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Rev C, 2/99
Instruction Manual

MKS Type 253B
Throttling Valve

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WARRANTY

Type 253B Equipment

MKS Instruments, Inc. (**MKS**) warrants that the equipment described above (the "equipment") manufactured by **MKS** shall be free from defects in materials and workmanship for a period of one year from date of shipment and will for a period of two years from the date of shipment, correctly perform all date-related operations, including without limitation accepting data entry, sequencing, sorting, comparing, and reporting, regardless of the date the operation is performed or the date involved in the operation, provided that, if the equipment exchanges data or is otherwise used with equipment, software, or other products of others, such products of others themselves correctly perform all date-related operations and store and transmit dates and date-related data in a format compatible with **MKS** equipment. THIS WARRANTY IS **MKS'** SOLE WARRANTY CONCERNING DATE-RELATED OPERATIONS.

For the period commencing with the date of shipment of this equipment and ending one year later in the case of defects in materials and workmanship, but two years later in the case of failure to comply with the date-related operations warranty, **MKS** will, at its option, either repair or replace any part which is defective in materials or workmanship or with respect to the date-related operations warranty without charge to the purchaser. The foregoing shall constitute the exclusive and sole remedy of the purchaser for any breach by **MKS** of this warranty.

The purchaser, before returning any equipment covered by this warranty, which is asserted to be defective by the purchaser, shall make specific written arrangements with respect to the responsibility for shipping the equipment and handling any other incidental charges with the **MKS** sales representative or distributor from which the equipment was purchased or, in the case of a direct purchase from **MKS**, with the **MKS** home office in Andover, Massachusetts, USA.

This warranty does not apply to any equipment which has not been installed and used in accordance with the specifications recommended by **MKS** for the proper and normal use of the equipment. **MKS** shall not be liable under any circumstances for indirect, special, consequential, or incidental damages in connection with, or arising out of, the sale, performance, or use of the equipment covered by this warranty.

MKS recommends that all **MKS** pressure and flow products be calibrated periodically (typically every 6 to 12 months) to ensure accurate readings. When a product is returned to **MKS** for this periodic re-calibration it is considered normal preventative maintenance not covered by any warranty.

THIS WARRANTY IS IN LIEU OF ALL OTHER RELEVANT WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTY AGAINST INFRINGEMENT OF ANY PATENT.

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Exhaust Throttle Valve

Please Note:
MKS Instruments provides these documents as the latest version for the revision indicated. The material is subject to change without notice, and should be verified if used in a critical application.

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Symbols Used in This Instruction Manual

Definitions of WARNING, CAUTION, and NOTE messages used throughout the manual.

Warning 

The WARNING sign denotes a hazard to personnel. It calls attention to a procedure, practice, condition, or the like, which, if not correctly performed or adhered to, could result in injury to personnel.

Caution 

The CAUTION sign denotes a hazard to equipment. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of all or part of the product.

Note 

The NOTE sign denotes important information. It calls attention to a procedure, practice, condition, or the like, which is essential to highlight.

Symbols Found on the Unit

The following table describes symbols that may be found on the unit.

Definition of Symbols Found on the Unit			
On (Supply) IEC 417, No.5007	 Off (Supply) IEC 417, No.5008	 Earth (ground) IEC 417, No.5017	 Protective earth (ground) IEC 417, No.5019
 Frame or chassis IEC 417, No.5020	 Equipotentiality IEC 417, No.5021	 Direct current IEC 417, No.5031	 Alternating current IEC 417, No.5032
 Both direct and alternating current IEC 417, No.5033-a	 Class ll equipment IEC 417, No.5172-a	 Three phase alternating current IEC 617-2 No.020206	
 Caution, refer to accompanying documents ISO 3864, No.B.3.1	 Caution, risk of electric shock ISO 3864, No.B.3.6	 Caution, hot surface IEC 417, No.5041	

Table 1: Definition of Symbols Found on the Unit

Safety Procedures and Precautions

Observe the following general safety precautions during all phases of valve operation. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of intended use of the valve and may impair the protection provided by the equipment. MKS Instruments, Inc. assumes no liability for the customer's failure to comply with these requirements.

Warning 

Moving parts in the valve create a risk of personal injury until the valve is securely incorporated into a system. To avoid injury, keep all bodily parts away from any valve opening.

1. **Do not insert objects into openings where contact with moving parts is possible.**
2. **Isolate the valve from any electrical or pneumatic power supply before handling the valve.**

DO NOT SUBSTITUTE PARTS OR MODIFY VALVE

Do not install substitute parts or perform any unauthorized modification to the valve. Return the valve to an MKS Calibration and Service Center for service and repair to ensure that all safety features are maintained.

SERVICE BY QUALIFIED PERSONNEL ONLY

Operating personnel must not attempt component replacement and internal adjustments. Any service must be performed by qualified service personnel only.

USE CAUTION WHEN OPERATING WITH HAZARDOUS MATERIALS

If hazardous materials are used, observe the proper safety precautions, completely purge the valve when necessary, and ensure that the material used is compatible with the wetted materials in this product, including any sealing materials.

PURGE THE VALVE

After installing the unit, or before removing it from a system, purge the unit completely with a clean, dry gas to eliminate all traces of the previously used flow material.

USE PROPER PROCEDURES WHEN PURGING

This valve must be purged under a ventilation hood, and gloves must be worn for protection.

DO NOT OPERATE IN AN EXPLOSIVE ENVIRONMENT

To avoid explosion, do not operate this product in an explosive environment unless it has been specifically certified for such operation**.**

USE PROPER FITTINGS AND TIGHTENING PROCEDURES

All valve fittings must be consistent with valve specifications, and compatible with the intended use of the valve. Assemble and tighten fittings according to manufacturer's directions.

CHECK FOR LEAK-TIGHT FITTINGS

Carefully check all vacuum component connections to ensure leak-tight installation.

OPERATE AT SAFE INLET PRESSURES

Never operate the valve at pressures higher than the rated maximum pressure (refer to the product specifications for the maximum allowable pressure).

INSTALL A SUITABLE BURST DISC

When operating from a pressurized gas source, install a suitable burst disc in the vacuum system to prevent system explosion should the system pressure rise.

KEEP THE UNIT FREE OF CONTAMINANTS

Do not allow contaminants to enter the unit before or during use. Contamination such as dust, dirt, lint, glass chips, and metal chips may permanently damage the unit or contaminate the process.

KEEP AWAY FROM VALVE OPENING

Keep fingers, other body parts, and other materials away from the valve opening when the valve is in operation.

Sicherheitshinweise für das Ventil

In dieser Betriebsanleitung vorkommende Symbole

Bedeutung der mit WARNUNG!, VORSICHT! und HINWEIS gekennzeichneten Absätze in dieser Betriebsanleitung.

Warnung! 

Das Symbol WARNUNG! weist auf eine Gefahr für das Bedienpersonal hin. Es macht auf einen Arbeitsablauf, eine Arbeitsweise, einen Zustand oder eine sonstige Gegebenheit aufmerksam, deren unsachgemäße Ausführung bzw. ungenügende Berücksichtigung zu Verletzungen führen kann.

Vorsicht! 

Das Symbol VORSICHT! weist auf eine Gefahr für das Gerät hin. Es macht auf einen Bedienungsablauf, eine Arbeitsweise oder eine sonstige Gegebenheit aufmerksam, deren unsachgemäße Ausführung bzw. ungenügende Berücksichtigung zu einer Beschädigung oder Zerstörung des Gerätes oder von Teilen des Gerätes führen kann.

Hinweis 

Das Symbol HINWEIS macht auf wichtige Informationen bezüglich eines Arbeitsablaufs, einer Arbeitsweise, eines Zustands oder einer sonstige Gegebenheit aufmerksam.

Erklärung der am Gerät angebrachten Symbole

Nachstehender Tabelle sind die Bedeutungen der Symbole zu entnehmen, die am Gerät angebracht sein können.

Bedeutung der am Gerät angebrachten Symbole			
Ein (Energie) IEC 417, No.5007	 Aus (Energie) IEC 417, No.5008	 Erdanschluß IEC 417, No.5017	 Schutzleiteranschluß IEC 417, No.5019
 Masseanschluß IEC 417, No.5020	 Aquipotential-anschluß IEC 417, No.5021	 Gleichstrom IEC 417, No.5031	 Wechselstrom IEC 417, No.5032
 Gleich- oder Wechselstrom IEC 417, No.5033-a	 Durchgängige doppelte oder verstärkte Isolierung IEC 417, No.5172-a	 Dreileiter-Wechselstrom (Drehstrom) IEC 617-2, No.020206	
 Warnung vor einer Gefahrenstelle (Achtung, Dokumen-tation beachten) ISO 3864, No.B.3.1	 Warnung vor gefährlicher elektrischer Spannung ISO 3864, No.B.3.6	 Höhere Temperatur an leicht zugänglichen Teilen IEC 417, No.5041	

Tabelle 2: Bedeutung der am Gerät angebrachten Symbole

Sicherheitsvorschriften und Vorsichtsmaßnahmen

Folgende allgemeine Sicherheitsvorschriften sind während allen Betriebsphasen dieses Ventils zu befolgen. Eine Mißachtung der Sicherheitsvorschriften und sonstiger Warnhinweise in dieser Betriebsanleitung verletzt die für dieses Ventil und seine Bedienung geltenden Sicherheits-standards, und kann die eingebauten Schutzvorrichtungen wirkungslos machen. MKS Instruments, Inc. haftet nicht für Mißachtung dieser Sicherheitsvorschriften seitens des Kunden.

Warnung! 

Solange das Ventil nicht fest in ein System eingebaut ist, besteht Verletzungsgefahr aufgrund von beweglichen Teilen. Daher Finger und andere Körperteile unbedingt von allen Ventilöffnungen fernhalten

1. **Niemals Fremdkörper in Öffnungen einführen, in denen ein Kontakt mit beweglichen Teilen möglich ist.**
2. **Das Ventil vor dem Hantieren stets von allen elektrischen und pneumatischen Kraftquellen trennen.**

Niemals Teile austauschen oder Änderungen am Ventil vornehmen!

Ersetzen Sie keine Teile mit baugleichen oder ähnlichen Teilen, und nehmen Sie keine eigenmächtigen Änderungen am Ventil vor. Schicken Sie das Ventil zwecks Wartung und Reparatur an den MKS-Kalibrierungs- und -Kundendienst ein. Nur so wird sichergestellt, daß alle Schutzvorrichtungen voll funktionsfähig bleiben.

Wartung nur durch qualifizierte Fachleute!

Das Auswechseln von Komponenten und das Vornehmen von internen Einstellungen darf nur von qualifizierten Fachleuten durchgeführt werden, niemals vom Bedienpersonal.

Vorsicht beim Arbeiten mit gefährlichen Stoffen!

Wenn gefährliche Stoffe verwendet werden, muß der Bediener die entsprechenden Sicherheitsvorschriften genauestens einhalten, das Ventil, falls erforderlich, vollständig spülen, sowie sicherstellen, daß der Gefahrstoff die von ihm benetzten, im Ventil verwendeten Materialien, insbesondere Dichtungen, nicht angreift.

Spülen des Ventils mit Gas!

Nach dem Installieren oder vor dem Ausbau aus einem System muß das Ventil unter Einsatz eines reinen Trockengases vollständig gespült werden, um alle Rückstände des Vorgängermediums zu entfernen.

Anweisungen zum Spülen des Ventils!

Das Ventil darf nur unter einer Ablufthaube gespült werden. Schutzhandschuhe sind zu tragen.

Nicht zusammmen mit explosiven Stoffen, Gasen oder Dämpfen benutzen!

Um der Gefahr einer Explosion vorzubeugen, darf dieses Produkt niemals zusammen mit explosiven Stoffe aller Art eingesetzt werden, sofern es nicht ausdrücklich für diesen Zweck zugelassen ist.

Anweisungen zum Installieren der Armaturen!

Alle Ventilanschlußstücke und Armaturenteile müssen mit den Ventilspezifikationen übereinstimmen, und mit dem geplanten Einsatz des Ventils kompatibel sein. Der Einbau, insbesondere das Anziehen und Abdichten, muß gemäß den Anweisungen des Herstellers vorgenommen werden.

Ventil auf Undichtigkeiten prüfen!

Überprüfen Sie sorgfältig alle Verbindungen auf undichte Stellen.

Nur unter zulässigen Anschlußdrücken betreiben!

Betreiben Sie das Ventil niemals unter Drücken, die den maximal zulässigen Druck (siehe Produktspezifikationen) übersteigen.

Geeignete Berstscheibe installieren!

Wenn mit einer unter Druck stehenden Gasquelle gearbeitet wird, sollte eine geeignete Berstscheibe in das Vakuumsystem installiert werden, um eine Explosionsgefahr aufgrund von steigendem Systemdruck zu vermeiden.

Verunreinigungen vermeiden!

Stellen Sie sicher, daß Verunreinigungen jeglicher Art weder vor dem Einsatz noch während des Betriebs in das Innere gelangen können. Staub- und Schmutzpartikel, Glassplitter oder Metallspäne können das Produkt dauerhaft beschädigen oder Prozeß und Meßwerte verfälschen.

Hände weg von der Ventilöffnung!

Körperteile, insbesondere Finger, sowie Fremdobjekte während des Betriebes von der Ventilöffnung fernhalten.

Informations relatives à la sécurité pour la valve

Symboles utilisés dans ce manuel d'utilisation

Définitions des indications AVERTISSEMENT, ATTENTION, et REMARQUE utilisées dans ce manuel.

Avertissement 

L'indication AVERTISSEMENT signale un danger pour le personnel. Elle attire l'attention sur une procédure, une pratique, une condition, ou toute autre situation présentant un risque d'accident pour le personnel, en cas d'exécution incorrecte ou de non respect des consignes.

Attention 

L'indication ATTENTION signale un danger pour l'appareil. Elle attire l'attention sur une procédure d'exploitation, une pratique, ou toute autre situation, présentant un risque d'endommagement ou de destruction d'une partie ou de la totalité de l'appareil, en cas d'exécution incorrecte ou de non respect des consignes.

Remarque 

L'indication REMARQUE signale une information importante. Elle attire l'attention sur une procédure, une pratique, une condition, ou toute autre situation, présentant un intérêt particulier.

Symboles apparaissant sur l'unité

Le tableau suivant décrit les symboles pouvant apparaître sur l'unité.

Définition des symboles apparaissant sur l'unité			
Marche (sous tension) IEC 417, No.5007	 Arrêt (hors tension) IEC 417, No.5008	 Terre (masse) IEC 417, No.5017	 Terre de protection (masse) IEC 417, No.5019
 Masse IEC 417, No.5020	 Equipotentialité IEC 417, No.5021	 Courant continu IEC 417, No.5031	 Courant alternatif IEC 417, No.5032
 Courant continu et alternatif IEC 417, No.5033-a	 Matériel de classe II IEC 417, No.5172-a	 Courant alternatif triphasé IEC 617-2, No.020206	
 Attention : se reporter à la documentation ISO 3864, No.B.3.1	 Attention : risque de choc électrique ISO 3864, No.B.3.6	 Attention : surface brûlante IEC 417, No.5041	

Tableau 3: Définition des symboles apparaissant sur l'unité

Mesures de sécurité et précautions

Prendre les précautions générales de sécurité suivantes pendant toutes les phases d'exploitation de la valve. Le non respect des ces précautions ou des avertissements contenus dans ce manuel constitue une violation des normes de sécurité relatives à l'utilisation de la valve et peut diminuer la protection fournie par l'appareil. MKS Instruments, Inc. n'assume aucune responsabilité concernant le non respect des consignes par les clients.

Avertissement 

Les pièces mobiles de la valve peuvent être une cause d'accident tant que la valve n'est pas solidement incorporée dans un système. Pour éviter tout accident, tenir toute partie du corps à distance de toute ouverture de la valve.

1. **Ne pas insérer des objets dans les ouvertures où le contact avec des pièces mobiles est possible.**
2. **Isoler la valve de toute source d'alimentation électrique ou pneumatique pendant la manipulation de la valve.**

PAS DE SUBSTITUTION DE PIÈCES OU DE MODIFICATION DE LA VALVE

Ne pas installer des pièces de substitution ou effectuer des modifications non autorisées sur la valve. Renvoyer la valve à un centre de service et de calibrage MKS pour tout dépannage ou réparation afin de garantir le l'intégrité des dispositifs de sécurité.

DÉPANNAGE UNIQUEMENT PAR DU PERSONNEL QUALIFIÉ

Le personnel d'exploitation ne doit pas essayer de remplacer des composants ou de faire des réglages internes. Tout dépannage doit être uniquement effectué par du personnel qualifié.

PRÉCAUTION EN CAS D'UTILISATION AVEC DES PRODUITS DANGEREUX

Si des produits dangereux sont utilisés, prendre les mesures de précaution appropriées, purger complètement la valve quand cela est nécessaire, et s'assurer que les produits utilisés sont compatibles avec les composants liquides de l'appareil, y compris les matériaux d'étanchéité.

PURGE DE LA VALVE

Après l'installation de l'unité, ou avant son enlèvement d'un système, purger l'unité complètement avec un gaz propre et sec afin d'éliminer toute trace du produit de flux utilisé précédemment.

UTILISATION DES PROCÉDURES APPROPRIÉES POUR LA PURGE

Cette valve doit être purgée sous une hotte de ventilation, et il faut porter des gants de protection.

PAS D'EXPLOITATION DANS UN ENVIRONNEMENT EXPLOSIF

Pour éviter toute explosion, ne pas utiliser cet appareil dans un environnement explosif, sauf en cas d'homologation spécifique pour une telle exploitation.

UTILISATION D'ÉQUIPEMENTS APPROPRIÉS ET PROCÉDURES DE SERRAGE

Tous les équipements de la valve doivent être cohérents avec ses spécifications, et compatibles avec l'utilisation prévue de la valve. Assembler et serrer les équipements conformément aux directives du fabricant.

VÉRIFICATION DE L'ÉTANCHÉITÉ DES CONNEXIONS

Vérifier attentivement toutes les connexions des composants pour le vide afin de garantir l'étanchéité de l'installation.

EXPLOITATION AVEC DES PRESSIONS D'ENTRÉE NON DANGEREUSES

Ne jamais utiliser la valve avec des pressions supérieures à la pression nominale maximum (se reporter aux spécifications de l'unité pour la pression maximum admissible).

INSTALLATION D'UN DISQUE D'ÉCHAPPEMENT ADAPTÉ

En cas d'exploitation avec une source de gaz pressurisé, installer un disque d'échappement adapté dans le système à vide afin d'éviter une explosion du système en cas d'augmentation de la pression.

MAINTIEN DE L'UNITÉ À L'ABRI DES CONTAMINATIONS

Ne pas laisser des produits contaminants pénétrer dans l'unité avant ou pendant l'utilisation. Des produits contaminants tels que des poussières et des fragments de tissu, de glace et de métal peuvent endommager l'unité d'une manière permanente ou contaminer le processus.

PRÉCAUTION AVEC L'OUVERTURE DE LA VALVE

Éviter tout contact des mains, toute autre partie du corps, ou tout autre matériel avec l'ouverture de la valve quand celle-ci est en fonctionnement.

Medidas de seguridad de la válvula

Símbolos usados en este manual de instrucciones

Definiciones de los mensajes de advertencia, precaución y de las notas usados en el manual.

Advertencia 

El símbolo de advertencia indica la posibilidad de que se produzcan daños personales. Pone de relieve un procedimiento, práctica, estado, etc. que en caso de no realizarse u observarse correctamente puede causar daños personales.

Precaución 

El símbolo de precaución indica la posibilidad de producir daños al equipo. Pone de relieve un procedimiento operativo, práctica, estado, etc. que en caso de no realizarse u observarse correctamente puede causar daños o la destrucción total o parcial del equipo.

Nota 

El símbolo de notas indica información de importancia. Este símbolo pone de relieve un procedimiento, práctica o condición cuyo conocimiento es esencial destacar.

Símbolos hallados en la unidad

La tabla siguiente contiene los símbolos que puede hallar en la unidad.

Definición de los símbolos hallados en la unidad			
Encendido (alimentación eléctrica) IEC 417, N° 5007	 Apagado (alimentación eléctrica) IEC 417, N° 5008	 Puesta a tierra IEC 417, N° 5017	 Protección a tierra IEC 417, N° 5019
 Caja o chasis IEC 417, N° 5020	 Equipotencialidad IEC 417, N° 5021	 Corriente continua IEC 417, N° 5031	 Corriente alterna IEC 417, N° 5032
 Corriente continua y alterna IEC 417, N° 5033-a	 Equipo de clase II IEC 417, N° 5172-a	 Corriente alterna trifásica IEC 617-2, N° 020206	
 Precaución. Consulte los documentos adjuntos ISO 3864, N° B.3.1	 Precaución. Riesgo de descarga eléctrica ISO 3864, N° B.3.6	 Precaución. Superficie caliente IEC 417, N° 5041	

Tabla 4: Definición de los símbolos hallados en la unidad

Procedimientos y precauciones de seguridad

Las precauciones generales de seguridad descritas a continuación deben observarse durante todas las etapas de funcionamiento de la válvula. La falta de cumplimiento de dichas precauciones o de las advertencias específicas a las que se hace referencia en el manual, constituye una violación de las normas de seguridad establecidas para el uso previsto de la válvula y podría anular la protección proporcionada por el equipo. Si el cliente no cumple dichas precauciones y advertencias, MKS Instruments, Inc. no asume responsabilidad legal alguna.

Advertencia 

Hasta que la válvula sea incorporada en forma segura al sistema, las piezas en movimiento presentes en la misma pueden causar daños personales. Para evitarlo, mantenga todo el cuerpo alejado de la abertura de válvula.

1. **No introduzca por las aberturas objetos que puedan entrar en contacto con piezas en movimiento.**
2. **Antes de tocar la válvula, aíslela de toda fuente de alimentación neumática o eléctrica.**

NO UTILICE PIEZAS NO ORIGINALES O MODIFIQUE LA VÁLVULA

No instale piezas que no sean originales o modifique la válvula sin autorización. Para asegurar el correcto funcionamiento de todos los dispositivos de seguridad, envíe la válvula al Centro de servicio y calibración de MKS toda vez que sea necesario efectuar reparaciones o tareas de mantenimiento.

LAS REPARACIONES DEBEN SER EFECTUADAS ÚNICAMENTE POR TÉCNICOS AUTORIZADOS

Los operarios no deben intentar reemplazar los componentes o realizar tareas de ajuste en el interior. Las tareas de mantenimiento o reparación deben ser realizadas únicamente por personal autorizado.

TENGA CUIDADO CUANDO TRABAJE CON MATERIALES TÓXICOS

Cuando se utilicen materiales tóxicos, los operarios deberán cumplir las medidas de seguridad correspondientes, purgar totalmente la válvula cuando sea necesario y comprobar que el material utilizado sea compatible con los materiales humedecidos del instrumento e inclusive, con los materiales de sellado.

PURGUE LA VÁLVULA

Una vez instalada la unidad o antes de retirarla del sistema, purgue completamente la unidad con gas limpio y seco para eliminar todo resto de la sustancia líquida empleada anteriormente.

USE PROCEDIMIENTOS ADECUADOS PARA REALIZAR LA PURGA

La válvula debe purgarse debajo de una campana de ventilación y deben utilizarse guantes protectores.

NO HAGA FUNCIONAR LA VÁLVULA EN UN AMBIENTE CON RIESGO DE EXPLOSIONES

Para evitar que se produzcan explosiones, no haga funcionar este producto en un ambiente con riesgo de explosiones, excepto cuando el mismo haya sido certificado específicamente para tal uso.

USE ACCESORIOS ADECUADOS Y REALICE CORRECTAMENTE LOS PROCEDIMIENTOS DE AJUSTE

Todos los accesorios de la válvula deben cumplir las especificaciones de la misma y ser compatibles con el uso que se debe dar a la válvula. Arme y ajuste los accesorios de acuerdo con las instrucciones del fabricante.

COMPRUEBE QUE LAS CONEXIONES SEAN A PRUEBA DE FUGAS

Inspeccione cuidadosamente las conexiones de los componentes de vacío para comprobar que hayan sido instalados a prueba de fugas.

HAGA FUNCIONAR LA VÁLVULA CON PRESIONES DE ENTRADA SEGURAS

No haga funcionar nunca la válvula con presiones superiores a la máxima presión nominal (en las especificaciones del instrumento hallará la presión máxima permitida).

INSTALE UNA CÁPSULA DE SEGURIDAD ADECUADA

Cuando el instrumento funcione con una fuente de gas presurizado, instale una cápsula de seguridad adecuada en el sistema de vacío para evitar que se produzcan explosiones cuando suba la presión del sistema.

MANTENGA LA UNIDAD LIBRE DE CONTAMINANTES

No permita el ingreso de contaminantes en la unidad antes o durante su uso. Los productos contaminantes tales como polvo, suciedad, pelusa, lascas de vidrio o virutas de metal pueden dañar irreparablemente la unidad o contaminar el proceso.

MANTÉNGASE ALEJADO DE LA ABERTURA DE LA VÁLVULA

Cuando la válvula esté funcionando, mantenga los dedos, otras partes del cuerpo y otros materiales alejados de la abertura.

Chapter One: General Information

Introduction

The MKS Type 253B Exhaust Throttle Valve is a butterfly valve designed to regulate (and in the case of a sealing valve, to shutoff) the removal of gas from a vacuum chamber when used with a MKS controller.

The 253 valve can be used with the Type 651, 652, 152G, or 252 (revision D or later) controllers. If you are retrofitting the 253B valve into an existing system with hex connector cables, an adapter cable is required (refer to Table 5, page 20).

The 253 valve is normally mounted to a Roots blower, diffusion, turbo, cryo, or other high vacuum pump. The valve's butterfly is positioned to modulate the gas flow (pumping speed as seen by the chamber), thereby controlling pressure within the vacuum chamber. A special feature of the valve is a nonlinear actuator placed between the butterfly shaft and the motor drive shaft whose function is to generate a linear valve transfer characteristic[1]. Practically speaking, the MKS controller will need little gain and phase lead adjustment as it operates the valve from the full closed to the full open position. This is of extreme importance when systems are automatically programmed to change flows and pressures as a process is carried out within the chamber.

[1] U.S. Patent No. 4,327,894

How This Manual is Organized

This manual is designed to provide instructions on how to set up, install, and operate a Type 253 unit.

Before installing your Type 253 unit in a system and/or operating it, carefully read and familiarize yourself with all precautionary notes in the *Safety Messages and Procedures* section at the front of this manual. In addition, observe and obey all WARNING and CAUTION notes provided throughout the manual.

Chapter One, *General Information*, (this chapter) introduces the product and describes the organization of the manual.

Chapter Two, *Installation*, explains the environmental requirements and describes how to mount the instrument in your system.

Chapter Three, *Operation and Theory of Operation*, gives a description of the instrument and its functionality.

Chapter Four, *Maintenance*, lists any maintenance required to keep the instrument in good working condition.

Appendix A, *Product Specifications*, lists the specifications of the instrument.

Appendix B, *Model Code Explanation*, describes the instrument's ordering codes.

Customer Support

Standard maintenance and repair services are available at all of our regional MKS Calibration and Service Centers, listed on the back cover. In addition, MKS accepts the instruments of other manufacturers for recalibration using the Primary and Transfer Standard calibration equipment located at all of our regional service centers. Should any difficulties arise in the use of your Type 253 instrument, or to obtain information about companion products MKS offers, contact any authorized MKS Calibration and Service Center. If it is necessary to return the instrument to MKS, please obtain an ERA Number (Equipment Return Authorization Number) from the MKS Calibration and Service Center before shipping. The ERA Number expedites handling and ensures proper servicing of your instrument.

Please refer to the inside of the back cover of this manual for a list of MKS Calibration and Service Centers.

Warning  **All returns to MKS Instruments must be free of harmful, corrosive, radioactive, or toxic materials.**

Chapter Two: Installation

How To Unpack the Type 253 Unit

MKS has carefully packed the Type 253 unit so that it will reach you in perfect operating order. Upon receiving the unit, however, you should check for defects, cracks, broken connectors, etc., to be certain that damage has not occurred during shipment.

Note Do *not* discard any packing materials until you have completed your inspection and are sure the unit arrived safely.

If you find any damage, notify your carrier and MKS immediately. If it is necessary to return the unit to MKS, obtain an ERA Number (Equipment Return Authorization Number) from the MKS Service Center before shipping. Please refer to the inside of the back cover of this manual for a list of MKS Calibration and Service Centers.

Unpacking Checklist

Standard Equipment:

- Type 253 Unit
- Type 253 Instruction Manual (this book)

Optional Equipment:

- Electrical Connector Accessories Kit (includes a mate for the electrical connector should you choose to make your own cable):
  253B-1-K1
  253B-2-K1
- Interface cables (refer to Table 5, page 20)

Interface Cables

As of January 1, 1996, most products shipped to the European Community must comply with the EMC Directive 89/336/EEC, which covers radio frequency emissions and immunity tests. In addition, as of January 1, 1997, some products shipped to the European Community must also comply with the Product Safety Directive 92/59/EEC and Low Voltage Directive 73/23/EEC, which cover general safety practices for design and workmanship. MKS products that meet these requirements are identified by application of the CE Mark.

To ensure compliance with EMC Directive 89/336/EEC, an overall metal braided shielded cable, properly grounded at both ends, is required during use. No additional installation requirements are necessary to ensure compliance with Directives 92/59/EEC and 73/23/EEC.

Note

1. Overall metal braided shielded cables, properly grounded at both ends, are required to meet CE specifications.
2. To order metal braided shielded cables, add an "S" after the cable type designation. For example, to order a standard cable to connect the 253 unit to a Type 651 controller, use part number CB651-30-x; for a metal braided shielded cable, use part number CB651S-30-x (where x = length in feet).

System Interface Cables

The system interface cables include cables to connect the 253 unit to a controller, or to retrofit the unit into an existing system.

System Interface Cables		
To Connect the 253 Unit To...	**Use the MKS Cable...***	
	Standard	**Shielded**
651, 652, 152G	CB651-30-x	CB651S-30-x
252D, 252E	CB252-16-x	CB252S-16-x
Existing System**	CB651-31-1	CB651S-31-1

* *x = length in feet*

** *If you are retrofitting the 253B valve into an existing system with hex connector cables, an adapter cable is required. Use adapter cable CB651-31-1 to replace the 253A valve with the 253B valve.*

Table 5: System Interface Cables

Generic Shielded Cables

MKS offers a full line of cables for all MKS equipment. Should you choose to manufacture your own cables, follow the guidelines listed below:

1. The cable must have an overall metal *braided* shield, covering all wires. Neither aluminum foil nor spiral shielding will be as effective; using either may nullify regulatory compliance.
2. The connectors must have a metal case which has direct contact to the cable's shield on the whole circumference of the cable. The inductance of a flying lead or wire from the shield to the connector will seriously degrade the shield's effectiveness. The shield should be grounded to the connector before its internal wires exit.
3. With very few exceptions, the connector(s) must make good contact to the device's case (ground). "Good contact" is about 0.01 ohms; and the ground should surround all wires. Contact to ground at just one point may not suffice.
4. For shielded cables with flying leads at one or both ends; it is important at each such end, to ground the shield *before* the wires exit. Make this ground with absolute minimum length. (A ¼ inch piece of #22 wire may be undesirably long since it has approximately 5 nH of inductance, equivalent to 31 ohms at 1000 MHz). After picking up the braid's ground, keep wires and braid flat against the case. With very few exceptions, grounded metal covers are not required over terminal strips. If one is required, it will be stated in the Declaration of Conformity or in the instruction manual.
5. In selecting the appropriate type and wire size for cables, consider:
   A. The voltage ratings;
   B. The cumulative I^2R heating of all the conductors (keep them safely cool);
   C. The IR drop of the conductors, so that adequate power or signal voltage gets to the device;
   D. The capacitance and inductance of cables which are handling fast signals, (such as data lines or stepper motor drive cables); and
   E. That some cables may need internal shielding from specific wires to others; please see the instruction manual for details regarding this matter.

Setup

Flanges

The 253 valve is available with the following flange types:

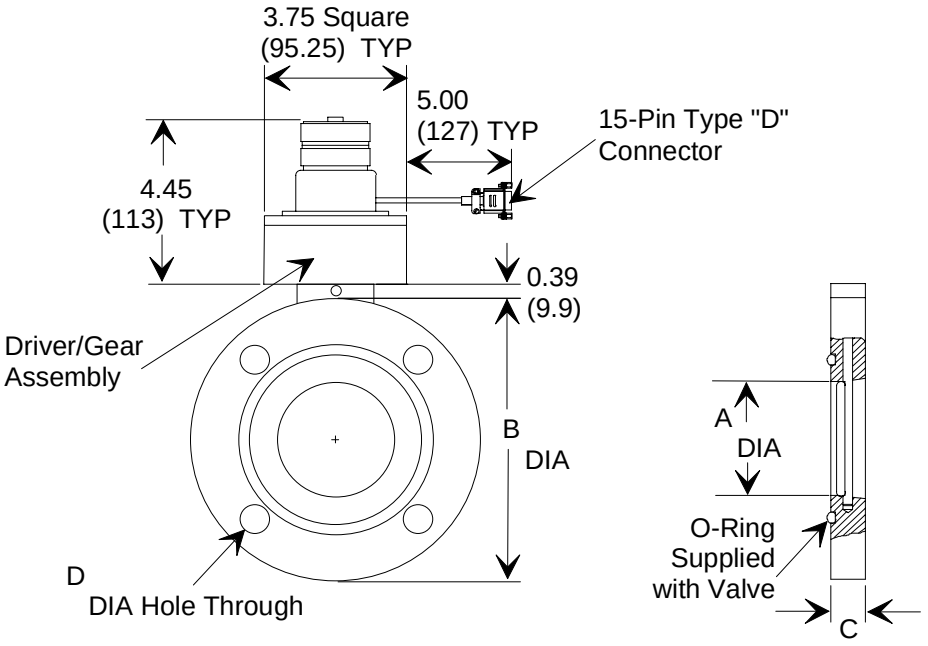
- ASA
- NW Style ISO
- KF Style ISO
- CF
- JIS

Examples of each flange type are shown in *Dimensions*, page 23. Refer to *Appendix A: Product Specifications*, page 33, for detailed information on each flange type.

Dimensions

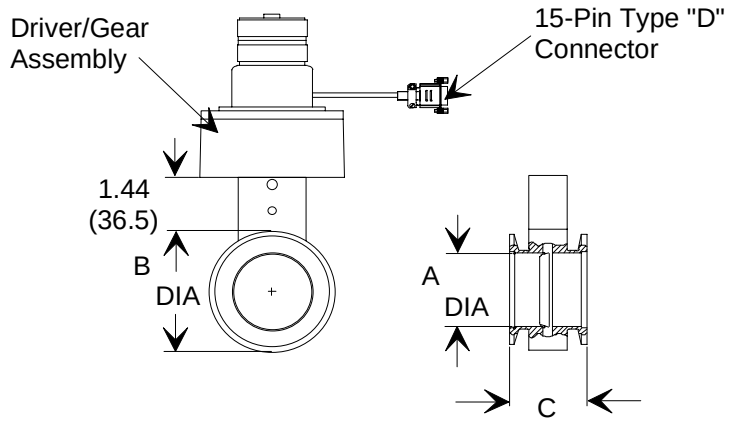
Note

1. All dimensions are listed in inches with millimeters referenced in parentheses.
2. The actual dimensions for the Inner Diameter (A), Outside Diameter (B), Thickness (C), and Bolt Hole Diameter (D, where applicable), are listed in *Appendix A: Product Specifications*, page 33.



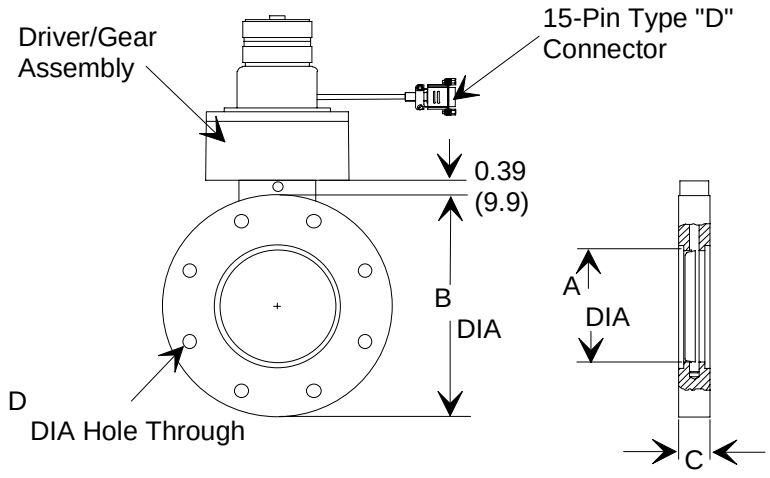
Type 253B-3-3-2 Shown

Figure 1: Type 253 Valve with an ASA Flange



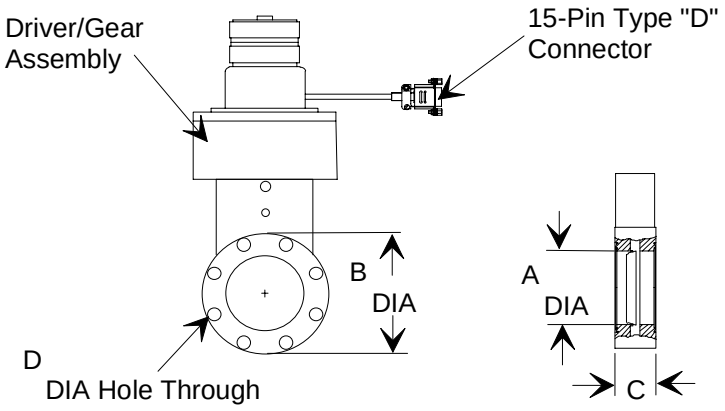
Type 253B-2-50-2 Shown

Figure 2: Type 253 Valve with a KF Style ISO Flange



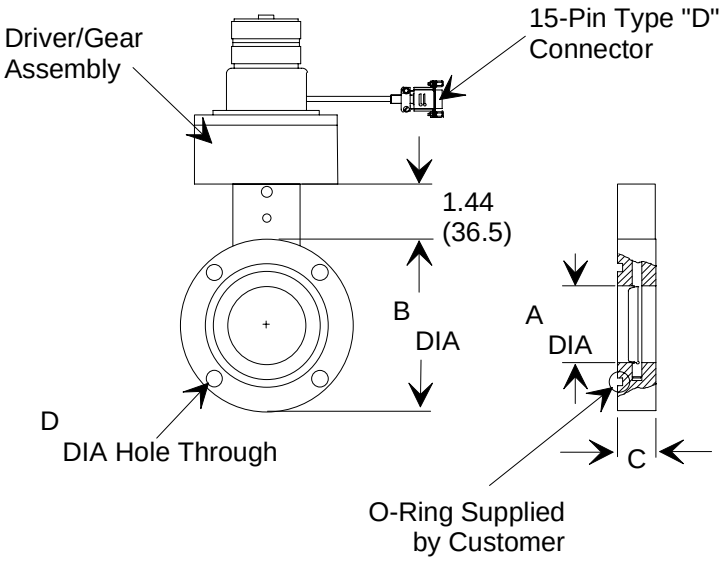
Type 253B-3-80-2 Shown

Figure 3: Type 253 Valve with a NW Style ISO Flange



Type 253B-2-3CF-2 Shown

Figure 4: Type 253 Valve with a CF Flange



Type 253B-2-50J-2 Shown

Figure 5: Type 253 Valve with a JIS Flange

O-Ring Material

Valves that have an O-ring sealed flapper are called *sealing* butterfly valves. This design ensures closed leak rates less than 1.3×10^{-7} scc/sec when new. Ensure that the O-ring material is compatible with the gases it will be exposed to in the system.

Mounting Instructions

Warning  **The moving parts in the valve create a risk of personal injury until the valve is securely incorporated into a system. To avoid injury keep all objects away from any valve opening.**

- Do not insert objects into openings where contact with moving parts is possible.
- Isolate the equipment from any electrical or pneumatic power supply before handling the valve.

The valve may be mounted in any position by clamping its KF style flanges or through bolting its flanges to a pair of mating flanges. Install the valve with the PUMP label (refer to Figure 6, page 28), oriented towards the high vacuum pump. Consideration should be given to providing proper clearances for valve removal, as routine cleaning may be necessary due to buildup of process contaminants.

Connectors

Note Overall metal braided shielded cables, properly grounded at both ends, are required to meet CE specifications.

15-Pin Type "D" Connector

The 15-pin Type "D" connector, located at the end of the 6" pigtail cable, is used to connect the 253 valve to a controller. The system interface cables are listed in Table 5, page 20.

15-Pin Type "D" Connector Pinout	
Pin	**Assignment**
1	No Connection
2	No Connection
3	Limit Switch Common
4	Open Limit Switch
5	Close Limit Switch
6	No Connection
7	No Connection
8	Winding A
9	Winding A'
10	Winding A Common
11	No Connection
12	No Connection
13	Winding B
14	Winding B'
15	Winding B Common

Table 6: 15-Pin Type "D" Connector Pinout

Note The "No Connection" pin assignment refers to a pin with no internal connection.

Labels

There are two labels on the 253 valve; a pump label and a serial number label. The labels are located on opposite sides of the driver/gear assembly (refer to Figures 1 to 5, pages 23 to 25).

Pump Label

The pump label, shown in Figure 6 indicates which side of the valve should be oriented towards the high vacuum pump during installation.

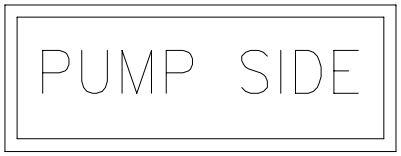


Figure 6: Pump Label

Serial Number Label

The serial number label, shown in Figure 7, lists the serial number and the product model number, and displays the CE mark signifying compliance with the European CE regulations.

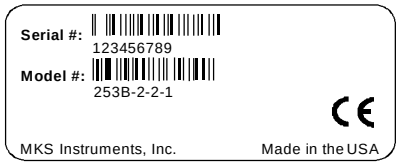


Figure 7: Serial Number Label

Refer to *Appendix B: Model Code Explanation*, page 41, for more information.

Chapter Three: Operation and Theory of Operation

Operation

MKS products are designed and tested to provide the highest degree of safety attainable. To use your 253 valve safely, you must always conform to the following instructions:

Caution 

When operating this valve with high vacuum diffusion pumps, it is important to make certain the pressure above the oil vapor jet does not exceed 0.5 milliTorr, as this leads to unstable pump performance. This unstable (oscillating) pump characteristic will manifest itself as a seemingly unstable control loop and no amount of adjustment of the lead and gain will correct the situation. The only solution is to lower flow rates so that the diffusion pump may operate in its correct pressure range.

Refer to the appropriate Instruction Manual for complete setup instructions for your MKS controller.

Theory of Operation

A butterfly valve's flow rate is very nonlinear with respect to shaft position; that is, the percent change in flow rate ranges from very large values when the valve is near closed, to zero when it is near fully open. This very large change in transfer characteristic means that for optimum performance, gain and phase lead must be reset each time a valve operates at a different position. In a processing situation, this is intolerable and MKS has introduced a special actuator mechanism which changes the transfer characteristics to a more linear relationship. The special "cosine generator" actuator introduces a second nonlinear motion which cancels the butterfly's nonlinear characteristics by giving a very slow initial opening characteristic (theoretically zero) rising as a sine (cosine) function and reaching a maximum when the valve is fully open. This gives the system near constant resolution throughout the valve's throughput range, enabling one lead and gain setting to be used over the operating range of the valve.

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Chapter Four: Maintenance

General Information

If the 253 valve fails to operate properly upon receipt, check for shipping damage, and check the cables for proper continuity. Any damage should be reported to the carrier and MKS Instruments immediately. If it is necessary to return the unit to MKS, obtain an ERA number (Equipment Return Authorization Number) from a MKS Service Center before shipping. Please refer to the inside back cover of this manual for a list of MKS Calibration and Service Centers.

Maintenance

Periodically check for wear on the cables and inspect the valve for visible signs of damage.

Difficulties encountered in the use of valves generally are caused by process chemistry, contamination of wetted parts, or mechanical wear. Contact any authorized MKS Service Center for repair instructions if you encounter any difficulties you cannot correct.

How To Clean the Unit

Periodically wipe down the unit with a cloth dampened with deionized water.

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Appendix A: Product Specifications

Valve Specifications

CE Mark Compliance Electromagnetic Compatibility[2] Machinery	 EMC Directive 89/336/EEC Machinery Directive 89/392/EEC
Differential Pressure Across Valve	1 atm. (15 psig) max.
Driver/Gear Assembly Width	3.75" square (95 mm)
External Leakage at Shaft Seal	1×10^{-7} scc/sec He
Materials Exposed to Process	316L SS, Viton® **
Heater Operating Temperature*	80° to 90° C (176° to 194° F) for 20° to 40° C (68° to 104° F) ambient
Power Input* (for valve body heater)	±15 VDC, 1 Amp (30 Watts) nominal, user-supplied *Note:* DC input is used for safety purposes.
Resolution	Standard: 1/10,000 Fast Motor Option: 1/2800***
Shaft Seal	Viton**
Speed (open to close)	Standard: 7.5 sec Optional: < 2 sec***
Valve Body Operating Temperature	0° to 90° C (32° to 194° F) max.
Valve Motor Ambient Operating Temperature	0° to 70° C (32° to 158° F) max.
Warm-up Time*	1 hour to 80° C (176° F), 2 hours to steady state
* *Applicable **only** to KF style ISO valves that are equipped with the heater option.* ** *Where Viton is used, other materials are available; consult factory.* *** *Fast Motor Option offered on select sizes; consult factory for ordering code.*	

[2] An overall metal braided shielded cable, properly grounded at both ends, is required during use.

ASA Flange Specifications

Valve Type Number	253B-2-2-1	253B-2-2-2	253B-60-2-1	253B-60-2-2	253B-3-2-2	253B-3-3-2	253B-4-3-2
Inside Diameter (A)*							
Inches	1.88	1.950	2.362	2.362	3.025	3.025	3.965
(mm)	(47.8)	(49.5)	(60.0)	(60.0)	(76.8)	(76.8)	(100.7)
Mounting Flange	ASA 2”	ASA 2”	ASA 2”	ASA 2”	ASA 2”	ASA 3”	ASA 3”
Outside Diameter (B)*							
Inches	5.95	5.95	5.95	5.95	5.95	7.40	7.40
(mm)	(151)	(151)	(151)	(151)	(151)	(188)	(188)
Controllable Conductance (l/sec)							
min	0.35	0.70	TBD	0.80	1.00	1.00	1.50
max	300	300	TBD	375	500	500	950
Closed Leakage							
(Torr l/sec)	$<10^{-7}$	N/A	$<10^{-7}$	N/A	N/A	N/A	N/A
Flapper Seal**	Viton	None	Viton	None	None	None	None
Thickness (C)*							
Inches	0.75	0.75	0.75	0.75	0.75	0.88	0.88
(mm)	(19.1)	(19.1)	(19.1)	(19.1)	(19.1)	(22.4)	(22.4)
Overall Height							
Inches	10.79	10.79	10.79	10.79	10.79	12.24	12.24
(mm)	(274.1)	(274.1)	(274.1)	(274.1)	(274.1)	(310.9)	(310.9)
No. of Bolt Holes	4	4	4	4	4	4	4
Bolt Hole Diameter (D)*							
Inches	0.75	0.75	0.75	0.75	0.75	0.75	0.75
(mm)	(19.1)	(19.1)	(19.1)	(19.1)	(19.1)	(19.1)	(19.1)
Bolt Circle Diameter							
Inches	4.750	4.750	4.750	4.750	4.750	6.000	6.000
(mm)	(120.7)	(120.7)	(120.7)	(120.7)	(120.7)	(152.4)	(152.4)
Flange O-ring groove ID							
In	3.365	3.365	3.365	3.365	3.365	4.475	4.475
(mm)	(85.5)	(85.5)	(85.5)	(85.5)	(85.5)	(113.7)	(113.7)
Parker® No. or Size (JIS)	2-237	2-237	2-237	2-237	2-237	2-349	2-349

(Continued on next page)

ASA Flange Specifications *(Continued)*

Valve Type Number	253B-4-4-2	253B-6-4-2	253B-6-6-2	253B-8-6-2	253B-8-8-2	253B-10-10-2
Inside Diameter (A)*						
Inches	3.965	5.781	5.781	7.501	7.501	10.000
(mm)	(100.7)	(146.8)	(146.8)	(190.5)	(190.5)	(254.0)
Mounting Flange	ASA 4”	ASA 4”	ASA 6”	ASA 6”	ASA 8”	ASA 10”
Outside Diameter (B)*						
Inches	8.90	8.90	10.90	10.90	13.19	16.00
(mm)	(226.1)	(226.1)	(276.9)	(276.9)	(335.0)	(406.4)
Controllable Conductance (l/sec)						
min	1.50	TBD	TBD	TBD	TBD	TBD
max	950	TBD	TBD	TBD	TBD	TBD
Closed Leakage (Torr l/sec)	N/A	N/A	N/A	N/A	N/A	N/A
Flapper Seal**	None	None	None	None	None	None
Thickness (C)*						
Inches	0.88	0.88	0.94	0.94	0.94	0.94
(mm)	(22.4)	(22.4)	(23.9)	(23.9)	(23.9)	(23.9)
Overall Height						
Inches	13.74	13.74	15.74	15.74	18.03	20.84
(mm)	(349.0)	(349.0)	(399.8)	(399.8)	(458.0)	(529.3)
No. of Bolt Holes	8	8	8	8	8	12
Bolt Hole Diameter (D)*						
Inches	0.75	0.75	0.88	0.88	0.88	1.00
(mm)	(19.1)	(19.1)	(22.4)	(22.4)	(22.4)	(25.4)
Bolt Circle Diameter						
Inches	7.500	7.500	9.500	9.500	11.750	14.250
(mm)	(190.9)	(190.9)	(241.3)	(241.3)	(298.5)	(362.0)
Flange O-ring groove ID						
In	5.995	5.995	8.000	8.000	9.734	11.938
(mm)	(152.3)	(152.3)	(203.2)	(203.2)	(247.2)	(303.2)
Parker® No. or Size (JIS)	2-258	2-258	2-266	2-266	2-273	2-278

***** *Refer to Figure 1, page 23.*

** *Where Viton is used, other materials are available; consult factory.*

KF Style ISO Flange Specifications

Valve Type Number	253B-20-40-1	253B-20-40-2	253B-1-40-1	253B-1-40-2	253B-2-50-1	253B-2-50-2
Inside Diameter (A)*						
Inches	0.779	0.779	1.270	1.270	1.888	2.000
(mm)	(19.8)	(19.8)	(32.3)	(32.3)	(48.0)	(50.8)
Mounting Flange	KF-40	KF-40	KF-40	KF-40	KF-50	KF-50
Outside Diameter (B)*						
Unheated						
Inches	2.75	2.75	2.75	2.75	3.25	3.25
(mm)	(69.9)	(69.9)	(69.9)	(69.9)	(82.6)	(82.6)
With heater *option*						
Inches	3.00	3.00	3.00	3.00	3.50	3.50
(mm)	(76.2)	(76.2)	(76.2)	(76.2)	(88.9)	(88.9)
Controllable Conductance (l/sec)						
min	0.07	0.25	0.20	0.40	0.35	0.70
max	24	31	50	55	300	300
Closed Leakage (Torr l/sec)	$<10^{-7}$	N/A	$<10^{-7}$	N/A	$<10^{-7}$	N/A
Flapper Seal**	Viton	None	Viton	None	Viton	None
Thickness (C)*						
Inches	2.25	2.25	2.25	2.25	2.00	2.00
(mm)	(57.2)	(57.2)	(57.2)	(57.2)	(50.8)	(50.8)
Overall Height						
Unheated						
Inches	8.64	8.64	8.64	8.64	9.14	9.14
(mm)	(219.5)	(219.5)	(219.5)	(219.5)	(232.2)	(232.2)
With heater *option*						
Inches	8.81	8.81	8.81	8.81	9.31	9.31
(mm)	(223.8)	(223.8)	(223.8)	(223.8)	(236.5)	(236.5)
No. of Bolt Holes	N/A	N/A	N/A	N/A	N/A	N/A
Bolt Hole Diameter (D)	N/A	N/A	N/A	N/A	N/A	N/A
Bolt Circle Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Flange O-ring groove ID	N/A	N/A	N/A	N/A	N/A	N/A

* *Refer to Figure 2, page 24.*

** *Where Viton is used, other materials are available; consult factory.*

NW Style ISO Flange Specifications

Valve Type Number	253B-60-63-1	253B-60-63-2	253B-3-80-2	253B-4-100-2	253B-6-160-2	253B-8-200-2	253B-10-250-2
Inside Diameter (A)*							
Inches	2.362	2.362	3.000	3.875	5.750	7.650	9.700
(mm)	(60.0)	(60.0)	(76.2)	(98.4)	(146.1)	(194.3)	(246.4)
Mounting Flange	NW-63	NW-63	NW-80	NW-100	NW-160	NW-200	NW-250
Outside Diameter (B)*							
Inches	5.95	5.95	5.95	7.40	8.90	11.22	13.19
(mm)	(151.1)	(151.1)	(151.1)	(188.0)	(226.1)	(285.0)	(335.0)
Controllable Conductance (l/sec)							
min	TBD	0.80	1.00	1.50	TBD	TBD	TBD
max	TBD	375	500	900	TBD	TBD	TBD
Closed Leakage (Torr l/sec)	$<10^{-7}$	N/A	N/A	N/A	N/A	N/A	N/A
Flapper Seal**	Viton	None	None	None	None	None	None
Thickness (C)*							
Inches	0.81	0.81	0.81	0.94	0.94	0.94	0.94
(mm)	(20.6)	(20.6)	(20.6)	(23.9)	(23.9)	(23.9)	(23.9)
Overall Height							
Inches	10.79	10.79	10.79	12.24	13.74	16.06	18.03
(mm)	(274.1)	(274.1)	(274.1)	(310.9)	(349.0)	(407.9)	(458)
No. of Bolt Holes	4	4	8	8	8	12	12
Bolt Hole Diameter (D)*							
Inches	0.35	0.35	0.35	0.35	0.43	0.43	0.43
(mm)	(8.89)	(8.89)	(8.89)	(8.89)	(10.9)	(10.9)	(10.9)
Bolt Circle Diameter							
Inches	4.330	4.330	4.920	5.710	7.870	10.240	12.200
(mm)	(110.0)	(110.0)	(125.0)	(145.0)	(199.9)	(260.1)	(309.9)
Flange O-ring groove ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* *Refer to Figure 3, page 24.*

** *Where Viton is used, other materials are available; consult factory.*

CF Flange Specifications

Valve Type Number	253B-20-2CF-1	253B-20-2CF-2	253B-1-2CF-1	253B-1-2CF-2	253B-2-3CF-1
Inside Diameter (A)*					
Inches	0.779	0.779	1.270	1.270	1.888
(mm)	(19.79)	(19.79)	(32.3)	(32.3)	(48.0)
Mounting Flange	2¾" CF	2¾" CF	2¾" CF	2¾" CF	3⅜" CF
Outside Diameter (B)*					
Inches	2.75	2.75	2.75	2.75	3.25
(mm)	(69.9)	(69.9)	(69.9)	(69.9)	(82.6)
Controllable Conductance (l/sec)					
min	0.07	0.25	0.20	0.40	0.35
max	24	31	50	55	300
Closed Leakage (Torr l/sec)	$<10^{-7}$	N/A	$<10^{-7}$	N/A	$<10^{-7}$
Flapper Seal**	Viton	None	Viton	None	Viton
Thickness (C)*					
Inches	1.25	1.25	1.25	1.25	1.06
(mm)	(31.8)	(31.8)	(31.8)	(31.8)	(26.9)
Overall Height					
Inches	8.64	8.64	8.64	8.64	9.14
(mm)	(219.5)	(219.5)	(219.5)	(219.5)	(232.2)
No. of Bolt Holes	6	6	6	6	8
Bolt Hole Diameter (D)*					
Inches	0.26	0.26	0.26	0.26	0.33
(mm)	(6.60)	(6.60)	(6.60)	(6.60)	(8.38)
Bolt Circle Diameter					
Inches	2.312	2.312	2.312	2.312	2.850
(mm)	(58.7)	(58.7)	(58.7)	(58.7)	(72.4)
Flange O-ring groove ID	N/A	N/A	N/A	N/A	N/A

(Continued on next page)

CF Flange Specifications (*Continued*)

Valve Type Number	253B 2-3CF-2	253B 2-4CF-1	253B 2-4CF-2	253B 3-6CF-2	253B 4-6CF-2
Inside Diameter (A)*					
Inches	2.000	1.888	2.000	3.000	3.875
(mm)	(50.8)	(48.0)	(50.8)	(76.2)	(98.4)
Mounting Flange	2¾" CF	4½" CF	4½" CF	6" CF	6" CF
Outside Diameter (B)*					
Inches	3.25	4.47	4.47	7.40	7.40
(mm)	(82.6)	(113.5)	(113.5)	(188.0)	(188.0)
Controllable Conductance (l/sec)					
min	0.70	TBD	0.70	1.00	1.50
max	300	TBD	300	500	900
Closed Leakage (Torr l/sec)	$<10^{-7}$	$<10^{-7}$	N/A	N/A	N/A
Flapper Seal**	Viton	Viton	None	None	None
Thickness (C)*					
Inches	1.25	1.00	1.00	0.81	0.94
(mm)	(31.8)	(25.4)	(25.4)	(20.6)	(23.9)
Overall Height***					
Inches	1.06	1.00	1.00	0.81	0.94
(mm)	(26.9)	(25.4)	(25.4)	(20.6)	(23.9)
No. of Bolt Holes	6	8	8	16	16
Bolt Hole Diameter (D)*					
Inches	0.33	0.33	0.33	0.33	0.33
(mm)	(8.38)	(8.38)	(8.38)	(8.38)	(8.38)
Bolt Circle Diameter					
Inches	2.859	3.628	3.628	5.128	5.128
(mm)	(72.6)	(92.2)	(92.2)	(130.3)	(130.3)
Flange O-ring groove ID	N/A	N/A	N/A	N/A	N/A

* *Refer to Figure 4, page 25.*
** *Where Viton is used, other materials are available; consult factory.*

JIS Flange Specifications

Valve Type Number	253B- 2-50J-1	253B 2-50J-2	253B 4-100J-2
Inside Diameter (A)*			
Inches	1.888	2.000	3.875
(mm)	(48.0)	(50.8)	(98.4)
Mounting Flange	2¾" CF	JIS 50 mm	JIS 100 mm
Outside Diameter (B)*			
Inches	4.47	4.47	7.40
(mm)	(113.5)	(113.5)	(188.0)
Controllable Conductance (l/sec)			
min	0.35	0.70	1.50
max	300	300	900
Closed Leakage (Torr l/sec)	$<10^{-7}$	N/A	N/A
Flapper Seal**	Viton	None	None
Thickness (C)*			
Inches	1.00	1.00	0.94
(mm)	(25.4)	(25.4)	(23.9)
Overall Height			
Inches	10.36	10.36	13.29
(mm)	(263.0)	(263.0)	(337.6)
No. of Bolt Holes	6	4	8
Bolt Hole Diameter (D)*			
Inches	0.39	0.39	0.47
(mm)	(9.91)	(9.91)	(11.9)
Bolt Circle Diameter			
Inches	3.937	3.937	6.299
(mm)	(100)	(100)	(160)
Flange O-ring groove ID			
In	2.766	2.766	2.766
(mm)	(70.26)	(70.26)	(70.26)
Parker® No. or Size (JIS)	2.765 x 0.157 (70 x (4)	2.765 x 0.157 (70 x (4)	2.765 x 0.157 (70 x (4)

* *Refer to Figure 5, page 25.*
** *Where Viton is used, other materials are available; consult factory.*

Due to continuing research and development activities, these product specifications are subject to change without notice.

Appendix B: Model Code Explanation

Model Code

The options for your valve are identified in the model code when you order the unit.

Type Number

The type number designates the model number of the valve.

Type 253 with ASA Flanges

Type Number	Nominal Inside Diameter inches (mm)	ASA Flange Size	Flapper O-Ring
253B-2-2-1	1.888 (48)	2”	Yes
253B-2-2-2	1.950 (50)	2”	No
253B-60-2-1	2.362 (60)	2”	Yes
253B-60-2-2	2.362 (60)	2”	No
253B-3-2-2	3.025 (77)	2”	No
253B-3-3-2	3.025 (77)	3”	No
253B-4-3-2	3.965 (101)	3”	No
253B-4-4-2	3.965 (101)	4”	No
253B-6-4-2	5.781 (147)	4”	No
253B-6-6-2	5.781 (147)	6”	No
253B-8-6-2	7.501 (191)	6”	No
253B-8-8-2	7.501 (191)	8”	No
253B-10-10-2	10.000 (254)	10”	No

Type 253 with KF or NW ISO Flanges

Type Number	Nominal Inside Diameter inches (mm)	ISO Flange Size	Flapper O-Ring
253B-20-40-1*	0.779 (20)	KF-40	Yes
253B-20-40-2*	0.779 (20)	KF-40	No
253B-1-40-1*	1.270 (32)	KF-40	Yes
253B-1-40-2*	1.270 (32)	KF-40	No
253B-2-50-1*	1.888 (48)	KF-50	Yes
253B-2-50-2*	2.000 (51)	KF-50	No
253B-60-63-1	2.362 (60)	NW-63	Yes
253B-60-63-2	2.362 (60)	NW-63	No
253B-3-80-2	3.000 (76)	NW-80	No
253B-4-100-2	3.875 (98)	NW-100	No
253B-6-160-2	5.750 (146)	NW-160	No
253B-8-200-2	7.650 (194)	NW-200	No
253B-10-250-2	9.700 (246)	NW-250	No
** Available with optional heater; consult factory for more information.*			

Type 253 with CF Flanges

Type Number	Nominal Inside Diameter inches (mm)	CF Flange Size	Flapper O-Ring
253B-20-2CF-1	0.779 (20)	2¾"	Yes
253B-20-2CF-2	0.779 (20)	2¾"	No
253B-1-2CF-1	1.270 (32)	2¾"	Yes
253B-1-2CF-2	1.270 (32)	2¾"	No
253B-2-3CF-1	1.888 (48)	3⅜"	Yes
253B-2-3CF-2	2.000 (51)	3⅜"	No
253B-2-4CF-1	2.000 (51)	4½"	Yes
253B-2-4CF-2	2.000 (51)	4½"	No
253B-3-6CF-2	3.000 (76)	6"	No
253B-4-6CF-2	3.875 (98)	6"	No

Type 253 with JIS Flanges

Type Number	Nominal Inside Diameter inches (mm)	JIS Flange Size	Flapper O-Ring
253B-2-50J-1	1.888 (48)	JIS-50	Yes
253B-2-50J-2	2.000 (51)	JIS-50	No
253B-4-100J-2	3.875 (98)	JIS-100	No

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