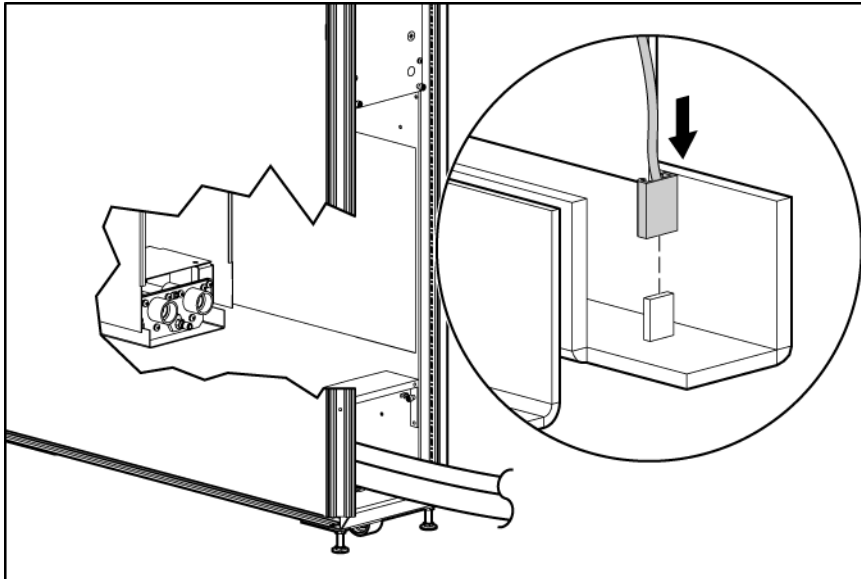
2. Install the two HEX unit shipping brackets.
  - a. Align the HEX unit shipping brackets to the screw holes on the HEX unit and the MCS frame (1).
  - b. Using a T-25 Torx driver, secure the two HEX unit shipping brackets to the heat exchanger unit by inserting and tightening four Torx screws (2).

- c. Using a T-25 Torx driver, secure the two HEX unit shipping brackets to the MCS frame by inserting and tightening four Torx screws (3).

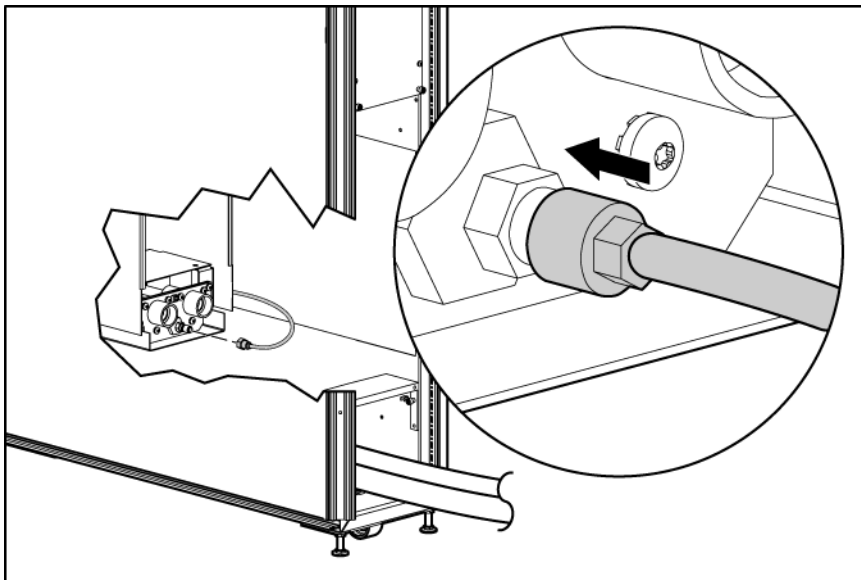


- 3. Open the rear MCS door.

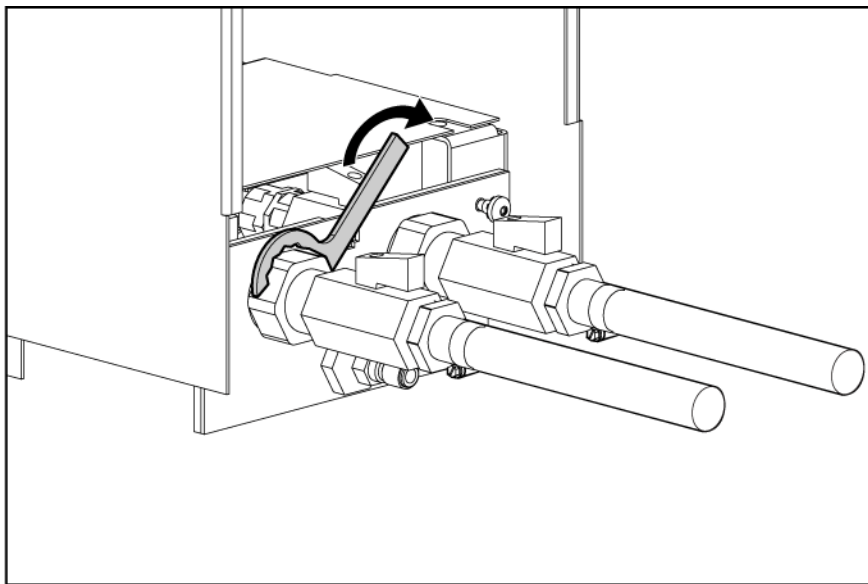
4. Connect the green and yellow ground bonding wire to the HEX unit.



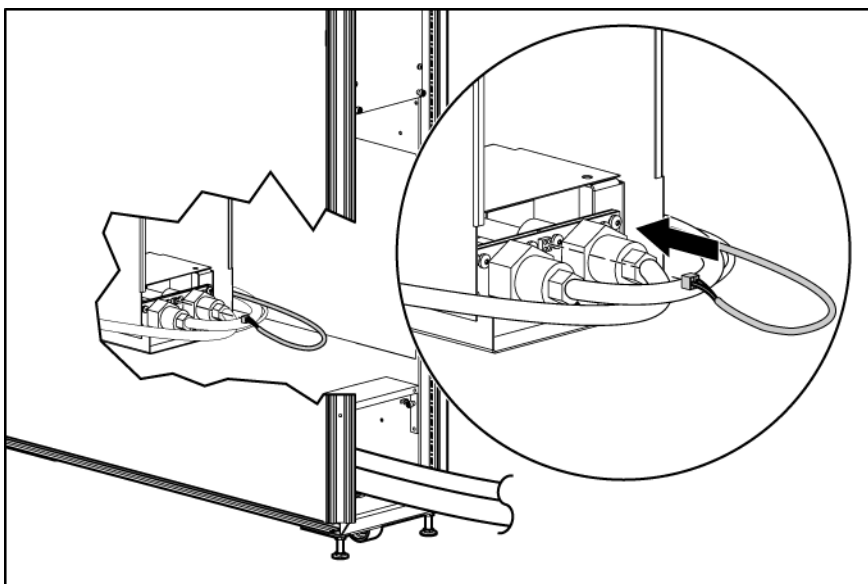
5. Connect the condensation hose to the HEX unit.



- Using an adjustable wrench or a pipe wrench, connect the two ball valve hose assemblies to the HEX unit.



- Connect the temperature sensor connector to the HEX unit.



- Open the ball valves inside the HEX unit.

9. Open the ball valves on the hose assemblies.



10. Confirm that water is flowing through the ball valve couplers, by touching the couplers. The couplers should be cold.
11. Replace the hose insulation over the couplers.
12. Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
13. Replace the fan unit ("[Replacing the fan unit](#)" on page 52).
14. Complete the operation checklist (on page 111).

## HEX coupling

The three HEX couplings are located at the rear of each HEX unit inside the MCS unit.

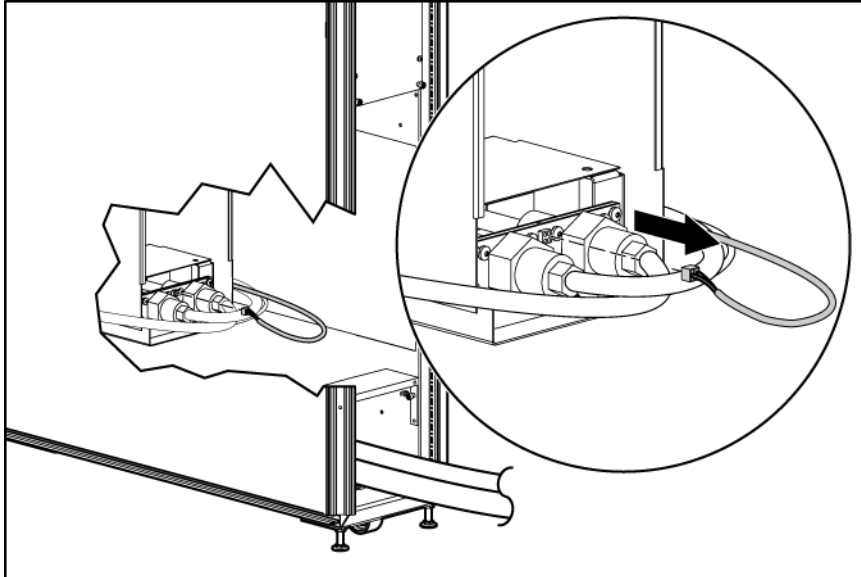


The following tools are required for installation:

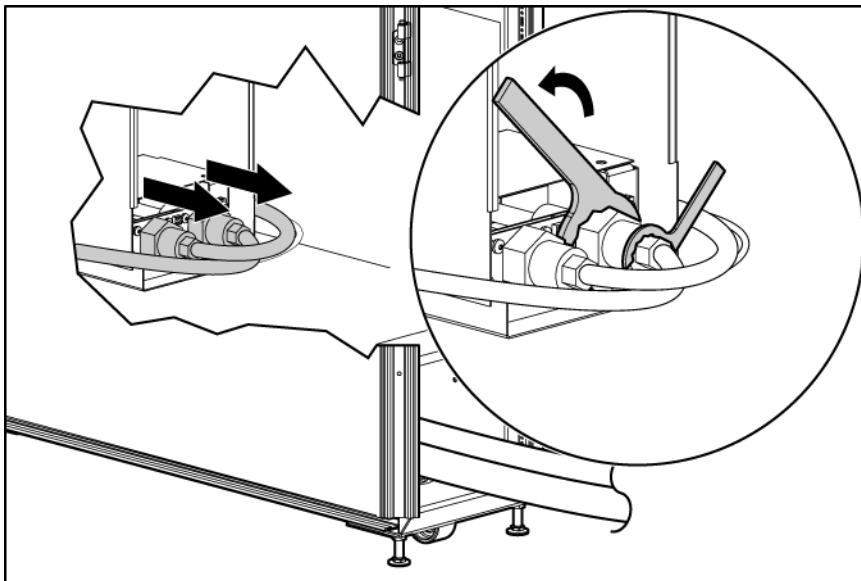
- T-25 Torx driver
- Water hose fitting wrench (included with your original MCS unit)
- Counter hold wrench (included with your original MCS unit)
- Flathead screwdriver
- Utility knife

## Removing the HEX coupling

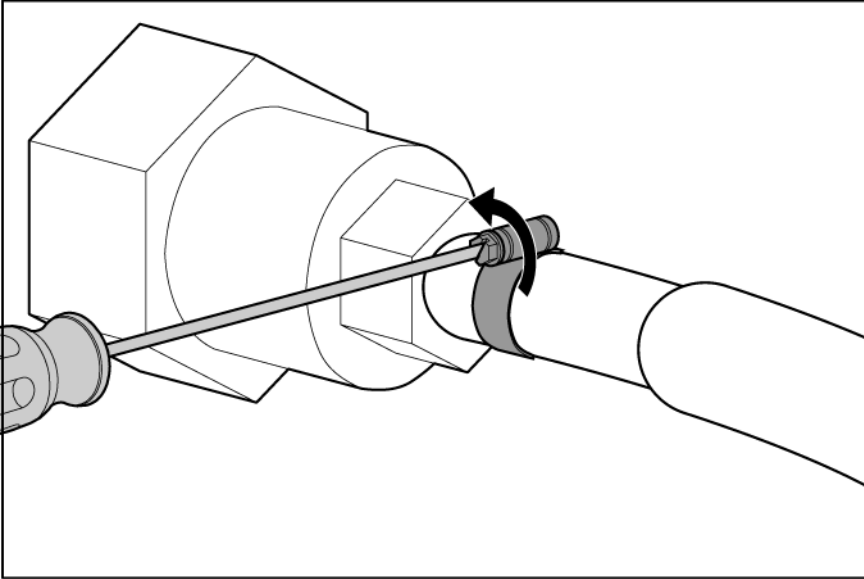
1. Shut off the water flowing into the MCS unit. ("[Shutting off the water](#)" on page 25)
2. Remove the corresponding fan unit. ("[Removing the fan unit](#)" on page 51)
3. Remove the corresponding air deflector plate. ("[Removing the air deflector plate](#)" on page 33)
4. Disconnect the temperature sensor cable from the heat exchanger unit.



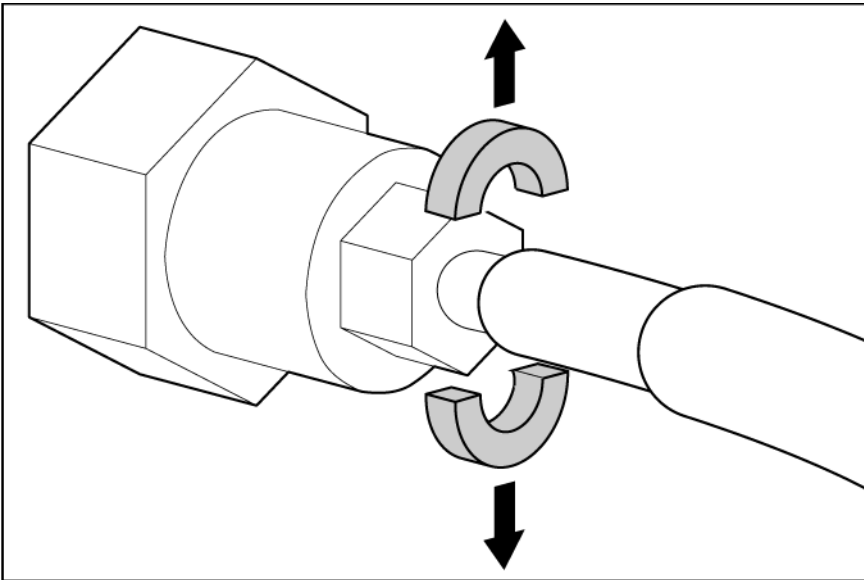
5. Slide back the insulation on either the In or Out water hose.
6. Using the water hose fitting wrench and the counter hold wrench, disconnect either the In or Out water hose from the heat exchanger unit.



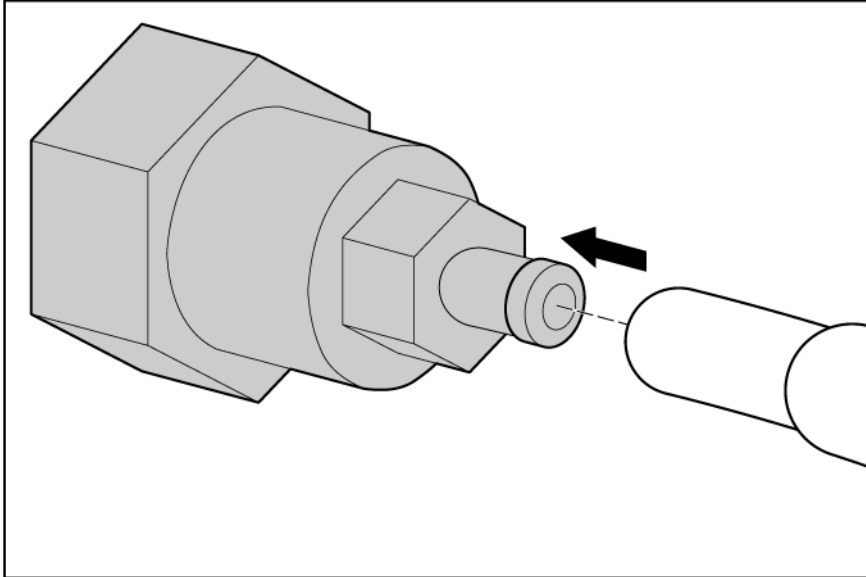
7. Using a flathead screwdriver, loosen the hose from the HEX coupling.



8. Using a utility knife, carefully trim approximately 0.64 cm (0.25 in) off the water hose.



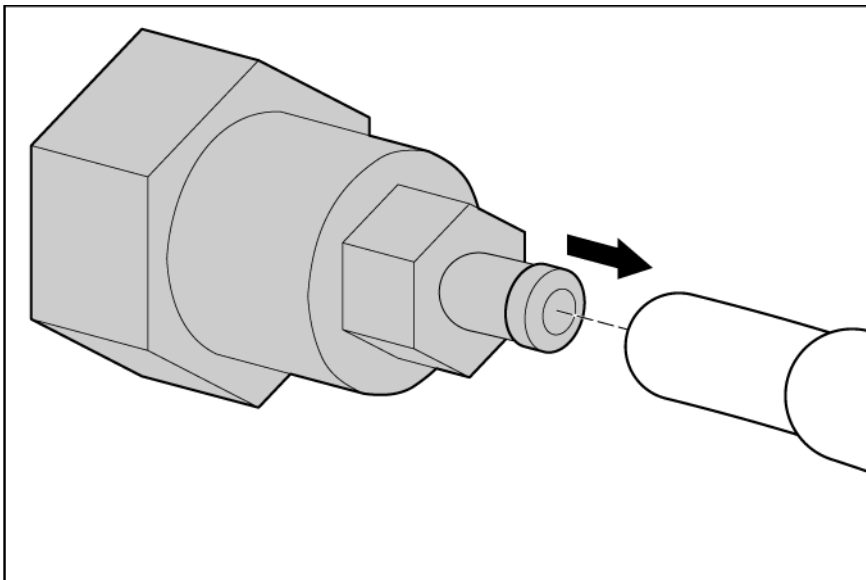
9. Remove the HEX coupling from the water hose.



To replace this component, see "Replacing the HEX coupling (on page 80)."

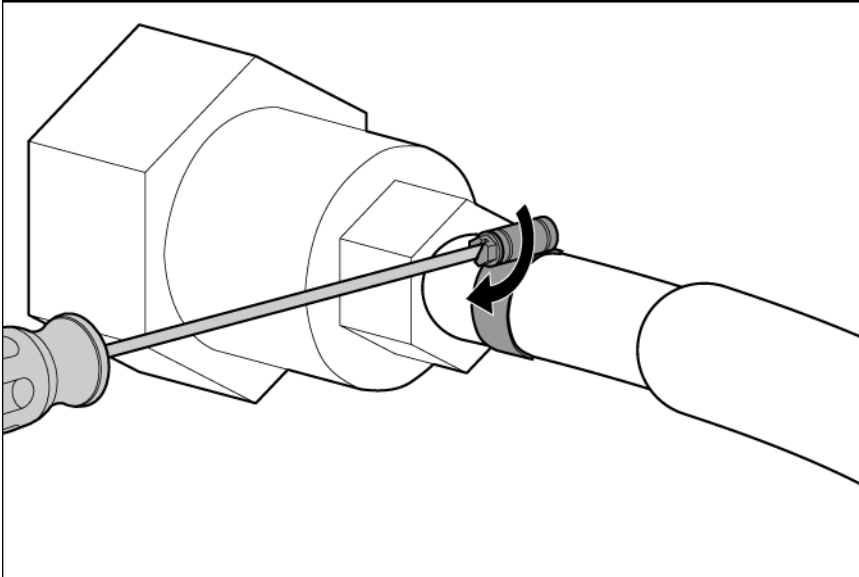
## Replacing the HEX coupling

1. Insert the HEX coupling into the water hose.

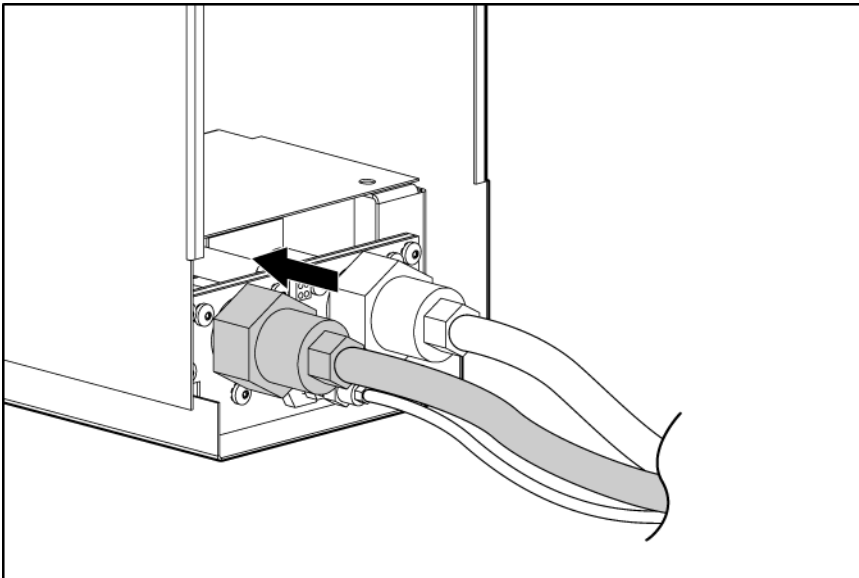




2. Using a flathead screwdriver, tighten the hose clamp.

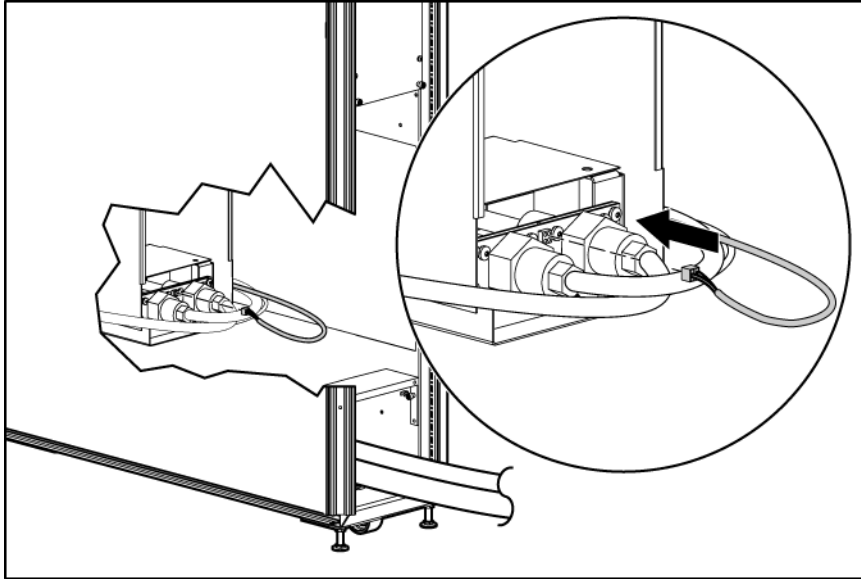


3. Connect the HEX coupling to the heat exchanger unit.



4. Using the water hose fitting wrench and the counter hold wrench, reconnect the appropriate In or Out water hose to the heat exchanger unit.
5. Confirm that the HEX coupling is fully engaged between the heat exchanger bulkhead and the coupling nut.

6. Reconnect the temperature sensor cable to the heat exchanger unit.



7. Slide the insulation back in place on the In or Out water hose up against the coupling.
8. Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
9. Replace the fan unit ("[Replacing the fan unit](#)" on page 52).
10. Restore water flow to the MCS unit ("[Restoring water flow](#)" on page 112).
11. Complete the operation checklist (on page 111).

## Magnetic solenoid valve

The magnetic solenoid valve is a component of the water group located at the bottom interior of the MCS unit.



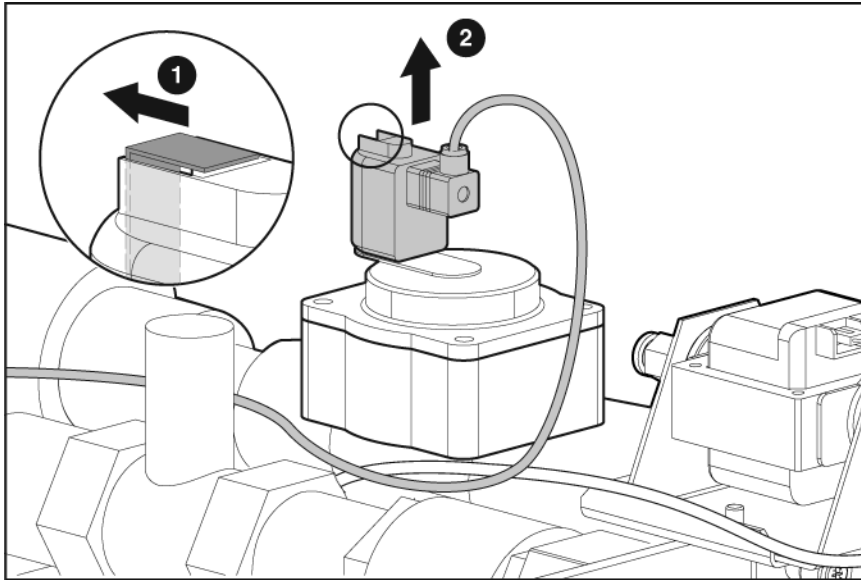
The following tools are required for installation:

- T-25 Torx driver
- Phillips screwdriver

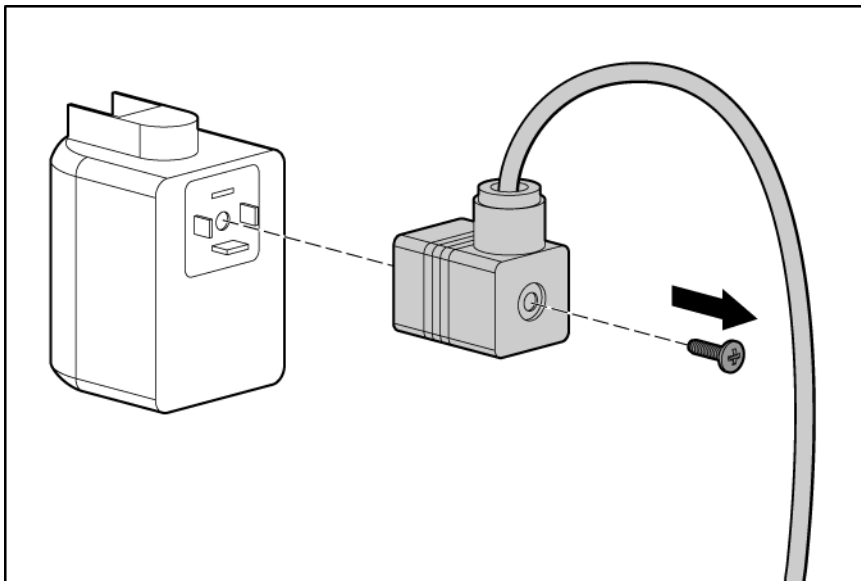
## Removing the magnetic solenoid valve

1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).

2. Remove the bottom fan unit ("[Removing the bottom fan unit](#)" on page 44).
3. Remove the air deflector plate ("[Removing the air deflector plate](#)" on page 33).
4. Adjust the water hoses connected to the rear of the bottom heat exchanger unit and hold them out of the way to reach the magnetic solenoid on the valve. This process can be difficult. If you struggle excessively, disconnect the In and Out water hoses on the back of the bottom heat exchanger unit using the counter hold wrench and the water hose fitting wrench.
5. On the magnetic solenoid valve, release the silver retainer tab (1), and remove the magnetic solenoid from the valve post (2).



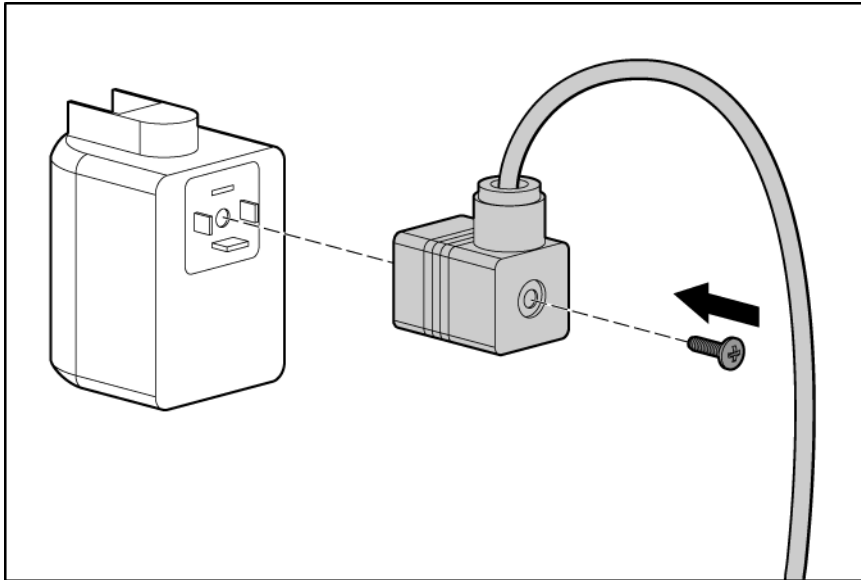
6. Using a Phillips screwdriver, remove the Phillips screw securing the electrical connector to the magnetic solenoid.



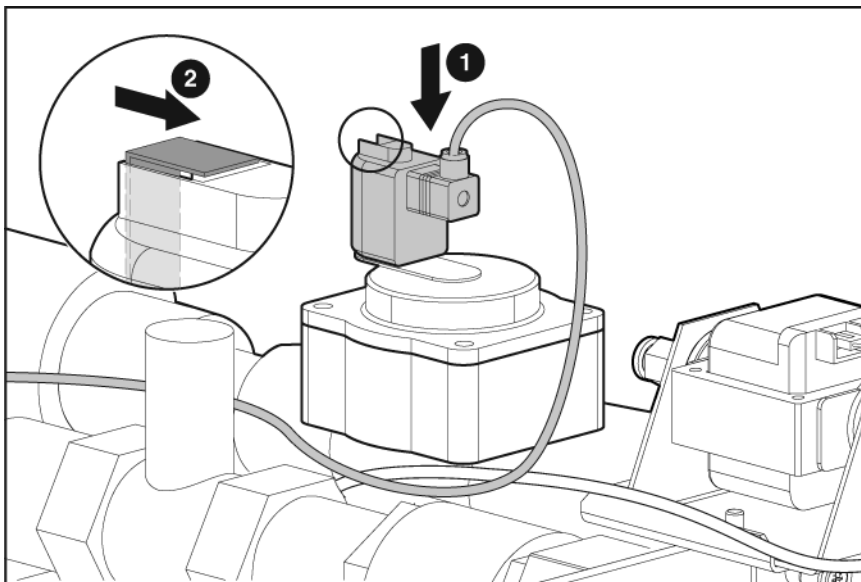
To replace the component, see "[Replacing the magnetic solenoid valve \(on page 84\)](#)."

## Replacing the magnetic solenoid valve

1. Using a Phillips screwdriver, connect the electrical connector from the MCS unit to the magnetic solenoid by inserting and tightening one Phillips screw.



2. Adjust the water hoses connected to the rear of the bottom heat exchanger unit and hold them out of the way to reach the solenoid valve post. This process can be difficult. If you struggle excessively, disconnect the In and Out water hoses connected to the bottom heat exchanger unit using the counter hold wrench and the water hose fitting wrench.
3. Place the magnetic solenoid back on the valve post (1), and press down until the silver retainer tab locks the magnetic solenoid in place on the valve (2).



4. Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
5. Replace the bottom fan unit ("[Replacing the bottom fan unit](#)" on page 45).
6. Complete the operation checklist (on page 111).

# Management module

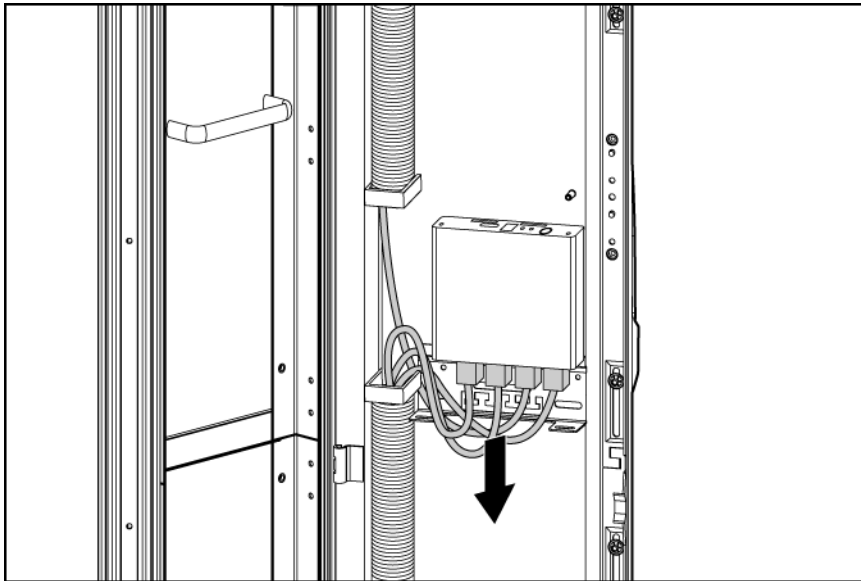
The management module is located on the inside of the front door of the MCS unit.



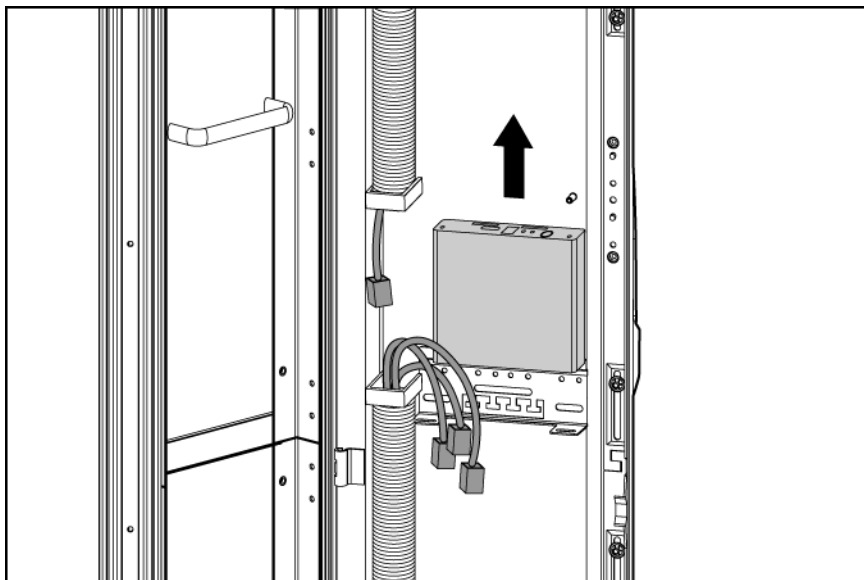
No tools are required for this procedure.

## Removing the management module

1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).
2. Open the front MCS door.
3. Disconnect the electrical cables from the management module.



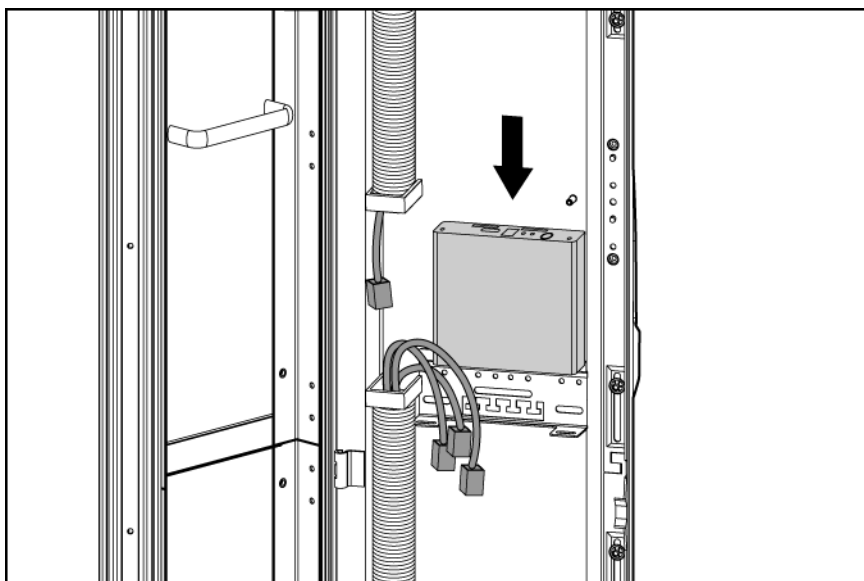
4. Slide the management module off of the mounting bracket, and remove it from the inside of the front MCS door.



To replace this component, see "Replacing the management module (on page 86)."

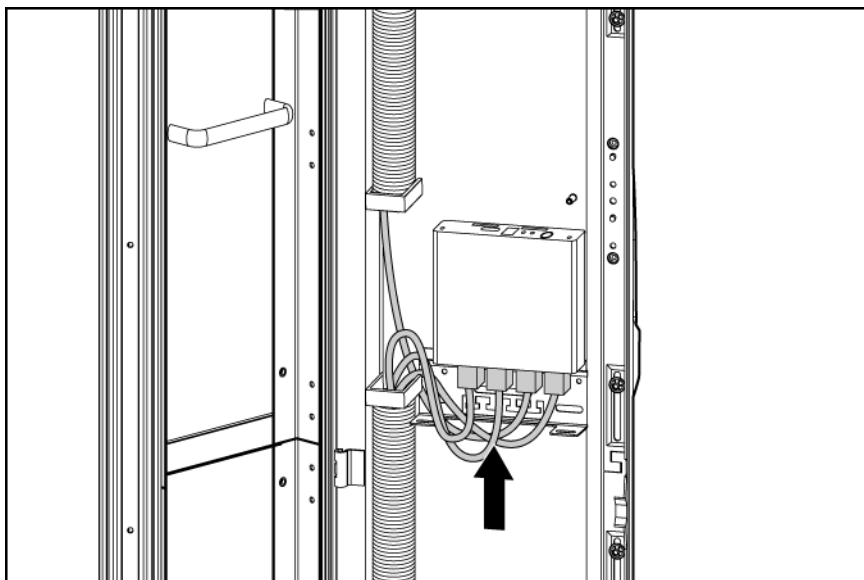
## Replacing the management module

1. Slide the management module onto the mounting bracket until it locks in place.

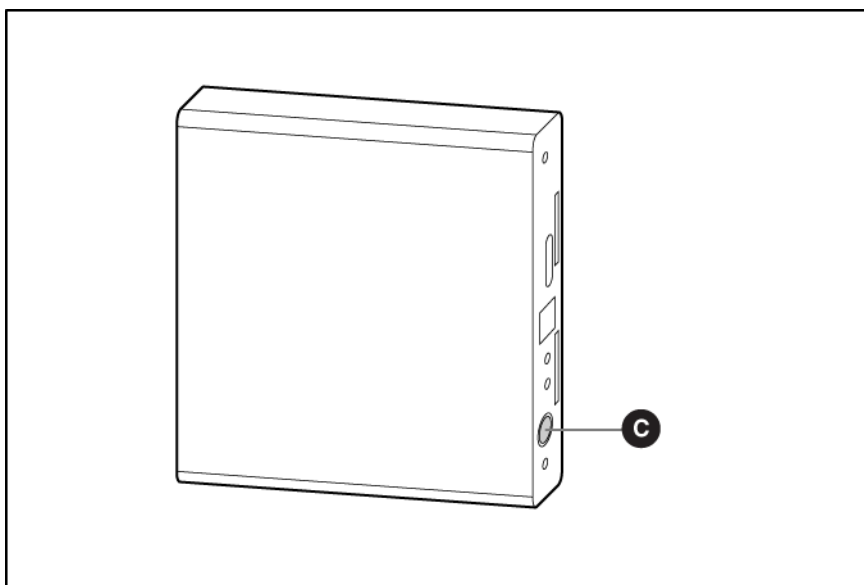


**CAUTION:** To avoid damage to the management module connectors, do not allow the cables to pull on the management module connectors.

2. Connect the electrical cables from the MCS unit to the management module.



3. Power on the management module.
4. Press and hold the **C** key for five seconds to confirm the configuration settings.



5. Complete the operation checklist (on page 111).

# Operator display

The operator display is located on the front door of the MCS unit.

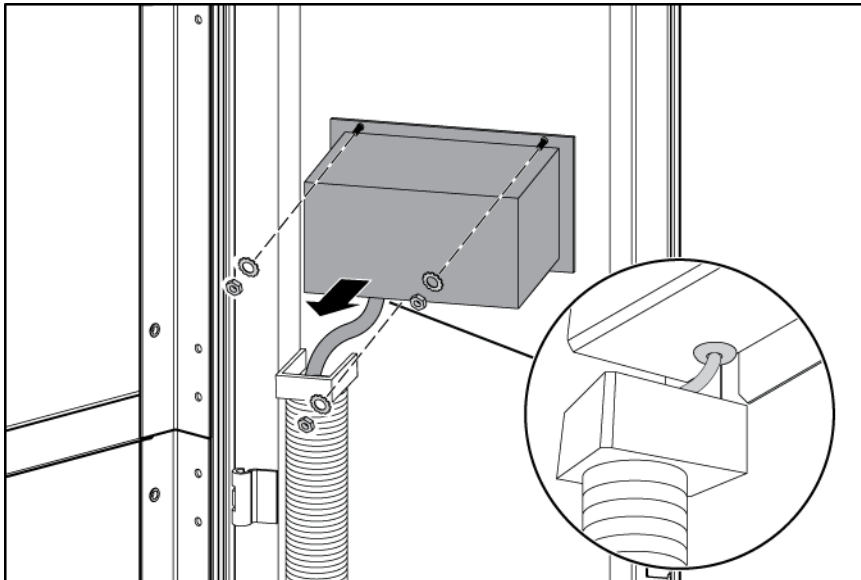


The following tools are required for installation:

- 8-mm socket
- Small Flathead screwdriver

## Removing the operator display

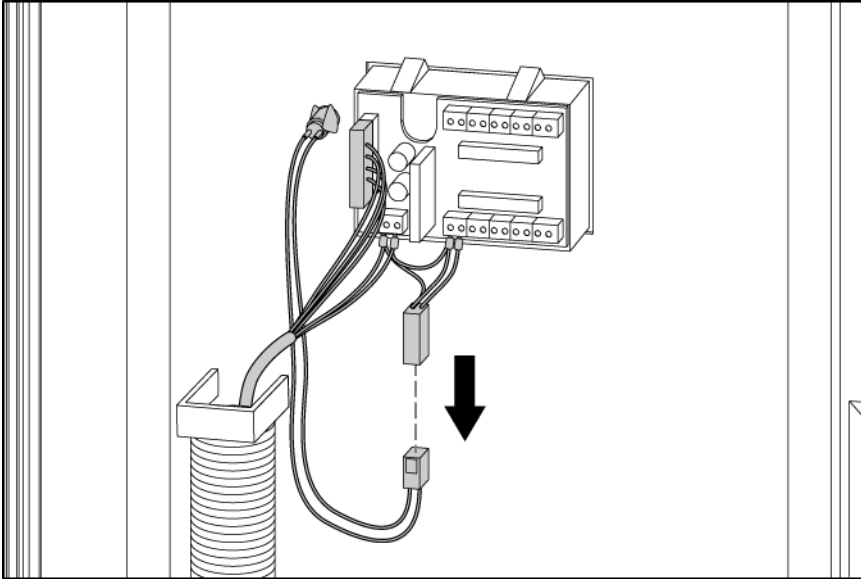
1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).
2. Open the front MCS door.
3. Using an 8 mm socket or wrench, remove the three nuts and external star washers securing the operator display rear cover to the back of the front MCS door.



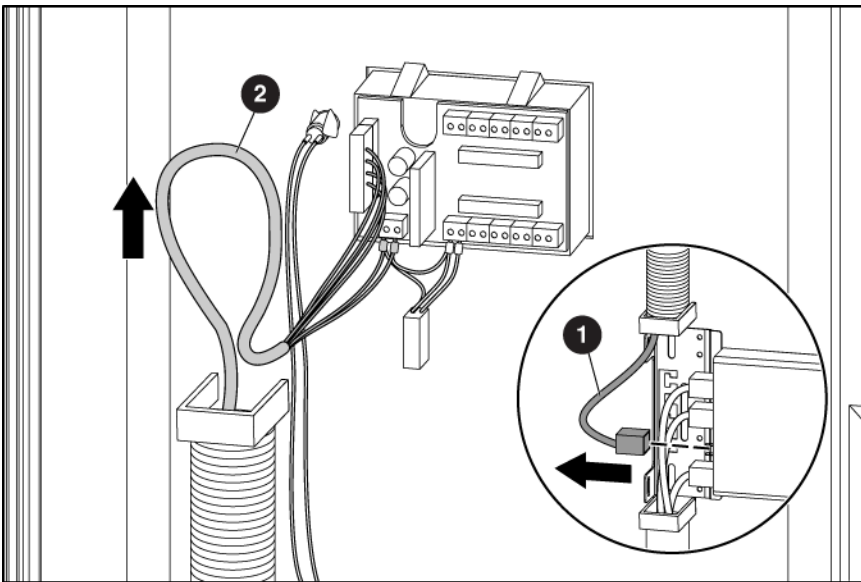
4. Remove the operator display rear cover.



5. Disconnect the connector between the operator display and the display button.



6. Disconnect the connector from the management module (1), and pull the cable up through the cable management hose (2).

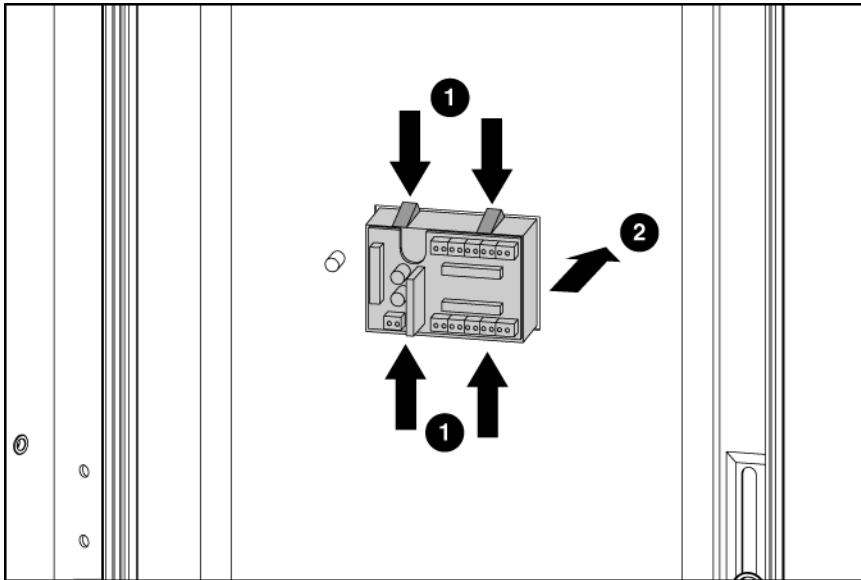


7. Squeeze the four release tabs on the top and bottom of the operator display (1), and push the operator display from the back to the front through the front MCS door (2).

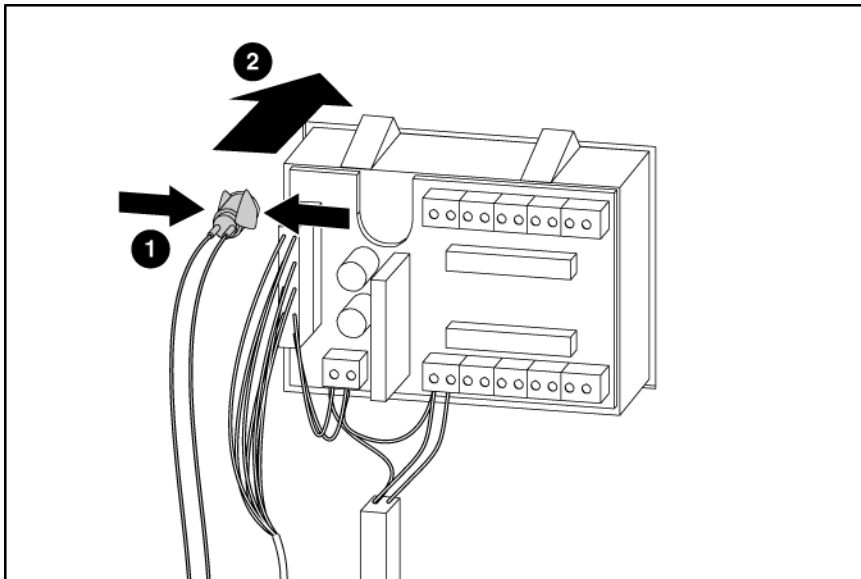
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**NOTE:** Cables are removed for clarity.

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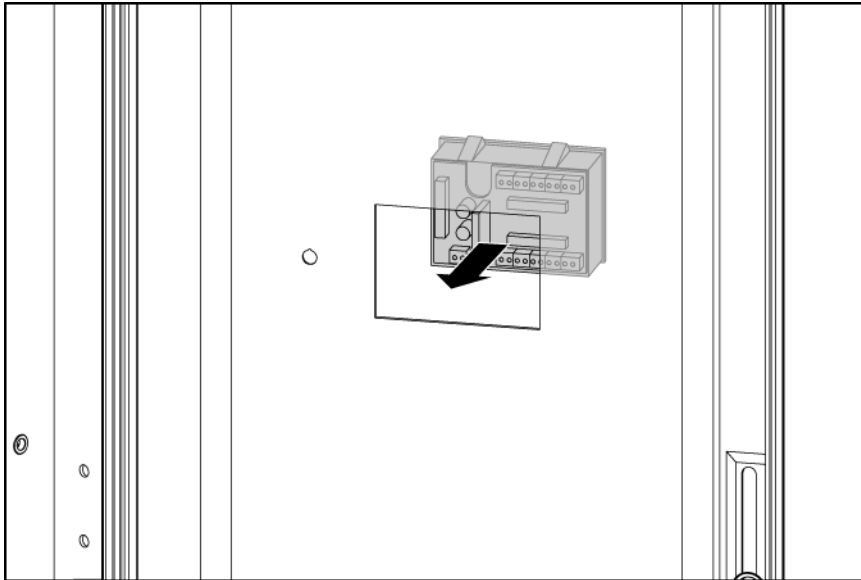
8. Remove the display button by squeezing the two release tabs on the sides of the display button (1) and pushing the display button from the back to the front through the front MCS door (2).



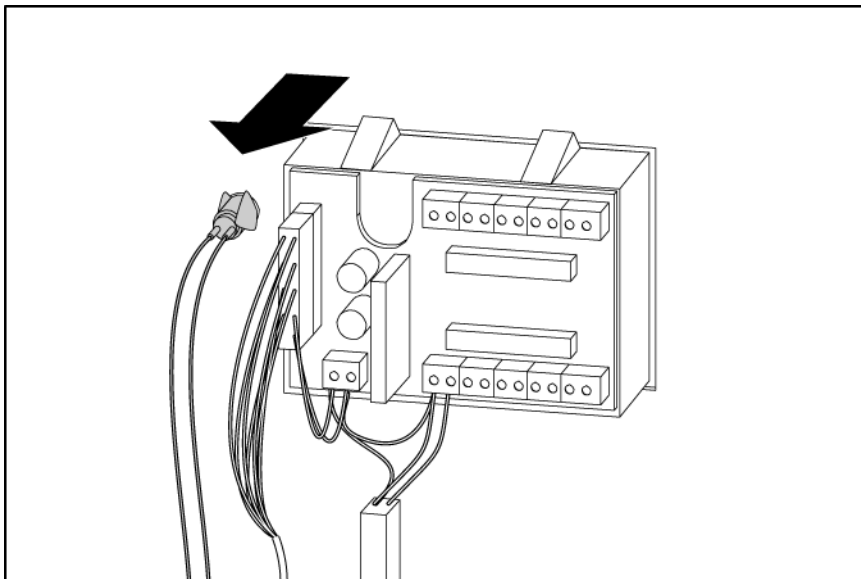
To replace this component, see "Replacing the operator display (on page 91)."

## Replacing the operator display

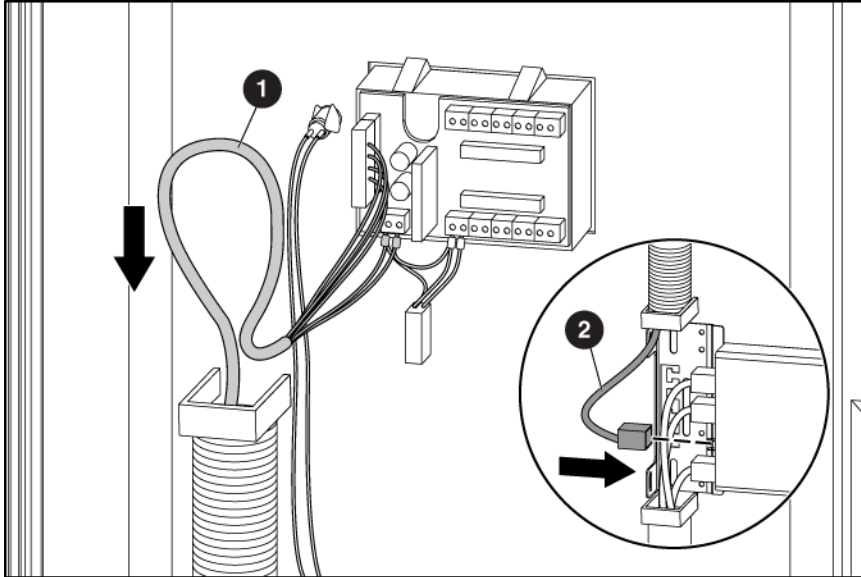
1. Hold the four release tabs while pushing the operator display from the front to the back through the front MCS door.



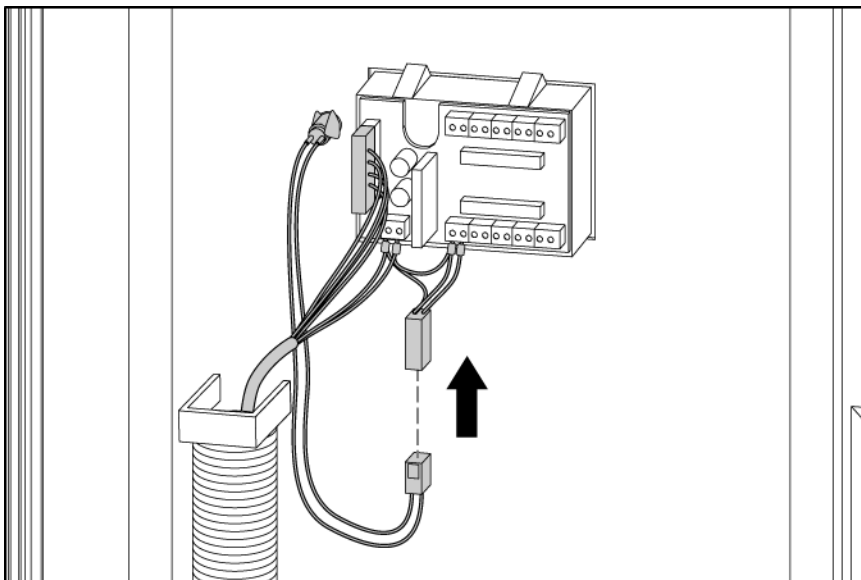
2. Hold the two release tabs while pushing the display button from the front to the back through the front MCS door.



3. Push the cable down through the cable management hose (1), and connect it to the management module connector (2).

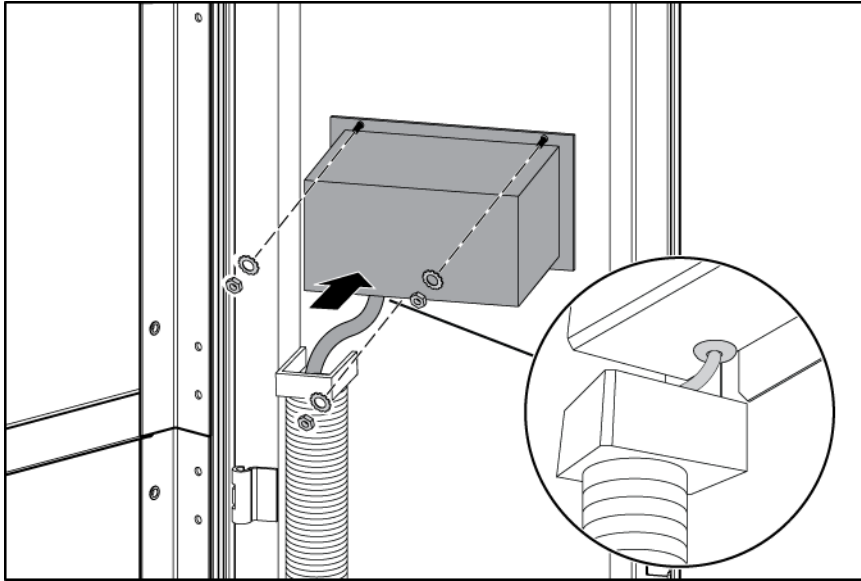


4. Connect the connector between the operator display and display button.



5. Slide any extra slack in the cable lines up into the operator display rear cover, and secure by inserting the rubber grommet into the designated notch on the operator display rear cover.

- Using an 8 mm socket or wrench, secure the operator display rear cover to the back of the operator display by inserting three nuts and external star washers.



- Complete the operation checklist (on page 111).

## Power inlet box

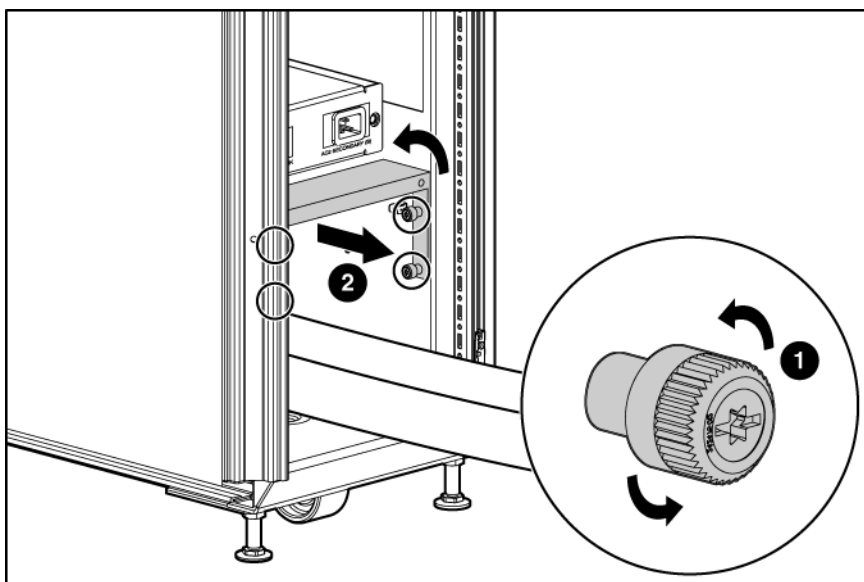
The power inlet box is not a spare part. The relocation instructions for the power inlet box are provided so that you can access other components.

No tools are required for this procedure.

## Relocating the power inlet box

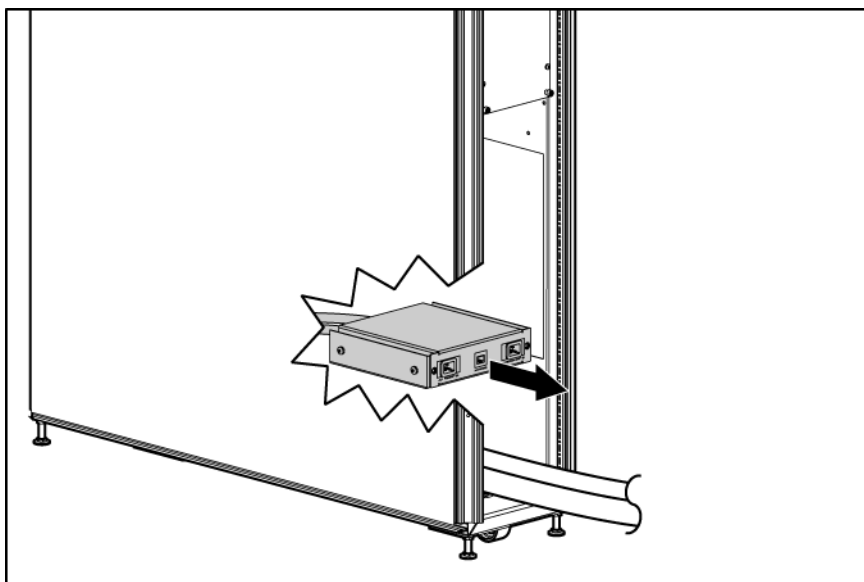
- Disconnect the green and yellow ground bonding wire grounding the outer support bracket to the MCS unit.
- Remove the outer support bracket.
  - Loosen the four thumbscrews securing the outer support bracket to the MCS unit (1).

- b. Lift the right side of the bracket up at a slant, and pull the bracket out of the MCS unit (2).

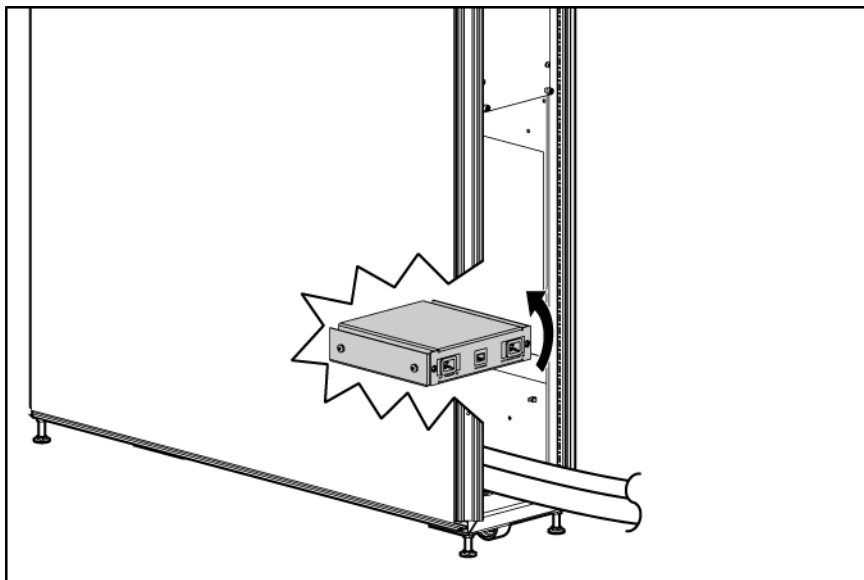


**IMPORTANT:** Do not disconnect any of the internal electrical connections to the power inlet box.

3. Pull the power inlet box toward you until it stops.



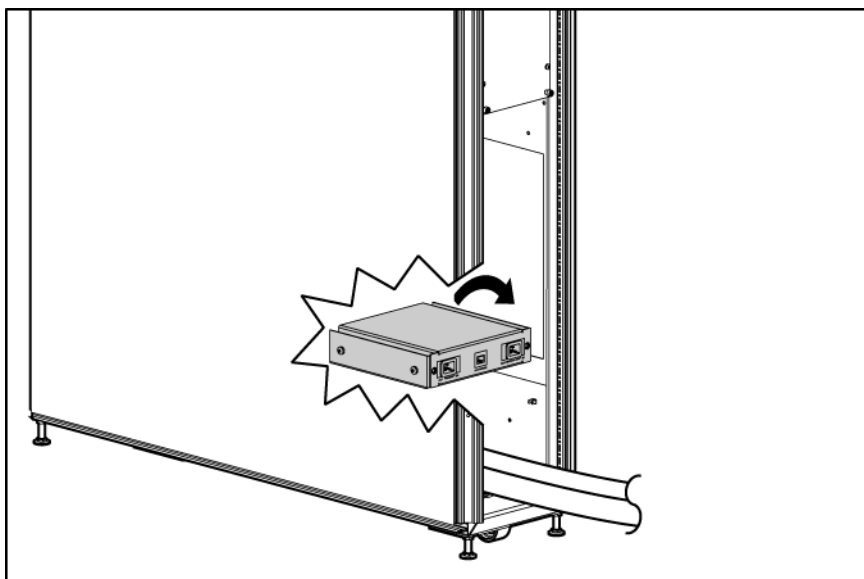
4. Set the power inlet box aside in the side cavity by lifting the right side of the power inlet box up until the box sits vertically on the left side of the MCS unit.



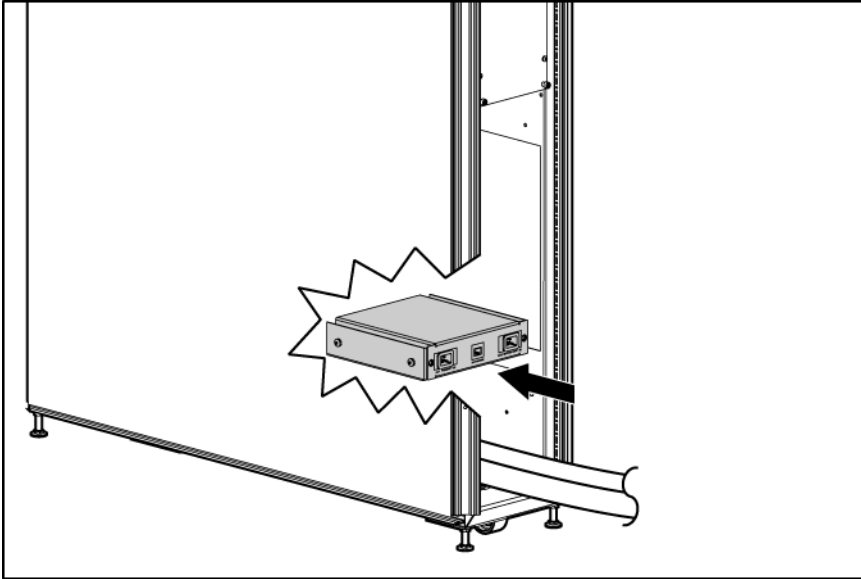
To replace this component, see "Relocating the power inlet box back into position (on page 95)."

## Relocating the power inlet box back into position

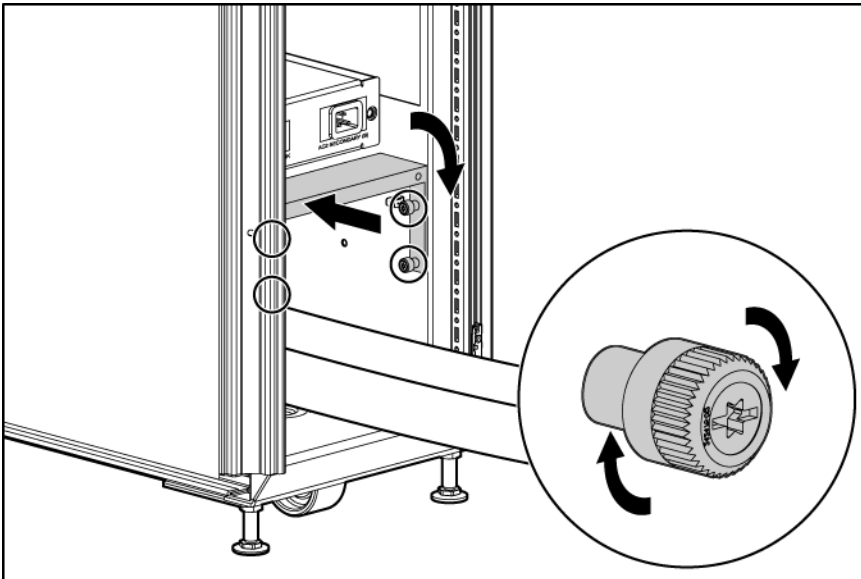
1. Lower the right side of the power inlet box until it is back into the horizontal position.



2. Push the power inlet box back into the MCS unit until it locks in place.



3. Replace the outer support bracket.
  - a. Lift the right side of the bracket up at a slant, and slide the bracket into the MCS unit.
  - b. Tighten the four thumbscrews to secure the outer bracket to the MCS unit.



4. Connect the green and yellow ground bonding wire to ground the outer support bracket to the MCS unit.



# Water group controller

The water group controller is located at the bottom front of the MCS unit.

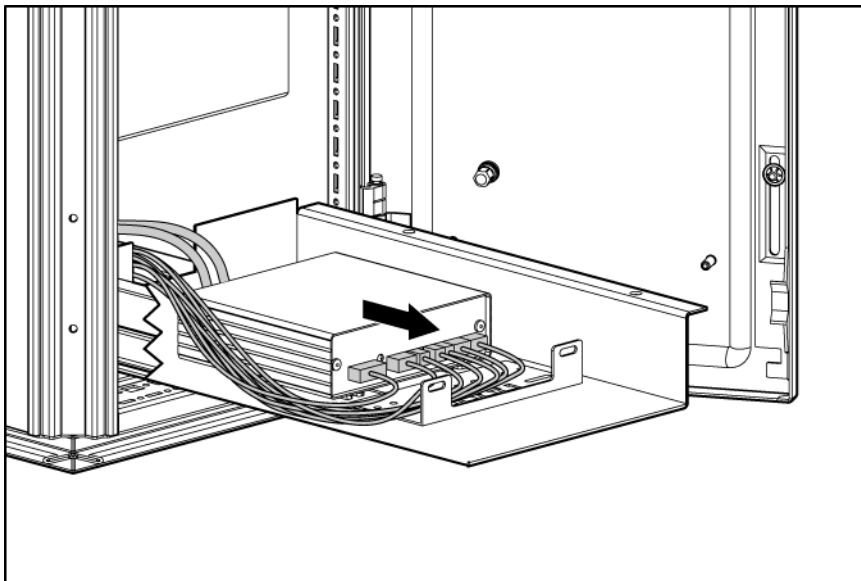


The following tools are required for installation:

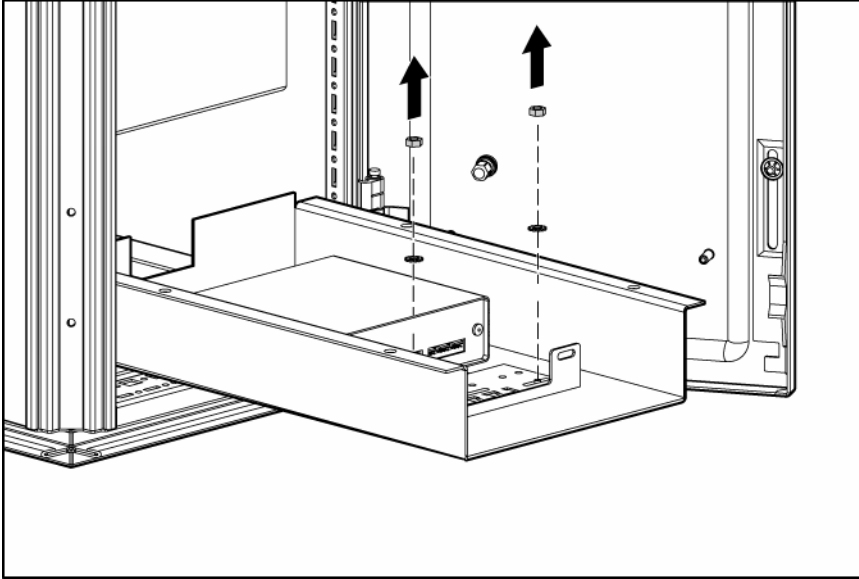
- T-25 Torx driver
- Flathead screwdriver
- 8-mm socket

## Removing the water group controller

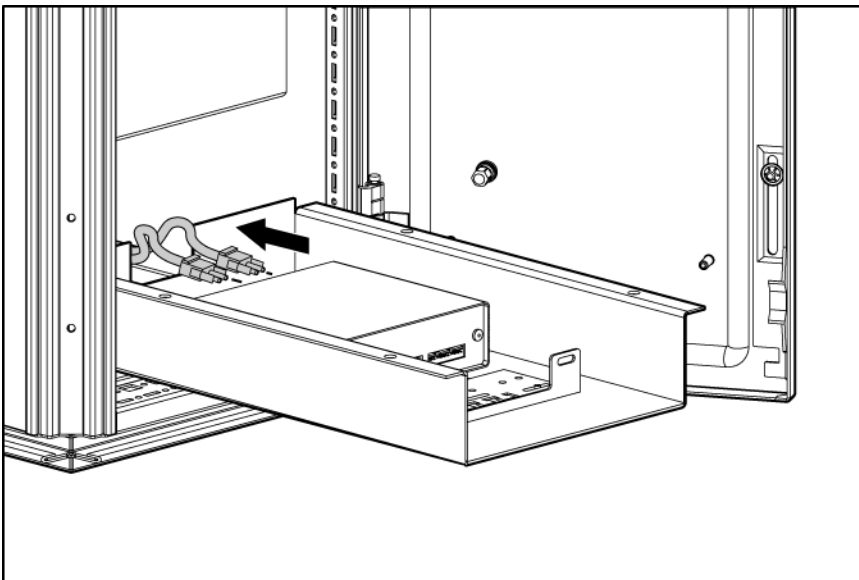
1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).
2. Remove the AC transfer switch ("[Removing the AC transfer switch](#)" on page 26).
3. Disconnect the seven electrical cables in the front of the water group controller.



- Using an 8 mm socket, remove the two 8 mm nuts and washers securing the water group controller bracket to the water group controller chassis.

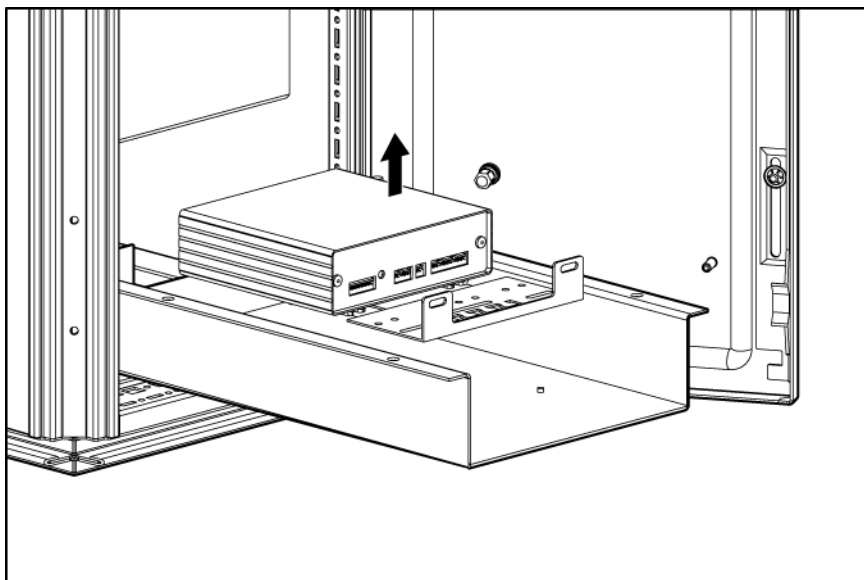


- Disconnect the two large electrical cables from the back of the water group controller.

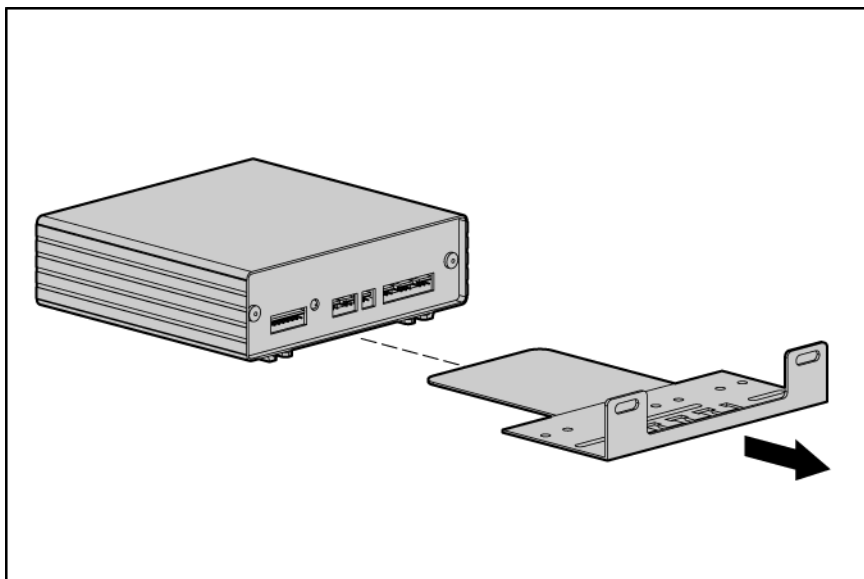


- Disconnect the green and yellow grounding wire securing the water group controller to the water group controller chassis.

7. Remove the water group controller (mounted on a bracket) from the water group controller chassis.



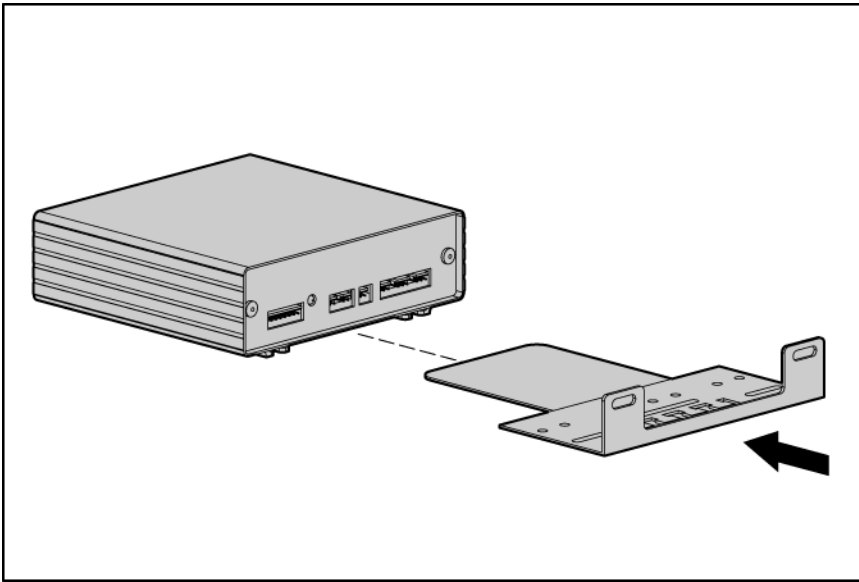
8. Slide the water group controller off of the mounting bracket.



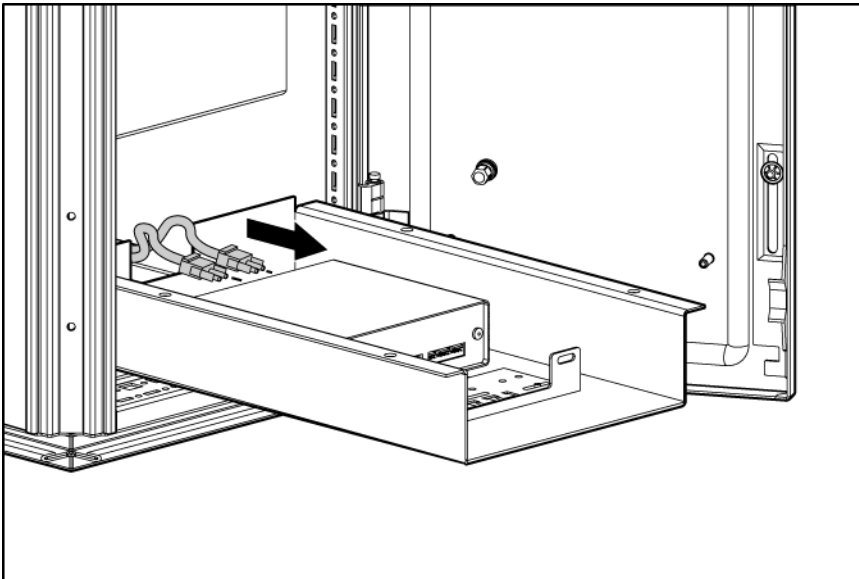
To replace this component, see "Replacing the water group controller (on page [100](#))."

## Replacing the water group controller

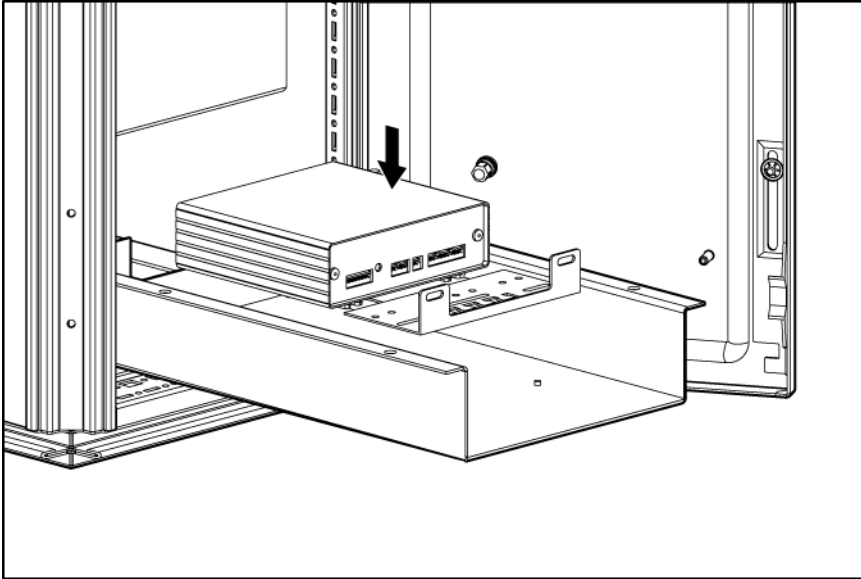
1. Slide the water group controller onto the mounting bracket until it locks in place.



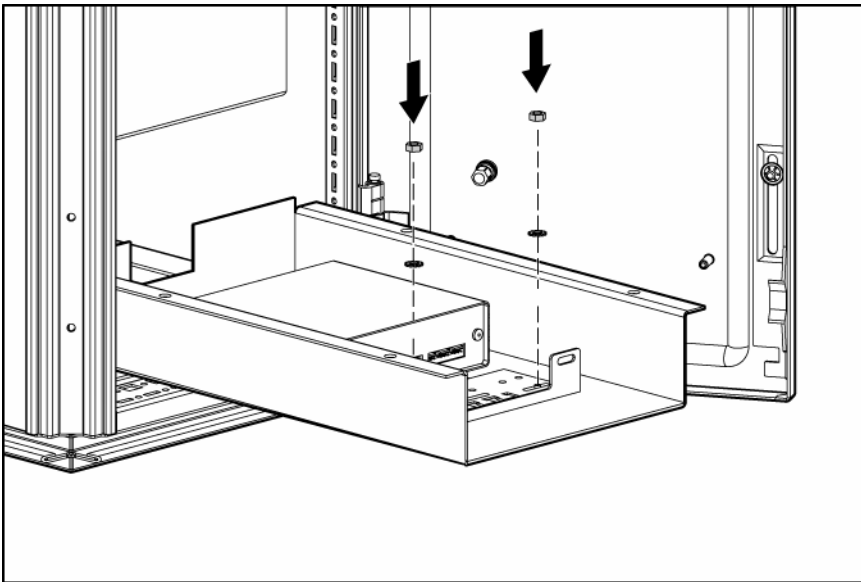
2. Connect the green and yellow grounding wire to secure the water group controller to the water group controller chassis.
3. Connect the two large electrical cables to the back of the water group controller.



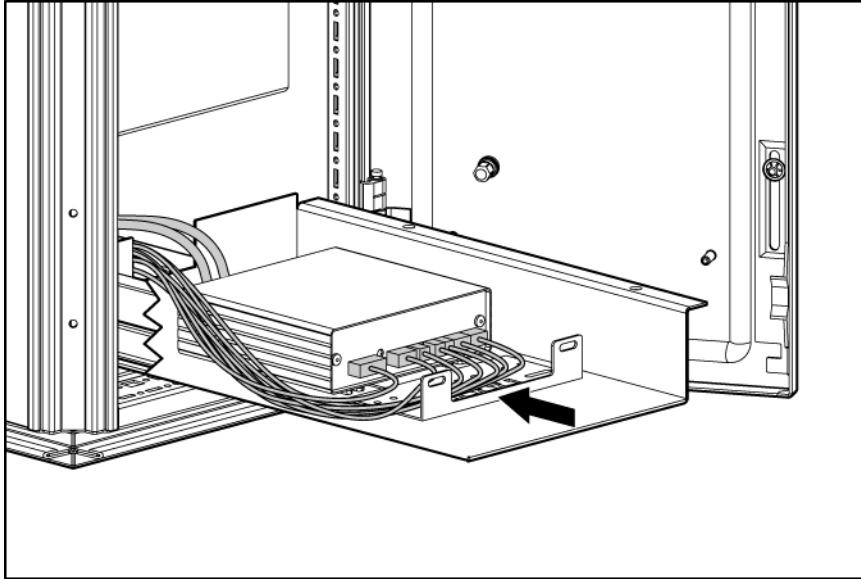
4. Place the water group controller (mounted on the bracket) in the water group controller chassis.



5. Using an 8 mm socket, secure the water group controller bracket to the water group controller chassis by inserting two washers and two 8 mm nuts.



6. Connect the seven electrical cables to the front of the water group controller.



7. Replace the AC transfer switch ("Replacing the AC transfer switch" on page 28).
8. Complete the operation checklist (on page 111).

## Water inlet coupling

The water inlet coupling is located on the inlet water hose connected to the MCS unit.



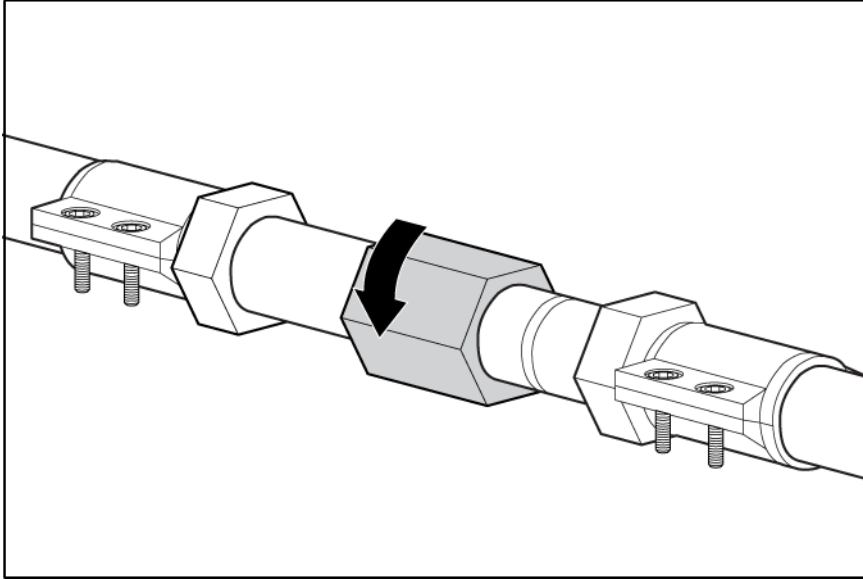
The following tools are required for installation:

- 5-mm Allen wrench

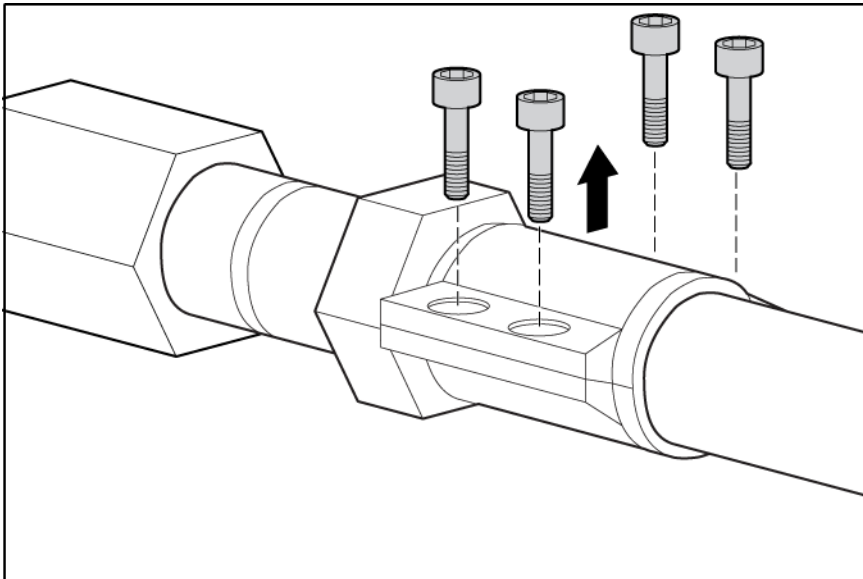
## Removing the water inlet coupling

1. Power down the MCS unit. ("Powering down the MCS unit" on page 24)
2. Shut off the water flowing into the MCS unit. ("Shutting off the water" on page 25)

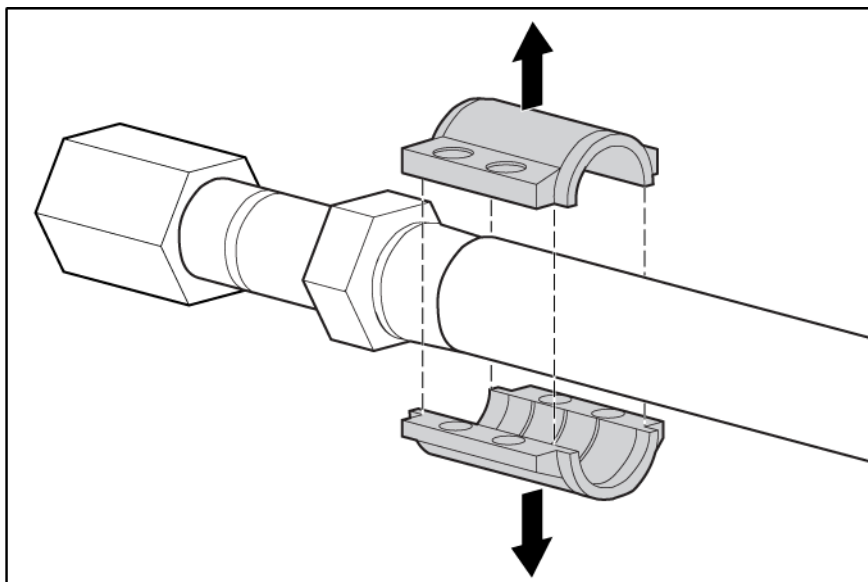
3. Using a pipe wrench, loosen the water inlet coupling and disconnect the water inlet hose from the supply hose.



4. Using an Allen wrench, remove the four Allen nuts and bolts securing the two brackets to the water inlet hose.

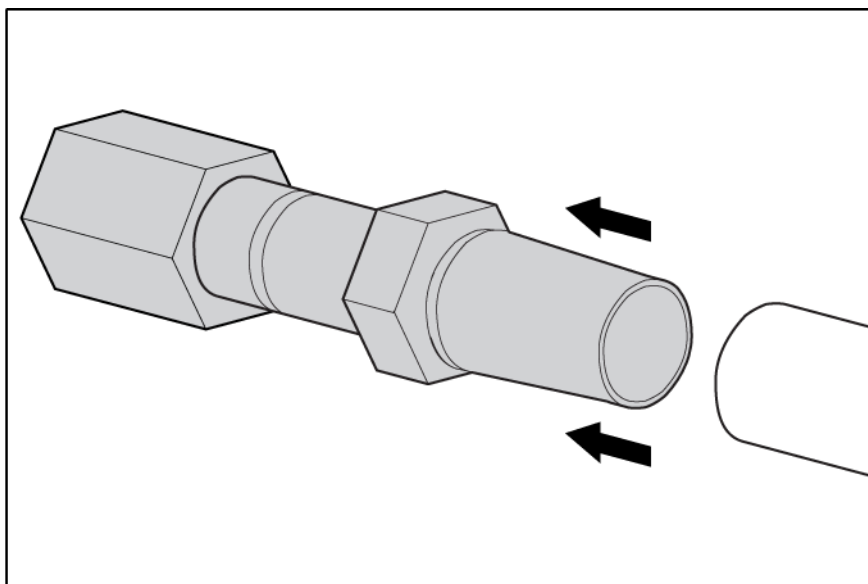


5. Remove the two brackets from around the water inlet hose.



**IMPORTANT:** Water will drain out of the hose when you remove the coupling. Be prepared to catch excess water drainage in a bucket or floor drain.

6. Remove the water inlet coupling from the water inlet hose.

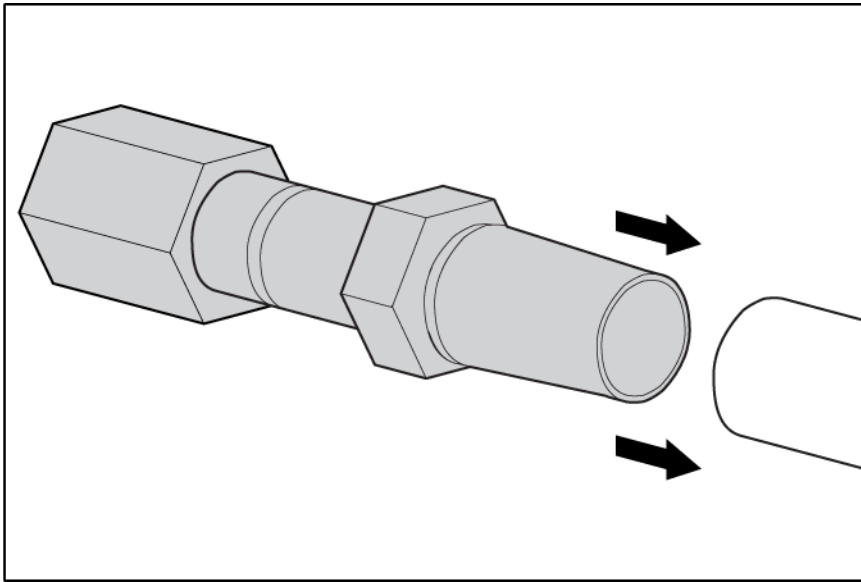


To replace this component, see "Replacing the water inlet coupling (on page [105](#))."

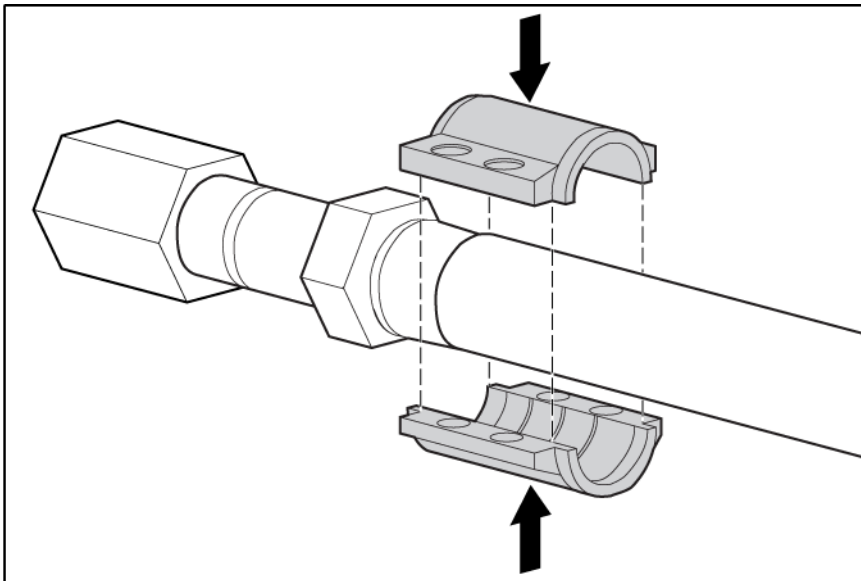


## Replacing the water inlet coupling

1. Insert the water inlet coupling into the water inlet hose.

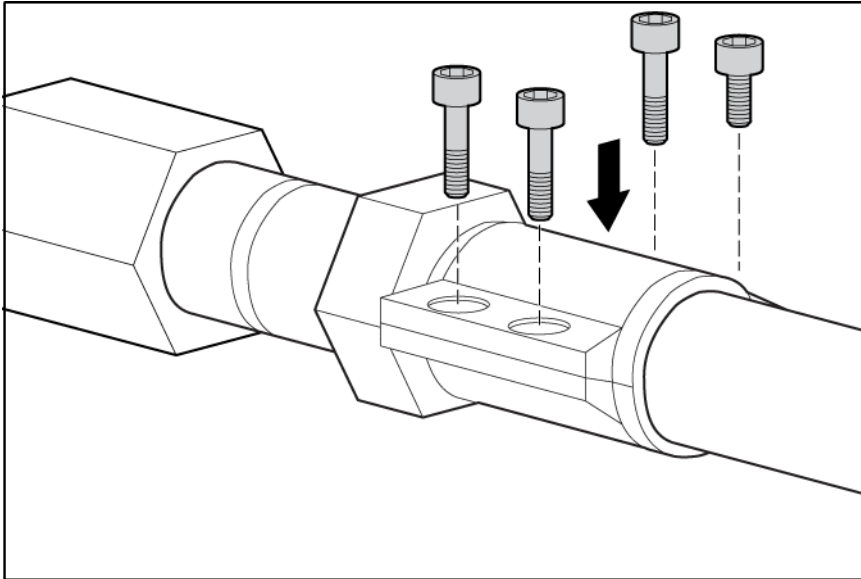


2. Align the two brackets around the water inlet hose.

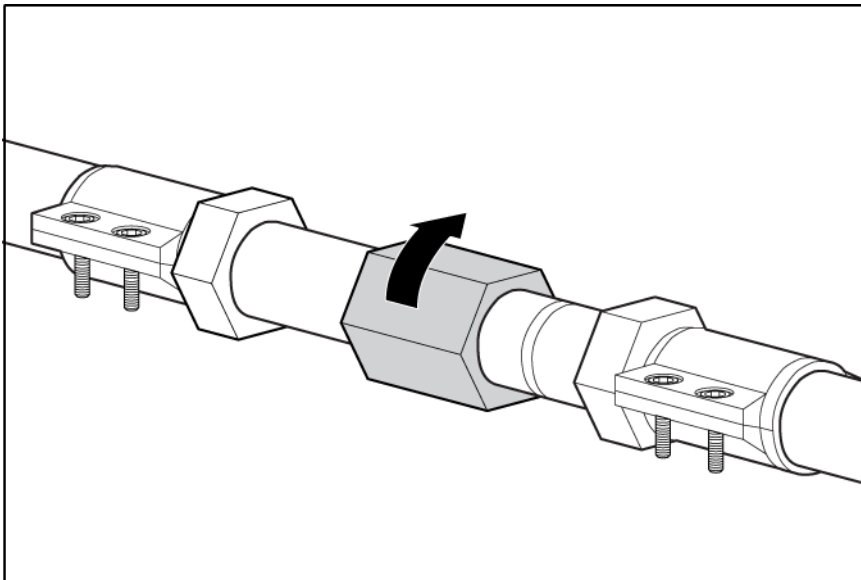


3. Using an Allen wrench, insert and tighten three 40-mm Allen nuts and bolts into three of the four screw holes.

- Using an Allen wrench, insert and tighten one of the original Allen nuts and bolts into the remaining screw hole. Compress completely.



- One by one, replace the three 40-mm Allen nuts and bolts with the original Allen nuts and bolts, until the brackets are firmly compressed around the water inlet hose.
- Using a pipe wrench, reconnect the water inlet hose to the supply hose and tighten the water inlet coupling.



- Restore water flow to the MCS unit ("[Restoring water flow](#)" on page [112](#)).
- Complete the operation checklist (on page [111](#)).

# Water temperature sensor

The water temperature sensor is a component of the water group located at the bottom interior of the MCS unit.



The following tools are required for installation:

- T-25 Torx driver
- Phillips screwdriver
- (2) 18-mm wrench
- Wire cutters

## Removing the water temperature sensor

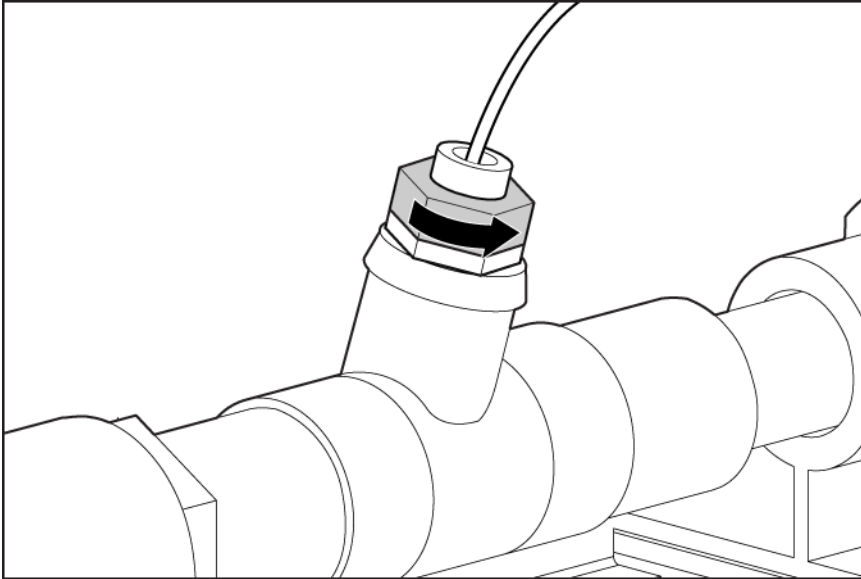
1. Power down the MCS unit. ("[Powering down the MCS unit](#)" on page 24)
2. Shut off the water flowing into the MCS unit. ("[Shutting off the water](#)" on page 25)
3. Remove the bottom fan unit. ("[Removing the bottom fan unit](#)" on page 44)
4. Relocate the power inlet box. ("[Relocating the power inlet box](#)" on page 93)
5. Remove the air sealing plate. ("[Removing the air sealing plate](#)" on page 35)
6. Remove the air deflector plate. ("[Removing the air deflector plate](#)" on page 33)
7. Remove the condensation pump and sensors. ("[Removing the condensation pump and sensors](#)" on page 47)
8. Remove the AC transfer switch. ("[Removing the AC transfer switch](#)" on page 26)

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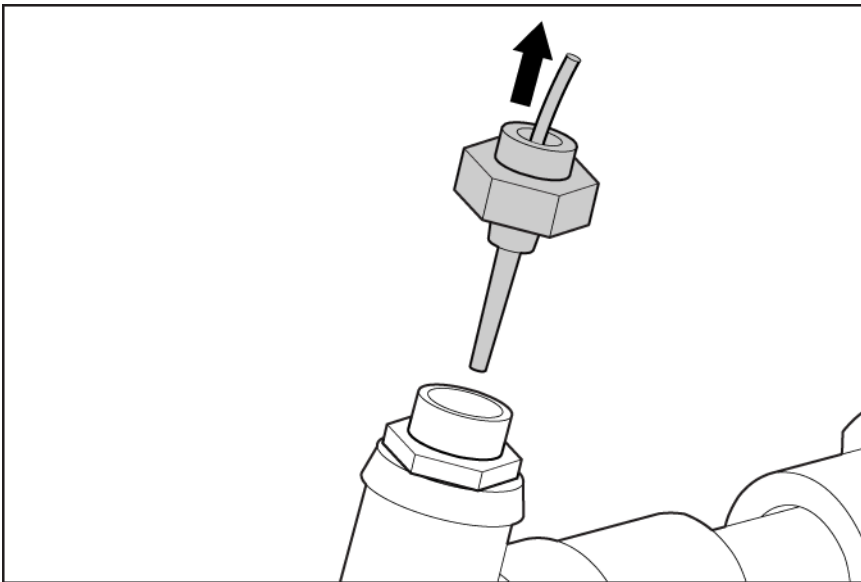
**NOTE:** HP recommends removing the In and Out water hoses and all cables to the bottom heat exchanger unit in order to gain greater access.

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9. Using two 18-mm wrenches, loosen the cap nut from the water temperature sensor.

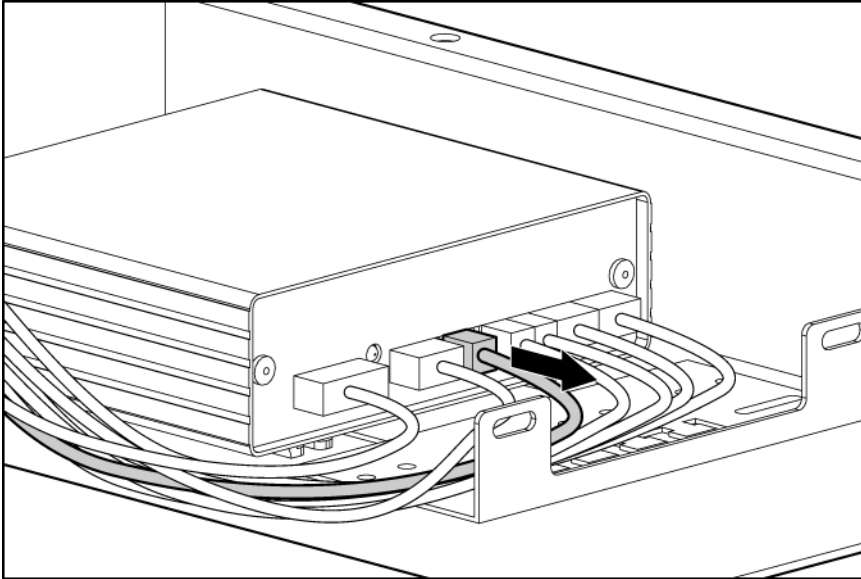


10. Using the wire cutters, cut the cable connected to the water temperature sensor, and remove the water temperature probe and cable from the MCS unit.



11. Disconnect the appropriate water temperature sensor cable connector from the water group controller and pull the cable completely out of the MCS unit.
- a. Disconnect the X12 cable connector if you are repairing the inlet water temperature sensor.

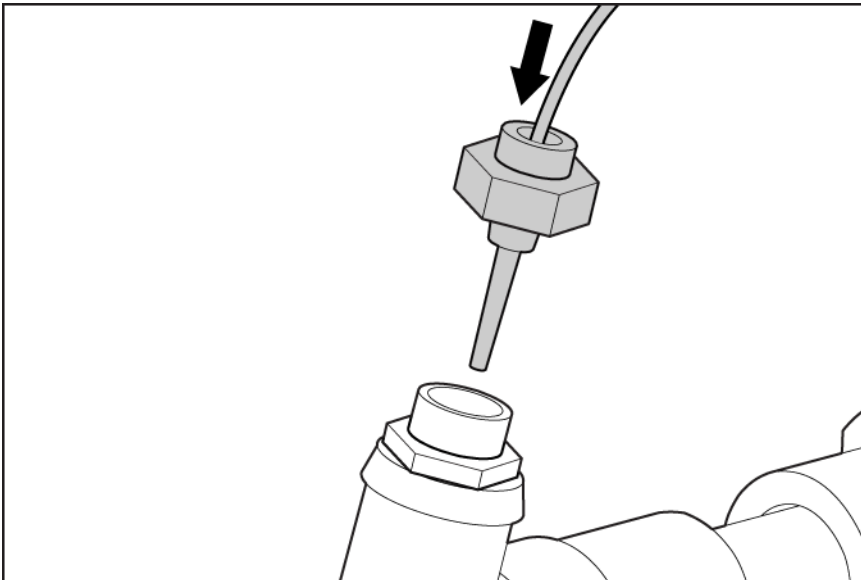
- b. Disconnect the X13 cable connector if you are repairing the outlet water temperature sensor.



To replace this component, see "Replacing the water temperature sensor."

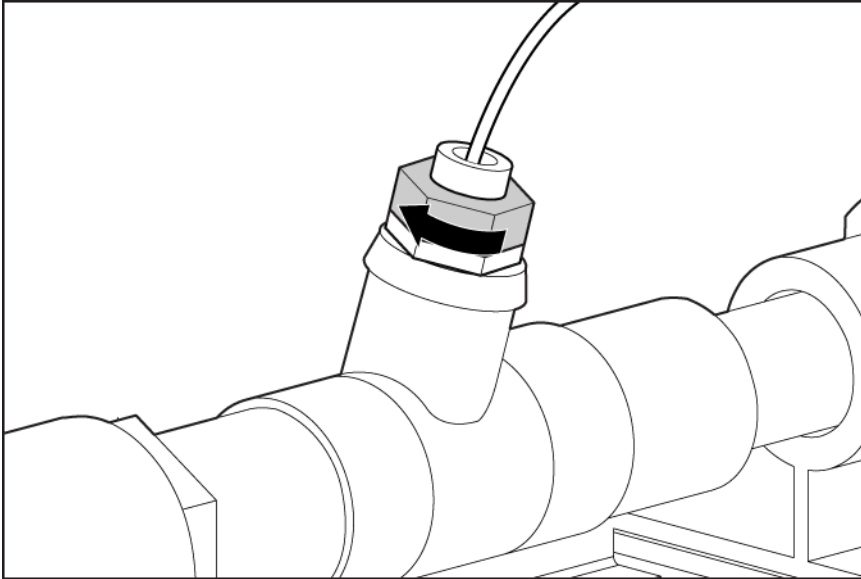
## Replacing the water temperature sensor

1. Insert the new water temperature sensor probe into the appropriate water line.

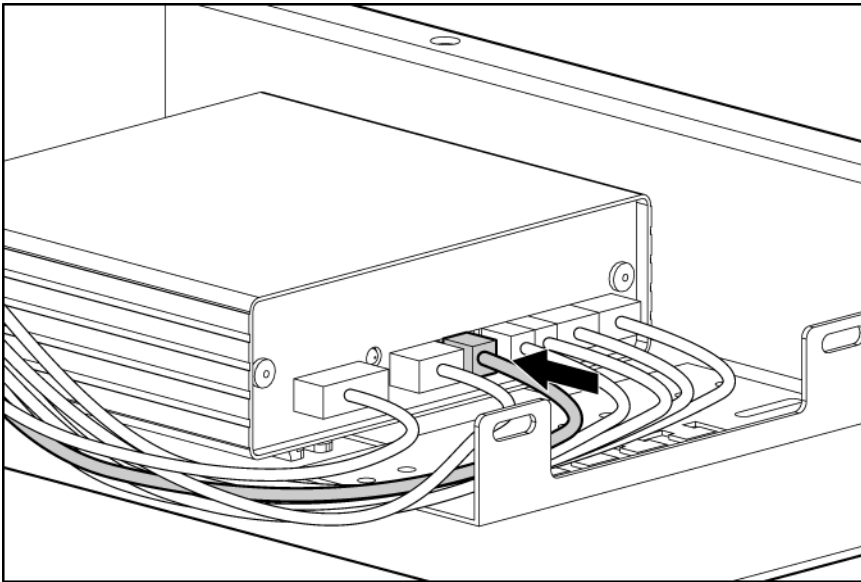


2. Place the cap nut over the water temperature sensor.

- Using two 18-mm wrenches, tighten the cap nut over the water temperature sensor.



- Route the water temperature sensor cable through to the front of the MCS unit.
- Connect the water temperature sensor cable connector to the water group controller connector labeled either X12 or X13.



- Replace the AC transfer switch ("[Replacing the AC transfer switch](#)" on page 28).
- Replace the condensation pump and sensors ("[Replacing the condensation pump and sensors](#)" on page 49).
- Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
- Replace the air sealing plate ("[Replacing the air sealing plate](#)" on page 36).
- Relocate the power inlet box back into position ("[Relocating the power inlet box back into position](#)" on page 95).
- Replace the bottom fan unit ("[Replacing the bottom fan unit](#)" on page 45).
- Restore water flow to the MCS unit ("[Restoring water flow](#)" on page 112).
- Complete the operation checklist (on page 111).

# Operation checklist

1. If you disconnected the power, restore power to the MCS unit ("[Restoring power to the MCS unit](#)" on page 111).
2. If you shut off the water flowing into the MCS, restore water flow to the MCS unit ("[Restoring water flow](#)" on page 112).
3. Clear all old logs from the web interface to ensure that any additional alarms are current.
4. Confirm that no additional warning or alarm messages have been detected by looking at the operator display.

## Restoring power to the MCS unit

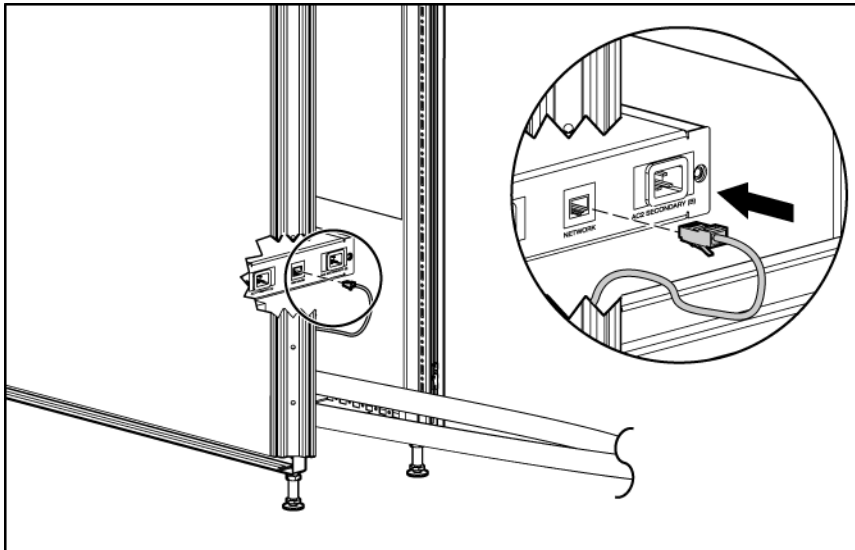
1. Open the rear MCS door.



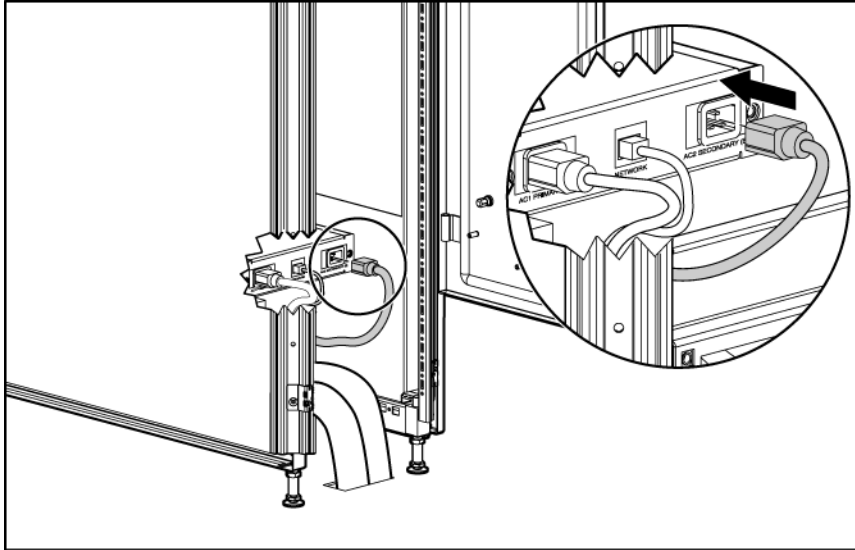
**WARNING:** To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the storage system.

2. Connect the network cable to the RJ-45 connector on the power inlet box.



3. Connect the two AC power cables to the power connectors on the power inlet box.



4. Open the front MCS door.
5. Turn on the AC1 breaker on the AC transfer switch.
6. Turn on the AC2 breaker on the AC transfer switch.

## Restoring water flow

If water was disconnected, restore water flow to the MCS unit at the facility-side valve.



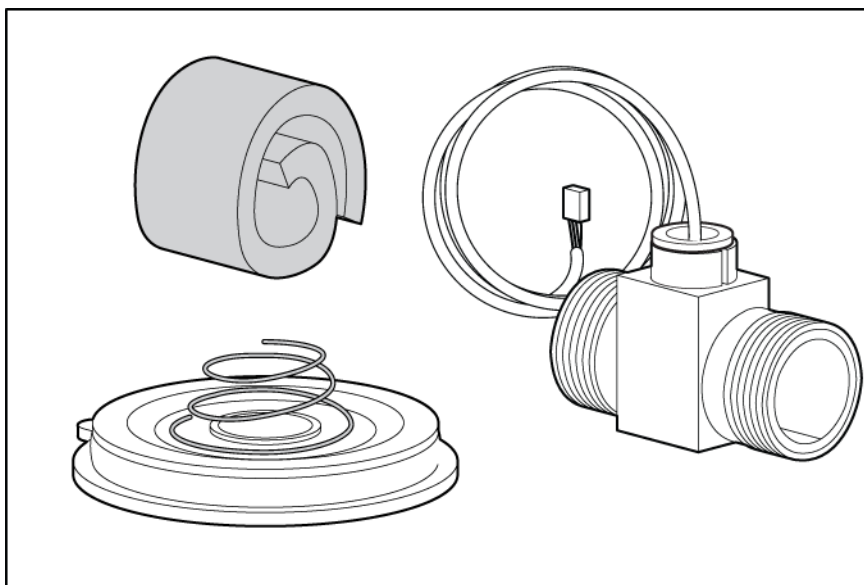
# Technician repair removal and replacement procedures

**⚠ WARNING:** You must follow the removal and replacement instructions listed in the site preparation guide, the user guide, and the maintenance and service guide. Failure to follow the instructions listed in these guides can void your warranty and service contract.

The customer can order the miscellaneous hardware kit, but it will be delivered by a trained HP service technician, who will then install the new spare kit by following the removal and replacement instructions in this chapter.

## Miscellaneous hardware kit overview

**🔧 IMPORTANT:** The following procedures should only be performed by an HP trained technician.



Description	Spare part number	Customer self repair
SPS- HARDWARE KIT, MISC ("Miscellaneous hardware kit overview" on page 113)	407165-001	No
A) Magnetic valve diaphragm and spring*	—	—
B) Flow meter	—	—
C) Gasket**	—	—

- \*Only the diaphragm and spring are shown, though the entire magnetic valve ships in the kit.
- \*\*The removal and replacement instructions for this component are not included in this document.

## Technician repair required tools

The following tools are required for the removal and replacement instructions for each component included in the miscellaneous hardware kit:

- **Flow meter**
  - T-25 Torx driver
  - Phillips screwdriver
  - Water hose fitting wrench (included with your original MCS unit)
  - Counter hold wrench (included with your original MCS unit)
  - 46 mm wrench (included in the miscellaneous hardware spare kit)
- **Gasket**

No tools are required for this procedure.
- **Magnetic valve diaphragm and spring**
  - T-25 Torx driver
  - Phillips screwdriver
  - 8 mm Allen wrench

## Flow meter

The flow meter is a component of the water group located at the bottom interior of the MCS unit.



The following tools are required for installation:

- T-25 Torx driver
- Phillips screwdriver
- Water hose fitting wrench (included with your original MCS unit)
- Counter hold wrench (included with your original MCS unit)
- 46-mm wrench (included with the miscellaneous hardware spare kit)

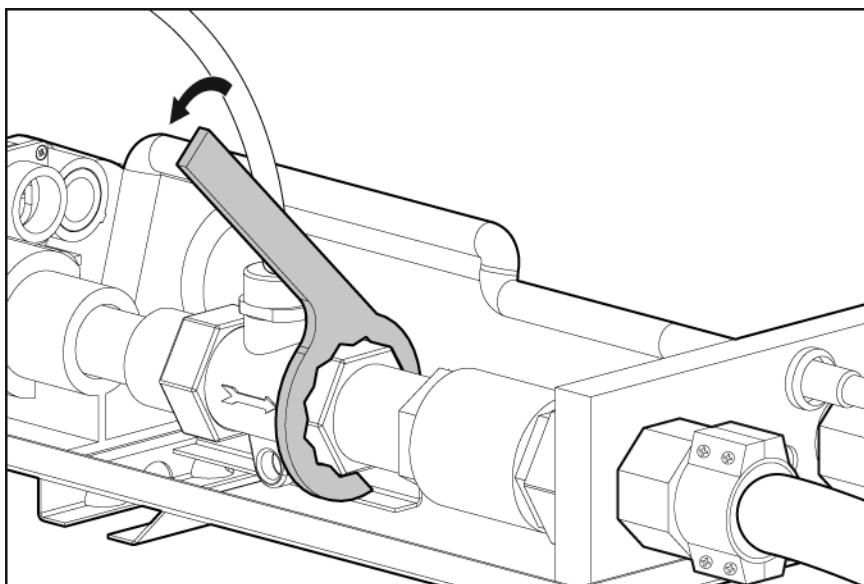
## Removing the flow meter

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**NOTE:** This procedure is specifically for the removal of the Type 1 flow meter.

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1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page 24).
2. Shut off the water flowing into the MCS unit ("[Shutting off the water](#)" on page 25).
3. Remove the bottom fan unit ("[Removing the bottom fan unit](#)" on page 44).
4. Relocate the power inlet box ("[Relocating the power inlet box](#)" on page 93).
5. Remove the condensation pump and sensors ("[Removing the condensation pump and sensors](#)" on page 47).
6. Remove the bottom heat exchanger unit ("[Removing the heat exchanger unit with couplers](#)" on page 59).
7. Remove the magnetic solenoid valve ("[Removing the magnetic solenoid valve](#)" on page 82).
8. Remove the AC transfer switch ("[Removing the AC transfer switch](#)" on page 26).
9. Using the 46-mm wrench (included in the miscellaneous hardware kit), loosen the two flow meter union nuts securing the flow meter in place.



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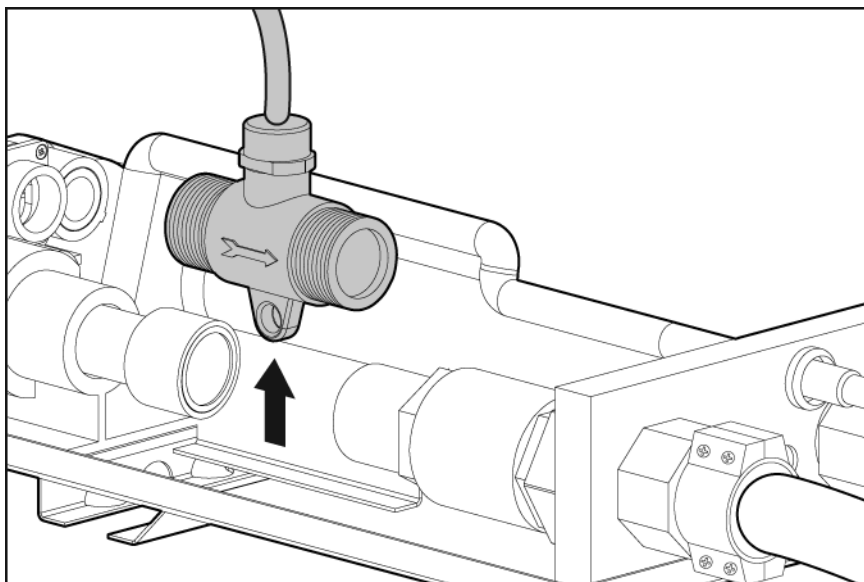
**⚠ WARNING:** To reduce the risk of electric shock or damage to the equipment, use extreme caution when removing and replacing components that involve water around the electrical wires and unsecured power inlet box. There is great risk of electrical shock when water is used near electricity.

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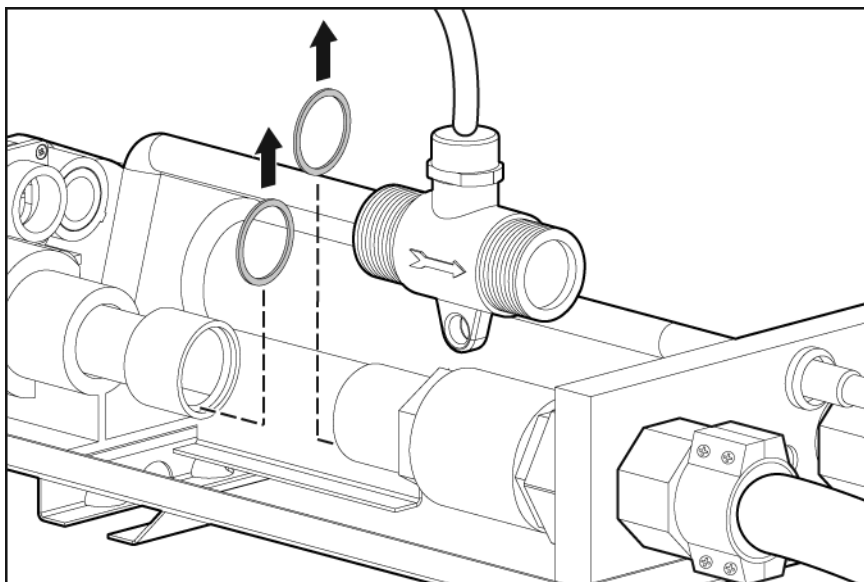
**⚠ WARNING:** To reduce the risk of electric shock or damage to the equipment, be prepared to clean up the water from the disconnected water line with towels and sponges.

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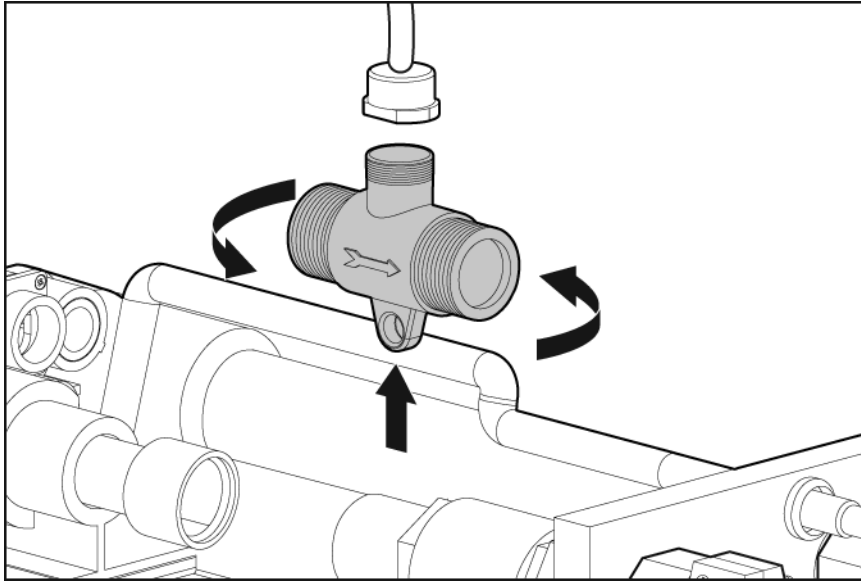
10. Remove the flow meter from the water line.



11. Remove the two fiber gaskets on either side of the water line.



12. Disconnect the threaded pick-up at the top of the flow meter and pull the flow meter out of the MCS unit.



13. Remove the threaded pick-up and cable from the MCS unit, and disconnect from the connector labeled X14 on the water group controller.

To replace this component, see "Replacing the flow meter (on page 117)."

## Replacing the flow meter

**NOTE:** This procedure is specifically for the replacement of the Type 2 flow meter.

**NOTE:** The Type 2 flow meter should arrive with the paddle-wheel sensor already installed in the top of the flow meter. For information concerning the installation of the paddle-wheel sensor, see Replacing the flow meter paddle-wheel sensor (on page 57).

1. Insert the two fiber gaskets on either side of the flow meter.



**IMPORTANT:** Be sure the arrow on the flow meter is pointing toward the rear of the MCS unit to ensure proper water flow.

2. Insert the flow meter back into place on the water line.
3. Using the 46-mm wrench (included in the miscellaneous hardware kit), tighten the two union nuts to secure the flow meter to the water line.
4. Route the flow meter paddle-wheel sensor cable through to the front of the MCS unit.
5. Connect the flow meter paddle-wheel sensor cable connector to the connector labeled X14 on the water group controller.
6. Replace the AC transfer switch ("Replacing the AC transfer switch" on page 28).
7. Replace the magnetic solenoid valve ("Replacing the magnetic solenoid valve" on page 84).
8. Replace the bottom heat exchanger unit ("Replacing the heat exchanger unit with couplers" on page 63).

9. Replace the condensation pump and sensors ("[Replacing the condensation pump and sensors](#)" on page [49](#)).
10. Relocate the power inlet box back into position ("[Relocating the power inlet box back into position](#)" on page [95](#)).
11. Replace the bottom fan unit ("[Replacing the bottom fan unit](#)" on page [45](#)).
12. Restore water flow to the MCS unit ("[Restoring water flow](#)" on page [112](#)).
13. Complete the operation checklist (on page [111](#)).

## Magnetic valve

The magnetic valve is a component of the water group located at the bottom interior of the MCS unit.



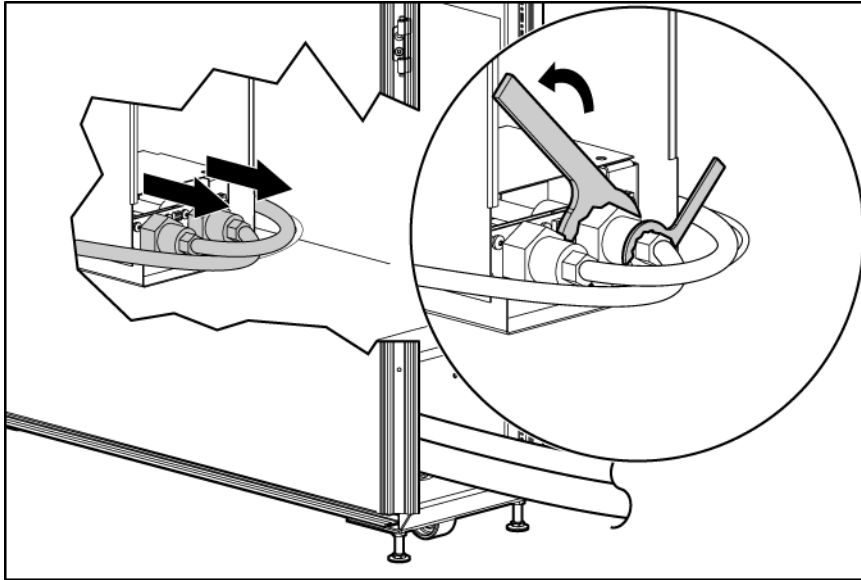
The following tools are required for installation:

- T-25 Torx driver
- Phillips screwdriver
- 8-mm Allen wrench

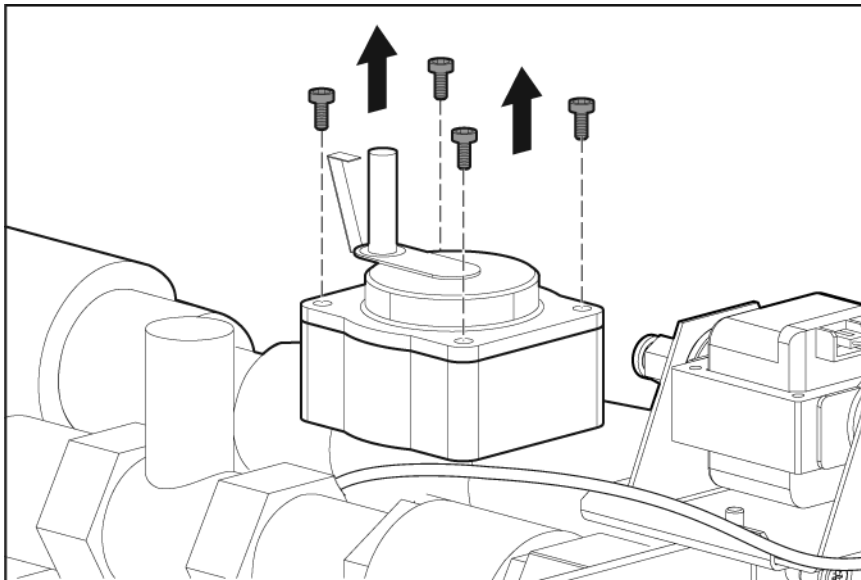
## Removing the magnetic valve diaphragm and spring

1. Power down the MCS unit ("[Powering down the MCS unit](#)" on page [24](#)).
2. Disconnect the main water lines at the quick disconnect couplings.
3. Remove the bottom fan unit ("[Removing the bottom fan unit](#)" on page [44](#)).
4. Relocate the power inlet box ("[Relocating the power inlet box](#)" on page [93](#)).
5. Remove the air deflector plate ("[Removing the air deflector plate](#)" on page [33](#)).

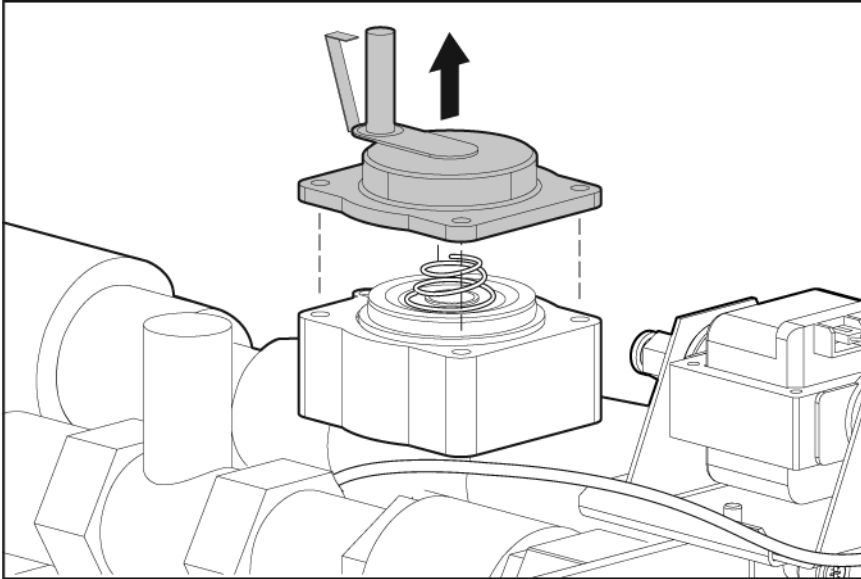
- Using the counter hold wrench to hold the fitting in place and the water hose fitting wrench to loosen the water hose (both wrenches included with your original MCS unit), disconnect the In and Out water hoses from the bottom heat exchanger unit.



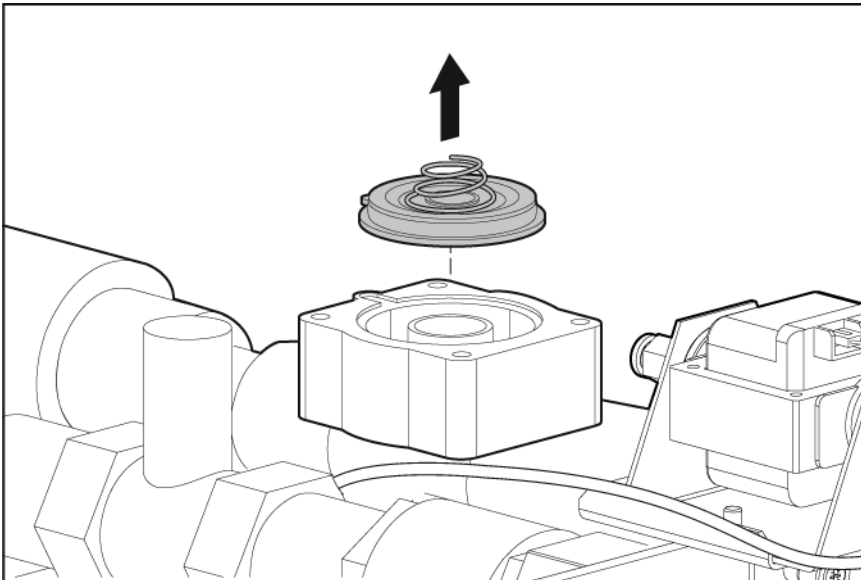
- Remove the magnetic solenoid valve ("[Removing the magnetic solenoid valve](#)" on page 82).
- Using an 8 mm Allen wrench, remove the four socket screws securing the cover of the magnetic valve.



9. Remove the cover from the magnetic valve.



10. Remove the diaphragm and spring from the magnetic valve.



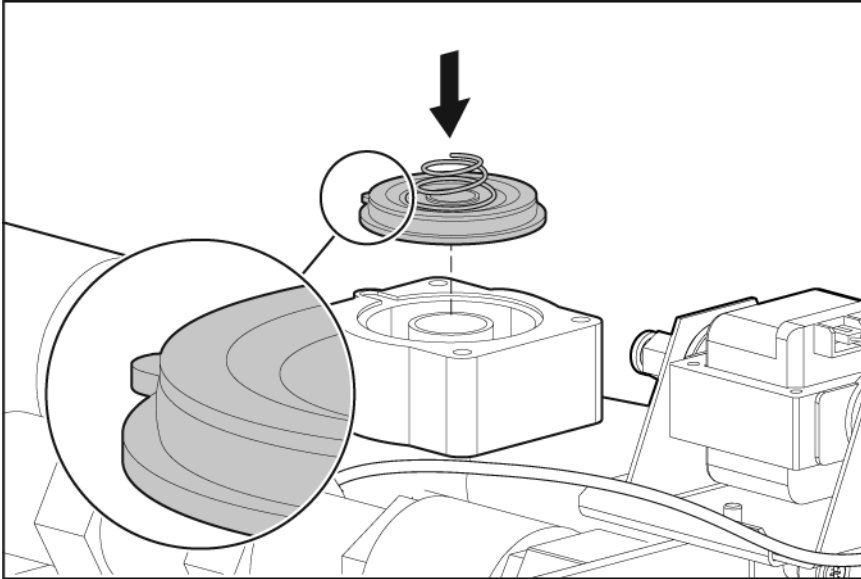
To replace this component, see "Replacing the magnetic valve diaphragm and spring (on page 120)."

## Replacing the magnetic valve diaphragm and spring

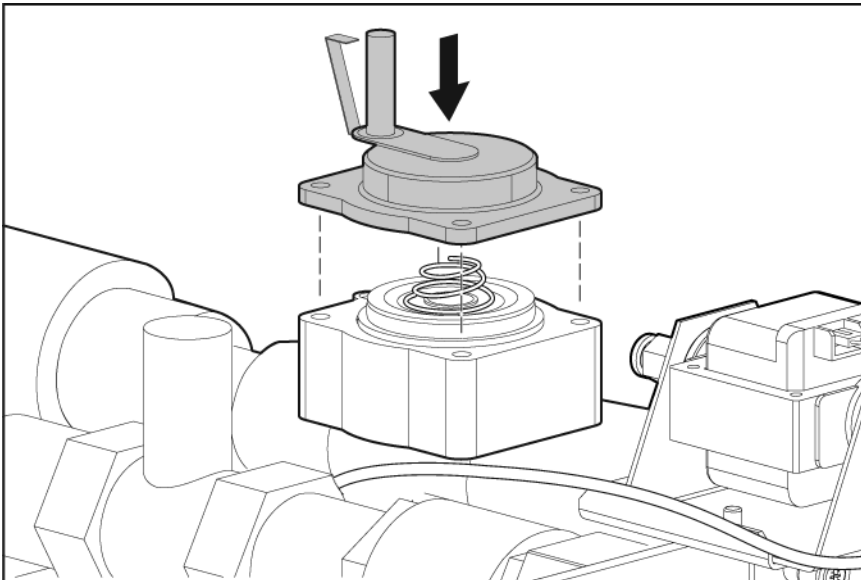
**NOTE:** When you replace the diaphragm inside the magnetic valve, be sure to line up the tab of the diaphragm with the indentation of the magnetic valve. If it is not aligned properly, the cover will not fit correctly, which could cause further problems.



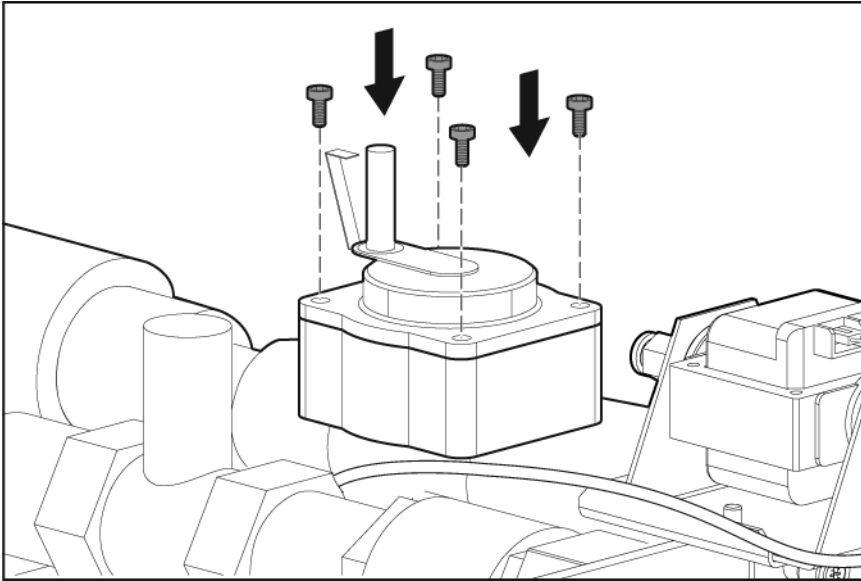
1. Place the diaphragm and spring on the magnetic valve.



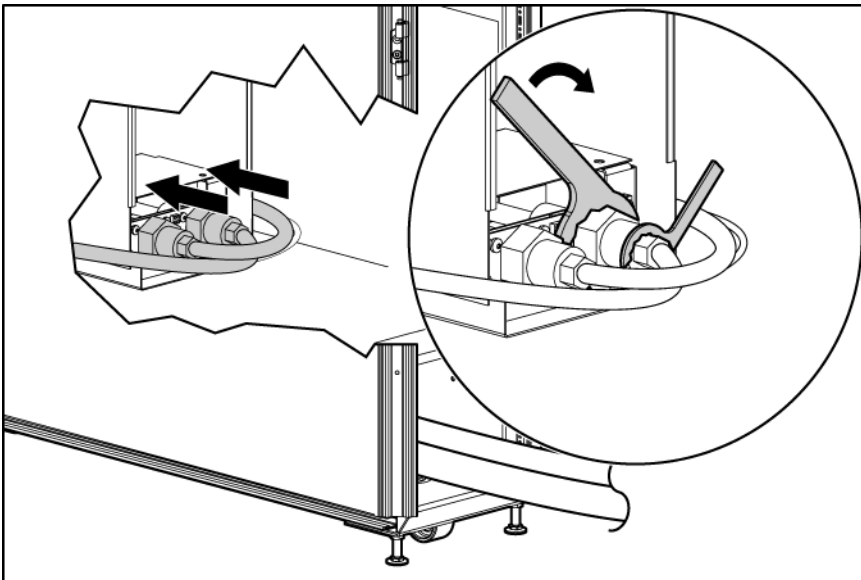
2. Place the cover on the magnetic valve.



3. Using an 8 mm Allen wrench, secure the cover to the magnetic valve by inserting and tightening four socket screws.



4. Replace the magnetic solenoid valve ("[Replacing the magnetic solenoid valve](#)" on page 84).
5. Using the counter hold wrench to hold the fitting in place and the water hose fitting wrench to tighten the water hose (both wrenches included in your original hardware kit), connect the In and Out water hoses to the bottom heat exchanger unit.



6. Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
7. Relocate the power inlet box back into position ("[Relocating the power inlet box back into position](#)" on page 95).
8. Replace the bottom fan unit ("[Replacing the bottom fan unit](#)" on page 45).
9. Reconnect the main water lines.
10. Complete the operation checklist (on page 111).

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# Upgrading procedures

## Viewing the upgrade procedures video

Because of the difficulty of removing and replacing spare parts, HP recommends watching the HP Modular Cooling System Spare Replacement video. This video provides further explanation and detail of replacement strategies and techniques that might be helpful when attempting to remove and replace spare parts. You can access the video on the HP website (<http://www.hp.com/go/mcs>).

1. Select **HP Modular Cooling System**.
2. Under Related Links, select **HP Support and Drivers**.
3. Select **HP Modular Cooling System**.
4. Under Resources for HP Modular Cooling System, select **Customer self repair steps (videos/animations)**.
5. Select either **Heat Exchanger Upgrade** or **Main Hose Upgrade**.

## Upgrading the HEX coupler

The HEX couplers are located on the HEX units.

The following tools are required for installation:

- T-25 Torx driver
- Small pipe wrench
- Adjustable wrench
- Flathead screwdriver
- Knife

## Removing the HEX coupler

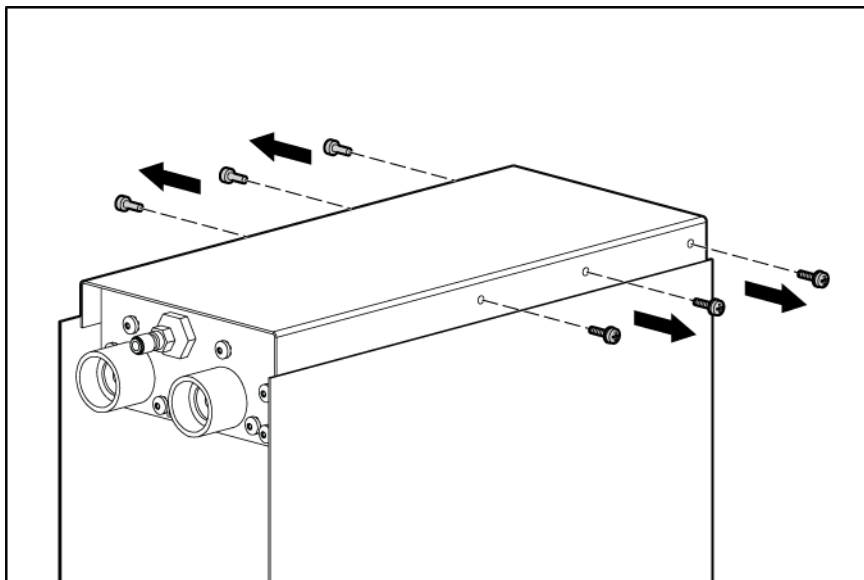
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**NOTE:** For this procedure, remove the fan unit seated directly behind the heat exchanger unit you will remove.

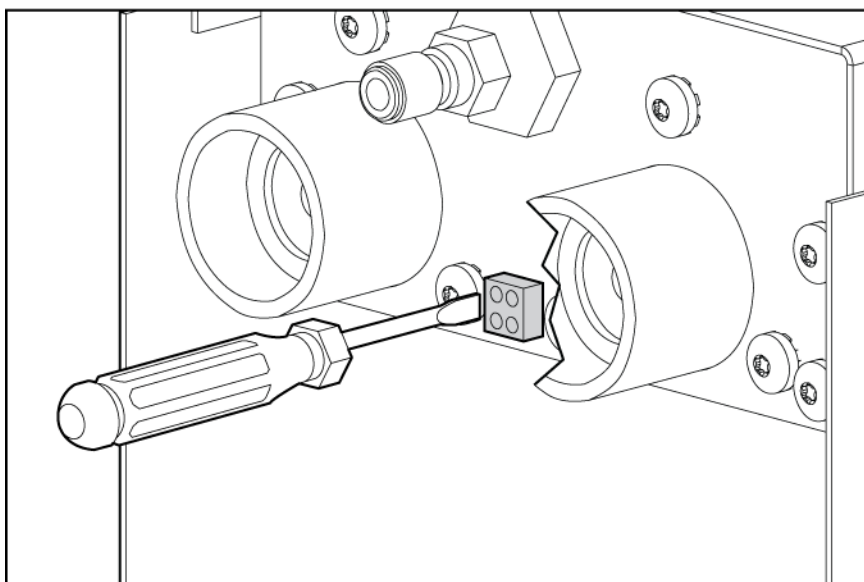
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1. Remove the fan unit ("[Removing the fan unit](#)" on page 51).
2. Remove the air deflector plate ("[Removing the air deflector plate](#)" on page 33).
3. Remove the heat exchanger unit ("[Removing the heat exchanger unit with couplers](#)" on page 59).
4. Turn the HEX unit over to access the bottom of the assembly.

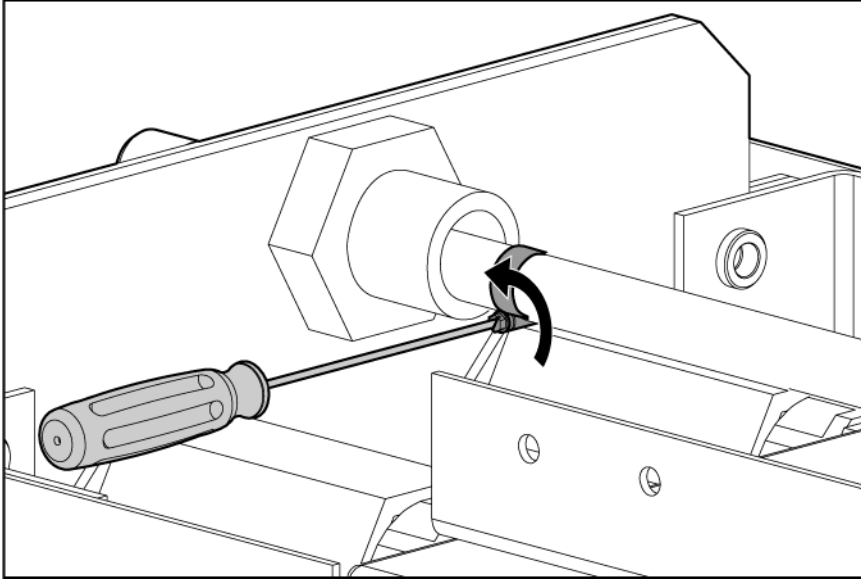
- Using a T-25 Torx driver, remove the three screws on each side of the bottom cover plate and remove the bottom cover plate from the HEX unit.



- Using a flathead screwdriver, push in the tabs of the white electrical connector of the temperature sensor and push the connector into the HEX unit.



- Using a flathead screwdriver, loosen the hose clamps attaching the condensation drain hose to the quick disconnect on the HEX unit face plate.



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**NOTE:** You might need to cut the condensation drain hose to remove it from the barbs.

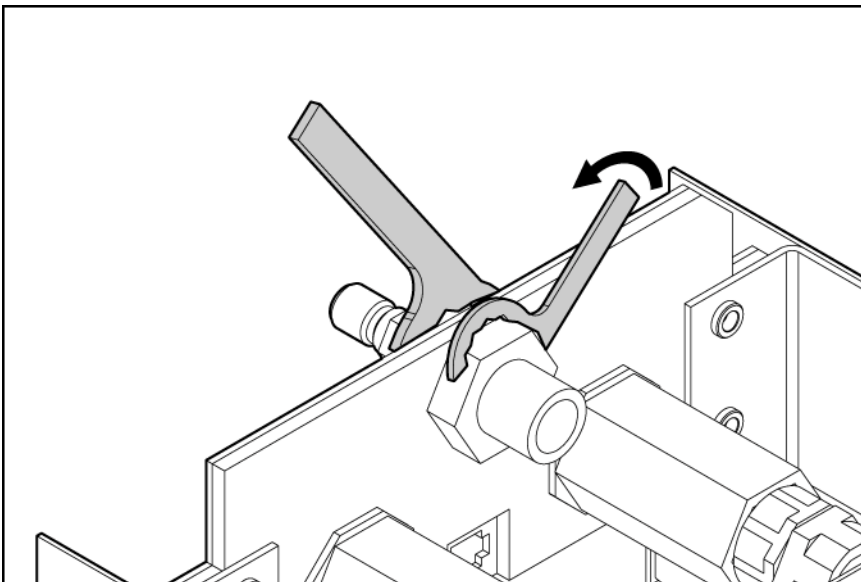
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- Remove the condensation drain hose from both barbs.

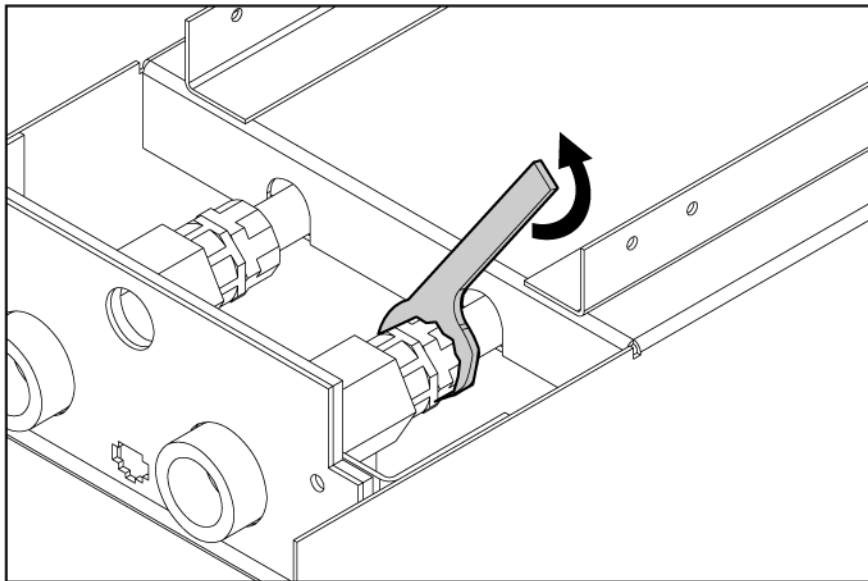
**NOTE:** Depending on the style of the hose barb, you might need to remove the hose barb before you remove the quick disconnect. If the hose barb is chrome-plated, remove it before you remove the quick disconnect.

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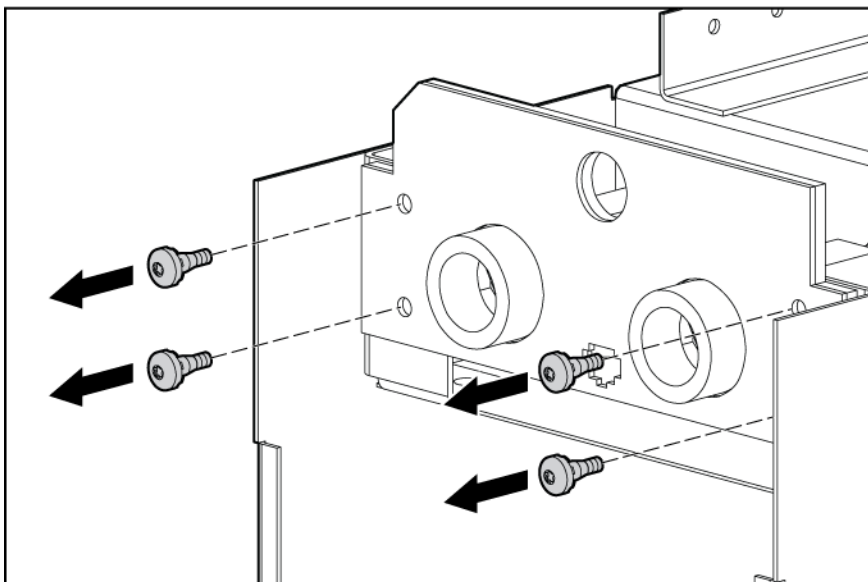
- Using a small pipe wrench and an adjustable wrench, remove the quick disconnect by loosening the large nut inside the quick disconnect faceplate.



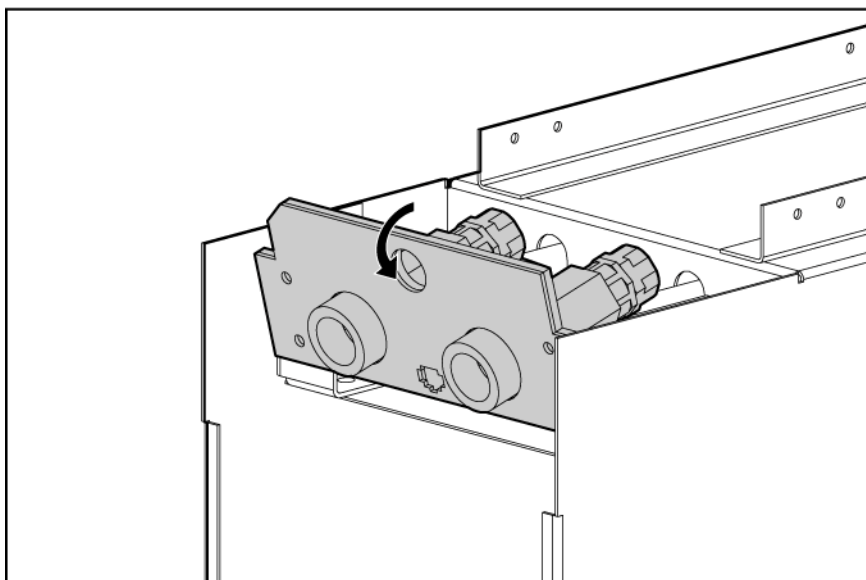
10. Using a small pipe wrench, loosen the nut attaching the HEX unit copper pipe to each of the ball valve assemblies.



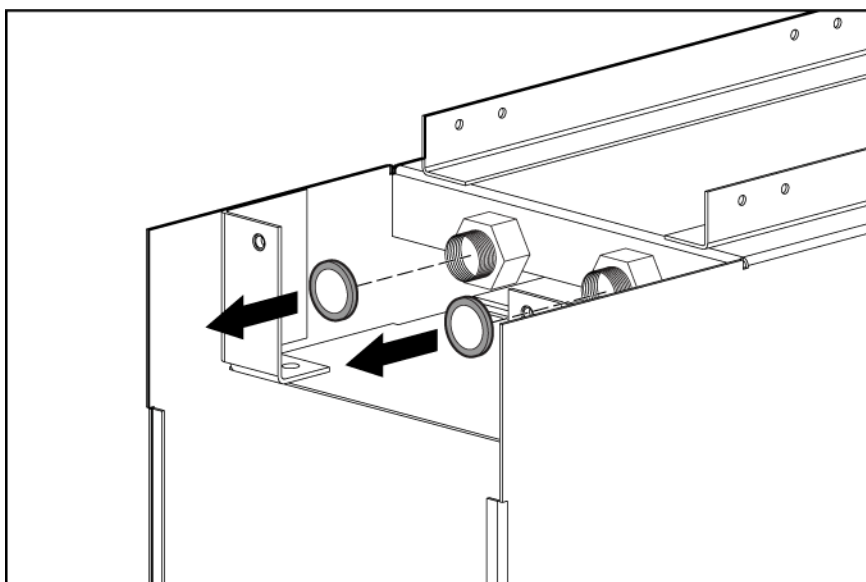
11. Using a T-25 Torx driver, remove the four screws securing the coupler face plate to the HEX unit.



12. Remove the coupler faceplate and hose couplers as a single assembly.



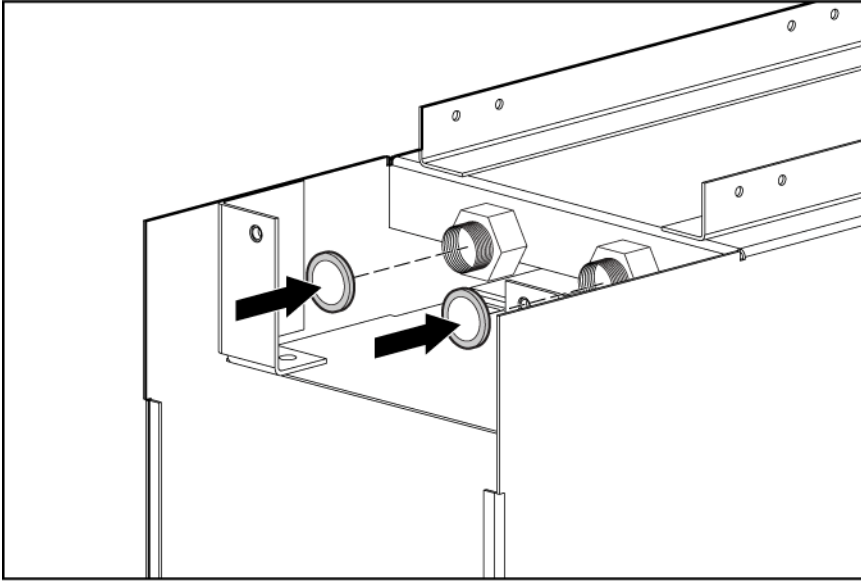
13. Remove the O-ring from each pipe and verify that the pipe is clean.



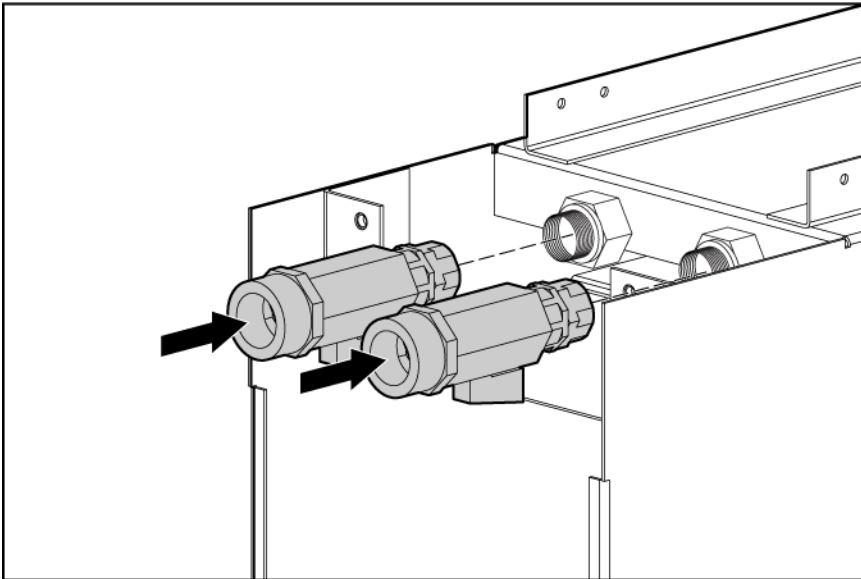
To replace this component, see "Replacing the HEX coupler (on page 128)."

## Replacing the HEX coupler

1. Install one O-ring on to each HEX unit pipe.



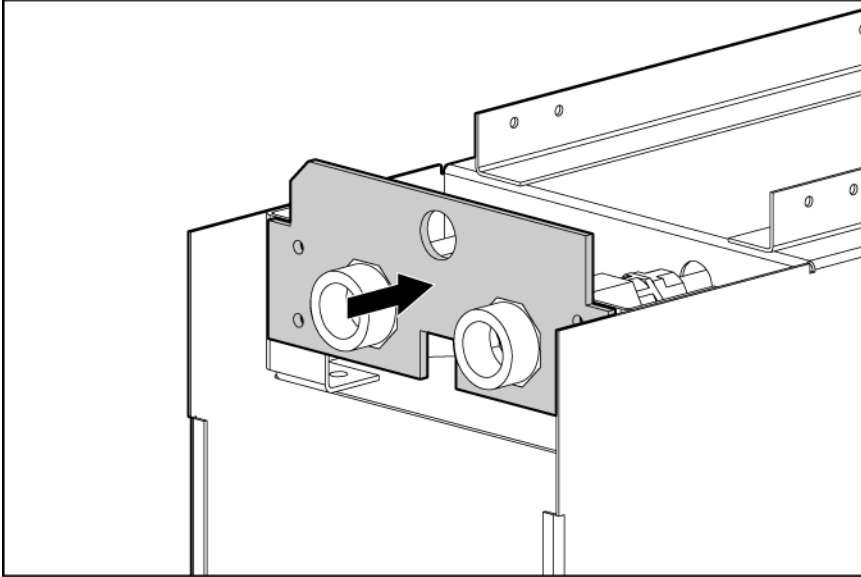
2. Install each ball valve assembly to the HEX unit tubing, positioning the handles down.



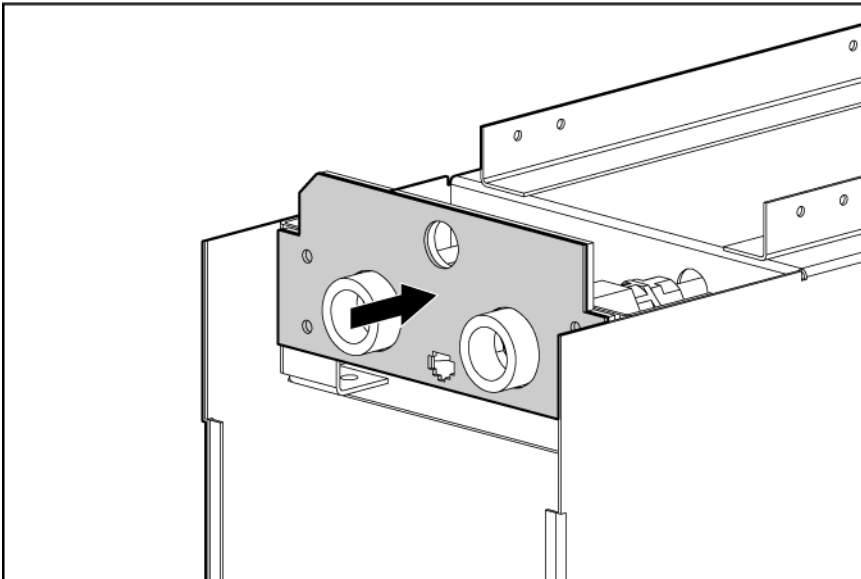
3. Loosely attach the HEX unit pipe nut to the ball valve assembly, barely connecting the threads.



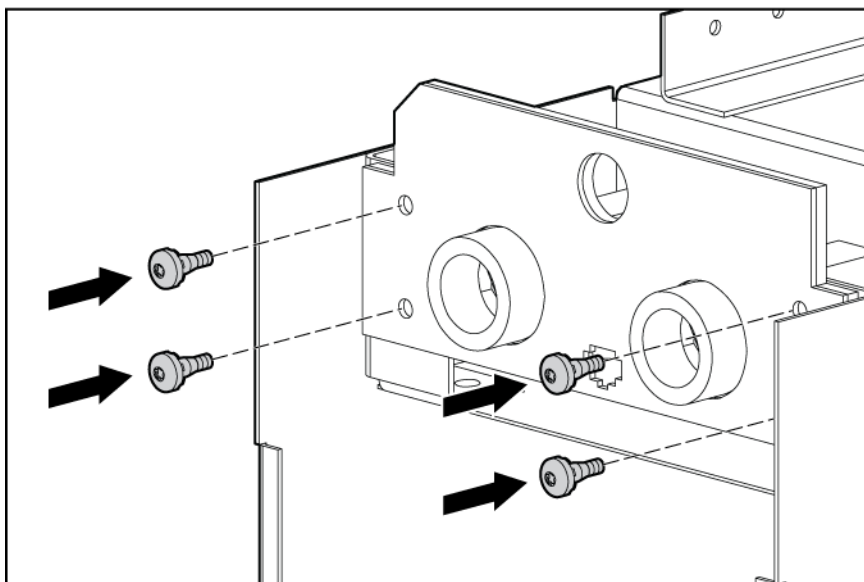
4. Align the first faceplate (faceplate with eight side holes) to the ball valve assemblies, and slide the faceplate over the ball valve assemblies.



5. Align the second faceplate (faceplate with round holes) to the ball valve assemblies and slide the faceplate over the ball valve assemblies.



- Using a T-25 Torx driver, install four screws to secure the faceplate.

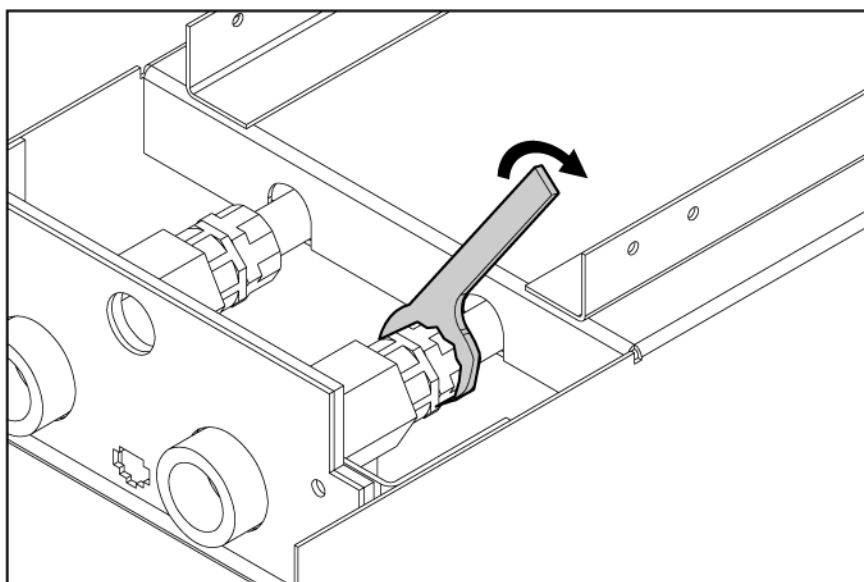


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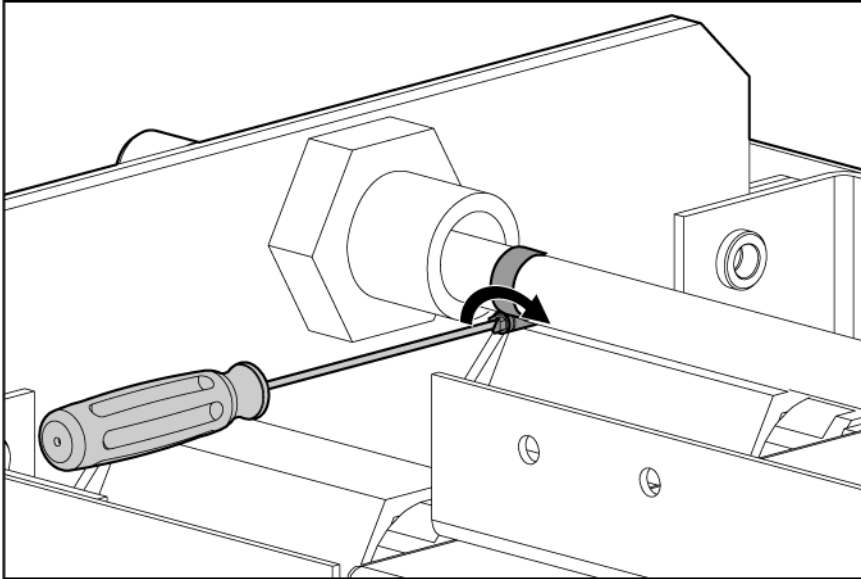
**NOTE:** Do not overtighten the fittings. The gasket needs only a slight compression to seal the fitting.

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- Using a small pipe wrench, tighten the fitting that connects the HEX unit copper pipe to the ball valve.

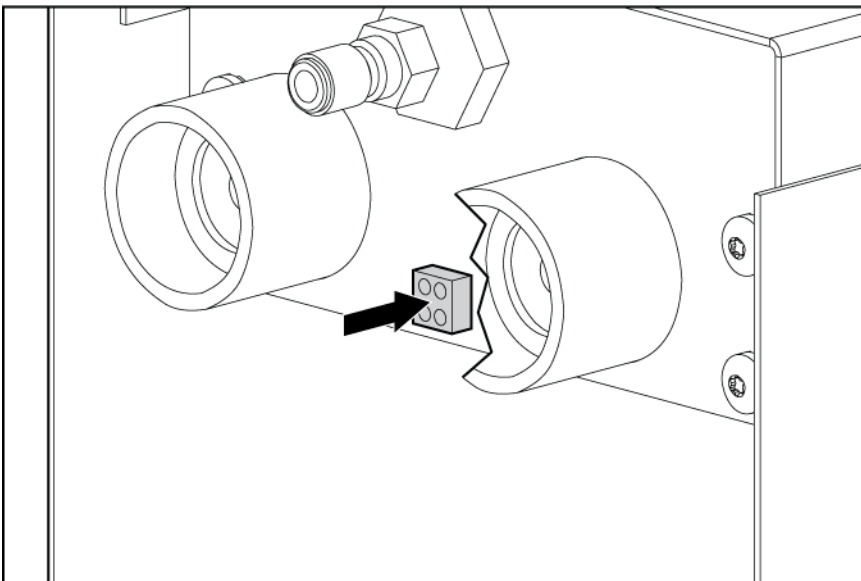


- Using an adjustable wrench, insert the quick disconnect for the drain hose in to the HEX unit.



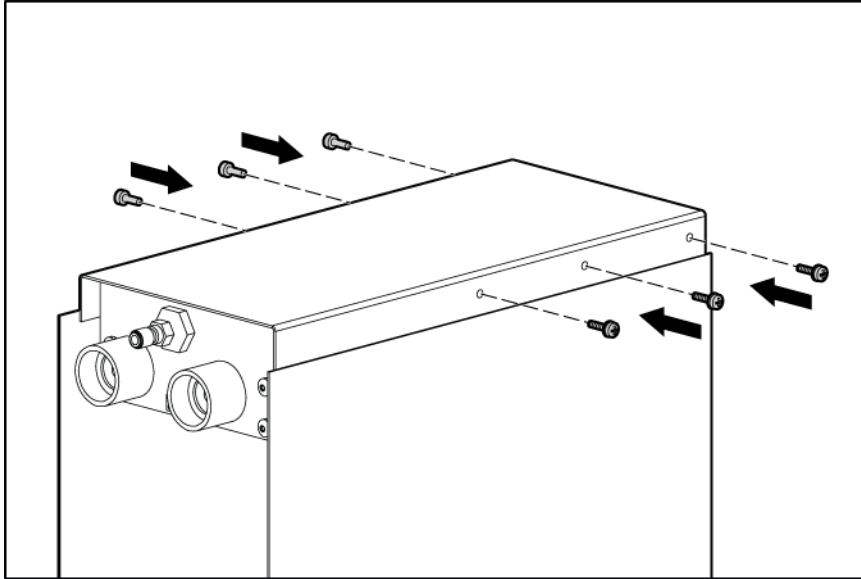
**TIP:** Use a light lubrication spray to ease installation of the hose barbs and hose clamps to hold the condensation drain line in place while working.

- Connect the condensation drain line between the quick disconnect hose barb and the HEX unit hose barb.
- Insert the white electrical connector into the faceplate, and verify that the tabs have locked in place.



- Align the bottom cover plate to the bottom of HEX unit.

- Using a T-25 Torx driver, insert and tighten three screws on each side of the bottom cover plate.



- Turn the HEX unit right-side up, so it is sitting on the bottom cover plate.
- Replace the heat exchanger unit ("[Replacing the heat exchanger unit with couplers](#)" on page 63).
- Replace the air deflector plate ("[Replacing the air deflector plate](#)" on page 34).
- Replace the fan unit ("[Replacing the fan unit](#)" on page 52).

## Upgrading the HEX hose coupler

The HEX hose coupler is a component of the HEX unit with ball valves that connects the HEX unit to the main water lines.

The following tools are required for installation:

- Adjustable wrench
- Knife
- T-25 Torx driver

## Removing the HEX hose coupler

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**NOTE:** For this procedure, remove the fan unit seated directly behind the heat exchanger unit you will remove.

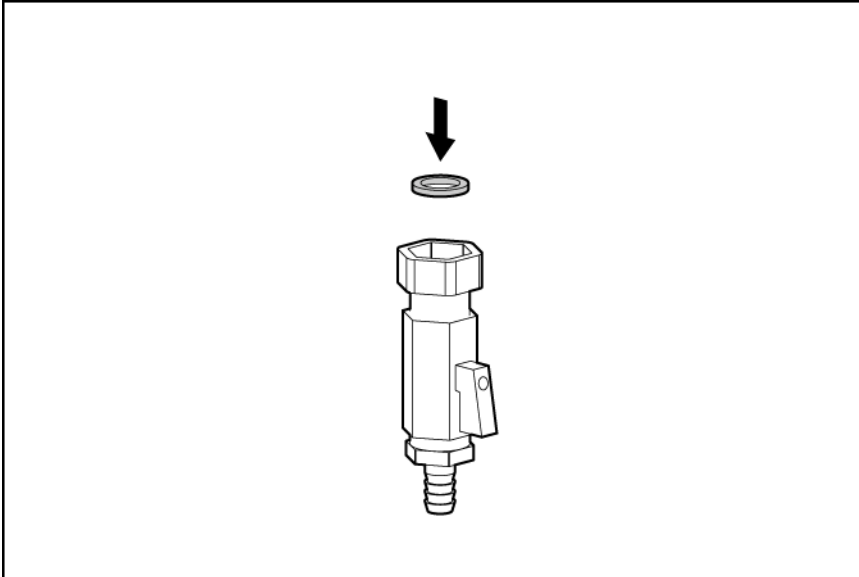
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- Remove the fan unit ("[Removing the fan unit](#)" on page 51).
- Remove the air deflector plate ("[Removing the air deflector plate](#)" on page 33).
- Remove the heat exchanger unit ("[Removing the heat exchanger unit with couplers](#)" on page 59).

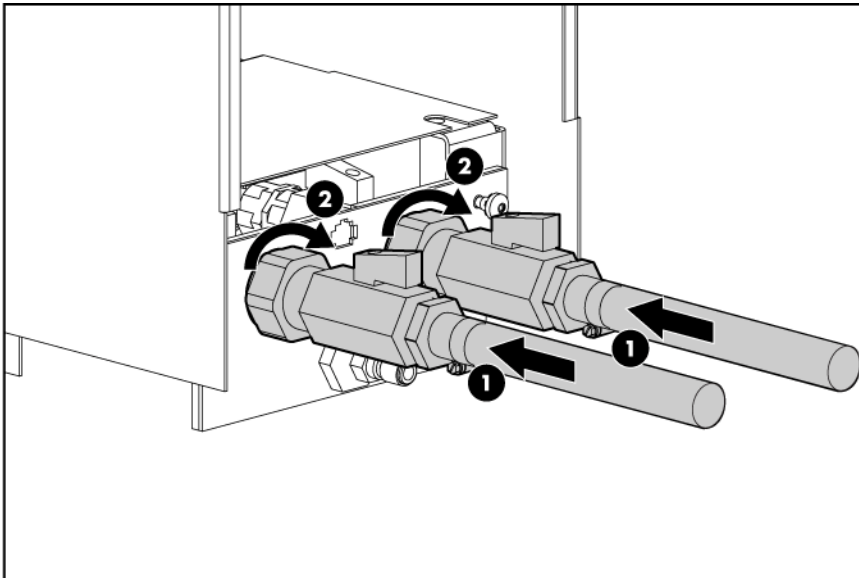
## Replacing the HEX hose coupler

- Verify that the ball valves inside the HEX unit and the ball valves on the hose assemblies are closed, with the handles perpendicular to the valves.

2. Insert the washer inside the hose union fitting of the hose assembly.



3. Hand-tighten the union fitting on the assembly, aligning the compression washer to the HEX unit.

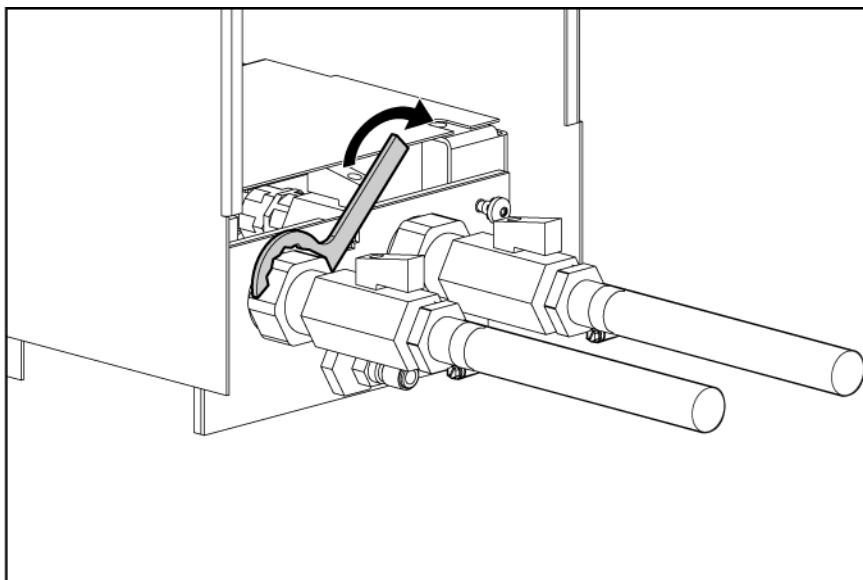


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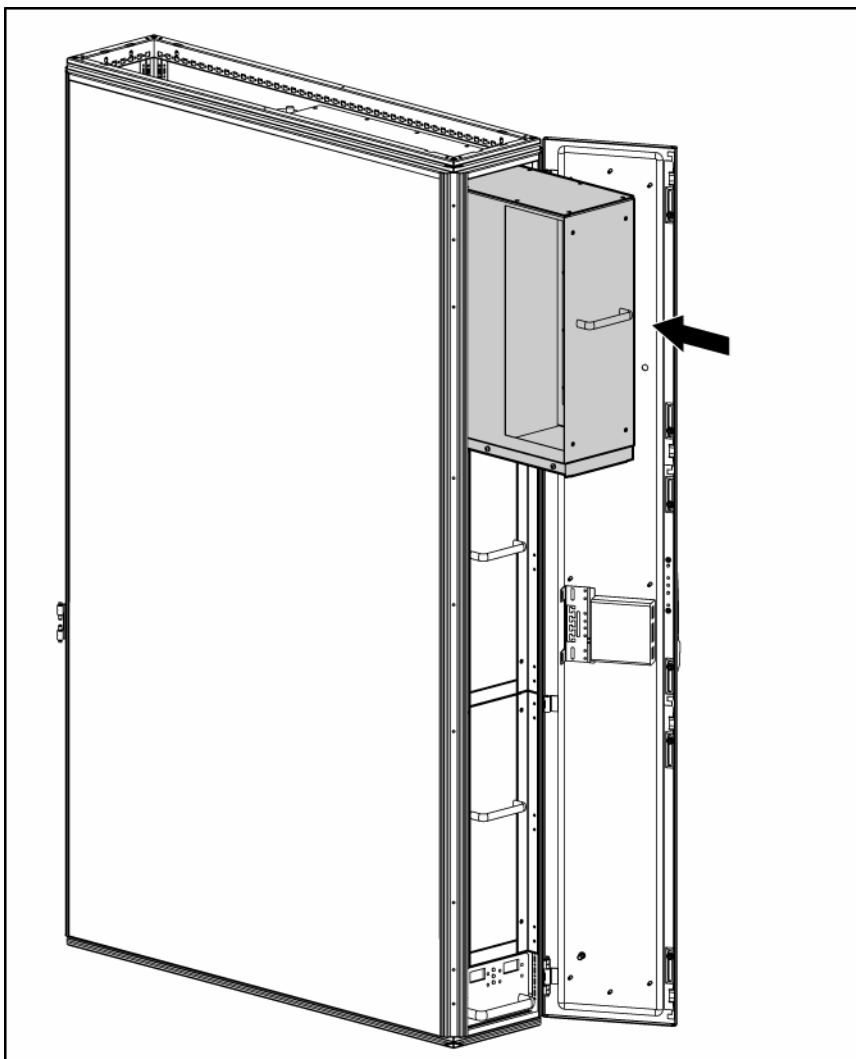
**NOTE:** Do not overtighten the fittings. The gasket needs only a slight compression to seal the fitting.

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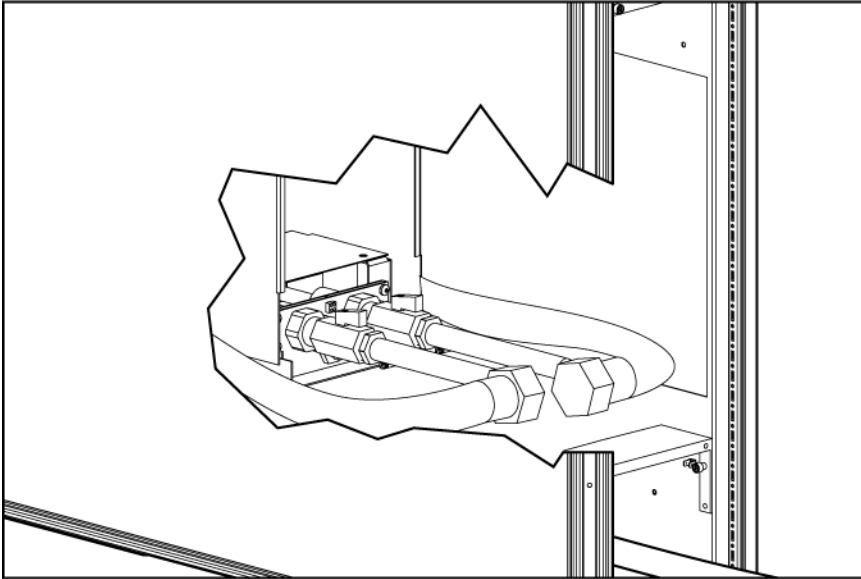
4. Using an adjustable wrench, tighten the union fitting 1/8 flat.



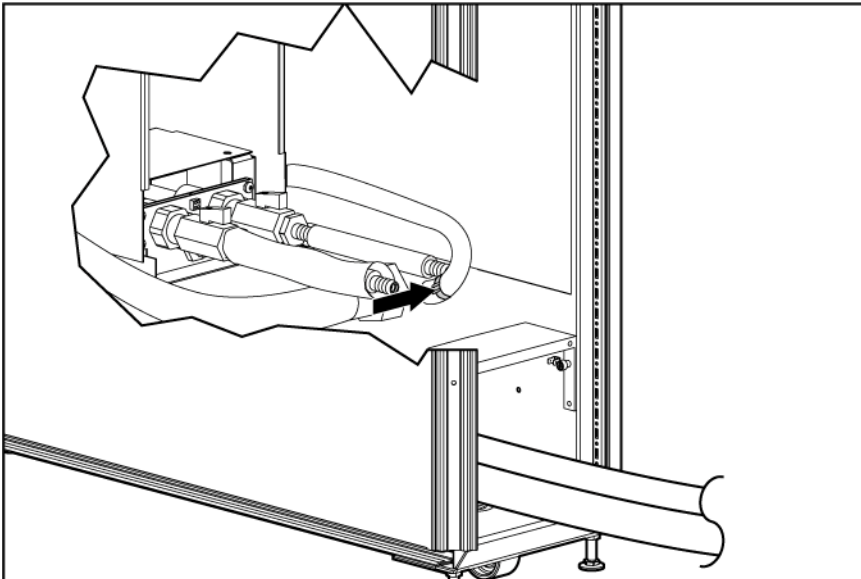
5. Insert the HEX unit in to the MCS unit.



6. Connect the right-side ball valve hose to the left-side MCS return hose. Connect the left-side ball valve hose to the right-side MCS return hose. The hoses create a criss-cross pattern.

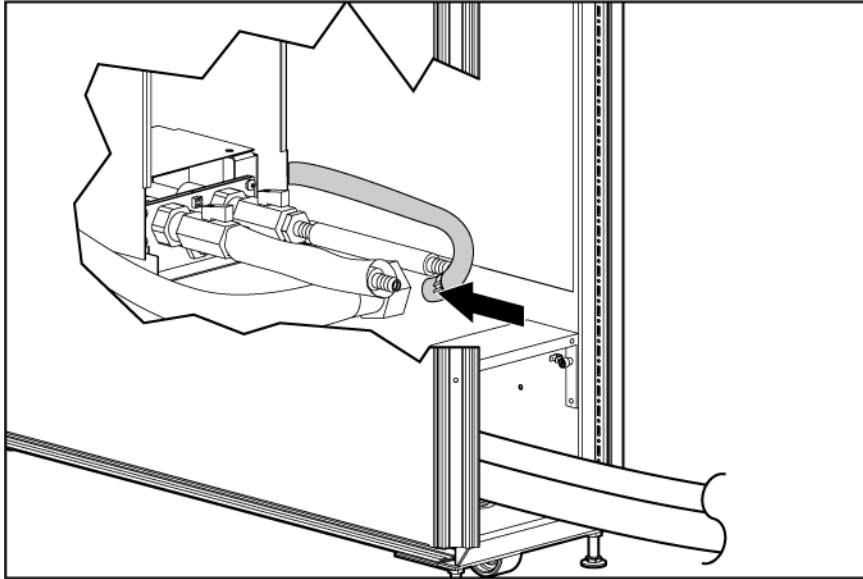


7. Cut the hose attached to the old coupler the same length of the replacement hose, and insert the hose barb from the HEX unit into the hose.

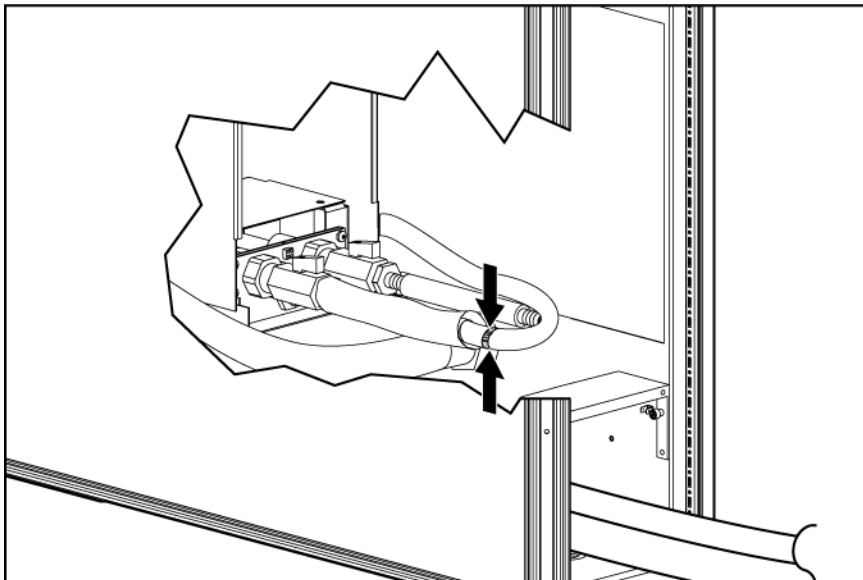


8. Remove the old coupler from the MCS unit.
9. Transfer the hose insulation from the old hose assembly to the new ball valve hose assembly, attached to the HEX unit.
10. Push the insulation back on the cut hose, and install a hose clamp.

11. Insert the barbed-end of the hose from the new ball valve assembly attached to the HEX unit into the hose you clamped in step 10.



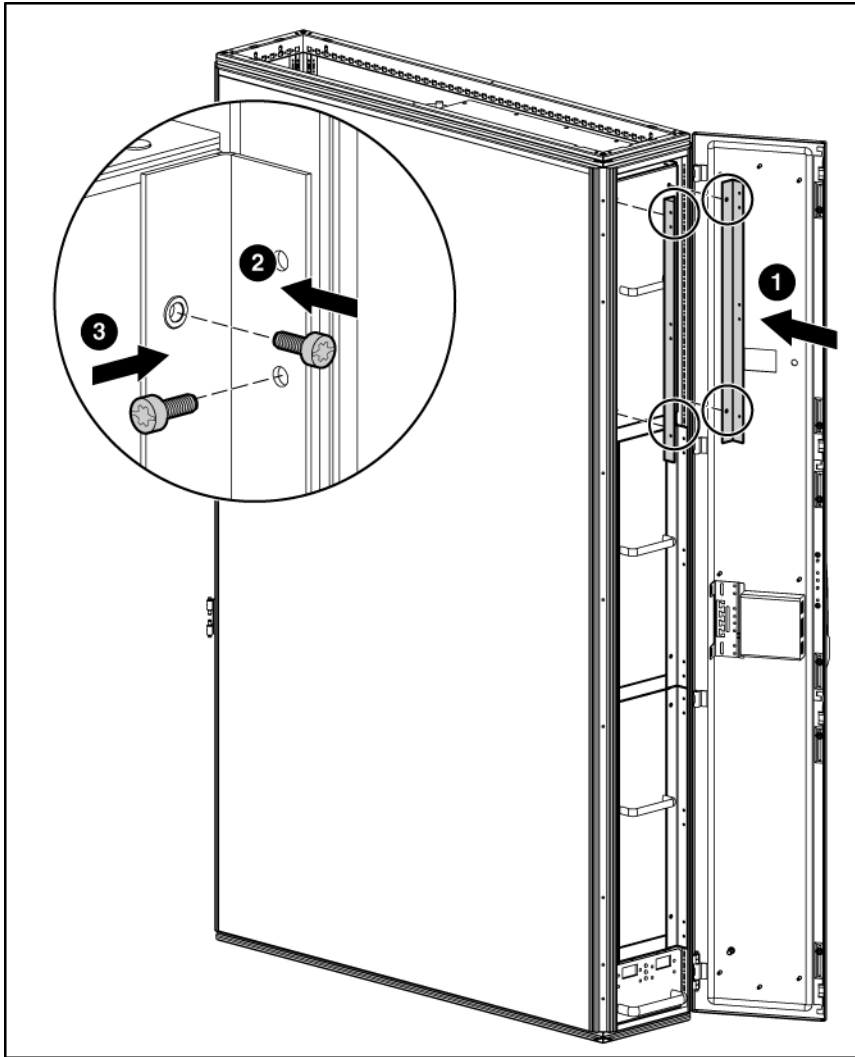
12. Tighten the hose clamp.



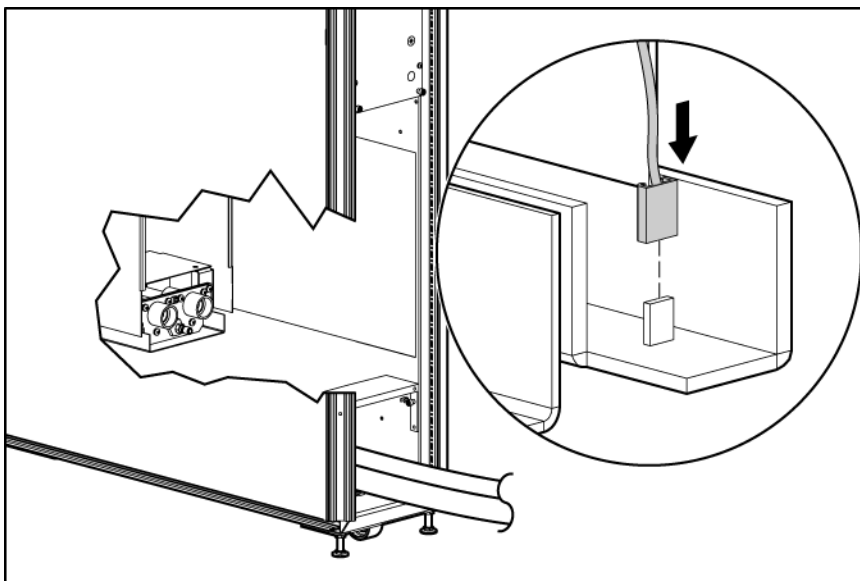
13. Slide the insulation back over the hose and secure with tie wraps.
14. Repeat steps 7 through 13 for the other HEX unit hose.
15. Open the valves inside the HEX unit and on each hose assembly.
16. Install the two HEX unit shipping brackets.
  - a. Align the HEX unit shipping brackets to the screw holes on the HEX unit and the MCS frame (1).
  - b. Using a T-25 Torx driver, insert and tighten four Torx screws to the HEX unit (2).



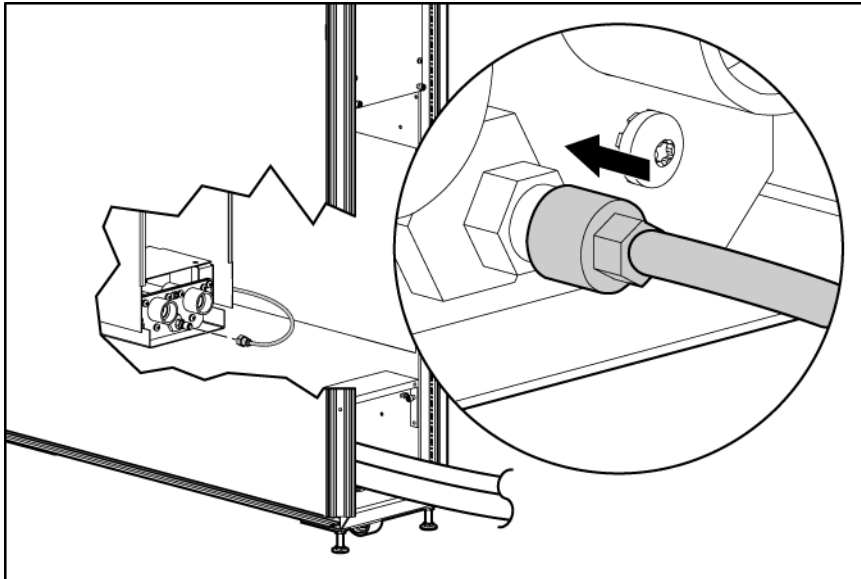
- c. Using a T-25 Torx driver, insert and tighten four Torx screws to the MCS frame (3).



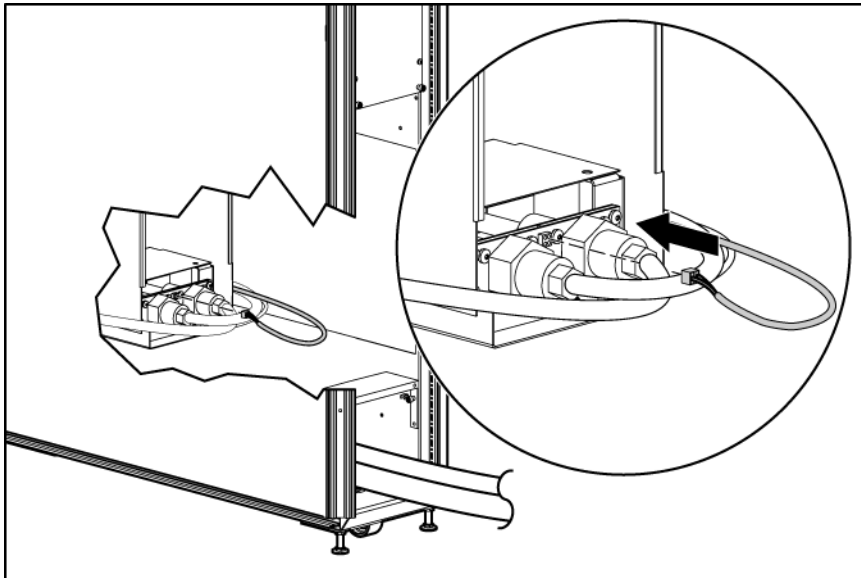
17. Connect the green and yellow ground bonding wire to the HEX unit.



18. Connect the condensation hose to the HEX unit.



19. Connect the temperature sensor cable to the HEX unit.



20. Replace the air deflector plate ("Replacing the air deflector plate" on page 34).  
21. Replace the fan unit ("Replacing the fan unit" on page 52).  
22. Complete the operation checklist (on page 111).

---

# Maintenance

## Maintenance and service

For information on maintenance and service, refer to the HP website (<http://www.hp.com>).

## Air and water heat exchanger maintenance

The air and water heat exchanger requires no maintenance. If particulates are present in the cooling water, a filter must be fitted. Check the functioning of the condensation drainage system regularly. Regularly perform visual inspections for leaks (annually).

## Water quality



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**CAUTION:** Damage caused by water that does not meet the HP Modular Cooling System water quality requirements is not covered by MCS warranty.

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For specific guidelines concerning water quality, see the *HP Modular Cooling System Site Preparation Guide*.

## Condensation management

Any condensation that forms is collected in each individual cooling module and is taken through a discharge tube to a condensation tray integrated in the base assembly. Where multiple cooling modules are used, the condensate discharge tubes are connected to one another using quick connectors. Any condensation that occurs is then removed through this series of connections to the condensation tray.

When the specified condensation level in the condensation tray is reached, a sensor activates a pump that pumps the condensation into the return system. A further discharge tube runs out of the system from condensation tray to drain excess fluid if needed. This hose should be connected to a collection system or an external drain.

To ensure reliable drainage:

- Ensure no kinks form in the drainage hose.
- Do not reduce diameter of drainage hose.
- Route the drainage hoses so that they always run downhill.

To avoid excessive buildup of condensate and to conserve energy, consider raising the cooling water temperature to the necessary cooling capacity.

## Frost damage

To avoid frost damage, the water temperature must not be allowed to fall below the minimum permissible temperature of +4 °C (+39.2 °F) at any point in the water cycle.

Before storage or transportation at sub-zero temperatures, the water cycle must be drained completely using compressed air. Avoid setting the target temperature lower than is necessary because the danger of falling below the dew point increases as water temperature decreases (condensation buildup). Ensure that the enclosure is sealed on all sides, and in particular at the cable inlet (condensation formation).

## Diagnostic tools

For a complete list of the warning and alarm messages displayed on the operator display and the web interface, see the *HP Modular Cooling System User Guide*, included with your original MCS unit.

# Troubleshooting

## HP Modular Cooling System troubleshooting

Issue	Resolution
The water flow is low or not flowing.	For more information, see the "Temperature Control settings" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The fan speed is too low.	For more information, see the "Cooling performance parameters" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The fan speed is too high.	For more information, see the "Cooling performance parameters" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The average server intake temperature (air going to the servers) is too high.	For more information, see the "Cooling performance parameters" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The average server intake temperature (air going to the servers) is too low.	For more information, see the "Cooling performance parameters" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The average exhaust temperature (air coming out of the servers) is too high.	For more information, see the "Cooling performance parameters" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The average exhaust temperature (air coming out of the servers) is too low.	For more information, see the "Cooling performance parameters" section in the <i>HP Modular Cooling System Web Interface User Guide</i> located on the Documentation CD included with this product.
The settings that have been modified through the web interface are not accepted, and the management module LED is blinking red, yellow, or green.	Press and hold the management module C key for five seconds to confirm these settings.
The measurement readings on the management module display or web interface seem to be incorrect, and the management module LED is blinking red, yellow, or green.	Press and hold the management module C key for five seconds to confirm these settings.
The heat exchanger unit stops operating correctly.	Remove the corresponding fan unit to keep the Automatic Door Release Kit from holding the rack doors open.

---

# Specifications

## MCS specifications

Item	Specification
Voltage	208–240 VAC +/- 10%, 50–60 Hz
Maximum Height (including the rack)	200 cm (78.7 in)
Maximum Width (including the rack)	90.9 cm (35.8 in) maximum
Maximum Depth (including the rack and rack handle)	127 cm (50 in)
Maximum Shipping Height (on skid)	224.8 cm (88.5 in)
Maximum Shipping Width (on skid)	122 cm (48 in)
Maximum Shipping Depth (on skid)	177.8 cm (70 in)
Maximum Depth with Rear Extension Kit installed	142.5 cm (56.1 in)
Net Weight (including the empty rack)	540 kg (1190 lb)
Shipping Weight (gross with packaging)	621.4 kg (1370 lb)
Effective cooling with 75 l/min (20 gal/min) water supply at 7°C, cold air at 25°C	35 kW
Rated current maximum	208 VAC–15 Amps
Cooling medium	water
Minimum recommended water inlet temperature	7°C (45°F)
Permissible operating pressure pmax	100 psi

## Thermal and air flow performance

Maximum thermal and air flow performance parameters	Specifications
Air temperature—inlet to rack-mounted components	25°C (68°F)
Chilled water temperature	7°–10°C (45°–50°F)
Total rack-mounted component air flow	2,600 cfm or less at 0 or more pressure drop across the rack-mounted components
Chilled water flow rate	21 gal/min
Chilled water pressure differential at flow needed to meet thermal specifications	2.0 bar delta pressure
Heat lost to room	approximately 10% maximum depending on the MCS settings and room temperature
Heat transferred to cooling fluid	35 kW maximum

## Environmental specifications

Features	Specifications
Operating temperature	5°C to 35°C (41°F to 95°F)
Non-operating temperature	0°C to 60°C (32°F to 140°F)
Transit temperature	-30°C to 60°C (-22°F to 140°F), up to 72 hours
Storage temperature	-20°C to 60°C (-4°F to 140°F)
Operating humidity	20 to 80% relative humidity (non-condensing)
Non-operating humidity	5 to 95% relative humidity (non-condensing)
Operating altitude	-76.2 to 3,048 m (-250 to 10,000 ft)
Non-operating altitude	-76.2 to 9,144 m (-250 to 30,000 ft)

## HP 10642 G2 Rack specifications

U height	Width	Depth	Dynamic load (gross)	Static load
42U	600 mm (23.82 in)	1,000 mm (39.37 in)	907.18 kg (2,000 lb)	907.18 kg (2,000 lb)

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# Acronyms and abbreviations

CSR

Customer Self Repair

HEX

heat exchanger

MCS

modular cooling system

SPS

spare part



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