



CENTRIFUGAL PUMP

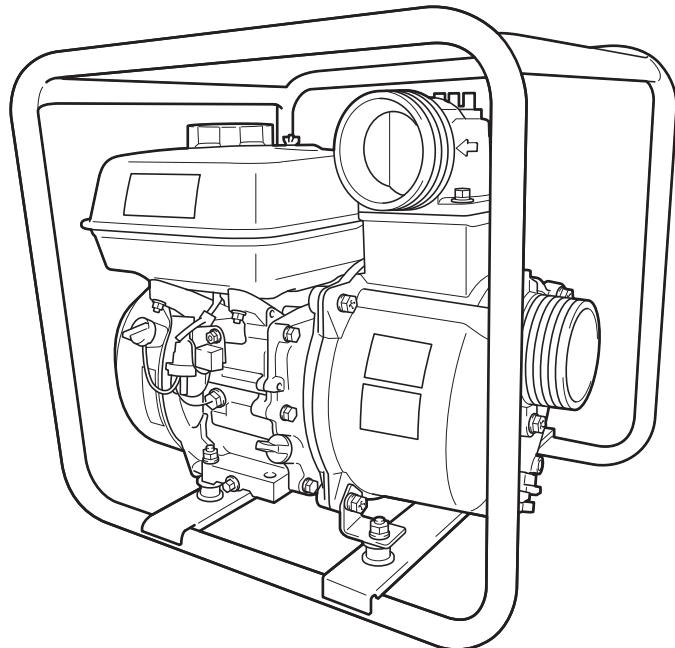
TE3-50HA

TE3-80HA

TE2-100HA

THP-4070HA (High head version)

OPERATION, SERVICE, AND REPAIR MANUAL



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TSURUMI MANUFACTURING CO., LTD.

INTRODUCTION

Using Your Tsurumi Operation, Service and Repair Manual

We thank you for purchasing a Tsurumi centrifugal pump. We are sure that the centrifugal pump you have selected will meet your portable pumping needs.

Tsurumi Centrifugal Pumps are designed to pump only clean water that is not intended for human consumption. Other uses can result in injury to the operator or damage to the pump and property.

This manual applies to the Tsurumi centrifugal pumps listed below. The specifications and key features of the centrifugal pumps are provided in the **SPECIFICATION** section and **DESCRIPTION** section respectively.

TE3-50HA

TE3-80HA

TE2-100HA

THP-4070HA (High head version)

This manual provides instructions for operation, service, and repair of your centrifugal pump. We strongly recommend that those who operate the centrifugal pump should acknowledge the pump features, controls, and their functions before operating the pump.

The Operation, Service and Repair Manual provides instructions to service, inspection, and repair the centrifugal pump. This manual also provides replacement parts information.

Operation, handling, repair, and service information including important safety information for Honda engine are provided in the Owner's Manual for Models GX120, GX160, and GX240. A copy of the Owner's Manual has been provided in the centrifugal pump's literature package.

Parts information for the Honda Engine is available in Honda's Parts Catalogs.

Separate instructions are provided in the procedure, for the pump models having structure and components different from the representative model.

All information in the Tsurumi manuals is based upon the latest production configuration of the centrifugal pump at the time of printing.

If you have any problems with your centrifugal pump that cannot be resolved using the Operation, Service and Repair Manual, or any questions regarding the operation, service, repair, or maintenance of the centrifugal pump, contact your local Tsurumi centrifugal pump dealer.

Keep this manual handy, so you can refer to it at any time. This manual is considered a permanent part of the centrifugal pump and should remain with it if rented or resold.

1 BE SURE TO READ FOR YOUR SAFETY

- THE CENTRIFUGAL PUMP IS DESIGNED TO GIVE SAFE AND RELIABLE SERVICE WHEN OPERATED ACCORDING TO THE INSTRUCTIONS IN THE TECHNICAL MANUAL PROVIDED WITH THE CENTRIFUGAL PUMP.
- DO NOT OPERATE THE CENTRIFUGAL PUMP BEFORE YOU HAVE READ AND UNDERSTOOD THE INSTRUCTIONS AND THE ENGINE MANUFACTURER'S MANUAL. OTHERWISE, PERSONAL INJURY OR EQUIPMENT DAMAGE COULD HAPPEN.
- REFER TO THE HONDA ENGINE OWNER'S MANUAL FOR MORE SAFETY INFORMATION.
- IN ORDER TO ASSURE SAFE AND EFFICIENT OPERATION OF THE CENTRIFUGAL PUMP, OPERATORS SHOULD READ AND COMPLY WITH THE FOLLOWING SAFETY PRECAUTIONS.

The precautionary measures described in this section are intended to prevent danger or damage to you or to others. The contents of this manual that could possibly be performed improperly are classified into two categories: **⚠WARNING**, and **⚠CAUTION**. The categories indicate the extent of possible damage or the urgency of the precaution. Note however, that what is included under **⚠CAUTION** may at times lead to a more serious problem. In either case, the categories pertain to safety-related items, and as such, must be observed carefully.

- **⚠WARNING** : Indicates that there is a strong possibility of personal injury or loss of life if the instructions are not followed, or if cleaning, lubricating, adhesives, and other materials are not used properly.
- **⚠CAUTION** : Indicates that there is a possibility of equipment damage if the instructions are not followed.
- **NOTE** : Are provided in the procedure section for additional or supplemental information to make the procedure easier and more efficient.
- Explanation of Symbols:

 : The  mark indicates a WARNING or CAUTION item.

 : The  mark indicates a prohibited action due to which users need to be more careful while handling the pump.

Safety Precautions

⚠WARNING

	<ul style="list-style-type: none">● It is the operator's responsibility to provide the necessary safeguards to protect people and property. Know how to stop the pump quickly in case of emergency. If you leave the pump for any reason, always turn the engine off. Understand the use of all controls and connections. Be sure that anyone who operates the pump receives proper instructions. Do not let the children operate the pump. Keep children and pets away from the area of operation.
	<ul style="list-style-type: none">● Improperly maintaining the pump, or failing to fix the problems before operation, could cause a malfunction in which you could be seriously injured. Always perform a pre-operational inspection and if you find any problems, fix them before operating the pump.
	<ul style="list-style-type: none">● Tsurumi Centrifugal Pumps are designed to pump only clean water that is not intended for human consumption, and other uses can result in injury to the operator or damage to the pump and other property.
	<ul style="list-style-type: none">● Do not use this pumping equipment to pump/move anything that is flammable or explosive liquid such as oil, gasoline, kerosene, ethanol, etc. Do not use in the presence of flammable or explosive vapors. Using this pump with or near flammable liquids can cause an explosion or fire, resulting in property damage, serious personal injury, and/or death.
	<ul style="list-style-type: none">● Do not pump liquids above 40 degree C (104-degree F). Doing so can damage the pump components or seriously injure the operator.

⚠️ **WARNING**

	● Do not use the centrifugal pump for transferring oil, salt water, sea water, chemicals, corrosives, or organic solvents. Doing so can damage the pump components and may also lead to serious personal injury.
	● Do not pump water containing corrosive chemicals or toxic substances. These fluids can cause serious health and environmental hazards. If you need assistance, contact your local authorities.
	● The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.
	● Do not operate the centrifugal pump inside a room, closed garage, cave, tunnel, or other insufficiently ventilated area. Always operate the centrifugal pump in a well-ventilated area. The engine may become overheated, and the poisonous carbon monoxide gas contained in the exhaust gases will endanger human lives.
	● Turn off the engine before transferring the centrifugal pump to another work site. If the centrifugal pump is tilted or moved during operation, fuel may spill and/or the centrifugal pump may tip over, causing a hazardous situation.
	● Do not smoke or use an open flame near the fuel tank and keep away other sources of flames and sparks.
	● Do not place flammable materials near the centrifugal pump. Be careful not to place fuel, matches, gunpowder, oily cloths, straw, or any other combustible objects near the centrifugal pump.
	● Gasoline is extremely flammable, and gasoline vapor can explode. Refuel outdoors, in a well-ventilated area, with the engine stopped and the pump on a level surface. Do not fill the tank above the fuel strainer shoulder. Always store gasoline in an approved container.
	● The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. Let the engine cool before transporting the pump or storing it indoors.
	● Do not refuel while the engine is running. Be careful not to spill fuel while refueling. If the fuel is spilled, wipe it off and let it dry before starting the engine.

⚠️ **CAUTION**

	● Keep the centrifugal pump at least 1 meter (3 feet) away from any structure or building during use. When a centrifugal pump is placed close to a building or nearby equipment, heat and exhaust from the engine will cause the surrounding temperature to rise. This will degrade the engine's cooling efficiency, causing overheating.
	● Do not enclose the centrifugal pump nor cover it with a box. The centrifugal pump has a built-in forced-air cooling system and may overheat if it is enclosed.
	● Operate the centrifugal pump on a level surface. It is not necessary to prepare a special foundation for operating the centrifugal pump. However, the centrifugal pump may vibrate excessively when operating over an irregular surface which might lead to the severe mechanical damages. Similarly, lubrication of engine parts will be poor if the pump is operated over sloped or inclined surface. In such a case, the piston may seize even if the oil level is nearby the upper level. Therefore, choose a level surface to operate the centrifugal pump.

■ ASEGUÍRESE DE LEER ESTE MANUAL PARA SU SEGURIDAD

- LA BOMBA CENTRÍFUGA ESTÁ DISEÑADA PARA DAR UN SERVICIO SEGURO Y CONFIABLE CUANDO SE OPERA SEGÚN LAS INSTRUCCIONES DEL MANUAL TÉCNICO SUMINISTRADO CON LA BOMBA CENTRÍFUGA.
- NO UTILICE LA BOMBA CENTRÍFUGA SIN HABER LEÍDO Y COMPRENDIDO LAS INSTRUCCIONES Y EL MANUAL DEL FABRICANTE DEL MOTOR. DE LO CONTRARIO, PODRÍAN PRODUCIRSE LESIONES PERSONALES O DAÑOS AL EQUIPO.
- CONSULTE EL MANUAL DEL PROPIETARIO DEL MOTOR HONDA PARA OBTENER MÁS INFORMACIÓN SOBRE LA SEGURIDAD.
- PARA ASEGURAR EL FUNCIONAMIENTO SEGURO Y EFICIENTE DE LA BOMBA CENTRÍFUGA, LOS OPERADORES DEBEN LEER Y CUMPLIR CON LAS SIGUIENTES PRECAUCIONES DE SEGURIDAD.

Las medidas de precaución descritas en esta sección están destinadas a prevenir el peligro o los daños para usted u otras personas. El contenido de este manual que posiblemente se puede llevar a cabo de manera inadecuada se clasifica en dos categorías: **⚠ ADVERTENCIA** y **⚠ PRECAUCIÓN**. Las categorías indican el alcance del posible daño o la urgencia de la precaución. Sin embargo, tenga en cuenta que lo que se incluye bajo la categoría **⚠ PRECAUCIÓN** en ocasiones puede dar lugar a un problema más grave. En cualquier caso, las categorías pertenecen a cuestiones relacionadas con la seguridad y, como tales, se deben cumplir al pie de la letra.

- **⚠ ADVERTENCIA** : indican que existe una gran posibilidad de lesiones personales o fallecimientos si no se siguen las instrucciones, o si la limpieza, lubricación, adhesivos y otros materiales no se utilizan correctamente.
- **⚠ PRECAUCIÓN** : indica que existe la posibilidad de que se dañe el equipo si no se siguen las instrucciones.
- **NOTA** : se proporcionan en la sección de procedimiento con el fin de proporcionar información adicional o suplementaria para hacer que el procedimiento sea más fácil y eficiente.
- Explicación de los símbolos:
 - !** : La marca **!** indica un elemento de ADVERTENCIA o PRECAUCIÓN.
 - 🚫** : La marca **🚫** indica una acción prohibida debido a la cual los usuarios deben tener más cuidado al manipular la bomba.

■ Precauciones de seguridad

⚠ ADVERTENCIA

!	<ul style="list-style-type: none"> ● Es responsabilidad del operador proporcionar las salvaguardas necesarias para proteger a las personas y la propiedad. Sepa cómo parar la bomba rápidamente en caso de emergencia. Si deja la bomba por cualquier motivo, apague siempre el motor. Entienda el uso de todos los controles y conexiones. Asegúrese de que cualquier persona que opere la bomba reciba las instrucciones adecuadas. No permita que los niños utilicen la bomba. Mantenga a los niños y las mascotas alejados del área de operación.
!	<ul style="list-style-type: none"> ● El mantenimiento incorrecto de la bomba, o no solucionar los problemas antes de la operación, podría causar un fallo de funcionamiento en el cual podría sufrir lesiones graves. Realice siempre una inspección previa a la operación y, si encuentra algún problema, arréglelo antes de operar la bomba.
!	<ul style="list-style-type: none"> ● Las bombas centrífugas Tsurumi están diseñadas para bombeo solo agua limpia que no está destinada al consumo humano, y otros usos pueden provocar lesiones al operador o daños a la bomba y otras propiedades.
!	<ul style="list-style-type: none"> ● No utilice este equipo de bombeo para bombeo/mover líquido que sea inflamable o explosivo, como aceite, gasolina, queroseno, etanol, etc. No lo utilice en presencia de vapores inflamables o explosivos. El uso de esta bomba con o cerca de líquidos inflamables puede provocar una explosión o un incendio, lo que puede ocasionar daños a la propiedad, lesiones personales graves y/o la muerte.

⚠ ADVERTENCIA

	● No bombee líquidos por encima de 40 °C (104 °F). De lo contrario, podría dañar los componentes de la bomba o causar lesiones graves al operador.
	● No utilice la bomba centrífuga para transferir aceite, agua salada, agua de mar, productos químicos, corrosivos o disolventes orgánicos. Si lo hace, puede dañar los componentes de la bomba y también puede provocar lesiones personales graves.
	● No bombee agua que contenga productos químicos corrosivos o sustancias tóxicas. Estos fluidos pueden causar peligros graves para la salud y el medio ambiente. Si necesita ayuda, póngase en contacto con las autoridades locales.
	● El escape del motor de este producto contiene sustancias químicas que el Estado de California reconoce como causantes de cáncer, defectos congénitos u otros daños reproductivos.
	● No utilice la bomba centrífuga dentro de una habitación, garaje cerrado, cueva, túnel u otra zona sin ventilación suficiente. Utilice siempre la bomba centrífuga en una zona bien ventilada. El motor podría sobrecalentarse, y el gas de monóxido de carbono venenoso contenido en los gases de escape pondrá en peligro vidas humanas.
	● Apague el motor antes de trasladar la bomba centrífuga a otro lugar de trabajo. Si la bomba centrífuga se inclina o se mueve durante el funcionamiento, el combustible puede derramarse y/o la bomba centrífuga puede volcar, provocando una situación peligrosa.
	● No fume ni utilice una llama abierta cerca del depósito de combustible y mantenga alejadas otras fuentes de llamas y chispas.
	● No coloque materiales inflamables cerca de la bomba centrífuga. Tenga cuidado de no colocar combustible, cerillas, pólvora, paños aceitosos, paja o cualquier otro objeto combustible cerca de la bomba centrífuga.
	● La gasolina es extremadamente inflamable y el vapor de gasolina puede explotar. Añada combustible en exteriores, en una zona bien ventilada, con el motor parado y la bomba en una superficie nivelada. No llene el depósito por encima del hombro del depurador de combustible. Almacene siempre la gasolina en un recipiente aprobado. Escape caliente.
	● El silenciador se calienta mucho durante el funcionamiento y permanece caliente durante un tiempo después de parar el motor. Tenga cuidado de no tocar el silenciador cuando esté caliente. Deje que el motor se enfrie antes de transportar la bomba o almacenarla en interiores.
	● No reposte mientras el motor está en marcha. Tenga cuidado de no derramar combustible durante el repostaje. Si se derrama combustible, límpielo y déjelo secar antes de arrancar el motor.

⚠ PRECAUCIÓN

	● Mantenga la bomba centrífuga a al menos 1 metro (3 pies) de distancia de cualquier estructura o edificio durante el uso. Cuando se coloca una bomba centrífuga cerca de un edificio o de un equipo cercano, el calor y el escape del motor aumentarán la temperatura del entorno. Esto degradará la eficiencia de refrigeración del motor, causando un sobrecalentamiento.
	● No coloque la bomba centrífuga ni la cubra con una caja. La bomba centrífuga tiene un sistema de enfriamiento de aire comprimido incorporado y puede sobrecalentarse si está encerrada.
	● Utilice la bomba centrífuga sobre una superficie nivelada. No es necesario preparar una base especial para el funcionamiento de la bomba centrífuga. Sin embargo, la bomba centrífuga podría vibrar excesivamente al funcionar sobre una superficie irregular, lo cual podría causar daños mecánicos graves. De manera similar, la lubricación de las piezas del motor será deficiente si la bomba se utiliza sobre una superficie inclinada. En tal caso, el pistón puede agarrotarse incluso si el nivel de aceite está cerca del nivel superior. Por lo tanto, elija una superficie nivelada para operar la bomba centrífuga.

VEILLEZ À LIRE ATTENTIVEMENT POUR VOTRE SÉCURITÉ

- LA POMPE CENTRIFUGE EST CONÇUE POUR GARANTIR UN FONCTIONNEMENT SÛR LORSQU'ELLE EST UTILISÉE SUIVANT LES INSTRUCTIONS DU MANUEL TECHNIQUE FOURNI AVEC LA POMPE CENTRIFUGE.
- NE PAS UTILISER LA POMPE CENTRIFUGE AVANT D'AVOIR LU ET COMPRIS LES INSTRUCTIONS ET LE MANUEL DU FABRICANT DU MOTEUR. SINON, DES BLESSURES CORPORELLES OU DES DÉGÂTS MATÉRIELS POURRAIENT SE PRODUIRE.
- REPORTEZ-VOUS AU MANUEL DU MOTEUR HONDA POUR PLUS D'INFORMATIONS SUR LA SÉCURITÉ.
- AFIN DE GARANTIR UN FONCTIONNEMENT SÛR ET EFFICACE DE LA POMPE CENTRIFUGE, LES OPÉRATEURS DOIVENT LIRE ET RESPECTER LES CONSIGNES DE SÉCURITÉ SUIVANTES.

Les mesures de précaution décrites dans cette section visent à éviter tout danger ou dommage pour vous ou autrui. Les opérations décrites dans ce manuel susceptibles d'être exécutées incorrectement sont classées en deux catégories : **⚠ AVERTISSEMENT**, et **⚠ MISE EN GARDE**. Les catégories indiquent l'étendue des dommages possibles ou le niveau d'urgence des précautions à prendre. Notez cependant que ce qui est indiqué dans une **⚠ MISE EN GARDE** peut parfois entraîner un problème plus grave. Dans les deux cas, les catégories se rapportent aux éléments liés à la sécurité, et de ce fait, doivent être observées attentivement.

- **⚠ AVERTISSEMENT** : Ils indiquent qu'il y a une forte probabilité de blessures corporelles ou de mort si les instructions ne sont pas respectées, ou si le nettoyage, le graissage, les adhésifs et d'autres matériaux ne sont pas utilisés correctement.
- **⚠ MISE EN GARDE** : elles indiquent une probabilité de dommages de l'équipement si les instructions ne sont pas suivies.
- **NOTE** : elles sont fournies dans la section de procédure pour des informations supplémentaires ou complémentaires afin de simplifier la procédure et de la rendre plus efficace.
- Explicación de los símbolos:



: La marque **!** indique un élément d'**AVERTISSEMENT** ou de **MISE EN GARDE**.



: La marque **○** indique une action interdite, raison pour laquelle les utilisateurs doivent être encore plus prudents lors de la manipulation de la pompe.

Consignes de sécurité

⚠ AVERTISSEMENT

	<ul style="list-style-type: none"> Il est de la responsabilité de l'opérateur de fournir les protections nécessaires à la protection des personnes et des biens. Savoir comment arrêter la pompe rapidement en cas d'urgence. Si vous vous éloignez de la pompe pour une raison quelconque, veillez à toujours couper le moteur. Comprendre l'utilisation de toutes les commandes et les connexions. Veillez à ce que toute personne qui utilise la pompe reçoive les instructions appropriées. Ne laissez pas les enfants utiliser la pompe. Eloignez les enfants et les animaux domestiques de la zone de fonctionnement.
	<ul style="list-style-type: none"> Un entretien incorrect de la pompe ou le fait de ne pas résoudre les problèmes avant le fonctionnement, peut provoquer un dysfonctionnement au cours duquel vous pourriez être gravement blessé. Effectuez toujours une inspection pré-opérationnelle et si vous trouvez des problèmes, corrigez-les avant d'utiliser la pompe.
	<ul style="list-style-type: none"> Les pompes centrifuges Tsurumi sont conçues pour pomper uniquement de l'eau propre qui n'est pas destinée à la consommation humaine et d'autres utilisations peuvent entraîner des blessures à l'opérateur ou des dommages de la pompe et autres matériels.
	<ul style="list-style-type: none"> N'utilisez pas cet équipement de pompage pour pomper ou déplacer tout objet inflammable ou explosif comme de l'huile, de l'essence, du kérosène, de l'éthanol, etc. N'utilisez pas l'appareil en présence de vapeurs inflammables ou explosives. L'utilisation de cette pompe avec ou à proximité de liquides inflammables peut provoquer une explosion ou un incendie, entraînant des dommages matériels, des blessures graves et/ou la mort.

⚠ AVERTISSEMENT

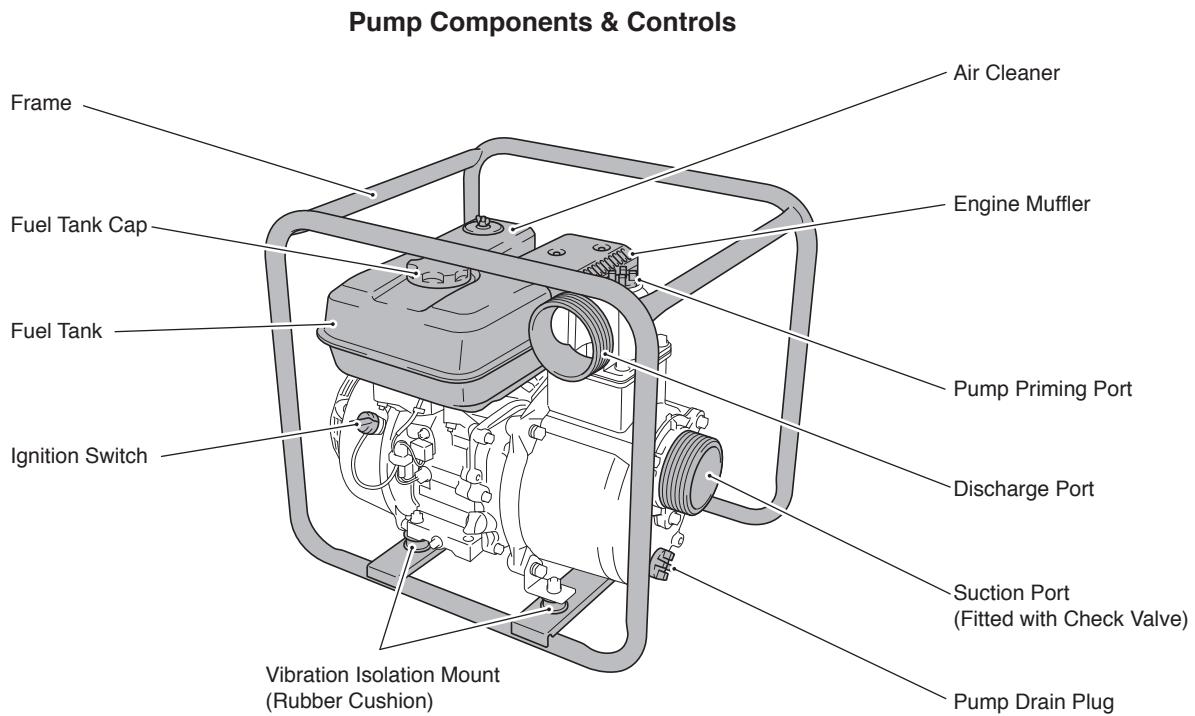
	● Ne pompez pas de liquides à plus de 40 °C (104 degrés F). Vous risqueriez d'endommager les composants de la pompe ou de blesser gravement l'opérateur.
	● N'utilisez pas la pompe centrifuge pour transférer de l'huile, de l'eau salée, de l'eau de mer, des produits chimiques, des corrosifs ou des solvants organiques. Cela pourrait endommager les composants de la pompe et entraîner des blessures graves.
	● Ne pompez pas de l'eau contenant des produits chimiques corrosifs ou des substances toxiques. Ces liquides peuvent entraîner de graves dangers pour la santé et l'environnement. Si vous avez besoin d'assistance, contactez les autorités locales.
	● Les gaz d'échappement de ce produit contiennent des produits chimiques reconnus par l'État de Californie comme cause de cancer, de malformations congénitales ou d'autres problèmes de reproduction.
	● Ne faites pas fonctionner la pompe centrifuge dans une pièce, un garage fermé, une cave, un tunnel ou toute autre zone insuffisamment aérée. Faites toujours fonctionner la pompe centrifuge dans un endroit bien ventilé. Le moteur risque de surchauffer et le monoxyde de carbone toxique contenu dans les gaz d'échappement présente un danger pour la vie humaine.
	● Arrêtez le moteur avant de transférer la pompe centrifuge à un autre lieu de travail. Si la pompe centrifuge est inclinée ou déplacée pendant le fonctionnement, le carburant risque de se déverser et/ou la pompe centrifuge peut se renverser, provoquant une situation dangereuse.
	● Ne fumez pas et n'utilisez pas de flamme nue à proximité du réservoir de carburant et ne vous éloignez pas d'autres sources de flammes ou d'étincelles.
	● Ne placez pas de matériaux inflammables à proximité de la pompe centrifuge. Veillez à ne pas placer de carburant, d'allumettes, de poudre à canon, de chiffons huileux, de paille ou tout autre objet combustible à proximité de la pompe centrifuge.
	● L'essence est extrêmement inflammable et les vapeurs d'essence peuvent provoquer une explosion. Faites le plein à l'extérieur, dans un endroit bien aéré, avec le moteur arrêté et la pompe sur une surface plane. Ne remplissez pas le réservoir au-delà de l'épaulement de la crête à carburant. Stockez toujours l'essence dans un récipient homologué.
	● Le silencieux devient très chaud pendant le fonctionnement et reste chaud pendant un moment après l'arrêt du moteur. Veillez à ne pas toucher le silencieux lorsqu'il est chaud. Laissez le moteur refroidir avant de transporter la pompe ou de l'entreposer à l'intérieur.
	● Ne faites pas le plein lorsque le moteur est en marche. Veillez à ne pas renverser de carburant pendant le ravitaillement. Si du carburant est renversé, essuyez-le et laissez-le sécher avant de démarrer le moteur.

⚠ MISE EN GARDE

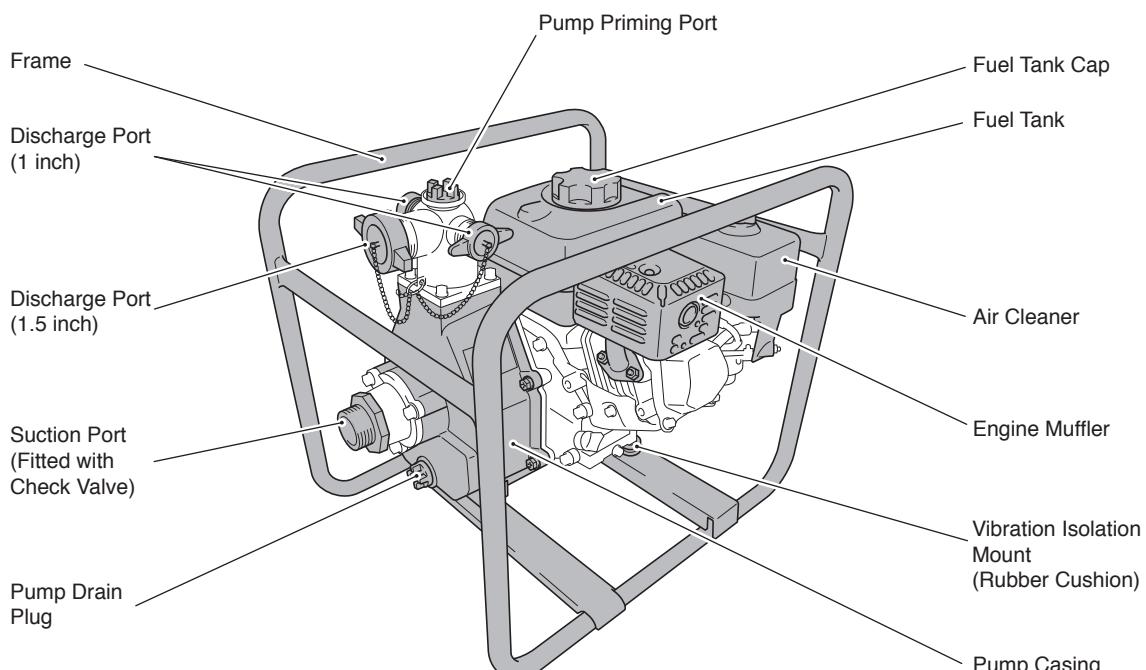
	● Maintenez la pompe centrifuge à au moins 1 mètre (3 pieds) de toute structure ou bâtiment pendant l'utilisation. Lorsqu'une pompe centrifuge est placée à proximité d'un bâtiment ou d'un équipement proche, la chaleur et l'échappement du moteur provoqueront une augmentation de la température ambiante. Cela dégraderait l'efficacité de refroidissement du moteur, provoquant une surchauffe.
	● N'enfermez pas la pompe centrifuge et ne la recouvrez pas avec un boîtier. La pompe centrifuge est dotée d'un système de refroidissement à air forcé intégré et peut surchauffer si elle est enfermée.
	● Actionnez la pompe centrifuge sur une surface plane. Il n'est pas nécessaire de préparer une embase spéciale pour l'utilisation de la pompe centrifuge. Toutefois, la pompe centrifuge peut vibrer de manière excessive lorsqu'elle fonctionne sur une surface irrégulière, ce qui pourrait entraîner des dommages mécaniques graves. De même, la lubrification des pièces du moteur sera insuffisante si la pompe est utilisée sur une surface inclinée ou en pente. Dans ce cas, le piston peut se bloquer même si le niveau d'huile se trouve à proximité du niveau supérieur. Par conséquent, choisissez une surface de niveau pour faire fonctionner la pompe centrifuge.

2 PART NAMES AND SAFETY LABELS

Pump Components and Controls Location



(Model: TE3-80HA)

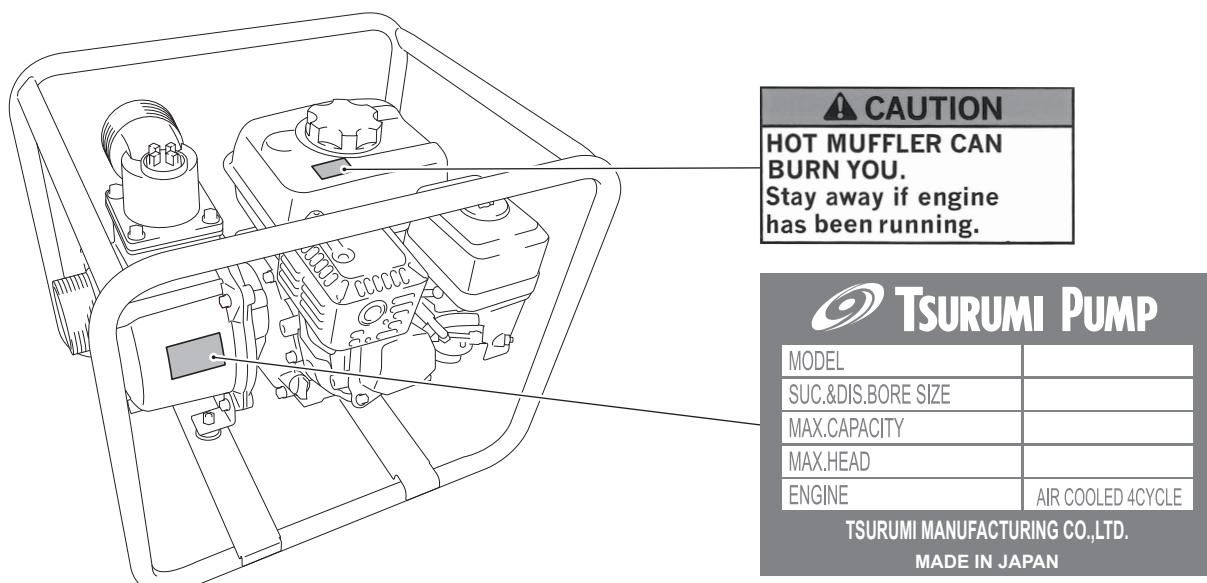
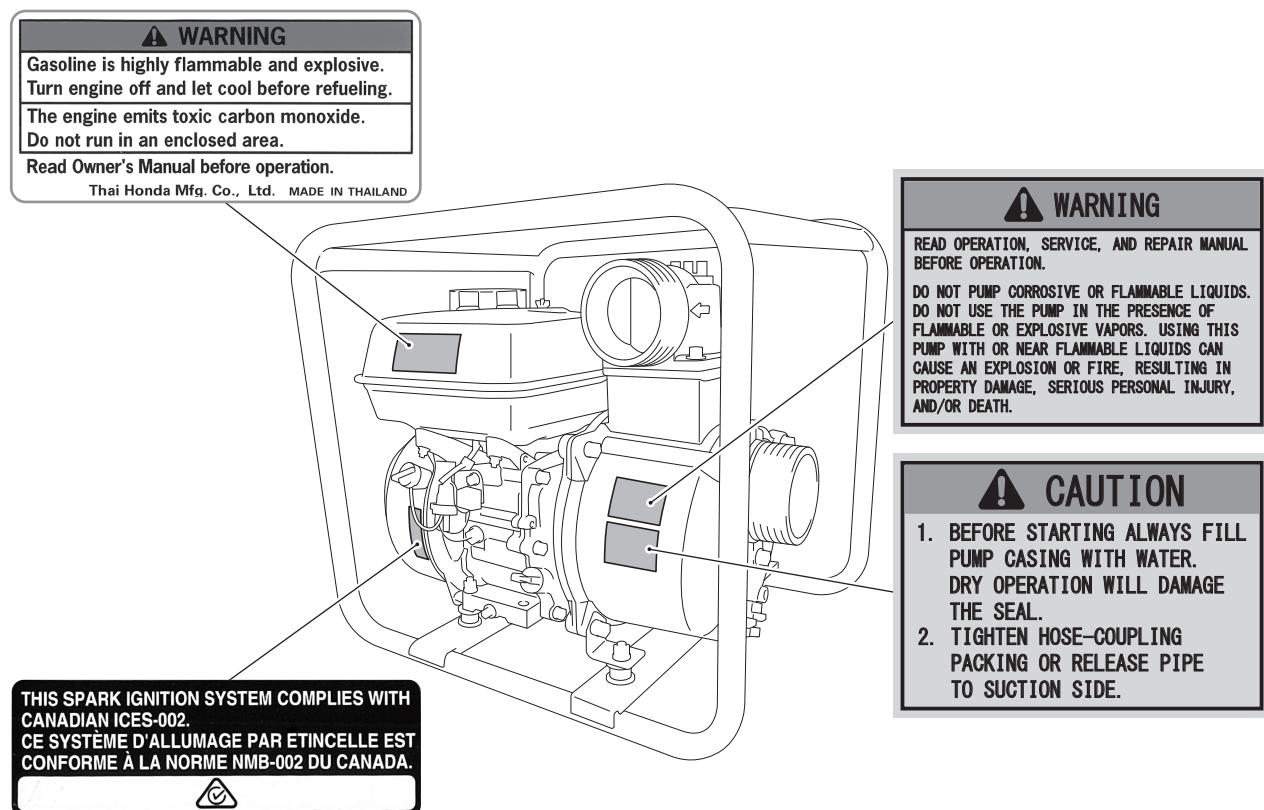


(Model: THP-4070HA)

Safety Label Location

The labels attached to the pump body have important safety information. Make sure you have acknowledged them all before operating the pump. And these labels must always be attached to the pump body. If for some reason, they get peeled off or the readability of the content is poor, contact your Tsurumi Pump dealer/supplier for the replacement.

Pump Safety Label Location (Model shown: TE3-80HA)



3 SPECIFICATIONS AND PERFORMANCE

Specifications / Key Features

- **Heavy-duty Honda Engine**.....proven reliability — quiet operation — higher fuel efficiency
- **Oil Level Sensor**.....prevents engine operation when oil level falls below the safe level
- **New Design**.....larger pump casing design with efficient hydraulic components
- **Mechanical Seal**.....silicon carbide seal element for longer service life
- **Rubber Vibration Isolation Mounts**.....isolates the frame from pump/engine vibrations, reduces the noise as well as damages to the base support/foundation.
- **Durable Rolled Steel Frame**.....for higher strength and durability
- **Cast Iron Inner Casing/Diffuser**.

Specifications of the Pump

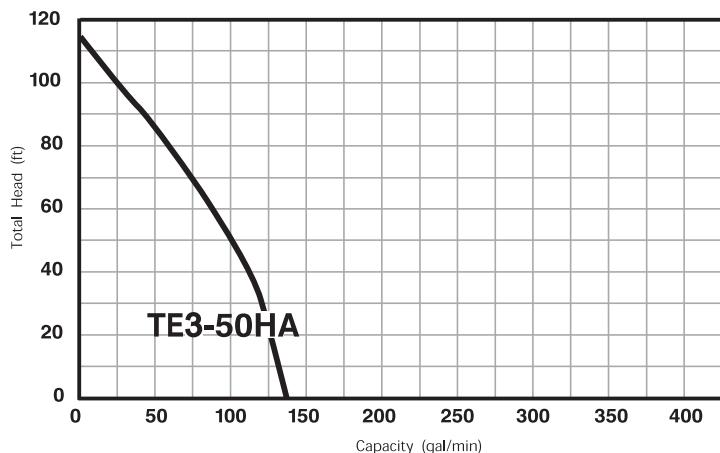
MODELS			TE3-50HA	TE3-80HA	TE2-100HA	THP-4070HA
PUMP	Pump Output	Gal./Min-to-Total Head	See Performance Curve	See Performance Curve	See Performance Curve	See Performance Curve
	Suction Size	Inches	2 NPT Male	3 NPT Male	4 NPT Male	1.5 PF
	Discharge Size	Inches	2 NPT Male	3 NPT Male	4 NPT Male	1/1/1.5 PF
ENGINE	Engine Model (Honda)	-----	GX120	GX160	GX240	GX160
	Max. HP (rpm)	hp/rpm	3.5 / 3600	4.8 / 3600	8.0 / 3600	4.8 / 3600
	Displacement	CC (In ³)	118 (7.2)	163 (9.9)	270 (16.5)	163 (9.9)
	Fuel Tank Capacity	Gals.	0.53	0.82	1.40	0.82
	Noise Level (Rated Load)	dB	64	68	72	68
	Starting System	---	Recoil	Recoil	Recoil	Recoil
SET	Dimensions (L x W x H)	Inches	17.9 x 14.0 x 16.3	20.0 x 15.7 x 17.9	13.0 x 22.2 x 16.7	20.7 x 15.7 x 17.9
	Shipping Weight	Lbs.	55	64	109	56.2
	Max. Solid Passage Dia.	Φ (inches)	Φ0.21	Φ0.27	Φ0.27	Φ0.21

* Please securely attach the strainer to prevent large solids from getting into the pump.

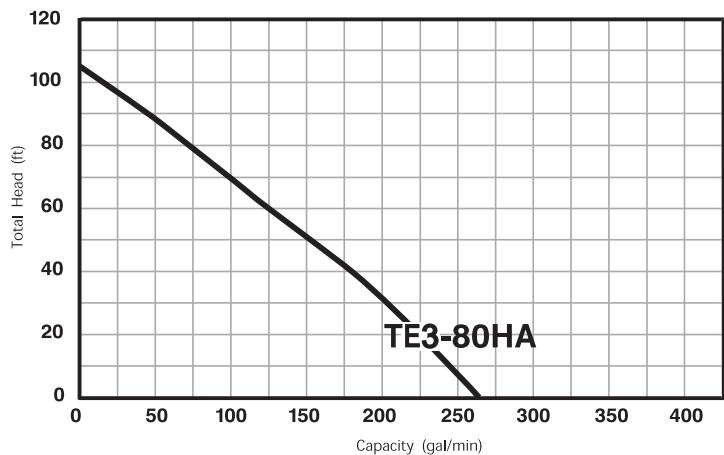
Performance Curve

Refer to the following **performance curves** for the pumping capacity of the centrifugal pumps.

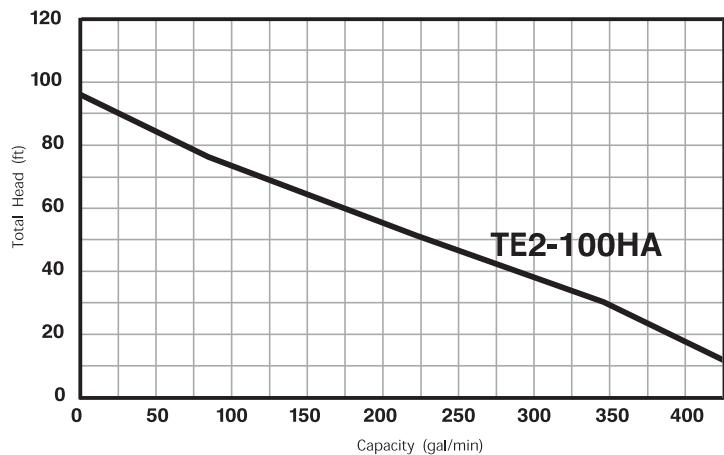
Model: TE3-50HA



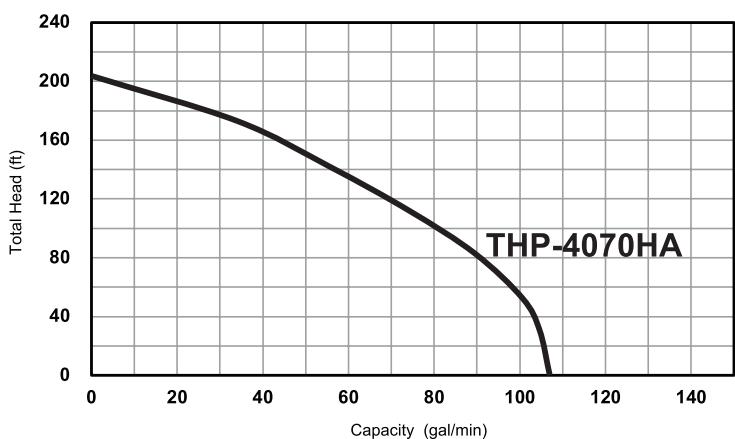
Model: TE3-80HA



Model: TE2-100HA



Model: THP-4070HA



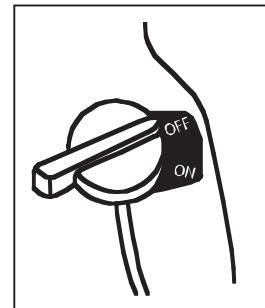
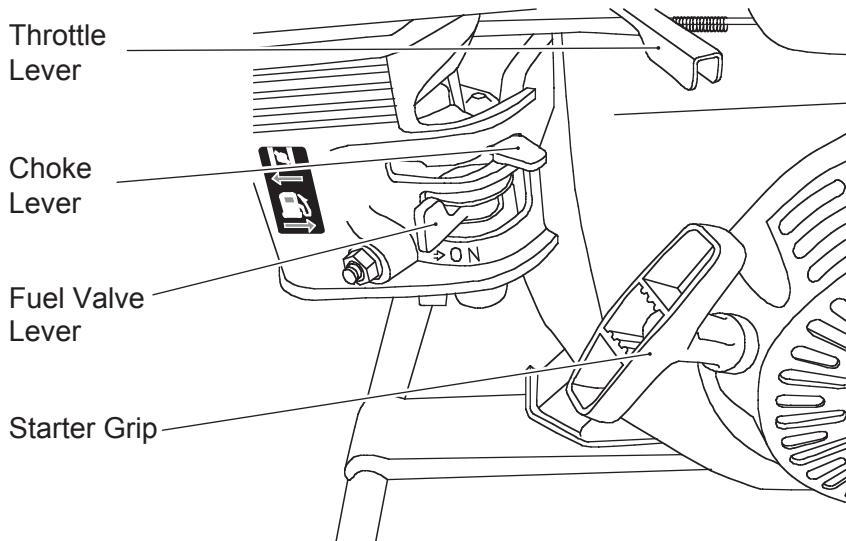
4 OPERATING INSTRUCTIONS

Note: REFER TO THE HONDA ENGINE OWNER'S MANUAL FOR OTHER OPERATING INSTRUCTIONS AND SAFETY INFORMATION.

Operating Controls

- A. The performance of the Centrifugal pump is controlled by using the engine operating controls provided in the engine unit.
- B. The operating controls consist of a throttle lever (for a speed control), choke lever (for cold weather starting), fuel valve lever (to prevent fuel spill), and a recoil starter (to crank the engine by hand).

Operating Controls



Ignition Switch

(Located on Recoil Starter Shroud)

Pre-Start Checks



- WARNING**
- MAKE SURE THAT YOU HAVE ACKNOWLEDGED EACH WARNING BEFORE OPERATING THE PUMP TO PREVENT POSSIBLE FIRE HAZARDS.
 - KEEP THE PUMP OPERATING AREA CLEAR OF FLAMMABLES OR OTHER HAZARDOUS MATERIALS.

Inspect the following sections before starting/operating the pump.

- A. Engine section
 - (a) Check the Leakage of gasoline or engine oil.
 - (b) Clean out excessive dirt or debris, especially around the muffler and recoil starter.
 - (c) Check the air filter element.
 - (d) Check that no Indication of damage or breakage on the components.
 - (e) Check engine oil level (refer to **Check Engine Oil Level** on page 13).
 - (f) Check fuel level (refer to **Check Fuel Level** on page 15) .

B. Pump section

- (a) Make sure that there is no blockage on the air vents of the pump with paper or other similar materials.
- (b) Check the suction hose and the discharge hose are connected properly so that there would be no air leakages on suction side and/or water leakages on the discharge side of the pump during operation.
- (c) Make sure that the strainer is in good condition and is attached securely to the free end of the suction hose. The strainer prevents the pump from getting clogged or damaged by the debris.



CAUTION Improper connection of the hoses significantly reduces the pump performance. In addition, the discharge hose could come off the pump under high pressure if not connected properly. And which might not only damage the surrounding objects but would also endanger human lives.

C. Check that all shield and covers are in place and all fasteners are tightened securely.

D. Check centrifugal pump surroundings

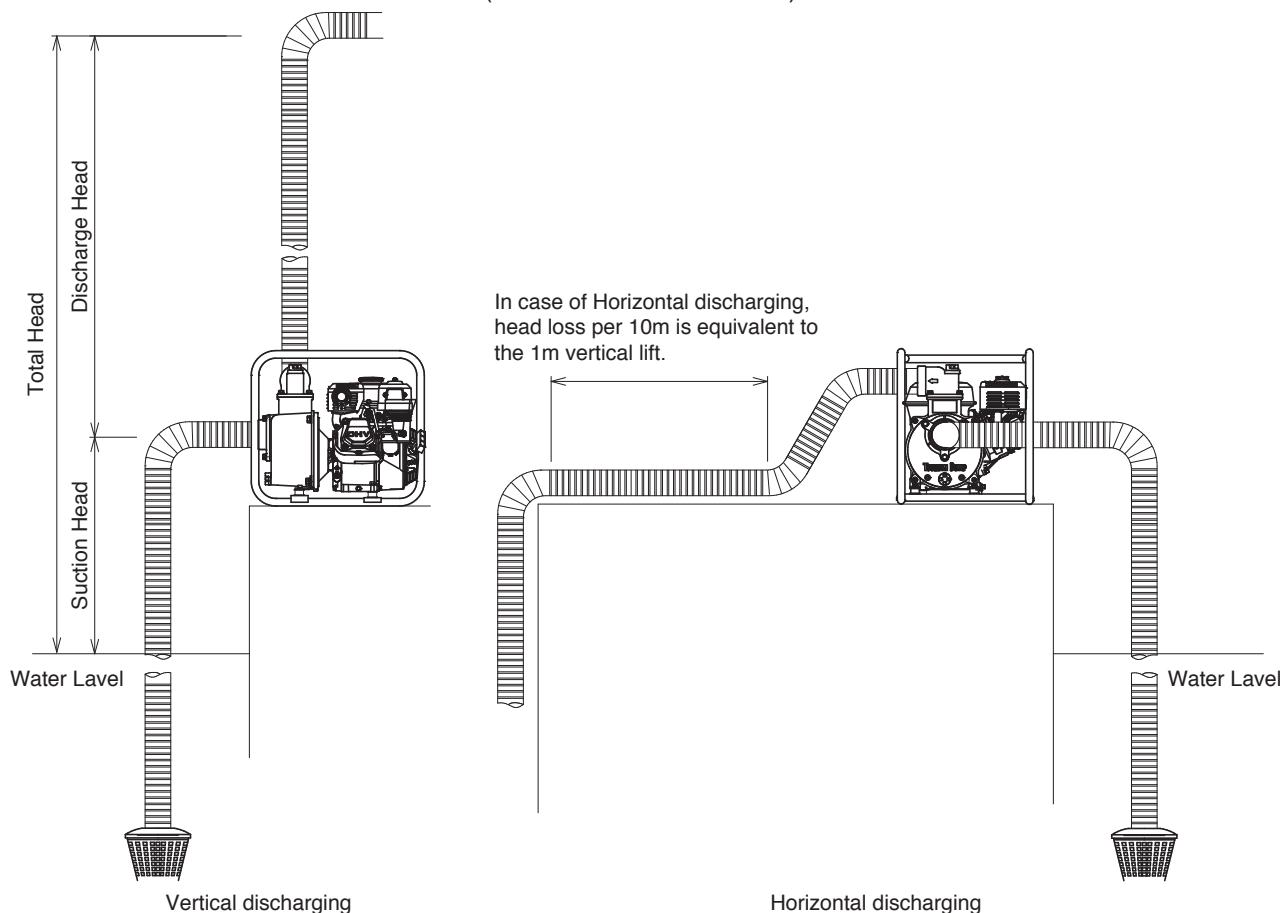
- (a) Keep centrifugal pump at least three (3) feet (one [1] meter) away from buildings or other structures.
- (b) Operate the centrifugal pump only in a dry, well-ventilated area.
- (c) Keep the centrifugal pump away from open flame.
- (d) Keep the centrifugal pump on a level and stable surface.

E. Pump location/placement

- (a) Place the pump close to water level as much as possible for better pump performance. Also, if possible, use a short and large diameter hose instead of a long and small diameter hose to minimize the head losses across the hose.
- (b) The pump should be placed in such a way that the suction head of the pump is always smaller than the discharge head.

Note: The maximum allowable suction head for all models of the centrifugal pump (including high head model THP-4070HA) is twenty-six (26) feet (eight <8> meter) and which may vary depending upon the operating conditions.

Pump Placement
(Model shown: TE3-80HA)

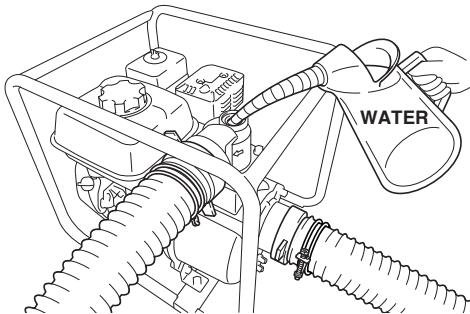


F. Pump Priming

Before starting the pump, remove the pump priming plug, and fill the pump casing chamber with water. As the pump casing chamber is fully-filled, reinstall the priming plug and tighten it securely.

Pump Priming

(Model shown: TE3-80HA)



⚠ CAUTION

- OPERATING THE PUMP DRY WILL DAMAGE THE PUMP MECHANICAL SEAL. IF THE PUMP HAS BEEN OPERATED DRY, STOP THE ENGINE IMMEDIATELY, AND ALLOW THE PUMP TO COOL BEFORE PRIMING.
- MAKE SURE THE PUMP PRIMING PLUG IS TIGHTENED SECURELY AFTER FILLING THE CASING CHAMBER. A LOOSE-TIGHTENED PRIMING PLUG MIGHT COME OFF UNDER HIGH PRESSURE DUE TO WHICH SURROUNDING OBJECTS MIGHT BE DAMAGED AS EXPOSED TO WATER.

► Check Engine Oil Level

⚠ CAUTION

- CHECK THE ENGINE OIL LEVEL BEFORE EACH USE, OR EVERY 10 HOURS FOR CONTINUOUS OPERATION.
- ENGINE OIL IS A MAJOR FACTOR AFFECTING THE PERFORMANCE AND SERVICE LIFE OF ENGINE. NON-DETERGENT OILS AND 2-STROKE OILS ARE NOT RECOMMENDED BECAUSE OF THEIR INADEQUATE LUBRICATING CHARACTERISTICS.
- CHECK THE OIL LEVEL WITH THE ENGINE STOPPED AND ON A LEVEL SURFACE.
- RUNNING THE ENGINE WITH A LOW OIL LEVEL CAN CAUSE ENGINE DAMAGE.

- A. Use 4-stroke motor oil that meets or exceeds the requirements for API service classification SJ or later (or equivalent). Always check the API service label on the oil container to be sure it includes the letters SJ or later (or equivalent). For general use SAE 10W/30 is recommended.
- B. Oil with other than recommended viscosity grades could be used when the surrounding average temperature is within the indicated range.

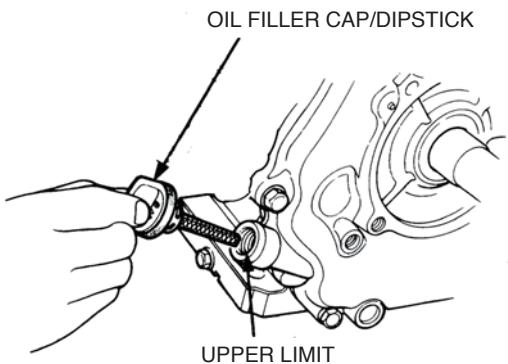
Oil Viscosity Grade-to-Temperature Recommendations

Single grade	5W	10W	20W	#20	#30	#40	
Multi-grade			10W-30		10W-40		
Ambient temperature	-20 -4	-10 14	0 32	10 50	20 68	30 86	40°C 104°F

C. When checking oil, observe the following (refer to **Checking Oil Level shown below**):

- (a) Make sure the engine is on a level surface.
- (b) Remove the oil filler cap/dipstick and wipe it clean.
- (c) Insert the filler cap/dipstick into the oil filler neck, but do not screw it in.
- (d) Remove the filler cap/dipstick and check the oil level.

Checking Oil Level



- (e) If the level is near or below the lower limit mark on the dipstick, fill with the recommended oil to the upper limit mark (bottom edge of the oil fill hole). Be careful not to overfill. (refer to **Engine oil capacity** on page 18)
- (f) Reinstall the oil filler cap/dipstick securely.

Oil Alert System

The oil alert system prevents engine damage due to an insufficient engine oil operation. The equipped oil level sensor detects the oil level and provides a signal to stop the engine automatically if the oil level falls below the safe level.

- A. If the engine stops automatically during operation and will not restart, check the oil level before troubleshooting in other areas. And if the oil level is low, refill up to the upper level and restart the engine.

Check Engine Fuel

WARNING

- GASOLINE IS HIGHLY FLAMMABLE AND EXPLOSIVE. MAKE SURE YOU REVIEW EACH WARNING IN ORDER TO PREVENT FIRE HAZARD.
- DO NOT REFUEL WHILE ENGINE IS RUNNING OR HOT.
- RISK OF BURNS. USE CAUTION WHEN DRAINING HOT ENGINE OIL. HOT OIL MAY BURN.
- BE CAREFUL NOT TO GET DUST, DIRT, WATER OR OTHER FOREIGN OBJECTS INTO FUEL.
- WIPE OFF SPILLED FUEL THOROUGHLY BEFORE STARTING THE ENGINE.
- KEEP FLAMES AND SPARKS AWAY FROM THE PUMP.
- DO NOT REFUEL WHILE SMOKING OR NEAR OPEN FLAME OR OTHER SUCH POTENTIAL FIRE HAZARDS. OTHERWISE, FIRE ACCIDENT MAY OCCUR.
- AVOID REPEATED OR PROLONGED CONTACT WITH SKIN OR INHALING OF GASOLINE VAPOR.
- KEEP OUT OF REACH OF CHILDREN.

Check Fuel Level

Note: *Starting with a full tank of gasoline will help to reduce operating interruptions for refueling.*

- A. Remove fuel tank cap. Check the fuel level and refill with recommended fuel if the fuel level is low.
- B. Fuel tank capacity:

TE3-50HA.....	0.53 gal.
TE3-80HA / THP-4070HA.....	0.82 gal.
TE2-100HA	1.40 gal.

Starting and Operating the Pump

Implement the following instructions to start and operate the engine. And for more information, please refer to the **Honda Engine owner's manual**.

- A. Move the fuel valve lever to the ON position.
- B. Move the choke lever to the CLOSED position.

Note: *The shifting of choke lever to the CLOSED position may not be needed if the engine is warm, or the surrounding air temperature is high.*

- C. Move the throttle lever slightly away from the MIN position, about 1/3 of the way toward the MAX position.
- D. Set the ignition switch to the ON position.
- E. Pull the starter grip lightly until resistance is felt, then pull briskly.

Note: *Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.*

- F. As the engine warms up, gradually move the choke lever to the OPEN position if it was moved to CLOSED position during starting the engine.
- G. Pump output can be regulated simply by adjusting the throttle lever position. Shifting the throttle lever towards the MAX. position increases the pump output and vice versa.

Stopping the Centrifugal Pump

Note: *In an emergency, simply turn the ignition switch to the OFF position to stop the engine. For normal operating conditions follow the following procedure.*

- A. Move the throttle lever to the MIN position.
- B. Turn the ignition switch to the OFF position.
- C. Move the fuel valve lever to the OFF position.

5 TROUBLESHOOTING

The following troubleshooting table can be used as a guide to isolate the faults in the centrifugal pump. Refer to the following table when the engine fails to start even after several attempts. And if the engine still fails to start even after conducting the following procedure, contact the nearest Tsurumi pump dealer.

Troubleshooting Table

Fault	Probable Causes	Remedy
Pump does not pump	Insufficient priming water Chipped or broken mechanical seal Damaged check valve Damaged suction hose Clogged strainer Air leaks caused by damaged O-ring	Add more water through priming plug Replace mechanical seal Replace check valve Replace hose Clean strainer Replace O-rings
Discharge flow or pump pressure is too low	Air leaks caused by damaged O-ring Clogged hose Clogged strainer Excessive impeller clearance (THP-4070HA excluded) Engine RPM is too low Discharge head is too high	Replace O-rings Replace hose Clean strainer Reduce the clearance by adding shim as required (refer to Impeller Gap Adjustment on page 28) Check the RPM and reset the throttle lever as required Lower the discharge head
Pump primes too slowly	Insufficient priming water Chipped or broken mechanical seal Damaged check valve Damaged suction hose Clogged strainer Air leaks caused by damaged O-ring Engine RPM is too low Discharge head is too high	Add more water through priming plug Replace mechanical seal Replace check valve Replace suction hose Clean strainer Replace O-rings Check the RPM and reset the throttle lever as required Lower the discharge head
Noise or vibration	Faulty mounting Damaged vibration isolation mounts	Tighten nuts, bolts, and other fasteners securely Replace the vibration isolation mounts

6 MAINTENANCE

Note: REFER TO THE HONDA ENGINE OWNER'S MANUAL FOR OTHER MAINTENANCE REQUIREMENTS AND SAFETY INFORMATION.

Maintenance Schedule

To maintain the centrifugal pump performance during peak operating condition, observe and implement the maintenance and/or service the pump according to the **Maintenance schedule**.

⚠ WARNING

- TURN OFF THE ENGINE BEFORE PERFORMING ANY MAINTENANCE. IF OPERATION OF THE ENGINE IS REQUIRED, MAKE SURE THE AREA IS WELL VENTILATED; THE ENGINE EXHAUST CONTAINS POISONOUS CARBON MONOXIDE GAS.
- HOT ENGINE MAY BURN YOUR BODY PARTS, THEREFORE, EQUIP APPROPRIATE WORKING GEAR AND USE CAUTION WHEN WORKING WITH HOT ENGINES.
- MOST USED OILS CONTAIN SMALL AMOUNTS OF SUBSTANCES THAT CAN CAUSE CANCER AND OTHER HEALTH PROBLEMS. DO NOT INHALE, INGEST, OR LEAVE IN CONTACT WITH THE SKIN FOR A LONG PERIOD OF TIME.

Note: To replace the mechanical seal, please refer to **Replacement of Mechanical seal** section (see page 26).

Note: To replace the check valve, please refer to the **Assembly procedure** (see page 32,35*) and **Disassembly procedure** (see page 21,24*) of the pump.

Note: To replace the vibration isolation mounts, please refer to the **Assembly procedure** (see page 31,34*) and **Disassembly procedure** (see page 21,24*) of the pump.

* : THP- 4070HA

Maintenance Schedule

Frequency	Maintenance Action
Before each use	Check oil level Check pump components (according to the PRE- START CHECK section)
50 Hours	Clean air cleaner element Check spark plug and clean if necessary
100 Hours	Change engine oil Clean sediment cup Clean fuel tank and filter Adjust spark plug gap Check the impeller condition, impeller clearance Check pump check valve
300 Hours	Replace spark plug and cleaner element Check-adjust idle speed Check-adjust valve clearance
500 Hours (12 Months)	Change mechanical seal
1,000 Hours (24 Months)	Overhaul the engine Clean and adjust carburetor Replace vibration isolation mounts

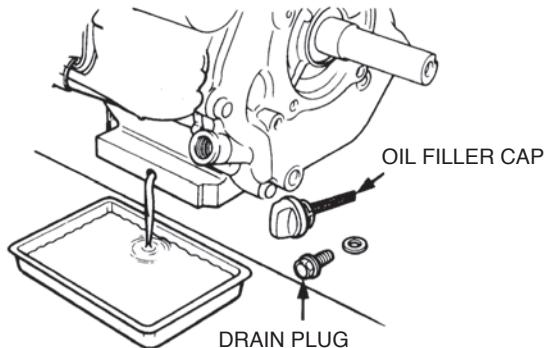
▶ Changing Engine Oil

⚠ WARNING

RISK OF BURNS. USE CAUTION WHEN DRAINING HOT ENGINE OIL. HOT OIL MAY BURN.

- A. An initial oil change should be performed after the first twenty (20) hours of use. Thereafter, change oil in every 100 hours.
- B. Before changing the oil, check for a suitable way to dispose of the used oil. Do not pour it down sewer drains, onto garden soil or into open streams. Refer to your local zoning and environmental regulations for disposal and handling requirements.
- C. Drain the oil while the engine is still warm for quick and complete draining. Remove the oil filler cap/dipstick and drain plug. Allow oil to drain from the engine (refer to **Draining Engine Oil**).

Draining Engine Oil

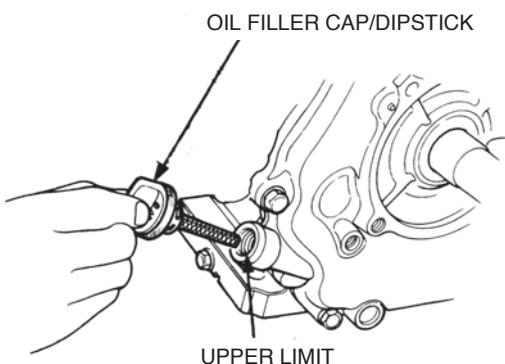


- D. Place the engine on a level surface, refill with the recommended oil up to upper limit (refer to **Oil Viscosity Grade-to-Temperature Recommendations** on page 13).
- E. Reinstall the oil filler cap/dipstick securely.

Note: *Engine oil capacity:*

TE3-50HA (GX-120).....	0.56L (18 US oz, 0.49 Imp qt)
TE3-80HA / THP-4070HA (GX-160).....	0.58L (19 US oz, 0.51 Imp qt)
TE2-100HA (GX-240)	1.1L (1.2 US qt, 1.0 Imp qt)

Checking Oil Level



■ Air Cleaner Service

⚠ WARNING NEVER USE GASOLINE OR LOW FLASH POINT SOLVENTS FOR CLEANING THE AIR CLEANER ELEMENT.
DOING SO MIGHT CASUE FIRE OR EXPLOSION.

⚠ CAUTION NEVER RUN THE ENGINE WITHOUT AN AIR CLEANER OR WITH A DAMAGED AIR CLEANER. RAPID ENGINE WEAR WILL RESULT FROM CONTAMINANTS, SUCH AS DUST AND DIRT, BEING DRAWN THROUGH THE CARBURETOR AND INTO THE ENGINE.

- A. A dirty air cleaner will restrict airflow to the carburetor, reducing the performance.
- B. To prevent degraded engine operation, service the air cleaner regularly. Service it more frequently when operating the engine in extremely dusty areas.

► Sediment Cup Cleaning

⚠ WARNING GASOLINE IS EXTREMELY FLAMMABLE AND IS EXPLOSIVE. THEREFORE, DO NOT SMOKE OR ALLOW OPEN FLAMES NEARBY THE PUMP OPERATING AREA.

- A. Turn the fuel valve lever to OFF position (refer to **Operating Controls** on page 11).
- B. Remove the sediment cup and O-ring. Wash them either with non-flammable or high flash point solvent.
- C. Wipe the sediment cup and O-ring dry, then reinstall.

⚠ WARNING AFTER INSTALLING THE SEDIMENT CUP, CHECK FOR LEAKAGES, AND ENSURE THAT THE SPILLED OIL IS WIPE UP PROPERLY BEFORE STARTING THE ENGINE.

- D. Turn the fuel valve lever to ON position (refer to **Operating Controls** on page 11).
- E. Check for the leakages.

► Cleaning and Adjusting Spark Plug

Recommended spark plug models: **BPR6ES (NGK), W20EPR-U (DENSO)**

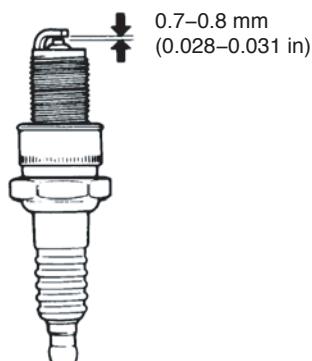
To ensure proper engine operation, the spark plug electrode gap must be maintained and should be free of deposits. For cleaning and adjusting the spark plug electrode gap, implement the following procedure.

⚠ WARNING THE MUFFLER BECOMES VERY HOT DURING OPERATION AND REMAINS HOT FOR A WHILE AFTER STOPPING THE ENGINE. BE CAREFUL NOT TO TOUCH THE MUFFLER WHILE IT IS HOT.

Note: *A loose spark plug can overheat and damage the engine. Similarly, overtightening the spark plug can damage the thread in the cylinder.*

- A. Remove the spark plug cap.
- B. Clean around the spark plug base.
- C. Use the proper size spark plug wrench to remove the spark plug.
- D. Visually inspect the spark plug. Discard the spark plug if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
- E. Measure the spark plug electrode gap with a wire-type filler gauge. Adjust the gap as necessary by bending the side electrode (refer to **Spark Plug Gap**).
- F. The gap between the electrode should be 0.7 - 0.8 mm (0.028 - 0.031 inch).

Spark Plug Gap



Disassembly of the Centrifugal Pump

⚠ WARNING

- MAKE SURE ENGINE OIL, GASOLINE, AND PUMP CHAMBER IS DRAINED OUT COMPLETELY BEFORE DISASSEMBLY.
- IT IS RECOMMENDED THAT THE PUMP BE ASSEMBLED AND DISASSEMBLED ON A BENCH OR SIMILAR SURFACE WITH THE ENGINE SHROUD FACING DOWN. IN ADDITION, WOODEN BLOCKS IN A VARIETY OF LENGTHS AND THICKNESS SHOULD BE AVAILABLE FOR SUPPORT OF THE ENGINE AFTER PUMP REMOVAL.
- THE SHIPPING WEIGHT OF THE PUMPS RANGES FROM 55 TO 109 POUNDS. TO AVOID PERSONAL INJURY, USE AN OVERHEAD LIFTING DEVICE OR GET ASSISTANCE FROM OTHERS DURING HANDLING THE PUMP.
- A WORN IMPELLER MAY HAVE SHARP EDGES; BE CAREFUL TO AVOID INJURY.

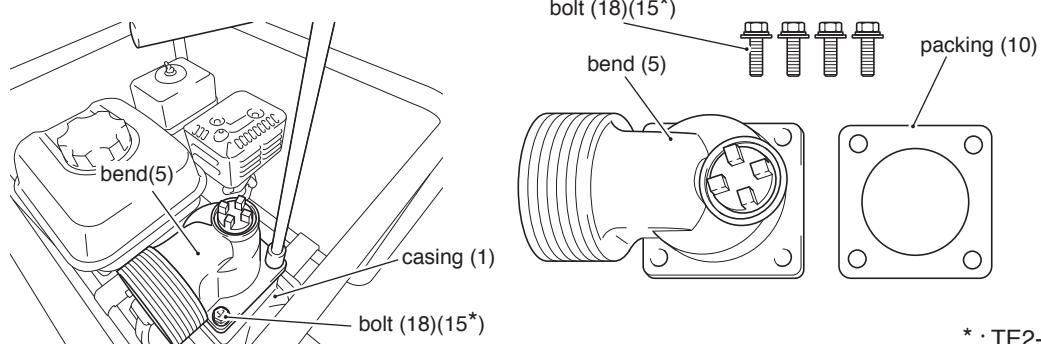
Note: Disassembly procedure for general centrifugal pump models TE3-50HA, TE3-80HA, TE2-100HA and high head centrifugal pump model THP-4070HA are provided separately.

Note: For an exploded view of a respective model, please refer to the **REPLACEMENT PARTS** section (see page 37).

Note: The part number represented in the procedure correspond with the part number provided in the exploded view and the parts list table of **REPLACEMENT PARTS** section. (see page 37).

A. Procedure for Disassembly of the Centrifugal Pump (For models: TE3-50HA, TE3-80HA, TE2-100HA)

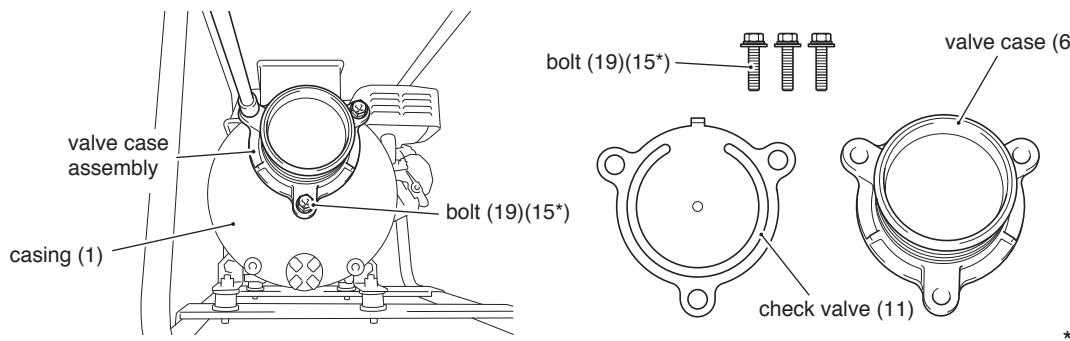
- (a) Place the pump on a plane and stable surface. Unscrew four bolts (18)(15*) used to fasten the discharge bend (5) to the casing (1). As the bolts (18)(15*) are unscrewed, remove the discharge bend (5) along with the packing (10).



* : TE2-100HA

- (b) Place the pump with suction port facing upward. Unscrew the bolts (19)(15*) used to attach the valve case assembly to the casing (1) and remove valve case (6) along with check valve (11).

Note: For the TE2-100HA model, an assembly of a check valve (11) and valve case (6) is attached to the casing (1) with four bolts (15).

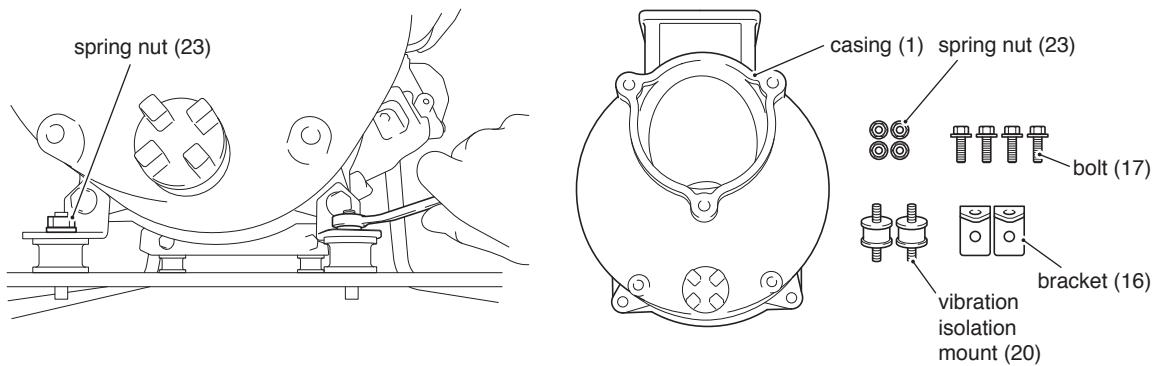
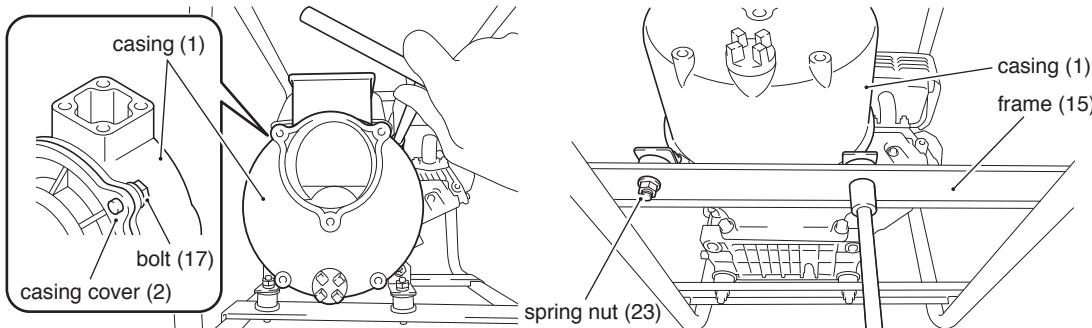


* : TE2-100HA

(c) Removal of the pump casing.

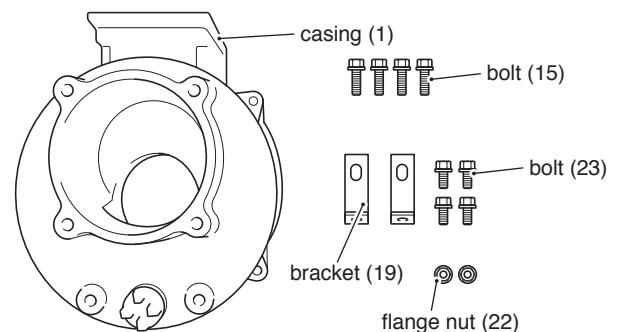
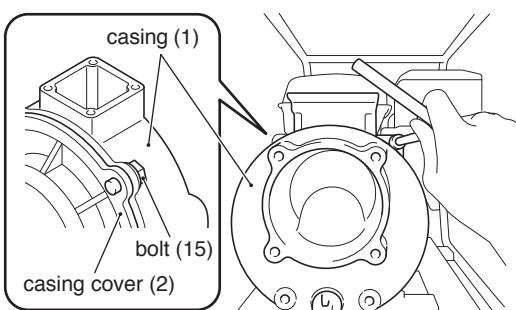
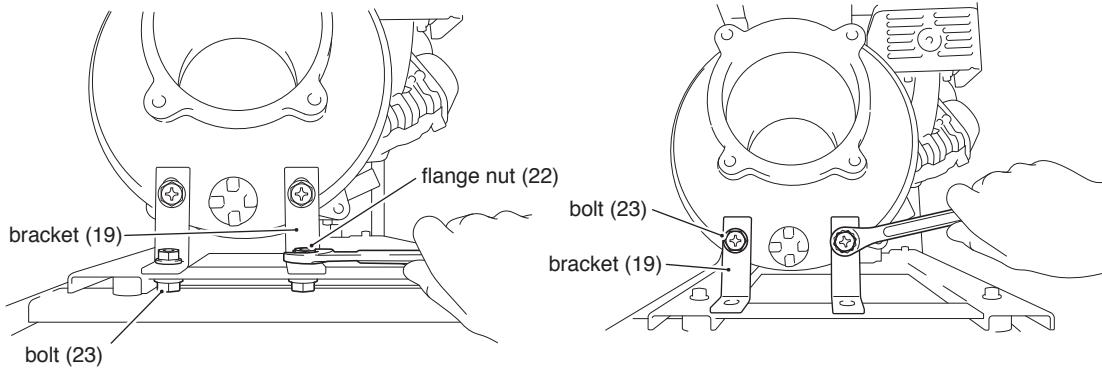
(c-1) For models TE3-50HA, TE3-80HA.

Unscrew four bolts (17) used for fastening casing (1) to the casing cover (2) and four spring nuts (23) used for fastening bracket (16) to the frame (15). Then remove the casing (1), vibration isolation mount (20) and brackets (16).

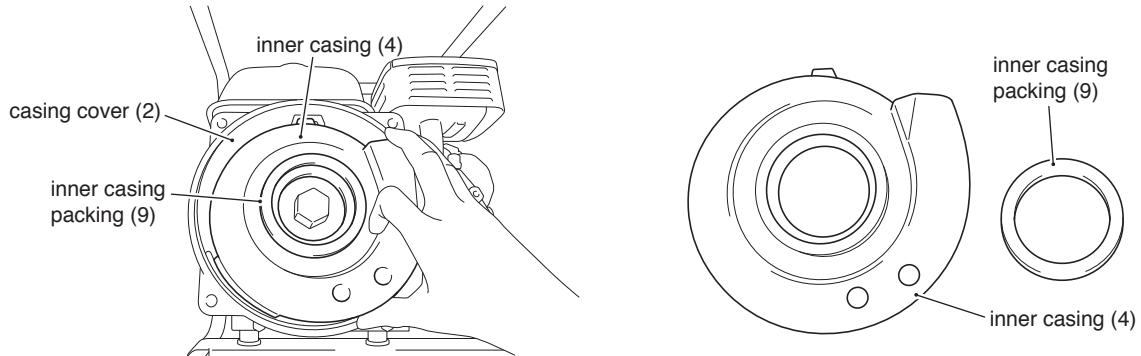


(c-2) For models TE2-100HA.

Unscrew four bolts (15) used for fastening casing (1) to the casing cover (2). Also unscrew other four bolts (23) used for fastening brackets (19). As all bolts are removed, takeout the casing (1) from the casing cover (2).



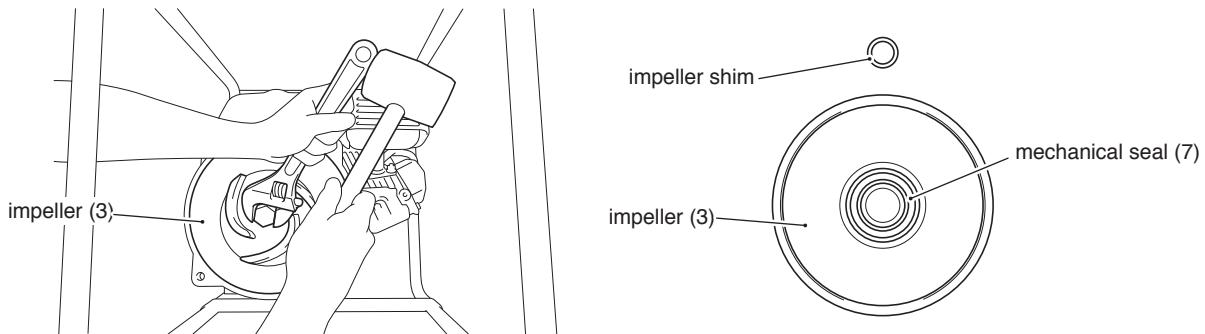
- (d) Remove Inner casing (4) along with inner casing packing (9) from the casing cover (2).



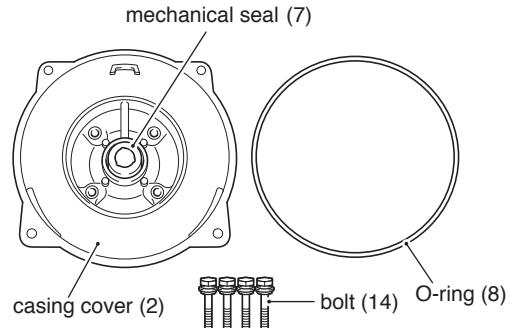
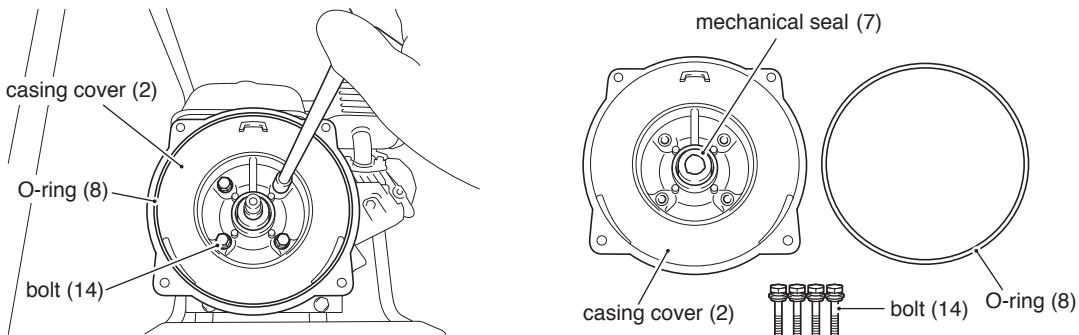
- (e) Unscrew the impeller (3) with a wrench. Use a hard plastic hammer for impacting on the free end of the wrench. As the impeller (3) gets loosened, unscrew it with the hand and remove it along with the mechanical seal (7) rotating part. Also, remove the impeller shim installed on the engine shaft.

Note: *The hexagonal nut-like part on the impeller (3) for tightening or loosening the impeller (3) is not a separate component. It is integrally cast with the impeller (3).*

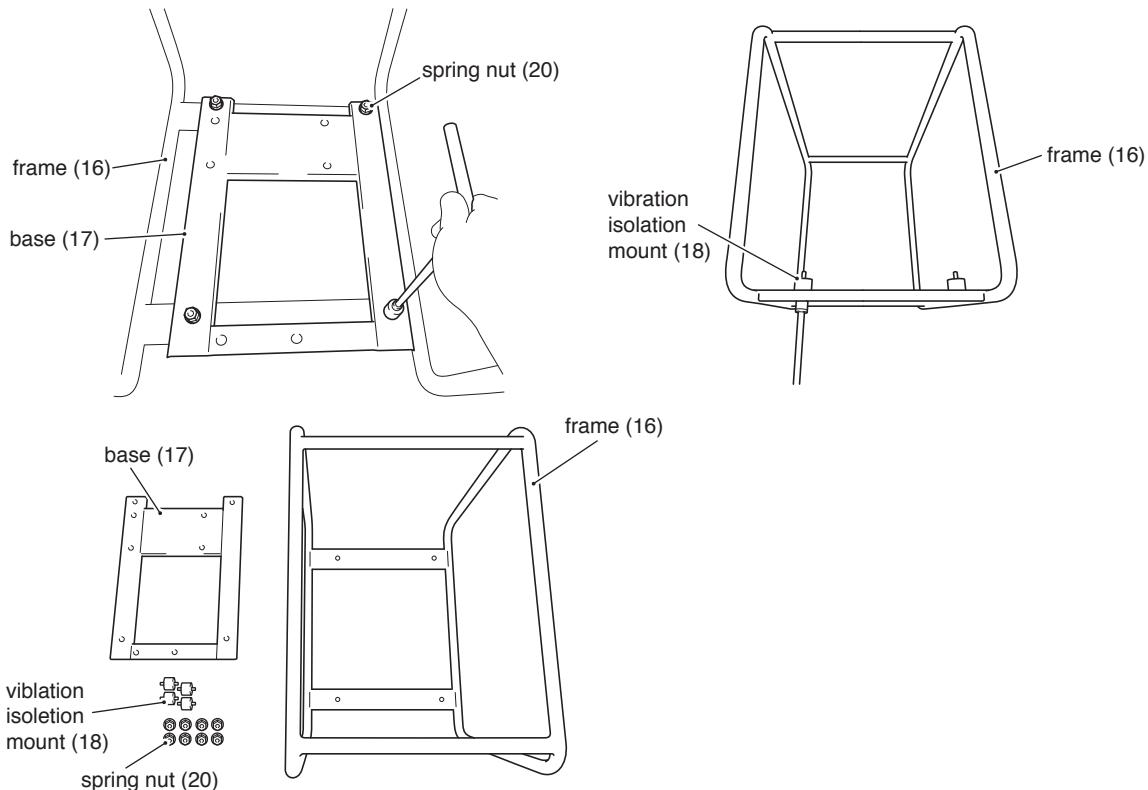
Note: THP-4070HA model does not have an impeller shim.



- (f) Unscrew four bolts (14) used to fasten the casing cover (2) to the engine. As the bolts (14) are unscrewed, remove the casing cover (2) along with a stationary part of the mechanical seal (7) installed at the center bore of the casing cover (2). Refer to Replacement of **Mechanical Seal** for replacing procedure of the mechanical seal (see page 26).

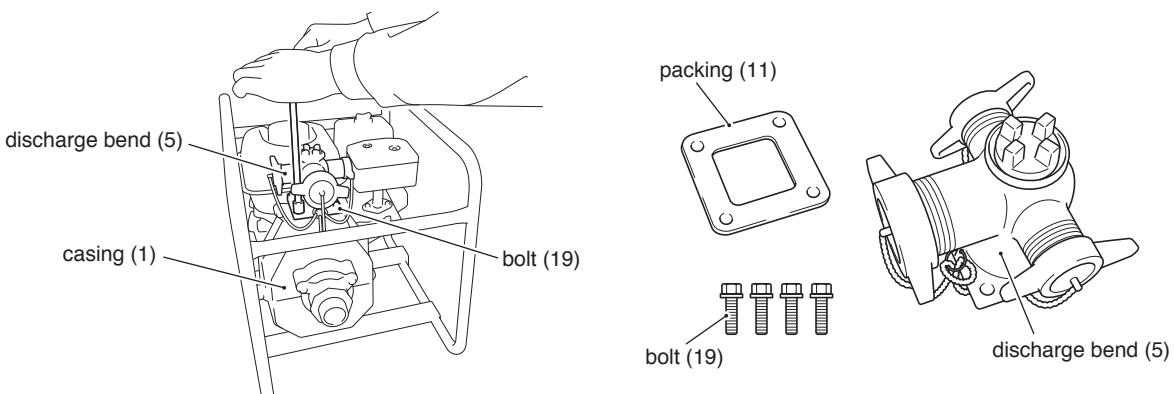


- (g) Removal of pump support base (17) from the frame (16). (This step is applicable for TE2-100HA model Only). Unscrew eight spring nuts (20) used to fasten the base (17) to the frame (16). And then remove the base (17) along with four vibration isolation mounts (18).

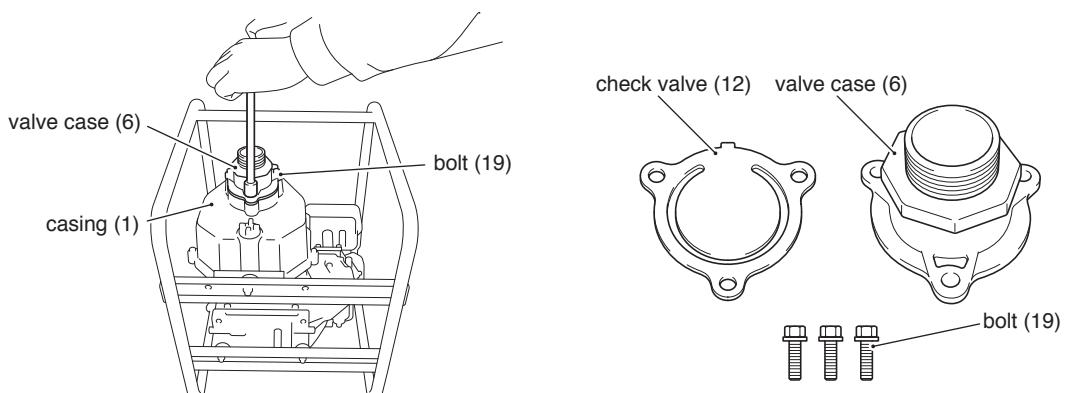


B. Procedure for Disassembly of the Centrifugal Pump (High Head Version: THP- 4070HA)

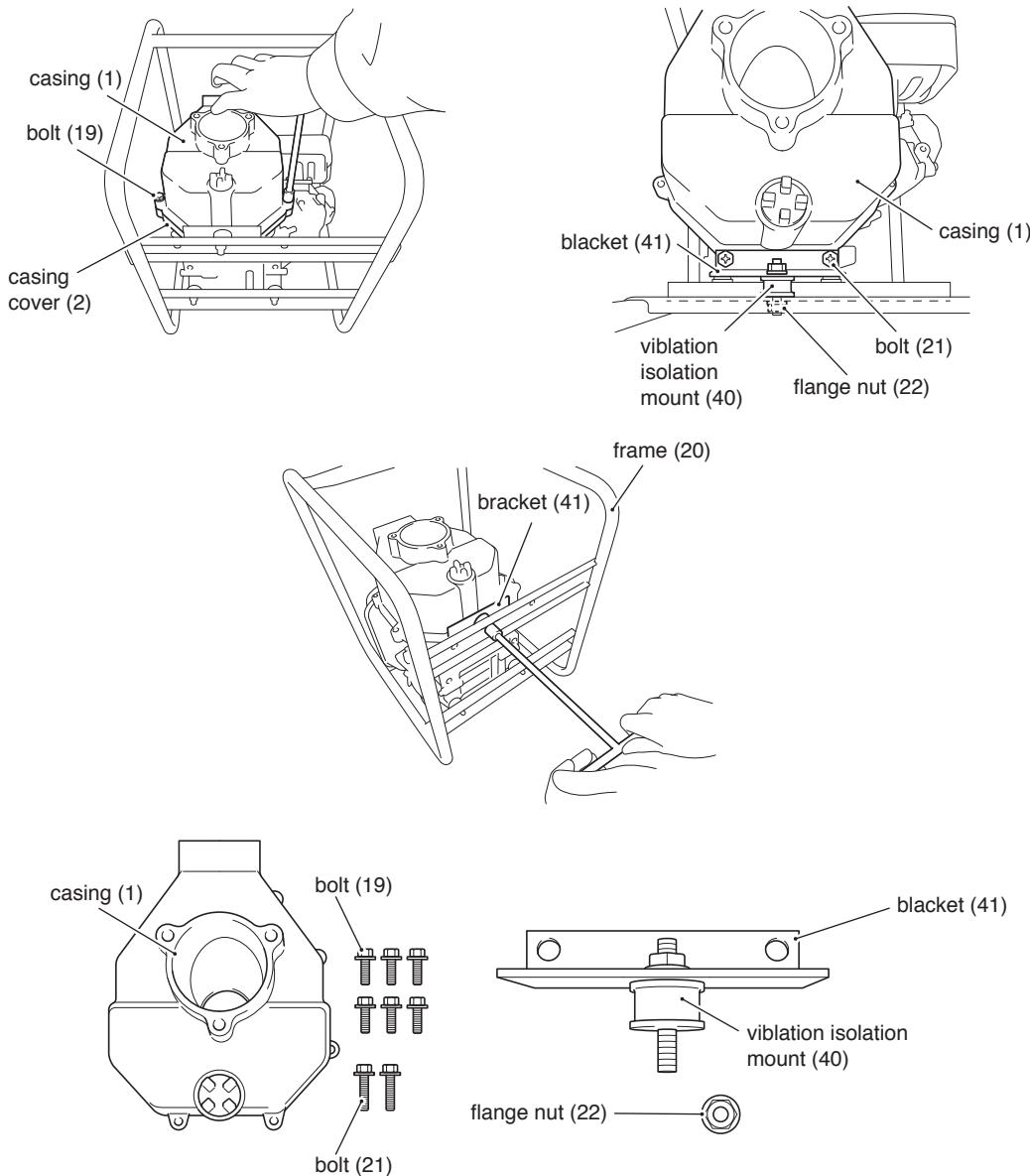
- (a) Place the pump on a plane and stable surface. Unscrew four bolts (19) used to fasten the discharge bend (5) to the casing (1). As the bolts (19) are unscrewed, remove the discharge bend (5) along with its packing (11).



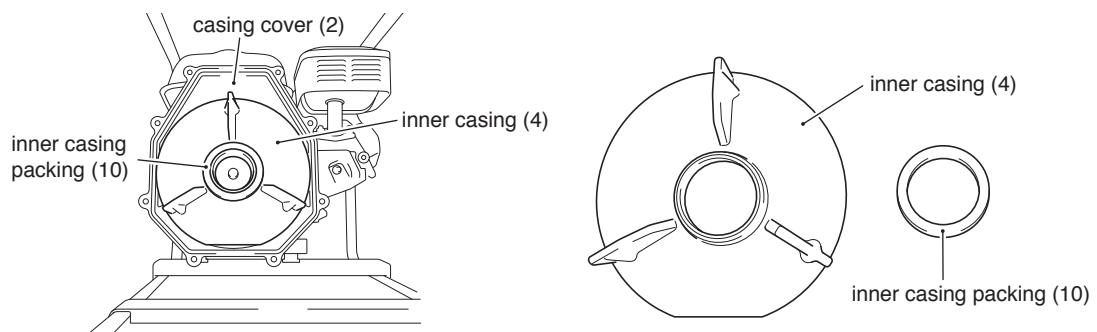
- (b) Place the pump with suction port facing upward.
 (c) Unscrew three bolts (19) to remove the valve case (6) and the check valve (12) from the casing (1).



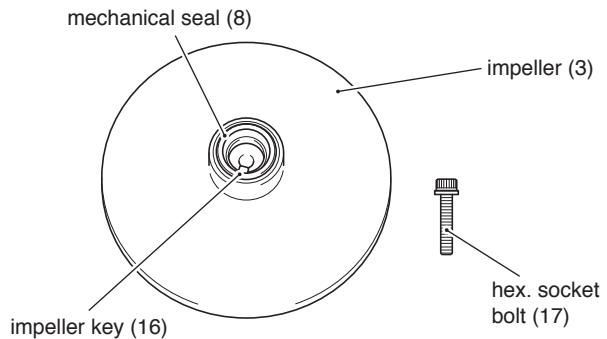
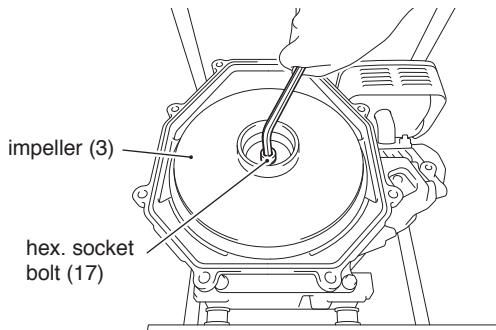
- (d) Unscrew six bolts (19), two bolts (21) and a flange nut (22) used to fasten the pump casing (1) to the casing cover (2) and frame (20). And then remove the casing (1) along with bracket (41) and vibration isolation mount (40).



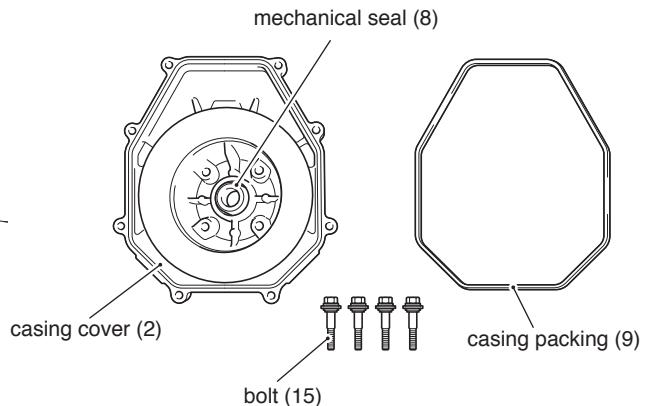
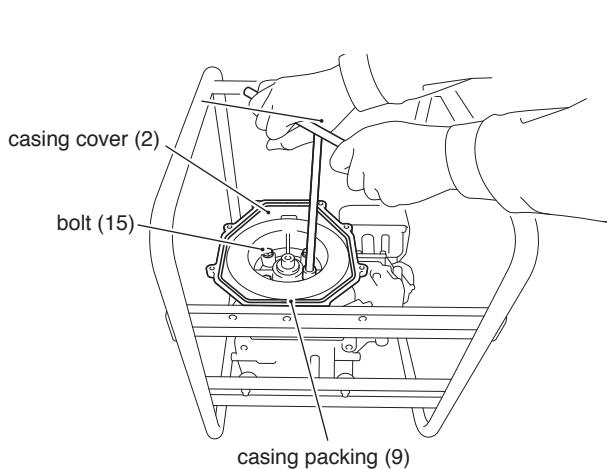
- (e) Remove the Inner casing (4) along with inner casing packing (10) from the casing cover (2).



- (f) Unscrew the hex. socket bolt (17) used to fasten the impeller (3) to the shaft and remove the impeller (3) along with rotating part of the mechanical seal (8). Also make sure that impeller key (16) is taken out. Refer to **Replacement of Mechanical Seal** for replacing procedure of the mechanical seal (see page 26).



- (g) Unscrew the four bolts (15) used to fasten the casing cover (2) to the engine. As the bolts (15) are taken out, remove the casing cover (2) from the engine along with stationary part of the mechanical seal (8) installed at its center bore. Refer to **Replacement of Mechanical Seal** for replacing procedure of the mechanical seal (see page 26).



Replacement of Mechanical Seal

A. Description of the Mechanical Seal

- The mechanical seal consists of two parts: stationary part and rotating part.
- The stationary part of the mechanical seal is installed into the center bore of casing cover. The mechanical seal stationary part cannot be reused once installed.
- The rotating part of the mechanical seal is installed into the center bore of the impeller. The rotating part consists of silicon carbide mating ring and a close-fitting vibration isolation mount. Water is used as an assembly aid when installing the cushion and mating ring.
- It is recommended to replace the mechanical seal at the time of overhaul.

Note: To install or remove the stationary part of the mechanical seal, use a similar jig shown in **Mechanical seal installation/removal jig**.

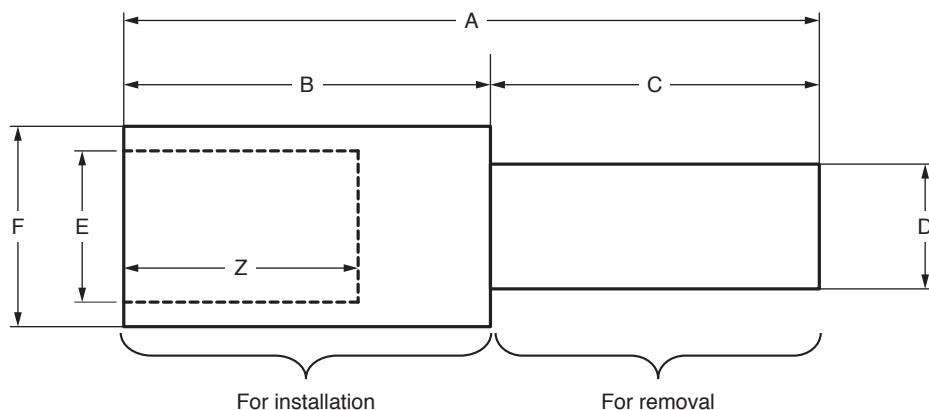
Note: A considerable force of about **800kgf~1000kgf** is required to install or remove the mechanical seal stationary part. Therefore, the use of an arbor press is recommended.

Note: Make sure that the mechanical seal is not scratched or cracked during installation. Clean the sealing faces properly after installing the mechanical seal.

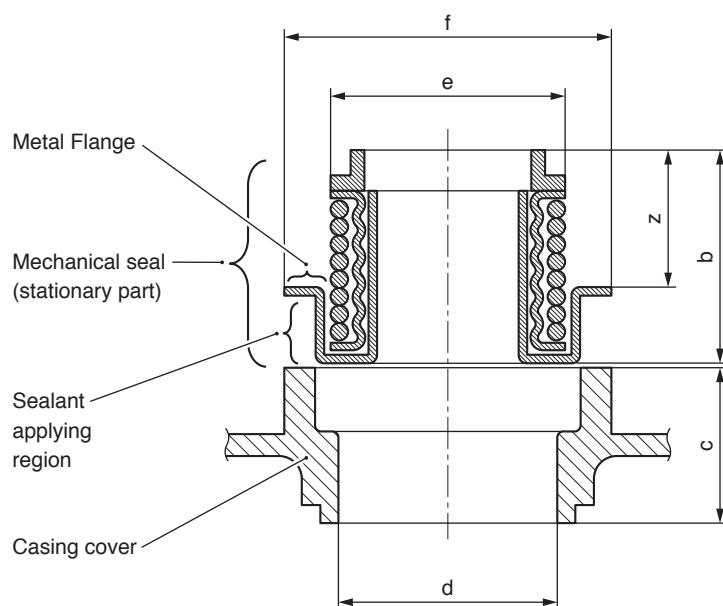
B. Removal of Mechanical Seal

- Disassemble the pump according to the procedure described in **Disassembly of the Centrifugal Pump** (see page 20) to replace the mechanical seal.
- Align "for removal" end of the jig to the mechanical seal stationary part as shown in **Removal of Mechanical seal** on page 27 and then apply force to remove it from the casing cover.
- Use a flat head screwdriver (minus screwdriver) to remove the mechanical seal rotating part fitted into the center bore of the impeller.

Mechanical seal installation/removal jig.



Mechanical seal (Stationary part)



$A = B + C$; Jig total height

$B \approx (\geq b)$; Height equal or greater than the total height of the mechanical seal stationary part.

$C \approx (c+5)$ mm; Height slightly greater than the center hub height of casing cover.

$D \approx (d-2)$ mm; Diameter slightly smaller than the center shaft hole (engine side) of casing cover.

$E \approx (e+2)$ mm; Diameter slightly greater than the outer diameter of sealing component.

$F \approx (f)$; Diameter equal to the outer diameter of metal flange of the stationary part.

$Z \approx (z+5)$ mm; Bore depth slightly greater than the height of sealing face from upper surface of metal flange.

To replace the mechanical seal stationary part installed in the casing cover, a jig with the following dimension is required.

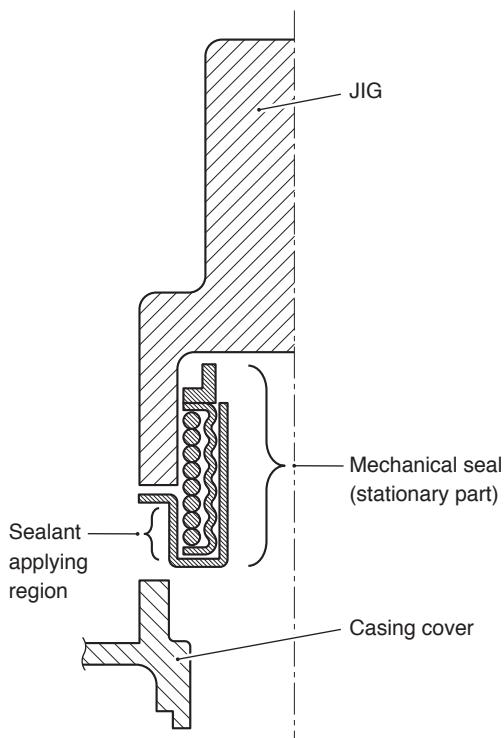
Jig Dimension

Jig Dimensions	Pump models	
	TE3-50HA, TE3-80HA, THP-4070HA	TE2-100HA
A	70 mm (2.757 inch)	80.0 mm (3.148 inch)
B	27.5 mm (1.082 inch)	32.0 mm (1.258 inch)
C	42.5 mm (1.671 inch)	48.0 mm (1.891 inch)
D	$\phi 28.0$ mm (1.102 inch)	$\phi 36.0$ mm (1.417 inch)
E	$\phi 37.5$ mm (1.475 inch)	$\phi 52.0$ mm (2.045 inch)
F	$\phi 43.5$ mm (1.713 inch)	$\phi 57.0$ mm (2.244 inch)
Z	12.5 mm (0.491 inch)	17.0 mm (0.667 inch)

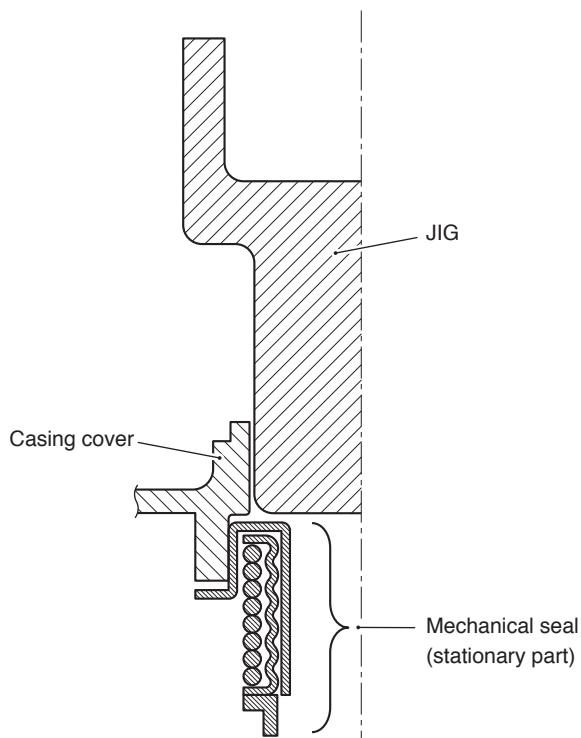
C. Installation of Mechanical Seal

- Clean the center bore of the casing cover where stationary part of the mechanical seal is to be installed. Make sure no traces of old sealant are left.
- Apply a strip of sealant on the outer circumference of the stationary part of the new mechanical seal and then install it into the center bore of the casing cover. Refer to **Installation of Mechanical seal** shown below for the jig alignment.
- Install the rotating part of the new mechanical seal into the center bore provided on the impeller. Make sure that center bore of the impeller is cleaned properly before installation.

Installation of Mechanical seal
(Stationary part)



Removal of Mechanical seal
(Stationary part)



■ Impeller Gap Adjustment (THP-4070HA model is not applicable for impeller gap adjustment)

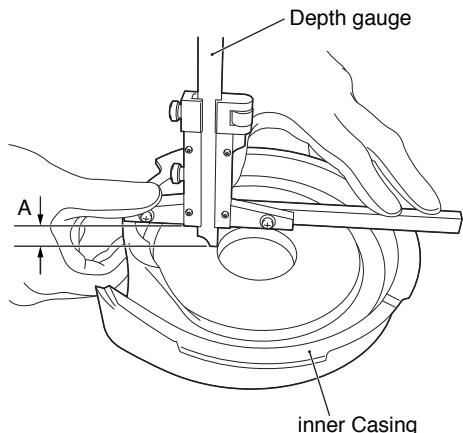
- A. Measure the inner casing depth and impeller height as shown below to figure out the shim thickness required for the clearance between the inner casing and impeller.
- Measure the inner casing depth [A], (refer to **Measuring Inner Casing Depth** shown below).
 - Measure the impeller height [B], (refer to **Measuring Impeller Height** shown below).
 - Subtract the impeller height [B] from inner casing depth [A]. The final value will be the shim thickness necessary for the required impeller gap.

$$\text{A} \text{ _____} - \text{B} \text{ _____} = \text{_____}$$

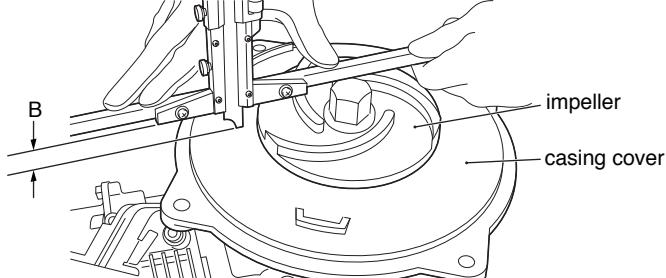
(Depth of Inner Casing) (Height of Installed Impeller) (Shim Thickness)

- B. Select a shim or combination of shims from the **Shim Dimension Table** shown below to get an impeller gap of **0.508 mm to 1.016 mm** (0.020 inch to 0.040 inch).

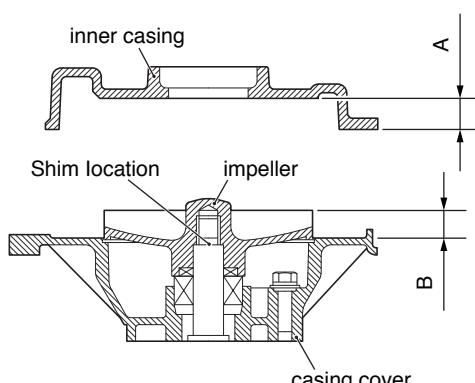
Measuring Inner Casing Depth



Measuring Impeller Height



Location of a shim



Shim Dimension Table

Model Number	Shim Thickness	OD x ID	Part Number
TE3-50H	0.3 mm (0.012 Inch)	18 x 14 mm (0.709 x 0.551 inch)	203100040
	0.6 mm (0.024 Inch)		203100041
	1.0 mm (0.039 Inch)		203100042
TE3-80HA	0.3 mm (0.012 Inch)	20x18 mm (0.787x0.709 inch)	203100050
	0.6 mm (0.024 Inch)		203100051
	1.0 mm (0.039 Inch)		203100052
TE2-100HA	0.3 mm (0.012 Inch)	24.2x20.0 mm (0.952x0.787 inch)	203100070
	0.6 mm (0.024 Inch)		203100071
	1.6 mm (0.039 Inch)		203100072

* OD = Outside Diameter / ID = Inside Diameter.

Assembly of the Centrifugal Pump

⚠ WARNING IT IS RECOMMENDED THAT THE PUMP BE ASSEMBLED AND DISASSEMBLED ON A BENCH OR SIMILAR STRUCTURE WITH THE ENGINE SHROUD FACING DOWN. IN ADDITION, WOODEN BLOCKS IN A VARIETY OF LENGTHS AND THICKNESS SHOULD BE AVAILABLE FOR SUPPORT OF THE ENGINE AFTER PUMP REMOVAL.

Note: Assembly procedure for general centrifugal pump models TE3-50HA, TE3-80HA, TE2-100HA and high head centrifugal pump model THP-4070HA are provided separately.

Note: For an exploded view of a respective model, please refer to the **REPLACEMENT PARTS** section (see page 37).

Note: The part number represented in the procedure correspond with the part number provided in the exploded view and the parts list table of **REPLACEMENT PARTS** section. (see page 37).

Note: Make sure that the mechanical seal is not scratched or cracked. Clean the sealing faces properly before assembling the pump.

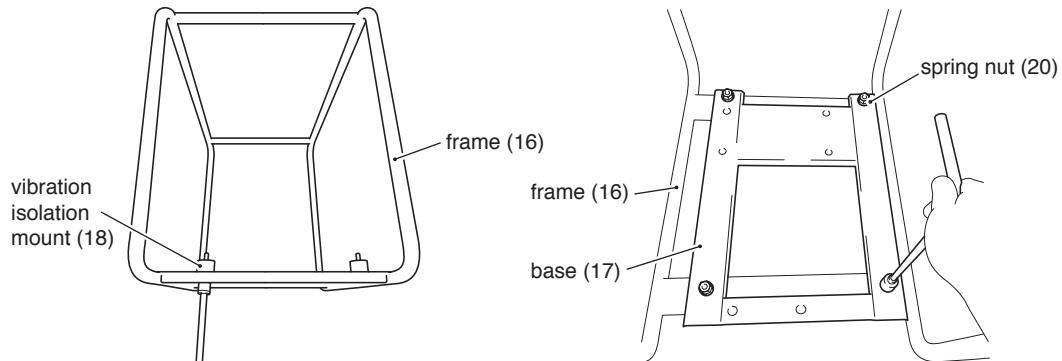
Note: Make sure that the check valve is not scratched or torn.

Note: Use wooden blocks to support or stabilize the pump during assembly.

A. Procedure for Assembly of the Centrifugal Pump (For Models: TE3-50HA, TE3-80HA, TE2-100HA)

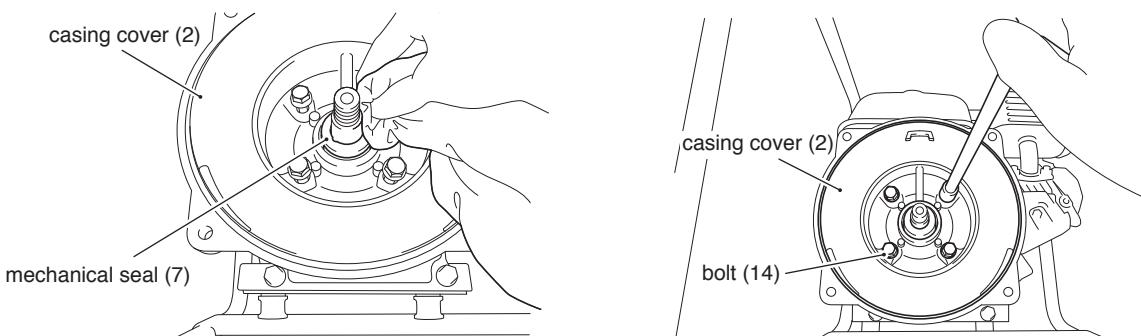
- Assembly of the pump support base (17) to the frame (16). (This step is applicable for TE2-100HA model Only)
Install the four vibration isolation mounts (18) to the frame (16). Align holes on the base (17) to the installed vibration isolation mounts (18) and tighten with spring nuts (20) securely.

Note: Tightening the nuts (20) on the top side of the frame may loosen the nuts (20) on the underside of the frame. Therefore, make sure that all the nuts (20) are tightened securely.

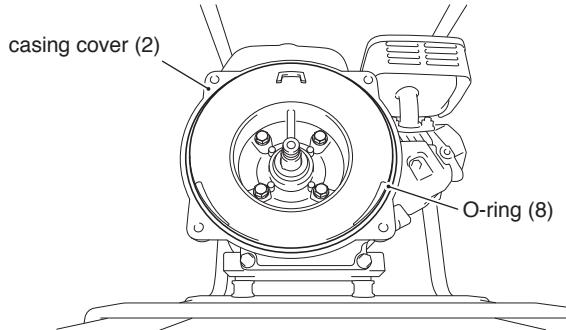


- Install stationary part of the mechanical seal (7) according to the instructions provided in **Replacement of Mechanical Seal** section (see page 26).
- Align the casing cover (2) to the engine and fasten securely with the four bolts (14).

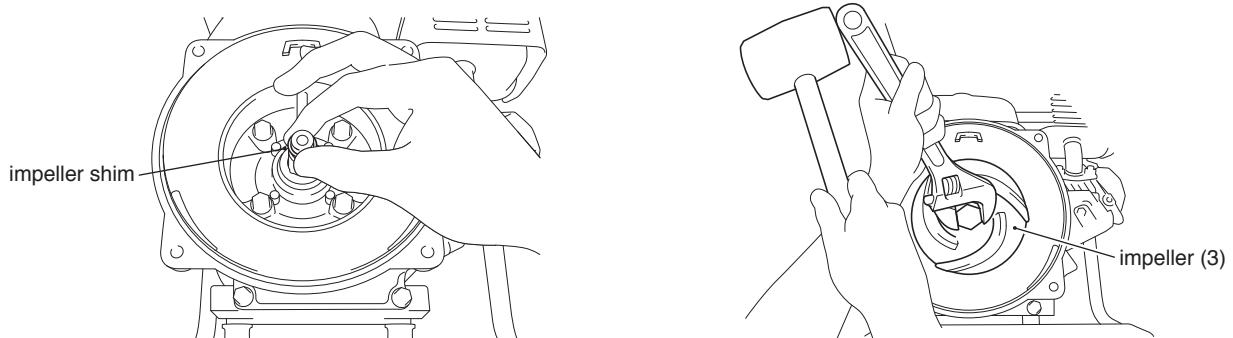
Note: Tighten the bolts (14) simultaneously in a diagonal pattern to prevent misalignment of the casing cover (2).



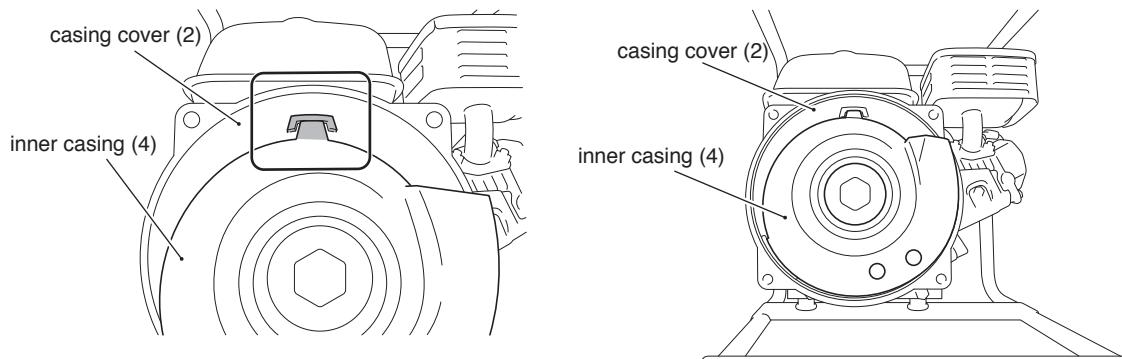
- (d) Install the O-ring (8) to the casing cover (2). Ensure that the O-ring (8) is properly seated on casing cover (2). Also make sure there are no scratches or tears on the O-ring (8).



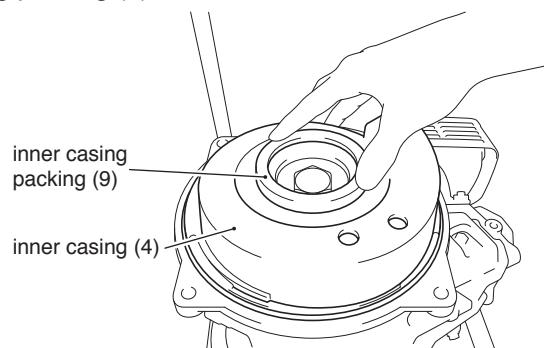
- (e) Install rotary part of the mechanical seal (7) into center bore of the impeller (3).
 (f) Place the impeller shim(s) on the engine shaft. To figure out the number of shims required, refer to the **Impeller Gap Adjustment** section (see page 28).
 (g) Install the impeller (3) to the shaft by screwing it on. As the impeller (3) becomes difficult to rotate by the hand, use the wrench to tighten securely.



- (h) Install the inner casing (4) by aligning its protruded part with that on the casing cover (2). Make sure the inner casing (4) is not levitating after the installation.



- (i) Install inner casing packing (9) to the inner casing (4). Make sure there are no scratches or tears on the inner casing packing (9).

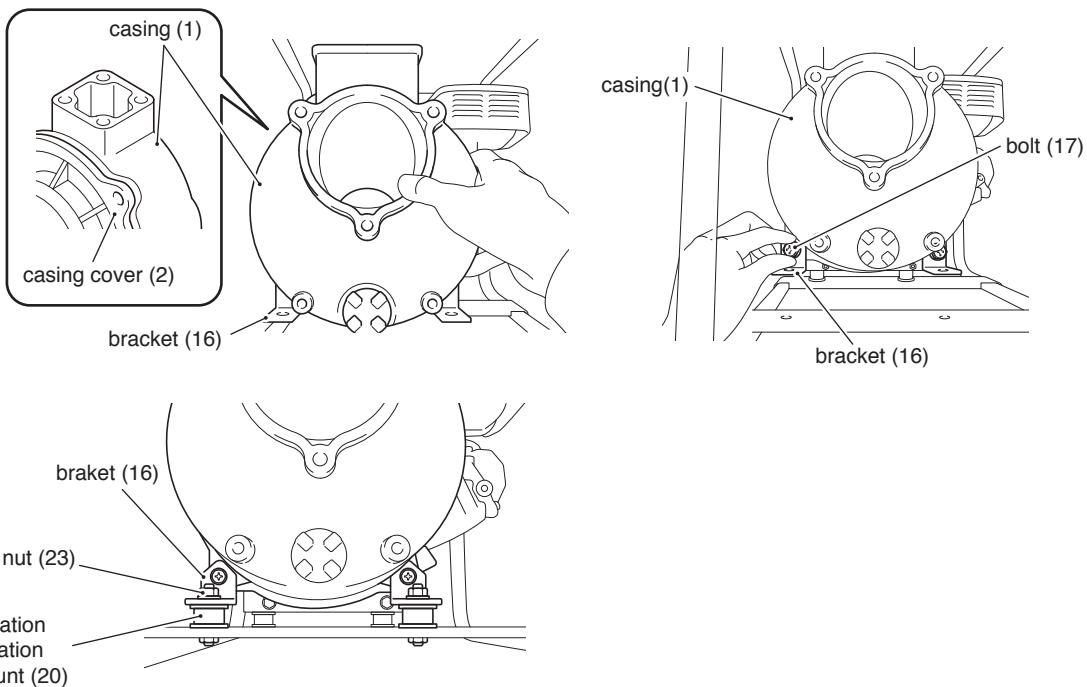


- (j) Installation of pump Casing (1) to the casing cover (2).

Note: Make sure the O-ring (8) is properly seated on the casing cover (2) while assembling the casing (1) to the casing cover (2).

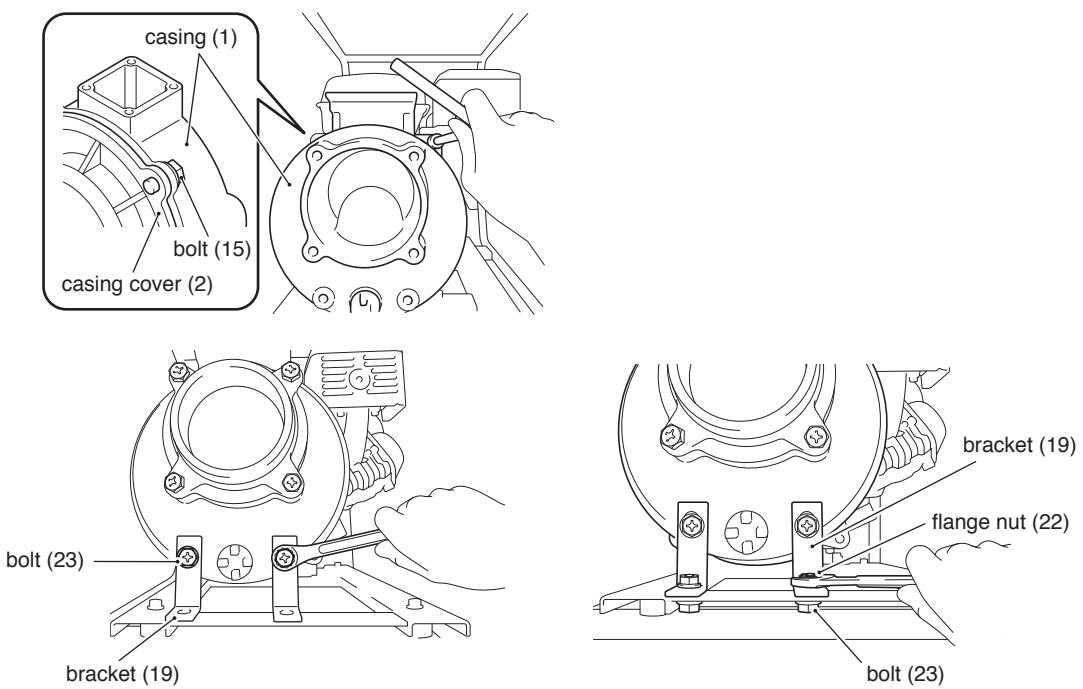
(i-1) For model TE3-50HA, TE3-80HA.

Align the casing (1) with the casing cover (2). Align the hole provided on the brackets (16) with that on the lower side of the casing (1). And then tighten securely with four bolts (17). After that, align the holes on brackets (16) with vibration isolation mounts (20) and tighten securely with the spring nuts (23).



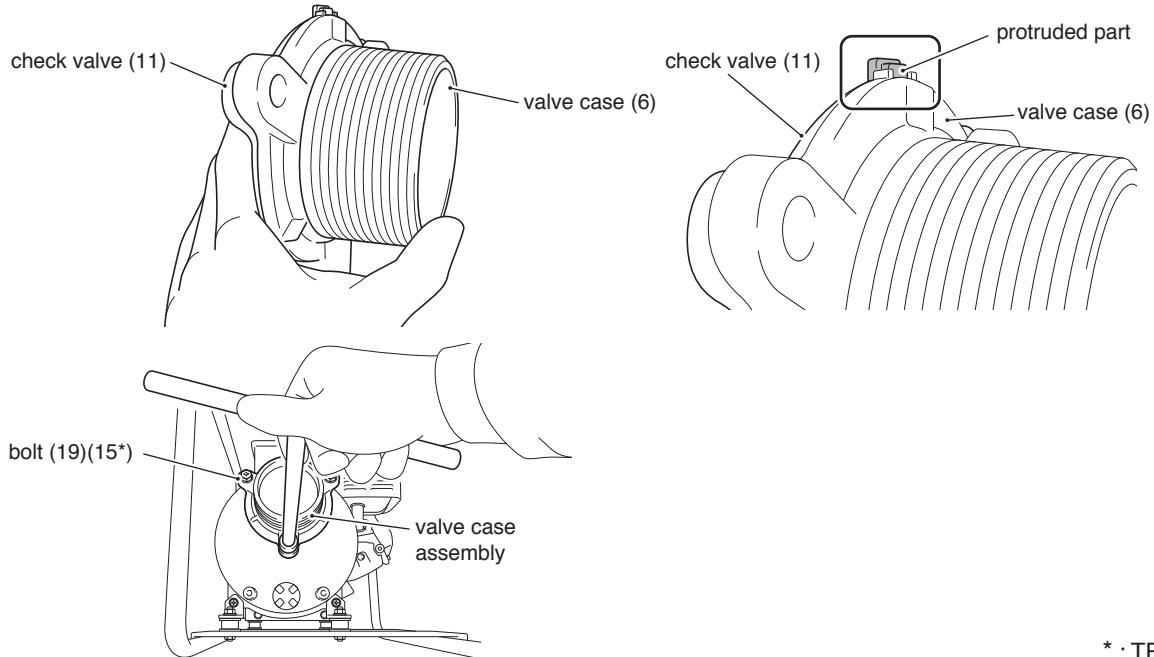
(i-2) For model TE2-100HA.

Align the casing (1) with the casing cover (2) and then tighten securely with four bolts (15). Attach the two brackets (19) to the casing (1). Then fix the casing (1) to the frame (16) with bolts (23) and flange nuts (22).



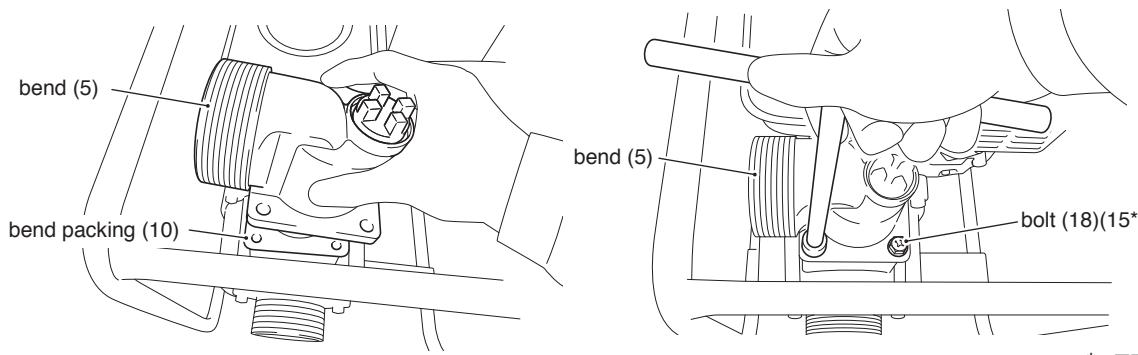
- (k) Align the check valve (11) to the valve case (6) with a protruded part on the check valve (11) facing towards the valve case (6). Also make sure that the protruded part of check valve (11) is aligned with that on the valve case (6).
- (l) Attach an assembly of check valve (11) and valve case (6) to the casing (1) and tighten with bolts (19) (15*). Make sure that the protruded part on check valve (11) is located on the upper side of the pump.

Note: For the model TE2-100HA, an assembly of a check valve (11) and valve case (6) is attached to the casing (1) with four bolts (15).



* : TE2-100HA

- (m) Align the pump bend packing (10) to discharge port of the casing (1). Then place the discharge bend (5) over the bend packing (10) and tighten with four bolts (18)(15*). Make sure that the pump bend packing (10) has no scratches or tears.

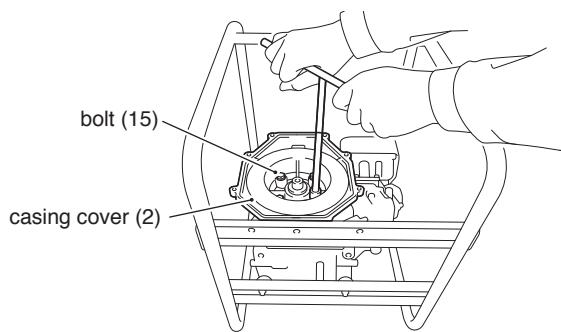
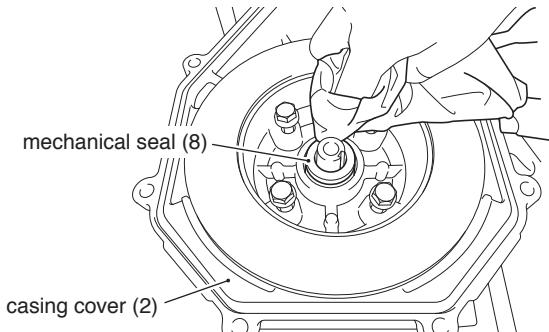


* : TE2-100HA

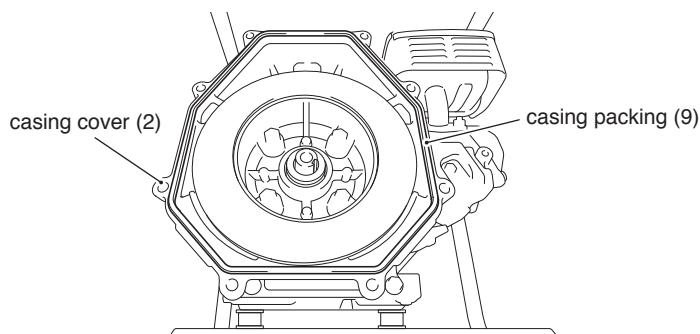
B. Procedure for Assembly of the Centrifugal Pump (High Head Version: THP- 4070HA).

- Install stationary part of the mechanical seal (8) to the casing cover (2) according to the instructions provided in **Replacement of Mechanical Seal** section (see page 26).
- Align the casing cover (2) to engine and tighten securely with the bolts (15).

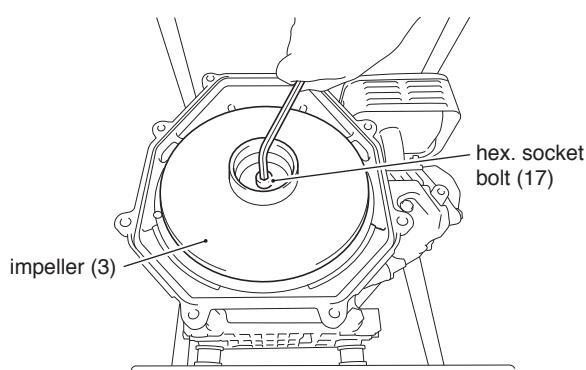
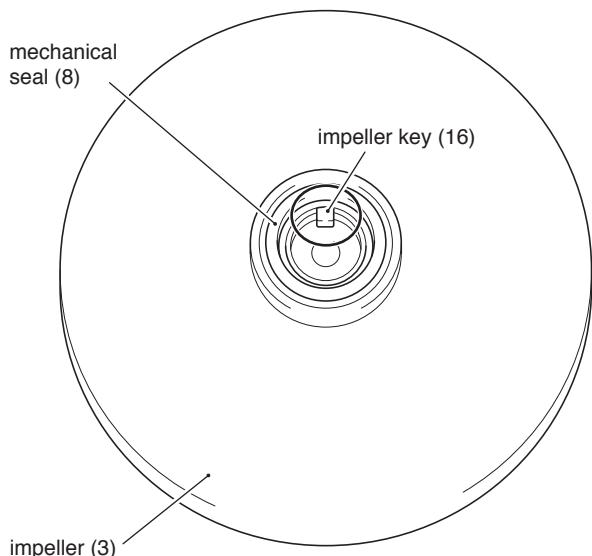
Note: Tighten the bolts (15) simultaneously in a diagonal pattern to prevent misalignment of the casing cover (2).



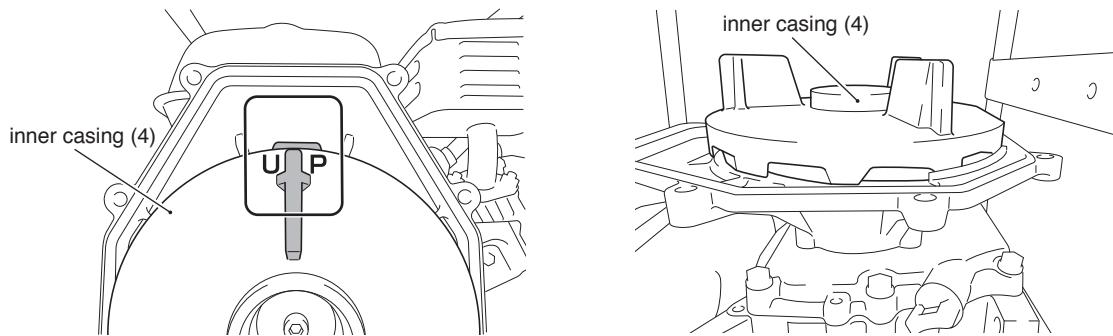
- Install the pump casing packing (9) to the groove on the casing cover (2). Ensure that the packing (9) is seated properly in groove of the casing cover (2). Also make sure that there are no scratches or tears on the packing (9).



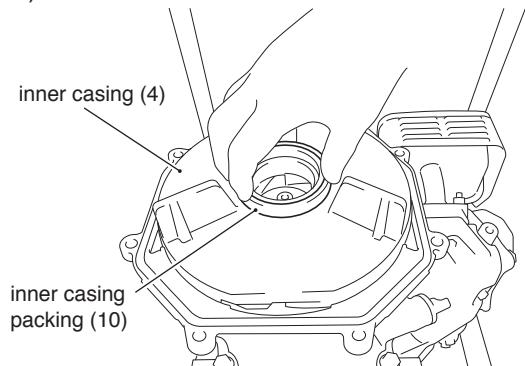
- Check for scratches or cracks on mechanical seal (8) rotary part, clean the sealing face properly and install into the center bore of the impeller (3).
- Place the impeller key (16) on the key seat of the impeller (3).
- Install the impeller (3) by aligning the impeller key (16) with a key seat on the shaft and tighten securely with hex. socket bolt (17).



- (g) Install the inner casing (4) by positioning the embossed letter UP on upper side of the pump. Make sure the inner casing (4) is not levitating after the installation.



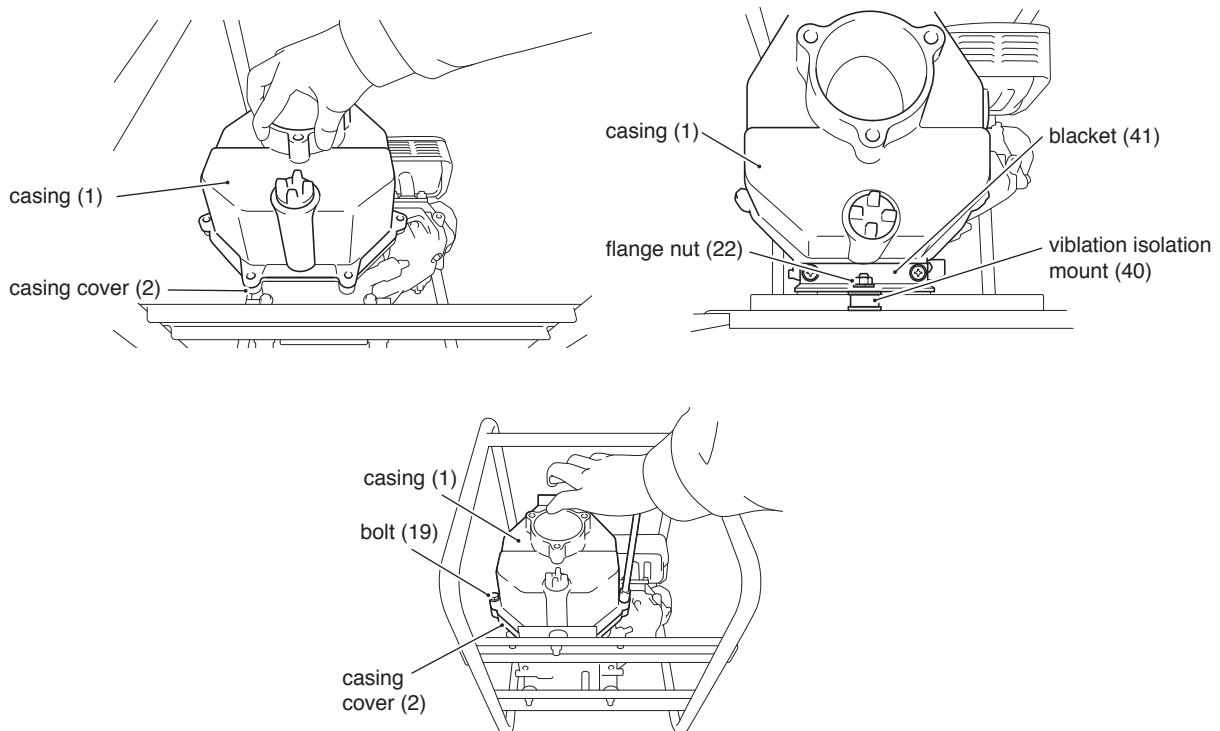
- (h) Install inner casing packing (10) to the inner casing (4). Make sure there are no scratches or tears on the packing (10).



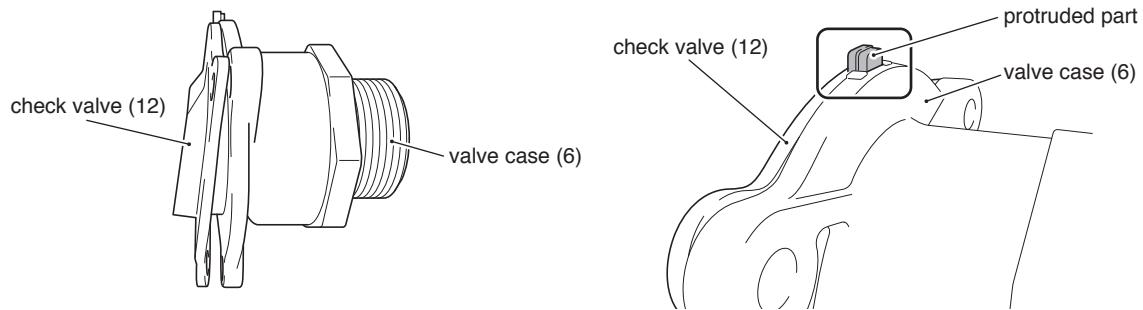
- (i) Align the pump casing (1) to the casing cover (2). Similarly, align the Bracket (41) to the lower side of the pump casing (1). After aligning the components, fix the Bracket (41) to the frame with vibration isolation mount (40) and flange nuts (22). And then tighten the pump casing (1) to the casing cover (2).

Note: *Make sure the pump casing packing (9) is properly seated on the groove of casing cover while assembling the pump casing (1).*

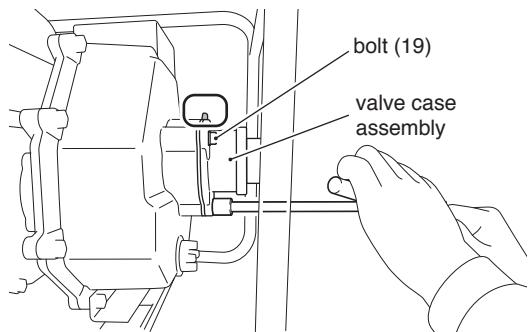
Note: *After securely tightening the pump casing (1), make sure that there is no physical contact between the impeller (3) and the inner casing (4) by pulling the starter handle slowly.*



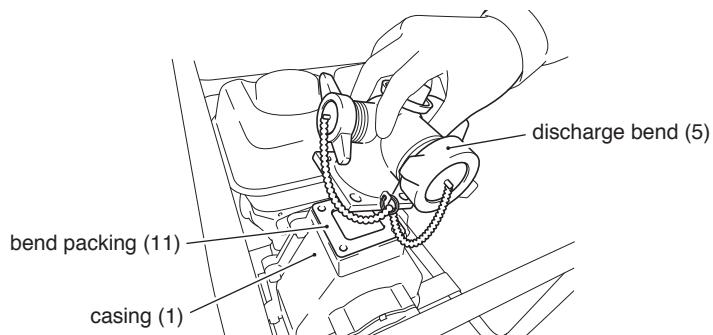
- (j) Align check valve (12) to valve case (6) with a protruded part on check valve facing towards valve case (6).



- (k) Attach the assembly of check valve and valve case to the pump casing (1) and tighten securely. Make sure that the protruded part on check valve (11) is located on the upper side of the pump.



- (l) Align the pump bend packing (11) to the discharge port of the casing (1). Then place the discharge bend (5) over the bend packing (11) and tighten securely. Make sure that the pump bend packing (11) has no scratches or tears.



7 STORAGE INSTRUCTIONS

Note: REFER TO THE HONDA ENGINE OWNER'S MANUAL FOR OTHER STORAGE REQUIREMENTS AND SAFETY INFORMATION.

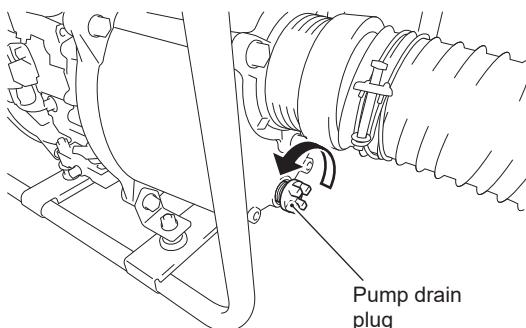
Procedure for Storing the Pump

WARNING

- TO AVOID SEVERE BURNS OR FIRE HAZARDS, LET THE ENGINE COOL BEFORE TRANSPORTING OR STORING INDOORS.
- WHEN TRANSPORTING THE PUMP, KEEP THE ENGINE IN UPRIGHT POSITION TO PREVENT FUEL SPILLAGE. FUEL VAPOR OR SPILLED FUEL MAY IGNITE IN THE PRESENCE OF SPARK.
- IF YOUR PUMP WILL BE STORED WITH GASOLINE IN THE FUEL TANK AND CARBURETOR, IT IS IMPORTANT TO REDUCE THE HAZARD OF GASOLINE VAPOR IGNITION. SELECT A WELL-VENTILATED STORAGE AREA AWAY FROM ANY APPLIANCE THAT OPERATES WITH THE FLAME, SUCH AS FURNACE, WATER HEATER, OR CLOTHES DRYER. ALSO AVOID ANY AREA WITH A SPARK-PRODUCING ELECTRIC MOTOR, OR WHERE POWER TOOLS ARE OPERATED.

- A. The following instructions should be followed before storing the pump for 6 months or longer.
 - (a) Make sure that the fuel tank is drained completely. Fuel left in the tank will deteriorate, which may cause difficulty in the engine starting.
 - (b) Remove the carburetor float chamber and drain the carburetor.
 - (c) Change the engine oil.
 - (d) Clean the pump thoroughly with oiled cloth. Spray with preservative if available.
NEVER USE WATER TO CLEAN THE PUMP!
 - (e) Drain the pump casing and flush it with clean water. Allow the complete draining of clean water and then reinstall the pump drain plug securely.

Pump Chamber Draining
(Model shown: TE3-80HA)



- (f) Check all nuts, bolts, and other fasteners for looseness and tighten them if necessary.
- (g) Pull starter handle until resistance is felt and leave it to that position.
- (h) Store the pump in a well-ventilated, low humidity area to prevent rust and corrosion.

8 | REPLACEMENT PARTS

Introduction

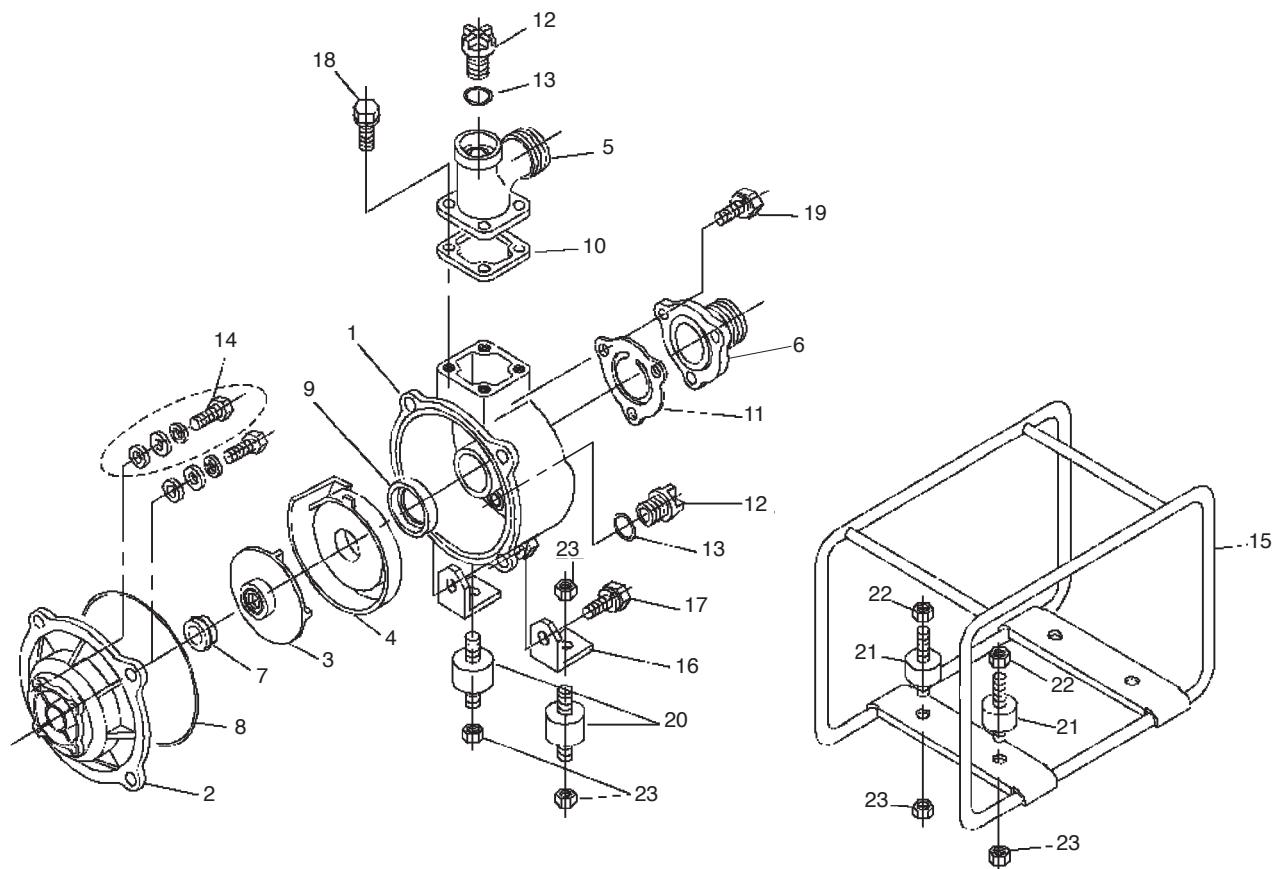
This section provides exploded view illustrations for the Centrifugal pumps. Additionally, this section also provides the parts list including parts number, description, size/specifications, and quantity. The part numbers shown in the illustrations correspond with the part numbers in the parts list table.

Ordering Parts

Order replacement parts from:

Tsurumi (America), Inc.
1625 Fullerton Court,
Glendale Heights, IL 60139
Tel : 1-888-878-7864
Fax : 1-630-766-6445
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Exploded View - Model TE3-50HA Centrifugal Pump

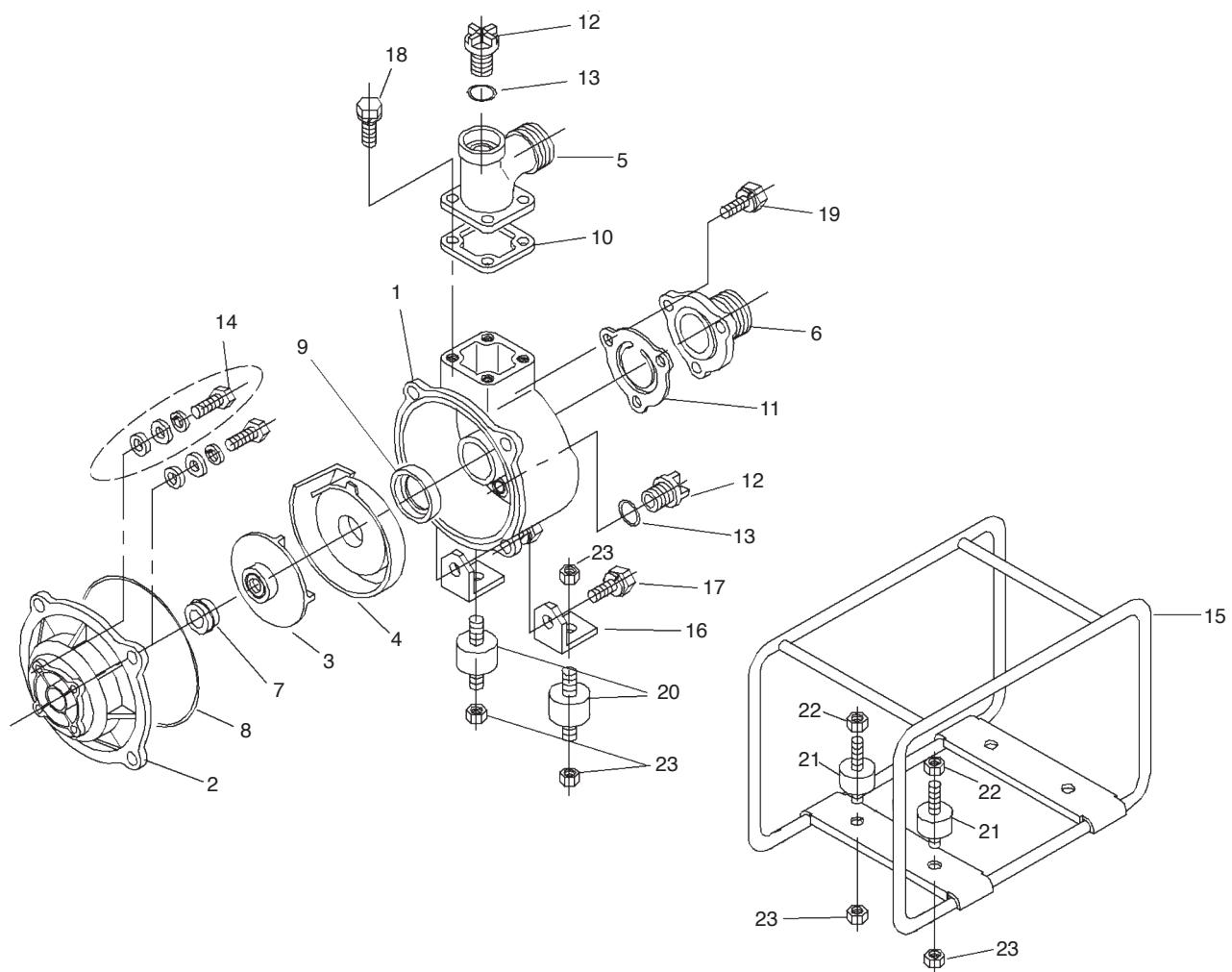


Parts List - Model TE3-50HA Centrifugal Pump

Ref. No.	Parts No.	Description	Qty
	ENGINE	Honda GX120	
1	200200146	Casing	1
2	200200772	Casing Cover	1
3	200210110	Impeller	1
4	200210010	Inner Casing	1
5	200200611	Bend (2" NPT)	1
6	200200231	Valve Case (2" NPT)	1
7	201100051	Mechanical Seal	1
8	200800180	O-Ring, Casing	1
9	200900240	Packing, Inner Casing	1
10	200900170	Packing, Bend	4
11	200900120	Check Valve	1
12	200500040	Plug Assy	2
13	200800020	O-Ring (P-24)	(2)
14	203000101	Casing Bolt Assy (M8x50)	4
15	200100140	Frame	1
16	200300180	Bracket	2
17	203000800	Bolt, Hex (M10x30SW)	4
18	203000041	Bolt, Hex (M8x25SW)	4
19	203000041	Bolt, Hex (M8x25SW)	3
20	200900370	Vibration isolation Mount (Cushion, Rubber (P))	2
21	200900410	Vibration Isolation Mount (Cushion, Rubber (E/G))	2
22	203200050	Flange Nut (M8)	2
23	203200030	Spring Nut (M8)	6

• For impeller shim part code, please refer to the Shim Dimension Table (see page 28)
 • Contact HONDA distributor for replacement of the engine parts.
 • Contact the TSURUMI pump dealer instead of HONDA distributors for the replacement of the crankshaft. (Crankshaft of the engine has a special metric thread)
 • Plug Assy (12) includes O-ring (13), so users do not have to order O-ring (13) separately if the Plug Assy (12) is being ordered.

Exploded View - Model TE3-80HA Centrifugal Pump

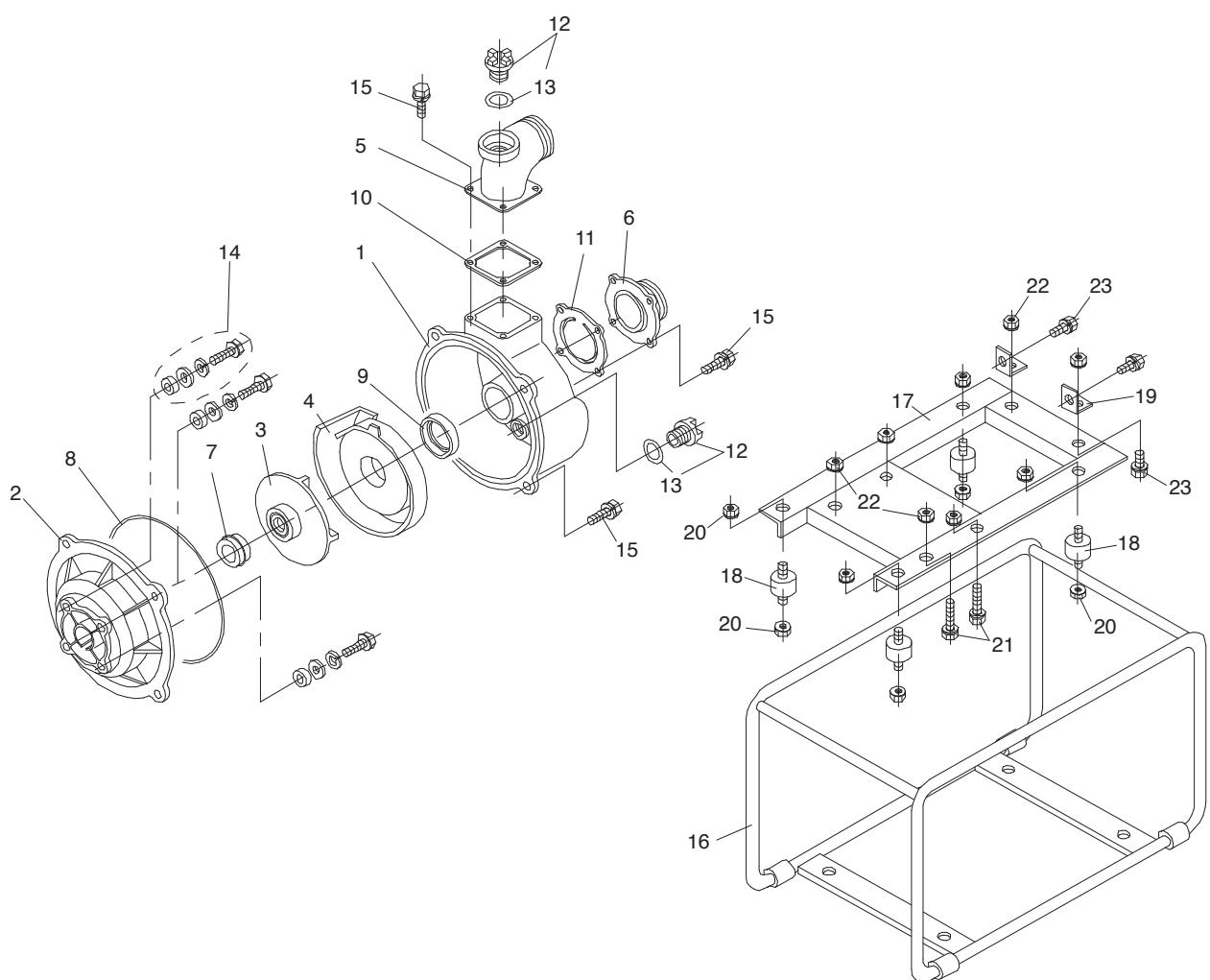


Parts List - Model TE3-80HA Centrifugal Pump

Ref. No.	Parts No.	Description	Qty
	ENGINE	Honda GX160	
1	200200186	Casing	1
2	200200772	Casing Cover	1
3	200210180	Impeller	1
4	200210020	Inner Casing	1
5	200200620	Bend (3" NPT)	1
6	200200600	Valve Case (3" NPT)	1
7	201100051	Mechanical Seal	1
8	200800180	O-Ring, Casing	1
9	200900180	Packing, Inner Casing	1
10	200900190	Packing, Bend	1
11	200900110	Check Valve	1
12	200500040	Plug Assy	2
13	200800020	O-Ring (P-24)	(2)
14	203000101	Casing Bolt Assy (M8x50)	4
15	200100280	Frame	1
16	200300180	Bracket	2
17	203000800	Bolt, Hex (M10x30SW)	4
18	203000810	Bolt, Hex (M8x25SW)	4
19	203000820	Bolt (M8x30SW)	3
20	200900370	Vibration isolation Mount (Cushion, Rubber(P))	2
21	200900410	Vibration Isolation Mount (Cushion, Rubber(E/G))	2
22	203200050	Flange Nut (M8)	2
23	203200030	Spring Nut (M8)	6

• For impeller shim part code, please refer to the Shim Dimension Table (see page 28)
 • Contact HONDA distributor for replacement of the engine parts.
 • Contact the TSURUMI pump dealer instead of HONDA distributors for the replacement of the crankshaft. (Crankshaft of the engine has a special metric thread)
 • Plug Assy (12) includes O-ring (13), so users do not have to order O-ring (13) separately if the Plug Assy (12) is being ordered.

Exploded View - Model TE2-100HA Centrifugal Pump

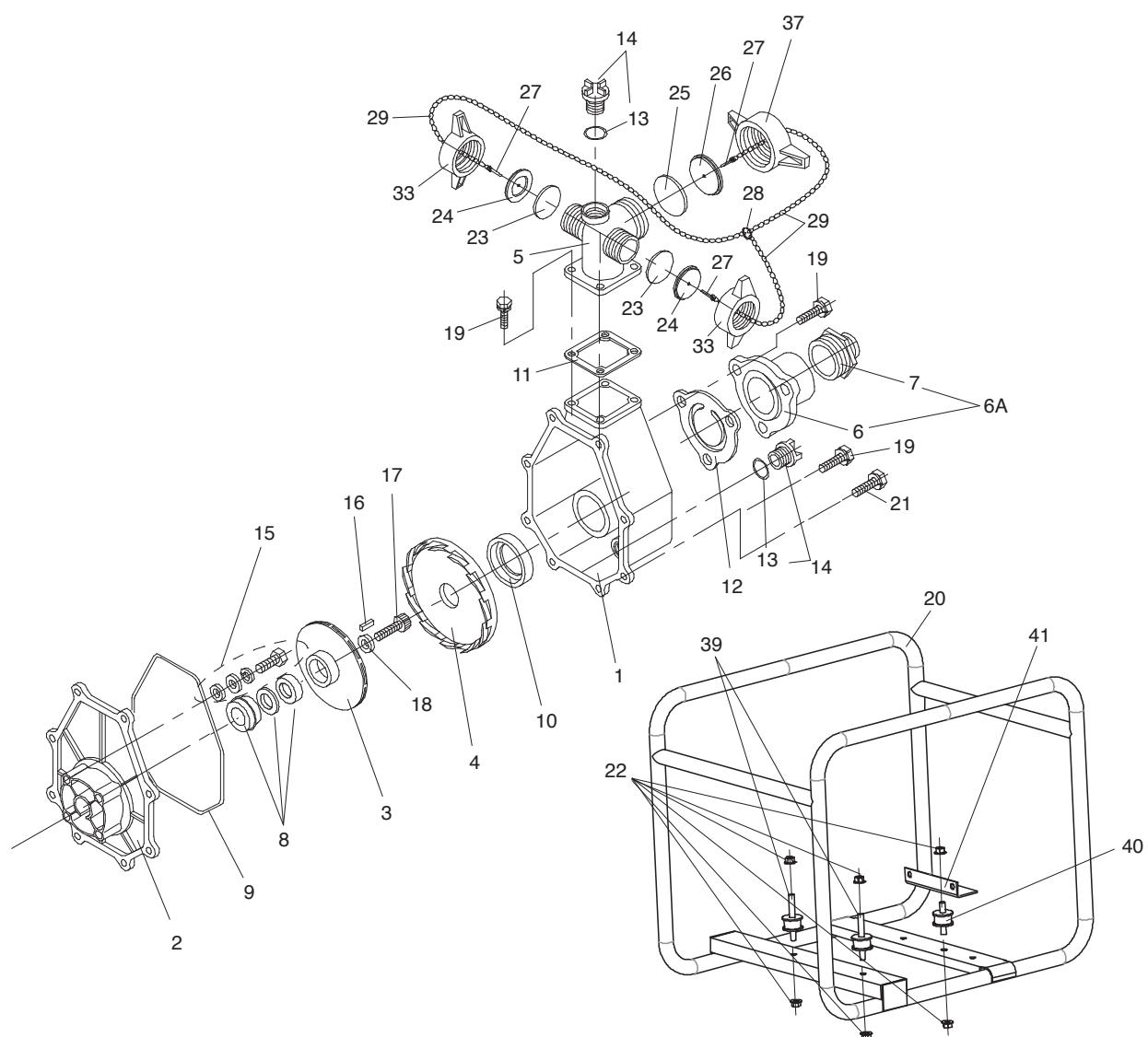


Parts List - Model TE2-100HA Centrifugal Pump

Ref. No.	Parts No.	Description	Qty
	ENGINE	Honda GX240	
1	200 200 281	Casing	1
2	200 200 290	Casing Cover	1
3	200 210 140	Impeller	1
4	200 210 030	Inner Casing	1
5	200 200 411	Bend (4" NPT)	(1)
6	200 200 571	Valve Case (4" NPT)	(1)
7	201 100 071	Mechanical Seal	1
8	200 800 190	O-Ring, Casing	1
9	200 900 220	Packing, Inner Casing	1
10	200 900 210	Packing, Bend	1
11	200 900 130	Check Valve	1
12	200 500 040	Plug Assy	2
13	200 800 020	O-Ring (P-24)	(2)
14	203 000 101	Casing Bolt Assy (M8x50)	4
15	203 000 082	Bolt, Hex (M10x30 P=2)	12
16	200 100 130	Frame (Black)	1
17	200 100 420	Base	1
18	200 900 370	Vibration Isolation Mount (Cushion, Rubber)	4
19	200 300 151	Bracket	2
20	203 200 030	Spring Nut (M8)	8
21	203 000 141	Bolt, Hex (M10x45 P=2)	4
22	203 200 021	Flange Nut(M10)	6
23	203 000 121	Bolt, Hex (M10x20 P=2)	4

• For impeller shim part code, please refer to the Shim Dimension Table (see page 28)
 • Contact HONDA distributor for replacement of the engine parts.
 • Contact the TSURUMI pump dealer instead of HONDA distributors for the replacement of the crankshaft. (Crankshaft of the engine has a special metric thread)
 • Plug Assy (12) includes O-ring (13), so users do not have to order O-ring (13) separately if the Plug Assy (12) is being ordered.

Exploded View - Model THP-4070HA Centrifugal Pump (High Head Version)



Parts List - Model THP-4070HA Centrifugal Pump (*High Head Version*)

Ref. No.	Parts No.	Description	Size/ Specification	Qty
	ENGINE	Honda GX160		
1	200 200 130	Casing	SCQ-50	1
2	200 201 040	Casing Cover		1
3	200 210 200	Impeller		1
4	200 210 410	Inner casing (Diffuser)		1
5	200 201 080	Discharge Bend (3 Way Outlet)		1
6	200 200 540	Valve Case	IN-NPSM2	1
7	200 500 240	Pipe Fitting	2in→1.5in	1
6A	202 200 160	Valve Case Assy	PF1.5	1
8	201 100 051	Mechanical Seal	SiC	1
9	200 900 350	Packing,Casing		1
10	200 900 240	Packing, Inner Casing		1
11	200 900 170	Packing, Bend		1
12	200 900 120	Check Valve		1
13	200 800 020	O-Ring	P-24	(2)
14	200 500 040	Plug Assy		2
15	203 000 101	Casing Bolt Assy	M8x50	4
16	203 300 100	Key, Impeller	5x5x7	1
17	203 000 400	Hex. Socket Bolt M8x35	HONDA	1
18	203 100 210	Seal Washer	W8-S1	1
19	203 000 041	Hex.Bolt	M8x25 P=2	13
20	200 100 320	Frame (Black)		1
21	203 000 241	Hex. Bolt	M8x30 P=2	2
22	203 200 100	Flange Nut	M8	6
23	200 900 100	Packing, Cap	Φ30.8	2
24	200 300 401	Cap	1in	2
25	200 900 090	Packing, Cap	Φ45.5	1
26	200 300 391	Cap	1.5in	1
27	203 300 050	Pin	3x15 (SUS)	3
28	203 300 060	Ring	Φ15	1
29	203 300 071	Chain		3
33	200 500 020	Hose Coupling Handle	PF 1in	4
37	200 500 150	Hose Coupling Handle	PF 1.5in	3
39	200 300 410	Vibration Isolation Mount (Cushion, Rubber)		2
40	200 300 370	Vibration Isolation Mount (Cushion, Rubber)		1
41	200 300 190	Plate (Bracket)		1

- Contact HONDA distributor for replacement of the engine parts.
- Contact the TSURUMI pump dealer instead of HONDA distributors for the replacement of the crankshaft. (Crankshaft of the engine has a special keyway)
- Plug Assy (14) includes O-ring (13), for which users do not have to order O-ring (13) separately if the Plug Assy (14) is being ordered.
- Parts with reference number 30,31,32,34,35,36,38 are not illustrated in the exploded view.

9 | LIMITED WARRANTY

TSURUMI MANUFACTURING CO., LTD. ("TSURUMI") warrants to the original end purchaser during the warranty period, every new TSURUMI pump or product to be free from defects in material and workmanship under normal use and service, when properly installed, used, and maintained (in accordance with Tsurumi's Operation, Service, and Repair Manual) for a period of two years from the date the unit was first installed or twenty six months from the date of shipment by TSURUMI to wholesaler, whichever comes first.

TSURUMI'S sole obligation under this warranty is to repair or replace at TSURUMI'S option, with new or remanufactured parts, any part(s) that fail or that are found to be defective during the warranty period. No allowance will be made for shipping charges, damages, labor, or other charges due to failure, repair, or replacement.

This warranty does not apply to any TSURUMI product that has been disassembled without prior approval of TSURUMI nor does it apply to any product that has been subjected to misuse, neglect, alteration, misapplication, accident, or act of God.

TSURUMI assumes no responsibility for compliance with any regulations, codes, standards, or ordinances applicable to the installation, location, operation, or maintenance of its products.

No other warranty, expressed or implied, is authorized by, or applicable to, the seller. No person, agent or dealer is authorized to enlarge upon this warranty.

TSURUMI expressly disclaims liability for consequential or incidental damages or breach of expressed or implied warranty; and any implied warrant of fitness for a particular purpose and merchantability shall be limited to the duration of the expressed warranty.

Some states do not allow limitations on the duration of an implied warranty, so the above limitation or exclusion may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.

Tsurumi Manufacturing Co., Ltd.