



Manual de Operación

Mantenimiento e Instalación

NE4 / NE 6



Este manual contiene las instrucciones necesarias para la instalación y puesta en marcha de sus bombas de Aguas Residuales NE4 & NE6. Lea cuidadosamente estas recomendaciones antes de poner en marcha su bomba. **MANTENGA LO SIEMPRE A MANO!**

Nota: Las especificaciones técnicas están sujetas a cambio sin previo aviso

Felicitaciones ! Usted acaba de adquirir un producto desarrollado con la más alta tecnología Y ÖT ÁWT ÜÜ.

Nuestras bombas han sido diseñadas y fabricadas con partes de la más alta calidad. Una larga experiencia como fabricantes y un especial cuidado y dedicación en la producción, hacen que nuestros productos cumplan los más exigentes estándares.

Para facilitar el mantenimiento y la operación se elaboró éste manual que trae importante información y es una guía para la instalación, operación y mantenimiento de nuestras bombas de Aguas Residuales.

Lea con atención las instrucciones antes de instalar su equipo. Guárdelo para consultas posteriores.

Las bombas han sido construidas según normas de los fabricantes norteamericanos de bombas (Contractors Pump Bureau) y ensayadas en la fábrica mediante pruebas hidrostáticas y de rendimiento que garantizan su correcto funcionamiento. Inspecciónelas detenidamente y asegúrese que no le falten piezas y que no se hayan deteriorado en el transporte. Haga el reclamo a la compañía transportadora tan pronto como sea posible en caso de que fuere necesario.

El diseño, los materiales y los procesos usados en la fabricación de nuestros productos aseguran un correcto funcionamiento. Sin embargo la vida y duración dependerá de la adecuada aplicación, instalación, inspección periódica y en general de un cuidadoso mantenimiento preventivo.



ADVERTENCIA !

WDM PUMPS no se hace responsable por daños o accidentes que se presenten debido a que no se cumplan las instrucciones dadas en éste manual. La garantía sólo es válida cuando se usen repuestos originales.

2. RECOMENDACIONES DE SEGURIDAD

- Use zapatos de seguridad cuando maneje partes ó herramientas pesadas
- No opere las bombas con las válvulas de descarga cerradas
- No retire tapones ó válvulas de drenaje cuando el equipo esté funcionando
- Nunca trate de acoplar tuberías a las bombas a la fuerza. Los tamaños deben ser los adecuados
- Para cualquier labor de mantenimiento siempre desconecte la corriente
- Asegúrese que la bomba está aislada de un sistema presurizado antes de desmontarla
- Use guantes de seguridad para manipular piezas con aristas cortantes ó filos.
- Nunca aplique calor para desarmar la bomba. Puede haber riesgo de explosión
- No use ropa suelta que pueda ser cogida por el impulsor u otras partes movibles
- Nunca coloque las manos en las bocas de succión o descarga
- No manipule la bomba cogiéndola por el conjunto de cable
- Asegure la bomba antes de operarla para evitar que se caiga o se deslice
- Operar la bomba con la válvula de descarga cerrada disminuye la vida de los rodamientos y el sello mecánico
- Las bombas de aguas negras NE 4 y NE 6 no son recomendadas para usarse en piscinas o instalaciones recreacionales con agua
- Desconecte la bomba de la fuente de potencia antes de practicar cualquier labor de mantenimiento

Estas bombas han sido diseñadas para operar en forma segura cuando se usan y se mantienen de acuerdo con lo consignado en éste manual.

Una bomba es un dispositivo que contiene piezas que están en rotación y que por tanto pueden ser peligrosas. Los operarios y el personal de mantenimiento deben ser conscientes de esto y seguir las recomendaciones de seguridad.

Precauciones previas a la instalación

- Tenga cuidado de no dañar los terminales del motor cuando desempaque la unidad
- Revise la placa de identificación y asegúrese de que los datos corresponden a la bomba que ud. compró.
- Asegurese de que los voltajes son los especificados para el trabajo de la bomba
- Conserve este manual para consultas posteriores.
- Transporte y coloque esta bomba siempre en posición vertical.



ADVERTENCIA!

Las bombas para aguas residuales NO son recomendadas para:

- (a) Bombear líquidos inflamables
- (b) Ser usadas en áreas consideradas como peligrosas
- (c) Ser usadas en piscinas ó instalaciones recreacionales acuáticas
- (d) Bombear líquidos con sólidos abrasivos
- (e) Operar sin el nivel de sumergencia recomendado.

El uso de estas bombas en los casos antes señalados hace perder la garantía. Cuando se requiera bombear líquidos abrasivos se sugiere solicitar un sello de caras duras en vez del sello estándar inferior. Consulte a la fábrica para la selección más recomendada.

3. INSTALACIÓN

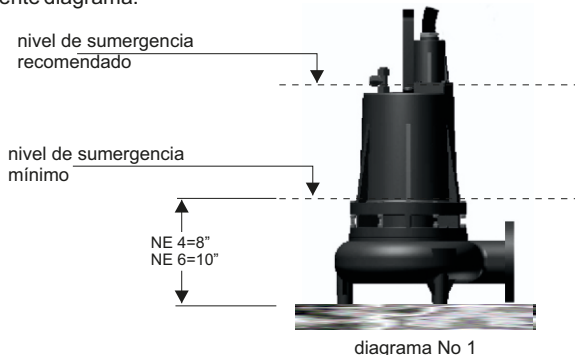
Localización

Nunca instale las bombas en zanjas con suelos movedizos. La bomba se puede hundir y la succión puede taparse.

Se recomienda que el nivel de sumergencia sea el mostrado en el diagrama No. 1

Nivel de Sumergencia

La carcasa de la bomba donde se encuentra alojado el motor contiene aceite para enfriar el motor, lubricar los rodamientos y el sello mecánico. Estos modelos pueden operar por largos periodos de tiempo sin bombear líquidos. No obstante se recomienda un nivel de sumergencia para lograr un mejor enfriamiento y aumentar la vida del motor tal y como se indica en el siguiente diagrama:



ADVERTENCIA!

Las bombas deben ser soportadas independientemente de las tuberías y NUNCA se deben forzar sus conexiones porque se generan esfuerzos en la bomba ocasionando fallas en su operación.

Conexión en la Descarga

La tubería de descarga debe ser tan corta como sea posible. Tanto un la válvula cheque y una válvula de cierre se recomiendan para cada bomba que se utiliza. La válvula cheque se utiliza para prevenir el refluo hacia el sumidero. Reflujo excesivo puede causar inundaciones y / o daños a la bomba. La válvula de cierre se utiliza para detener el flujo en la bomba para mantenimiento de la válvula cheque.

Y OT AÚT UÚA suministra An Codo Estacionario con Sistema de Descarga diseñado para permitir que la bomba sumergible de aguas residuales sea fácil de instalar o des-instalar sin necesidad de que el personal de mantenimiento tenga que entrar en el pozo.

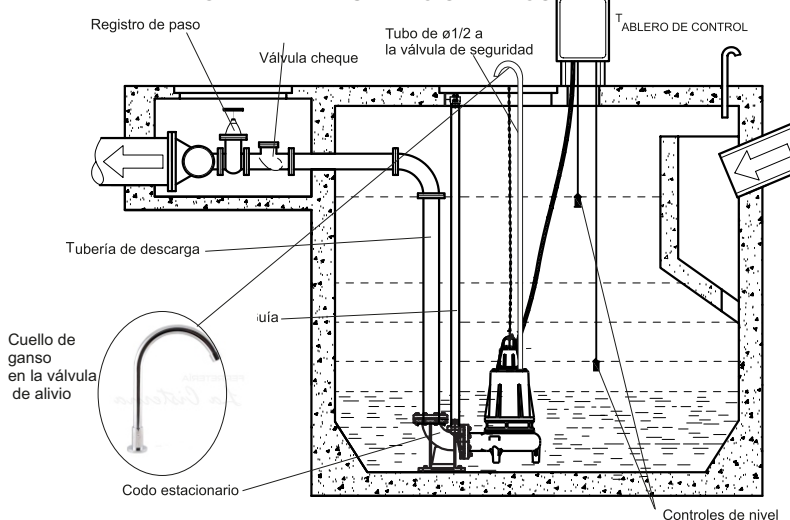
Vea el manual de ACCESORIOS PARA INSTALACIÓN DE BOMBAS NE4 y NE 6 para más información, o consulte a uno de nuestros asesores.



Advertencia:

Se debe instalar siempre la tubería de la válvula de seguridad o alivio, de no ser instalada podría ocasionar una falla en el funcionamiento del motor que es provocada por la entrada de agua a la cámara del mismo, No aplica garantía si no se cumple con esta recomendación.

DIAGRAMA DE INSTALACIÓN TÍPICO



Controles de nivel de líquido: Los controles de nivel han de ser apoyados por un soporte que este unido a la pared del pozo, la cubierta o caja de empalmes. cable empuñaduras se utilizan para sostener los cables en su lugar en el montaje. El control de nivel puede ser cambiado ajustando la longitud del cable de acuerdo con los planes y especificaciones. Asegúrese de que los controles de nivel no queden mal colocados, o falte movimiento en su desplazamiento de columpio, y que la bomba este completamente sumergida cuando el control de nivel se encuentra en el modo apagado.

Conexiones eléctricas:



ADVERTENCIA!

* No se debe usar el conjunto de cables para alzar o mover la bomba, para esto utilice únicamente la manija que trae instalada.

Potencia y Control de cables: El conjunto de cable montado en la bomba no debe ser modificado de ninguna manera excepto para acortar a una específica aplicación. Cualquier empalme entre la bomba y el tablero de control debe hacerse de acuerdo con todas las normas eléctricas. No deje expuestas las puntas del cable a la humedad, ya que esta podría filtrarse, llegar al motor y causar graves daños.

El cable blanco no es de tierra. Los cables de color negro, blanco y rojo son de transporte de energía (conductores). El cable verde es para la conexión a Tierra.



ADVERTENCIA!

Todos los modelos de las bombas sumergibles deben estar conectados a tierra (cable verde)

Sensor de temperatura

normalmente cerrado está (N/C) integrado en las bobinas del motor y detectará el calor excesivo en el caso que se produzca una sobrecarga. El sensor térmico se disparará cuando las bobinas se calienten demasiado y se restablecerá automáticamente cuando el motor de la bomba se enfríe a una temperatura segura. Es recomendable que el sensor térmico sea conectado a un dispositivo de alarma para alertar al operador de una condición de sobrecarga, y/o la bobina de arranque del motor para detener la bomba. En el caso de una sobrecarga, se debe detectar el origen del problema y reparar.

RANGOS ELÉCTRICOS DEL SENSOR DE TEMPERATURA		
Voltios	Amperios Continuos	Amperios Arranque
110-120	3.00	30.0
220-240	1.50	15.0
440-480	0.75	7.5
600	0.60	6.0

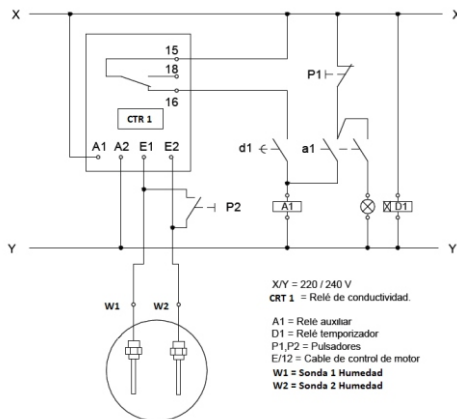
Sonda de Detección de Agua o Humedad: de 1 watt a 330 kilo ohmios, 500 volt, se instala dentro de la cámara sellada de la bomba para detectar cualquier humedad o agua presente.

Se recomienda que estas sondas sean conectadas a un dispositivo de control, alarma o relay de conductividad para alertar al operador de que algo de agua o humedad han sido detectadas en las cámaras internas de la Bomba. En el caso que se detecte, verifique de forma individual los cables el sensor de humedad, (∞ resistencia = sin humedad) y la unión caja/caja de control por humedad.

Estas situaciones pueden inducir a una señal falsa en el circuito de detección de humedad. Si ninguna de las pruebas anteriores demuestran conclusiones, la bomba(s) debe ser extraída y el origen de la falla reparado.

¡SI SE HA DETECTADO HUMEDAD EL MANTENIMIENTO DEBE HACERSE DE INMEDIATO!

Ejemplo de conexión: Tener en cuenta que puede cambiar dependiendo del dispositivo de control o alarma utilizado para la conexión de las sondas de Humedad



Cuando la cámara de sellado está llena de aceite limpio, no fluye ninguna corriente entre la sonda (W1) y (W2). Tan pronto ingrese agua a la cámara, la conductividad del aceite aumentará, debiendo encenderse una alarma visual y apagar el motor.

Como la conductividad de la mezcla de aceite y agua entre la sonda (W1) y (W2) varía de acuerdo a la agitación y a la rotación (si el motor está detenido o en funcionamiento), la alarma y el motor con ella estaría continuamente prendiéndose y apagándose. Para evitar esto, el circuito detector de humedad debe dejar encendida la alarma y apagado el motor con el primer pulso. Con el pulsador P1 se resetea la alarma.

Como los relés de conductividad tienen en su mayoría un circuito interno de retardo (de aprox. 1s.) y las conexiones 15 y 16 están normalmente cerrados (como se muestra en la figura) cuando no hay energía (y se abren al energizar el relé), un temporizador (D1) para la alarma visual es recomendado. Para verificar el funcionamiento de la alarma se dispone del pulsador P2 entre las conexiones E1 y E2.

Si P1 es presionado una vez que el motor ha sido detenido y la luz se apaga, entonces indicaría la presencia de solamente una pequeña cantidad de agua en la cámara de sellado y que probablemente se ha depositado en el fondo. Sin embargo si la luz se queda prendida indicaría que la cantidad de agua que ha ingresado es importante y que la bomba debería repararse cuanto antes.

Debido a que el sistema de detección de humedad en la cámara de sellado opera como un circuito abierto y se requiere que se cierre para indicar una falla del sello NO BRINDA UNA TOTAL SEGURIDAD DE FALLA. Podría desprenderse o romperse uno de sus terminales y el sistema seguiría abierto "Indicando" que el agua no ha ingresado a la cámara de sellado cuando lo contrario pudiera haber ocurrido.

Tabla de consumos eléctricos

MODELO	HP	VOLT.	FASES	R.P.M	AMP. MAXIMO	AMP. MAXIMO ROTOR BLOQUEADO	RESIST. EMOBINADO INICIO-ARRANQUE	TAMAÑO DEL CABLE
NE 4 45-4-220	4.5	220	3	1.750	18.2	56.0	1.43	10/4
NE 4 45-4-440	4.5	440	3	1.750	9.1	28.0	5.71	10/4
NE 4 75-4-220	7.5	220	3	1.750	26.8	80.0	0.71	10/4
NE 4 75-4-440	7.5	440	3	1.750	13.0	40.0	2.85	10/4
NE 4 113-4-220	11.3	220	3	1.750	28.0	126.0	0.43	10/4
NE 4 113-4-440	11.3	440	3	1.750	14.0	63.0	1.72	10/4
NE 4 150-4-220	15.0	220	3	1.750	38.0	160.0	0.35	8/4
NE 4 150-4-440	15.0	440	3	1.750	19.0	80.0	1.45	8/4
NE 6 90-6-220	9.0	220	3	1.150	26.0	162	0.445	2/4
NE 6 90-6-440	9.0	440	3	1.150	13.0	81.0	1.780	2/4
NE 6 120-6-220	12.0	220	3	1.150	36.0	162.0	0.445	2/4
NE 6 120-6-440	12.0	440	3	1.150	18.0	81.0	1.780	2/4
NE 6 180-6-220	18.0	220	3	1.150	50.0	232.0	0.080	2/4
NE 6 180-6-440	18.0	440	3	1.150	25.0	116.0	0.320	2/4
NE 6 240-6-220	24.0	220	3	1.150	64.0	290.0	0.235	2/4
NE 6 240-6-440	24.0	440	3	1.150	32.0	145.0	0.940	2/4
NE 6 300-6-220	30.0	220	3	1.150	82.0	364.0	0.123	2/4
NE 6 300-6-440	30.0	440	3	1.150	41.0	182.0	0.490	2/4
NE 6 180-4-220	18.0	220	3	1.750	50.6	232.0	0.270	2/4
NE 6 180-4-440	18.0	440	3	1.750	25.3	116.0	1.080	2/4
NE 6 240-4-220	24.0	220	3	1.750	62.8	290.0	0.205	2/4
NE 6 240-4-440	24.0	440	3	1.750	31.4	145.0	0.820	2/4
NE 6 300-4-220	30.0	220	3	1.750	76.0	364.0	0.188	2/4
NE 6 300-4-440	30.0	440	3	1.750	38.0	182.0	0.750	2/4
NE 6 360-4-220	36.0	220	3	1.750	90.0	434.0	0.110	2/4
NE 6 360-4-440	36.0	440	3	1.750	45.0	217.0	0.440	2/4
NE 6 480-4-440	48.0	440	3	1.750	65.0	290.0	0.540	2/4
NE 6 600-4-440	60.0	440	3	1.750	78.0	363.0	0.310	2/4
NE 6 750-4-440	75.0	440	3	1.750	96.0	576.0	0.187	2/4

3-OPERACIÓN

Antes de operar las bombas, verifique los siguientes puntos:

- **Voltaje y fases:** Verifique los datos eléctricos contenidos en la placa de identificación
- **Rotación de los motores.** Debe ser la correcta para evitar daños en el motor y la bomba. Dé un arranque suave y observe el sentido de giro. Debe coincidir con lo señalado en la placa (sentido horario viendo la parte superior de la carcasa). Si la rotación no es la indicada intercambie dos cables en la conexión del tablero de control. No haga cambios en las conexiones del motor. Verifique de nuevo.
- **Identificación la bomba:** De Anote el número de serie de la bomba para referencia posterior.
- **Test de aislamiento:** Efectúe una lectura de la resistencia de aislamiento del motor. Estos valores, los voltajes y amperajes en las líneas de potencia deben ser guardados para futuras referencias.
- **Prueba de Bombeo:** Una vez que la bomba haya sido conectada adecuadamente y bajada al pozo, debe revisarse su funcionamiento durante algunos ciclos de trabajo. Se deben anotar los tiempos de vaciado del pozo o de funcionamiento por ciclo. La carcasa debe contener aceite para refrigerar el motor.

4- MANTENIMIENTO



ADVERTENCIA!

Antes de comenzar cualquier labor de mantenimiento o reparación en las bombas, cierre la válvula de la descarga y desconecte la corriente.

Debido a que el motor es del tipo lubricado por aceite, no se necesita otro tipo de lubricación ó trabajo de mantenimiento. Estas bombas generalmente son muy confiables en su operación y en la mayoría de los casos pueden durar funcionando sin contratiempos durante muchos años.

Sin embargo como cualquier equipo mecánico, debe efectuarse un programa de mantenimiento preventivo que incluya:

- Revisión de la carcasa del motor para verificar su nivel y contaminación del aceite.
- Inspección del estado del impulsor y cuerpo por desgaste ó atascamiento.
- Revisión del motor y rodamientos.
- Verificación de desgaste y fugas del sello.

La bomba se suministra de fabrica con el aceite para la refrigeración del motor , únicamente reemplace el aceite si hay algún fallo o realiza labores internas de mantenimiento, para eso use aceite dieléctrico Texaco Diala-Oil- AX o Mobil D.T.E Oil Light según la cantidad recomendada en la siguiente tabla:

MODELO	CARCASA		CAMARA DEL SELLO	
	GAL	LITROS	GAL	LITROS
NE 4 450/750/1130/1500	2.5	9.5	0.3	1.1
NE 6 9/180/240	15.0	56.8	0.4	1.5
NE 6 300/480/600/750	11.0	41.6	0.4	1.5



ADVERTENCIA!

Verifique que el aceite este por debajo del nivel de aceite en la parte superior unos 4cms. de no hacer esto se provocaría una presión hidráulica excesiva que podría destruir la bomba. El sobrellenado de aceite anula la garantía.

Test de Presión

Carcasa: Para comprobar que la bomba no tenga fugas alrededor de la entrada de la junta de eje, anillos cuadrados, y el cable, el nivel de aceite debe estar en la cantidad indicada . Retire la válvula de presión (22) de la carcasa (16). Aplique sellador y coloque un tubo con un manómetro y ajuste en el orificio de la válvula de presión (**Ver Diagrama 2**). Aplicar aire a presión en la carcasa a 10 P.S.I. Use jabón en agua en torno a las áreas selladas y examine las uniones para verificar si hay burbujas de aire. Si, después de 5 minutos la presión todavía se mantiene constante, y no se observa "burbujas" retire el tubo y el manómetro y vuelva a colocar la Válvula de presión con un sellador. Si la presión no se mantiene revise bien hasta ubicar la fuga.

Camara del sello: retire tapón (31), comprobar nivel de aceite recomendado, colocar tubo con sellante y manómetro y aplicar aire a presión de 20-25 P.S.I y revise si tiene fugas repitiendo lo indicado en el paso anterior.

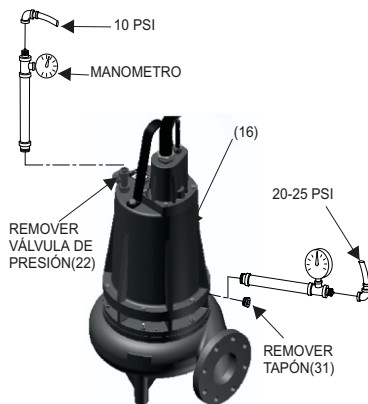


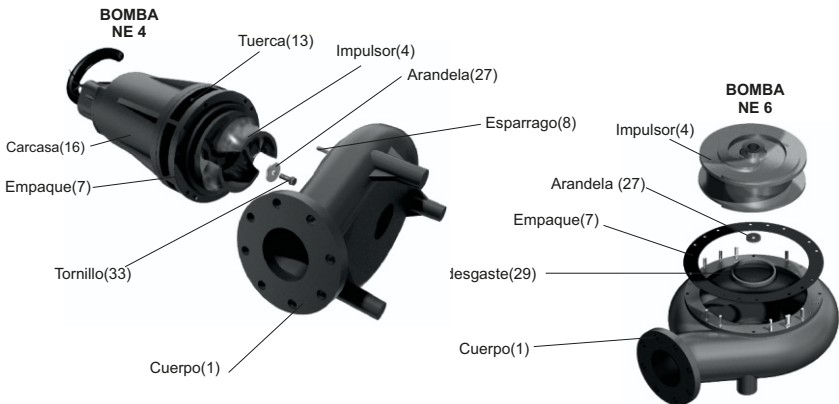
Diagrama 2

Limpieza

Si la bomba se utiliza en aplicaciones transportables, es necesario limpiarla después de cada uso haciendo que bombee agua limpia para, de esta manera, evitar la formación de depósitos de suciedad e incrustaciones.

Reemplazo de impulsor.

Para limpiar el cuerpo (1) o reemplazar el impulsor (4), o sustituir el anillo de desgaste(29) (bomba NE 6), desconecte la alimentación, retire las tuercas hexagonales (13) y levante el motor vertical y el sello conjunto del cuerpo (1). Limpie el cuerpo si es necesario. Limpie y examine el impulsor (4), por picaduras o desgaste y reemplazar si necesario, inspeccione el empaque (7) y reemplace si esta cortado o dañado. Si el impulsor (4) requiere sustitución, retire el tornillo (33) y la arandela (27). retire, y saque el impulsor directo del eje por medio de un extractor . Si el anillo de desgaste (29) en la bomba NE 6 se requiere reemplazar, cortar el anillo y retirelo, tenga cuidado de no dañar el cuerpo(1).



Montaje:

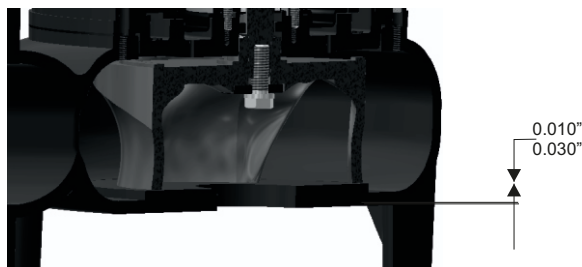
Para instalar el anillo de desgaste (29) en las bombas NE 6 pulse el anillo de desgaste en el orificio del cuerpo (1) hasta que quede asentado. Para instalar impulsor (4), en todos los modelos, aplique una capa delgada de aceite al eje del motor y el impulsor se deslizará directamente en el eje, manteniendo chaveteros alineados. Aplique un compuesto bloqueador de roscas en el tornillo (33) y apriete a un par de 35 lb/pies .

Coloque el empaque(7) en el cuerpo de la bomba(1) después de instalar el impulsor(4) haga coincidir los esparragos (8) con los orificios de la carcasa(16). Rosque la tuerca (13) en el espárrago (8). aplicando bloqueador de roscas Loctite 277 y apriete aplicando un torque de 24 lb/pies .



ATENCIÓN!

Al instalar el impulsor nuevamente en la bomba serie NE 4 revise que la holgura que existe entre el impulsor y la cara plana del cuerpo esta dentro de 0.010”(0.25mm) a 0.030”(0.7mm).



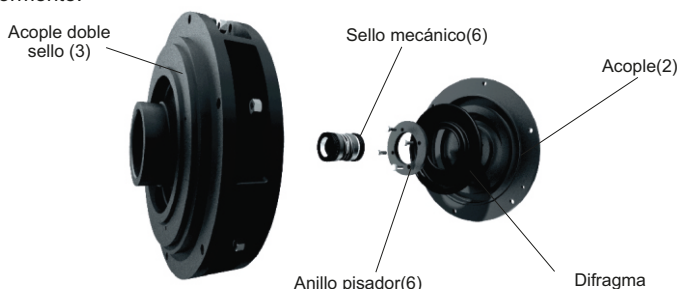
Mantenimiento de Motor y sello mecánico.

- Retire cuerpo(1) e impulsor(4) como se anoto anteriormente.
- Extraiga el aceite de la carcasa(16). quitando válvula (22)
- Retire las tuercas(13) y separe el motor (5) con el acople(3) de la car casa (16)
- Desconecte el motor(5) del conjunto de cables(20), suelte tornillos del acople y retire el acople(2) junto con la parte estacionaria del sello.(6)del motor (5)
- Examine ahora el motor, rodamiento y componentes del sello
- Cambie lo que tenga desgaste o este dañado.
- Si uno de los componentes del sello requiere cambio, reemplacelo todo.



PRECAUCIÓN !.
Maneje las partes del sello cuidadosamente.

- No rasguñe o estropee las caras rectificadas.
- Cuando reemplace el sello retire el componente rotativo y el resorte del eje del motor. También la parte fija del acople. Limpie la cavidad del acople doble sello(3).
- Coloque nuevo componente fijo en el acople doble sello(3), y la parte fija en caras duras en el acople (2). Asegúrese de que el resorte está fijado adecuadamente sobre el componente rotativo. Cuidadosamente ensamble el acople (3)sobre el motor(5) utilizando los tornillos del motor. Apriete luego el acople (2) con tornillos(9) en el acople(3), introduzca este ensamble en la carcasa (16) y el cuerpo (1) y asegure con tuercas (13), adicione el aceite que se especifico anteriormente.



Conexiones del conjunto de cable:

Revise los cables para asegurar que no tengan rasgaduras o cualquier otro defecto. En caso de reemplazo, cambie toda la tapa del conjunto de cable(20). Saque los cables del motor y verifique los aislamientos . Cambielos si se necesitan. Ahora coloque el anillo cuadrado(23) en la tapa de conjunto de cable (20). Reconecte los terminales del motor al cable de potencia como se muestra en diagrama 3

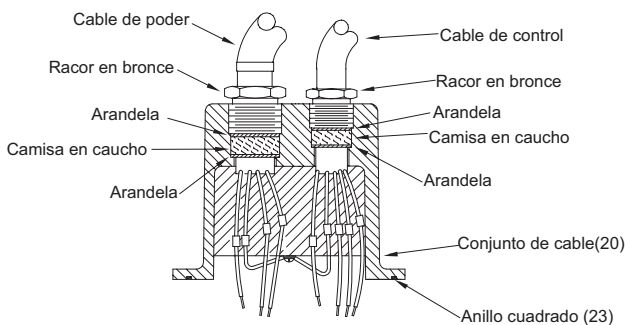
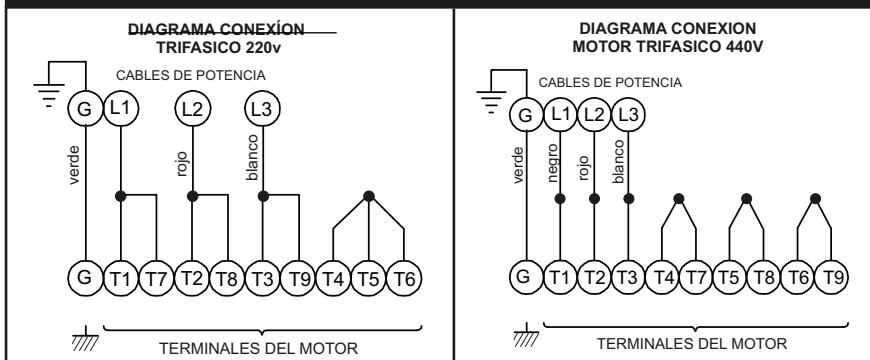
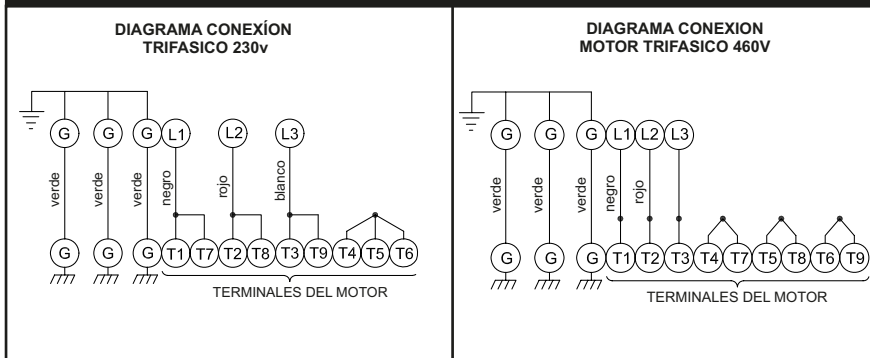


Diagrama 3

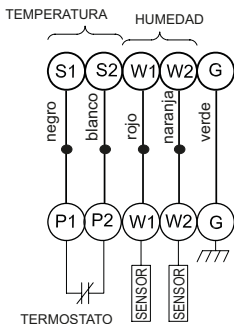
CONEXIONES NE 4



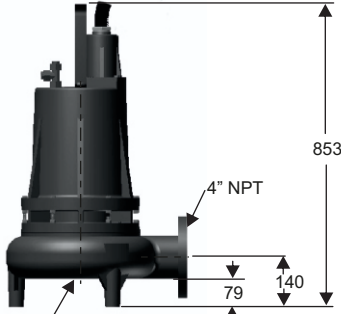
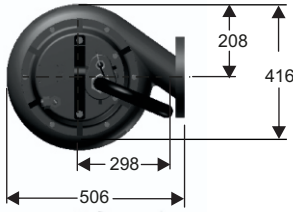
CONEXIONES NE 6



SENSOR DE HUMEDAD Y TEMPERATURA

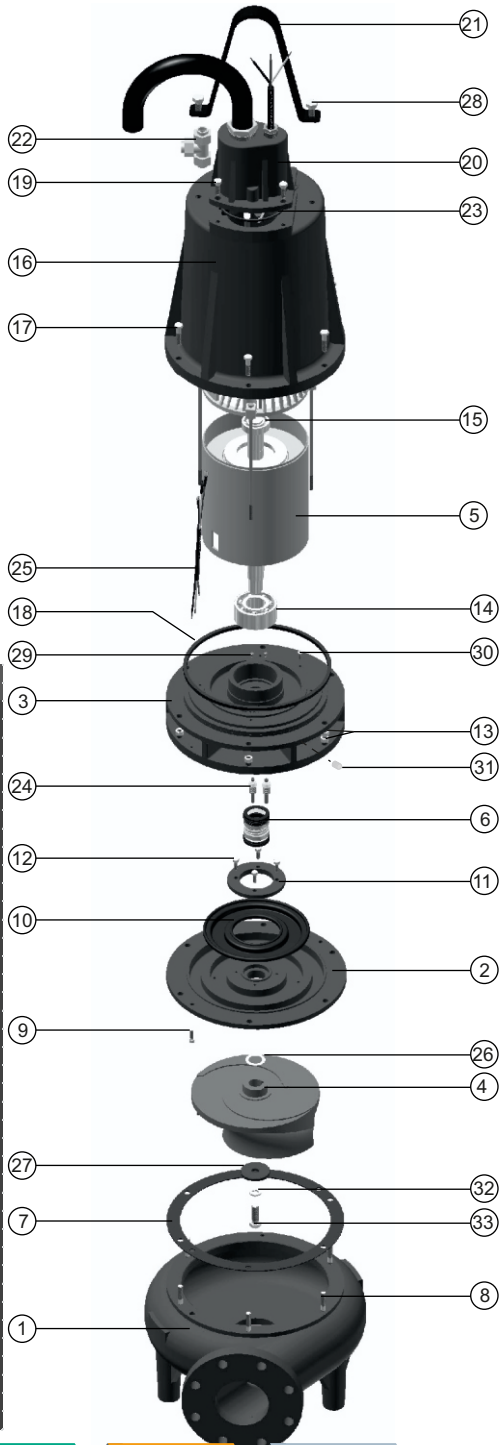


NE 4

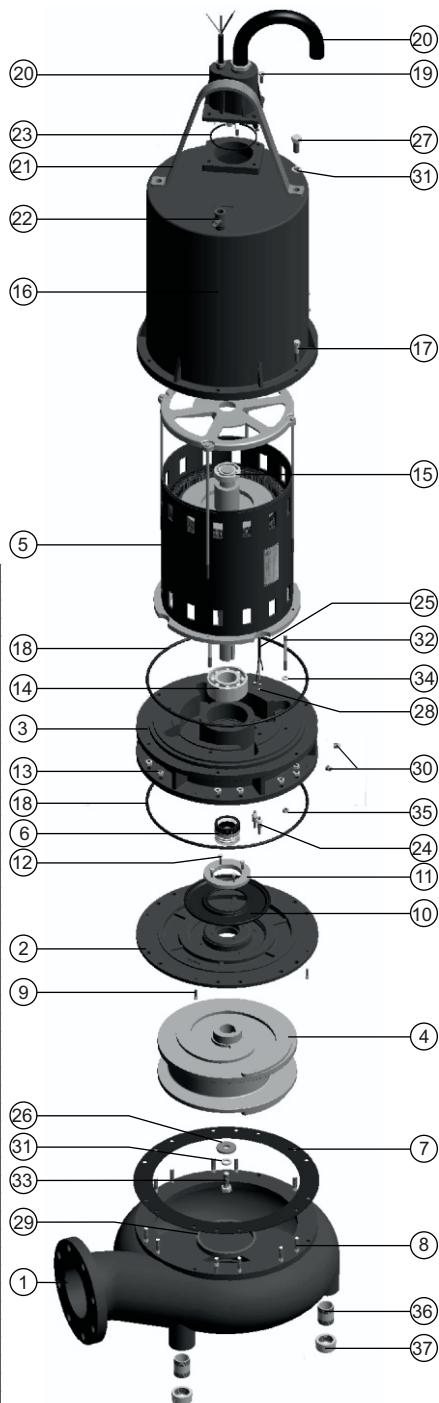
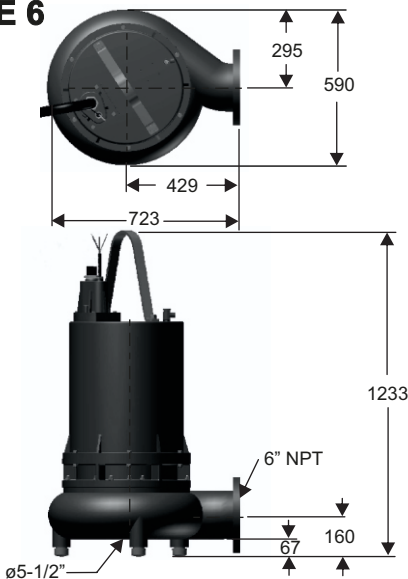


ø3-1/2"

No	DESCRIPCION	REF	CANTIDAD			
			4,5	7,5	10	15
1	CUERPO EN HIERRO	61575	1	1	1	1
2	ACOPLE EN HIERRO	62485	1	1	1	1
3	ACOPLE DOBLE SELLO	62484	1	1	1	1
4	IMPULSOR ø6.500"	53265	1			
4	IMPULSOR ø7.000"	53270		1		
4	IMPULSOR ø8.000"	53282			1	
4	IMPULSOR ø8.500"	53278				1
5	MOTOR 4.5 HP 1,750	62310	1			
5	MOTOR 7.5 HP 1,750	62311		1		
5	MOTOR 11.3 HP 1,750	62312			1	
5	MOTOR 15.0 HP	62313				1
6	SELLO MECANICO 1-1/4" MIXTO	00052	1	1	1	1
7	EMPAQUE DEL CUERPO	27346	1	1	1	1
8	ESPARRAGO 3/8"x 2" NC INOX	02423	6	6	6	6
9	TORNILLO BCC 1/4"x3/4" INOX	16673	2	2	2	2
10	DIAFRAGMA 4SEH	00194	1	1	1	1
11	ANILLO PISADOR DIFRAGMA	22756	1	1	1	1
12	TORNILLO 1/4"x3/4" NC INOX	16670	4	4	4	4
13	TUERCA 3/8"NC INOXIDABLE	02521	12	12	12	12
14	RODAMIENTO 5307	39495	1	1	1	1
15	RODAMIENTO 6205 ZZ	17807	1	1	1	1
16	CARCASA	62050	1	1	1	1
17	TORNILLO 3/8" x 2" NC INOX	02237	6	6	6	6
18	ANILLO CUADRADO	27347	1	1	1	1
19	TORNILLO 3/8"x1" NC INOX	02218	4	4	4	4
20	CONJUNTO DE CABLES	61282	1	1	1	
20	CONJUNTO DE CABLES	61283				1
21	MANIJA DE ELEVACION	52214	1	1	1	1
22	VALVULA DE ALIVIO 1/2"	70426	1	1	1	1
23	ANILLO CUADRADO	27348	1	1	1	1
24	ELECTRODO PARA SENSOR	39383	2	2	2	2
25	CABLE DEL SENSOR	90085	1	1	1	1
26	ARANDELA ESP. 0.010"	01348	1	1	1	1
27	ARANDELA DE RETENCION	30657	1	1	1	1
28	TORNILLO 1/2"x-1"NC INOX	02231	2	2	2	2
29	TORNILLO #6-32NC x5/16 T.F	21765	2	2	2	2
30	TORNILLO 3/16"x1/2NC BR.	16955	1	1	1	1
31	TAPON 1/4" NPT	03201	1	1	1	1
32	GUASA 1/2" INOXIDABLE	02609	1	1	1	1
33	TORNILLO 1/2"x1-1/2"NC INOX.	02230	1	1	1	1



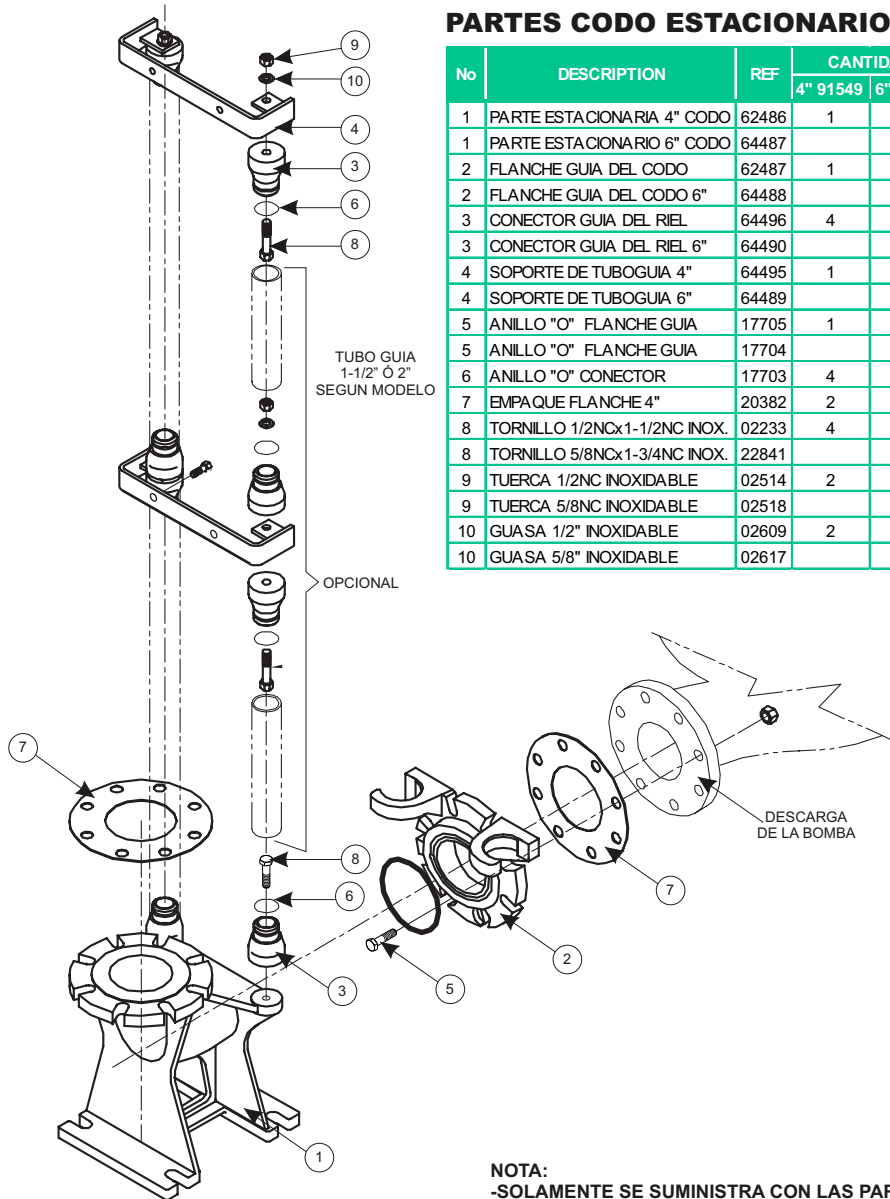
NE 6



No	DESCRIPCION	REF	CANTIDAD					
			9	12	18	24	30	
1	CUERPO EN HIERRO	42167	1	1	1	1	1	1
2	ACOPLE EN HIERRO	72593	1	1	1	1	1	1
3	ACOPLE DOBLE SELLO	72330	1	1	1	1	1	1
4	IMPULSOR ø11,500"	58115	1					
4	IMPULSOR ø12,000"	41324		1				
4	IMPULSOR ø13,000"	41325			1			
4	IMPULSOR ø14,000"	41326				1		
4	IMPULSOR ø14,625"	41327						1
5	MOTOR 9 HP 1200RPM	62323	1					
	MOTOR 12 HP 1200RPM	62324		1				
5	MOTOR 18 HP 1200RPM	62317			1			
5	MOTOR 24 HP 1200RPM	62315					1	
5	MOTOR 30 HP 1200RPM	62319						1
6	SELLO MECANICO 1-7/8" MIXTO	00056	1	1	1	1	1	1
7	EMPAQUE DEL CUERPO	51936	1	1	1	1	1	1
8	ESPARRAGO 7/16"x 2-1/4"NC INOX.	02424	12	12	12	12	12	12
9	TORNILLO BCC 1/4" x1" INOX	16673	2	2	2	2	2	2
10	DIAPHRAGMA 4SEH	00193	1	1	1	1	1	1
11	ANILLO PISADOR DIFRAGMA	52206	1	1	1	1	1	1
12	TORNILLO 1/4"x1" NC INOX.	02452	4	4	4	4	4	4
13	TUERCA 7/16"NC INOXIDABLE	02451	18	18	18	18	18	18
14	RODAMIENTO 3310 A/C3	28255	1	1	1	1	1	1
15	RODAMIENTO 6207 C3	2300081	1	1	1	1	1	1
16	CARCASA	41303	1	1	1	1	1	1
17	TORNILLO 7/16"x 2-1/4" NC INOX.	02450	6	6	6	6	6	6
18	ANILLO "O" CARCASA	52082	2	2	2	2	2	2
19	TORNILLO 3/8"x1" NC INOX.	02218	4	4	4	4	4	4
20	CONJUNTO DE CABLES	61288	1	1	1	1	1	1
21	MANIJA DE ELEVACION	52215	1	1	1	1	1	1
22	VÁLVULA DE ALIVIO 1/2"	70426	1	1	1	1	1	1
23	ANILLO CUADRADO CONJ.	27248	1	1	1	1	1	1
24	ELECTRODO PARA SENSOR	39383	2	2	2	2	2	2
25	CABLE DEL SENSOR	90198	1	1	1	1	1	1
26	ARANDELA DE RETENCION	02458	1	1	1	1	1	1
27	TORNILLO 5/8"x1-1/2"NC INOX	02457	2	2	2	2	2	2
28	TORNILLO #6-32NC x5/16 T.F	21765	3	3	3	3	3	3
29	ANILLO DE FRICCION	30677	1	1	1	1	1	1
30	TAPON 1/4" NPT	03201	2	2	2	2	2	2
31	ARANDELA DE PRESION 5/8" INOX	02617	3	3	3	3	3	3
32	TORNILLO 5/8"x1-3/4"NC INOX.	22841	1	1	1	1	1	1
33	ESPARRAGO 3/8" x 4-1/2"NC INOX.	02430	4	4	4	4	4	4
34	ARANDELA DE PRESION 3/8"INOX	02616	4	4	4	4	4	4
35	TUERCA 3/8"NC INOXIDABLE	02521	4	4	4	4	4	4
36	NIPLE 1-1/4" x 2" LONG. INOX	72296	3	3	3	3	3	3
37	TAPON HEMBRA 1-1/4 ACERO	03235	3	3	3	3	3	3

PARTES CODO ESTACIONARIO

No	DESCRIPTION	REF	CANTIDAD	
			4" 91549	6" 91550
1	PARTE ESTACIONARIA 4" CODO	62486	1	
1	PARTE ESTACIONARIO 6" CODO	64487		1
2	FLANCHE GUIA DEL CODO	62487	1	
2	FLANCHE GUIA DEL CODO 6"	64488		1
3	CONECTOR GUIA DEL RIEL	64496	4	
3	CONECTOR GUIA DEL RIEL 6"	64490		4
4	SOPORTE DE TUBOGUIA 4"	64495	1	
4	SOPORTE DE TUBOGUIA 6"	64489		1
5	ANILLO "O" FLANCHE GUIA	17705	1	
5	ANILLO "O" FLANCHE GUIA	17704		1
6	ANILLO "O" CONECTOR	17703	4	4
7	EMPAQUE FLANCHE 4"	20382	2	2
8	TORNILLO 1/2NCx1-1/2NC INOX.	02233	4	
8	TORNILLO 5/8NCx1-3/4NC INOX.	22841		4
9	TUERCA 1/2NC INOXIDABLE	02514	2	
9	TUERCA 5/8NC INOXIDABLE	02518		2
10	GUASA 1/2" INOXIDABLE	02609	2	
10	GUASA 5/8" INOXIDABLE	02617		2



NOTA:
-SOLAMENTE SE SUMINISTRA CON LAS PARTES
NUMERADOS EN EL GRÁFICO

5- FALLAS, CAUSAS Y SOLUCIONES.

Si el sistema no funciona correctamente, lea detenidamente las instrucciones y realice las recomendaciones de mantenimiento.

Si los problemas de funcionamiento no se corrigen, la siguiente guía puede ser de ayuda en la identificación y corrección de ellos:

TIPO DE FALLA	CAUSA PROBABLE	SOLUCION
1.-La bomba no arranca	No hay corriente en las conexiones al motor.	Revisar y corregir
	Impulsor boqueado por sólidos más grandes que los que puede manejar la bomba.	Mida la corriente en las terminales del motor si mide +/- 20% máx. amperaje del rotor bloquead, desconecte la bomba y retire la obstrucción.
	Protector de sobrecarga disparado.	Si la corriente en los terminales del motor es cero en monofásicos, desconectelos, dejelo enfriar y vuelva a conectar. En trifásicos permita que el protector se enfrie, presione y vuelva a medir corriente. Si aun es cero revise las conexiones de instalación de la bomba, arrancador o cables en general. En los motores trifásicos, después de colocar los protectores, si la corriente está dentro de los límites aceptables un tornillo de los relays de sobrecarga podría estar flojo
2.-La bomba funciona manual pero no automáticamente.	Switch flotador defectuoso	Verifique las conexiones al switch en el pozo. Asegurese de que haya suficiente agua para operar los controles. Si hay un ohmnímetro disponible, coloque los terminales del switch, use una escala de 100 ohmnios, opere manualmente y observe si marca cero cuando está cerrado.
3.-La bomba arranca pero después el relé de sobrecarga se dispara	Falla en una fase de alimentación.	controlar el equilibrio de las fases.
	Desequilibrio de fases.	Controlar el reglaje .Sustituir el relé de sobrecarga
	Mala regulación o relé defectuoso. rotor bloqueado.	enviar a servicio técnico especializado.
	La tensión de alimentación no corresponde con la del motor.	Sustituir el motor o controlar la alimentación.
4.-La bomba funciona pero no desagua el estanque.	Succión de la bomba total o parcialmente obstruida.	Eliminar la obstruccion
	Tubería de descarga obstruida.	Limpie la tubería.
	Válvula de descarga cerrada.	Abrir válvula.
	Aire atrapado en el cuerpo de la bomba.	Proceda a subir y volver a bajar la bomba, o abra la válvula hasta que salga todo el aire.
	Altura de elevación real muy superior a la prevista	Reemplazar modelo por otro diferente.

6. GARANTÍA

Consultar con su agente comercial las Políticas de Garantías que aplican a cada País



ATENCIÓN !

Cualquier anomalía detectada debe ser comunicada de forma inmediata a **WDM PUMPS.**



GA074

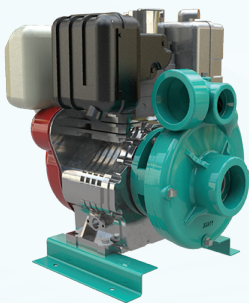
ESCANEA ESTE CODIGO
Y CONOCE MAS DE
NUESTROS
PRODUCTOS.



VER 2.1
14/04/2021

WDM®
PUMPS

WDM PUMPS



▮ Bombas Alta Presión

Línea H / Q / K

WDM Water Systems

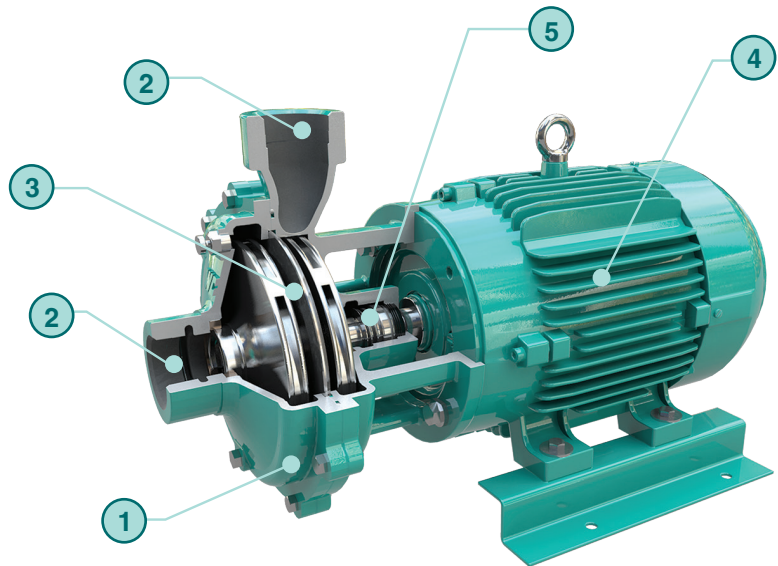
Beneficios

- Variedad de tamaños
- Métodos flexibles de instalación
- Larga duración de servicio
- Fácil mantenimiento
- Cualquier tipo de motor puede ser instalado

Aplicaciones

- Industria de la construcción
- Municipal y ambiental
- Líquidos con partículas no abrasivas
- Agua limpia o aguas residuales con partículas no abrasivas
- Drenaje de espacios pequeños
- Transportación de líquidos
- Agricultura
- Riego
- Tratamiento de agua
- Evacuación de fluidos

Límites de Operación	
Gasto	Hasta 1,750 gpm
Carga	Hasta 175 mca
Temperatura	Hasta 70 °C
Descarga	Hasta 6"
Bomba de 1 y 2 Impulsores	



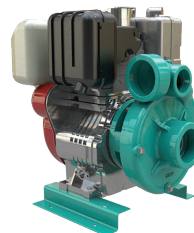
- 1 Construcción de hierro de alta resistencia
- 2 Succión y descarga de 1 1/2" hasta 6" **
(Dependiendo el modelo y el tamaño ésta puede ser rosacada o brida.)
- 3 Impulsor cerrado
- 4 Motores de 2 hp y 4hp
- 5 Sello mecánico **
(Puede ser acoplada con motor eléctrico, diesel o gasolina)



HE



HG

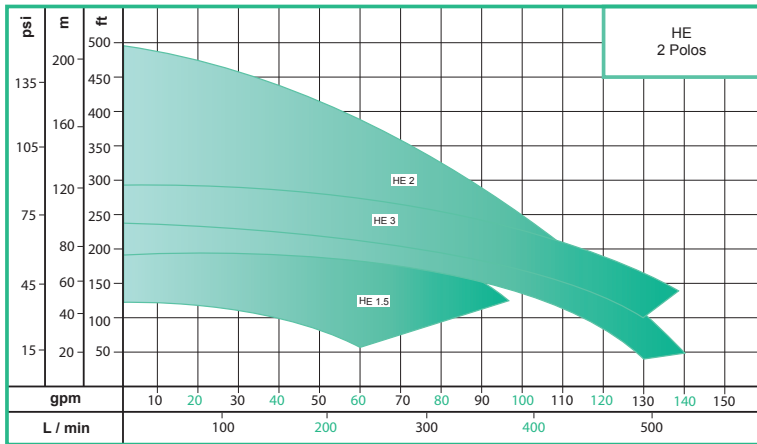


HD



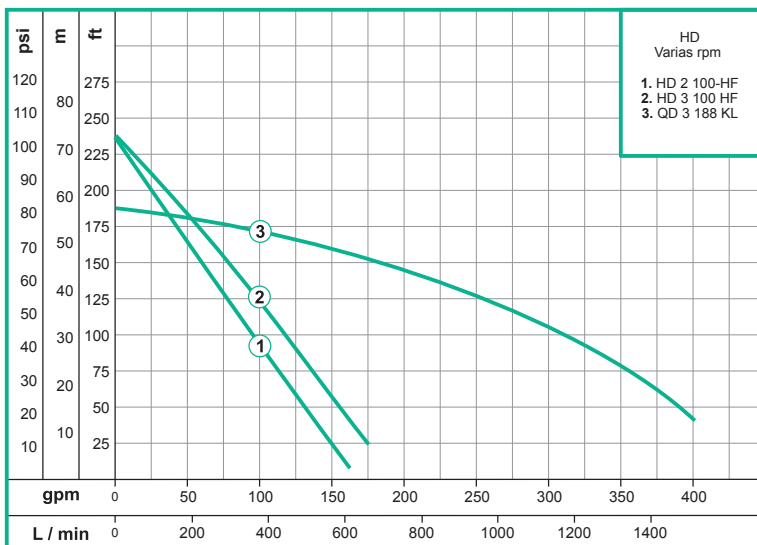
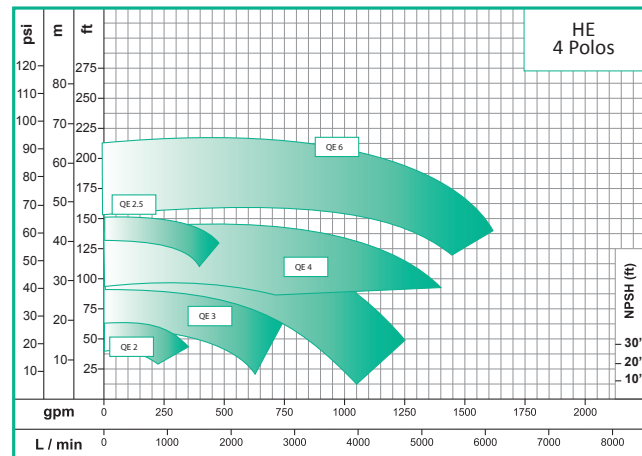
HU

Gráfica de Selección



Modelo	Suc.	Desc.	hp
HE 1.5	1.5"	1.5"	2 - 10
HE 2	2"	2"	3 - 15
HE 3	3"	3"	7.5 - 25

Modelo	Suc.	Desc.	hp
QE 2	2.5"	2"	3.5 - 10
QE 2.5	3"	2.5"	3.5 - 18
QE 3	4"	3"	8 - 18
QE 4	5"	4"	13 - 18



Modelo	Suc.	Desc.	hp
HD 2	2"	2"	10
HD 3	3"	3"	10
QD 3	4"	3"	18.8

WDM Water Systems

Somos una multinacional que desde 1961 fabrica Bombas para Agua y Sistemas de Bombeo con tecnología, calidad y respaldo técnico de orden mundial, ofreciendo soluciones integrales a la industria, la construcción y los sectores institucional y agrícola. Actualmente tenemos presencia en toda América, con plantas instaladas en México, Estados Unidos, Colombia, Argentina y Panamá. Manejamos una red de distribución en toda la República Mexicana, otorgando a nuestros distribuidores todas las ventajas como mayoristas.



Nuestros productos se utilizan en la extracción, conducción y elevación de agua. Sus aplicaciones más comunes son el manejo del agua potable, agua de lluvia y aguas negras, desinundaciones, procesamiento de granos, suministro de agua en edificios, lavado de vehículos, maquinaria y establos, aumento de presión en tuberías de suministro, extinción de incendios, riego por aspersión, minería, recirculación de agua en piscinas y torres de enfriamiento, plantas de tratamiento de agua, drenajes y construcción en general.

Para cumplir con todas estas aplicaciones, dentro de nuestro portafolio contamos con Bombas Autocebantes, Multietapas, Mediana y Alta Presión, Servicios Generales, Sumergibles para Aguas Residuales, Sumergibles para Pozo Profundo y Caseras, entre otras.



- Estados Unidos
- México
- Guatemala
- Panamá
- Colombia
- Argentina

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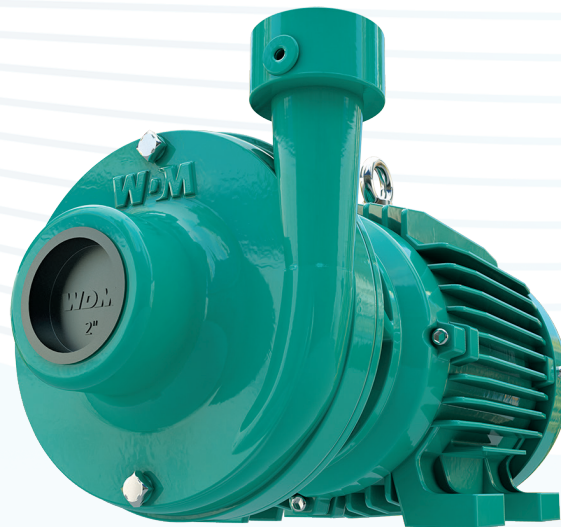
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Tel. (66) 2207 1158

■ **México**
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ME

Bombas de Mediana Presión

WDM Water Systems

Beneficios

- Variedad de tamaños
- Motor incluido
- Lista para instalar
- Métodos flexibles de instalación
- Fácil mantenimiento
- Larga duración de servicio

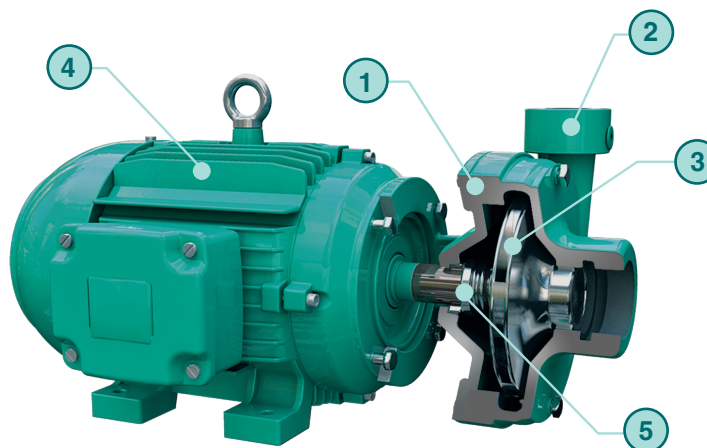


Aplicaciones

- Riego
- Recirculación
- Refrigeración
- Torres de enfriamiento
- Acueductos

Límites de Operación

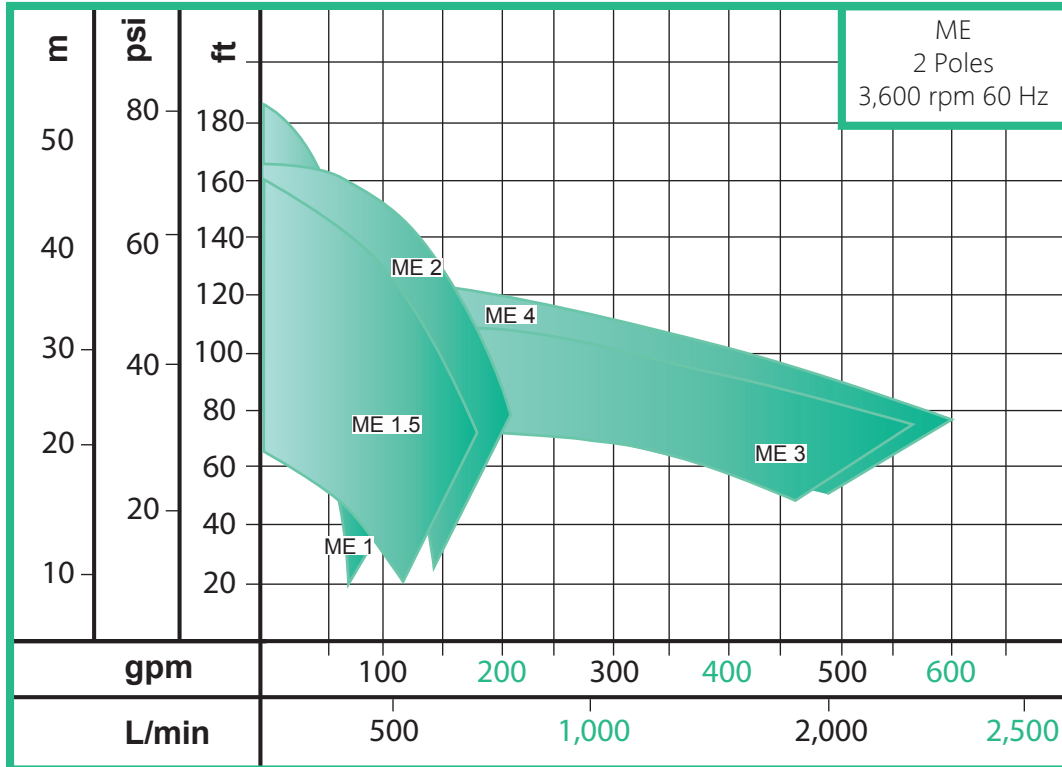
Gasto	Hasta 600 gpm
Carga	Hasta 56 mca
Temperatura	Hasta 70 °C
Descarga	Hasta de 4"
Presión máxima	80 psi



- ① Construcción en hierro fundido
- ② Succión y descarga de hasta 4"
- ③ Impulsor cerrado en hierro

- ④ Motores de 1 y 3 fases, de hasta 15 hp
- ⑤ Sello mecánico estándar de 1.25"

Gráfica de selección



Modelo	Suc.	Desc.	hp
ME 1	1.5"	1"	1.5 - 5
ME 1.5	2"	1.5"	1.5 - 7.5
ME 2	2.5"	2"	3 - 10
ME 3	3"	3"	7.5 - 15
ME 4	4"	4"	7.5 - 15

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CE / DE / EE / FE

Bombas Caseras

WDM Water Systems

Beneficios

- Variedad de tamaños
- Diseño de alta eficiencia
- Lista para instalar
- Fácil mantenimiento
- Variedad de aplicaciones



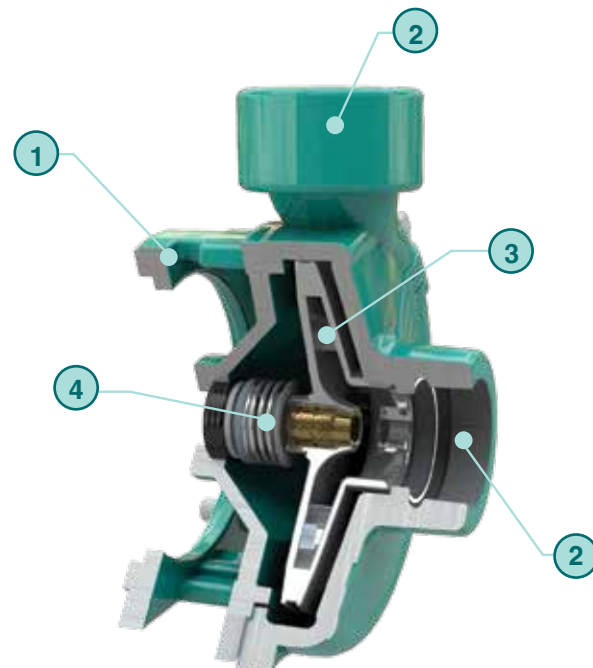
Aplicaciones

- Equipos de calefacción, refrigeración y ventilación
- Riego
- Recirculación
- Refrigeración
- Sistemas de presión
- Aprovechamiento de aguas limpias

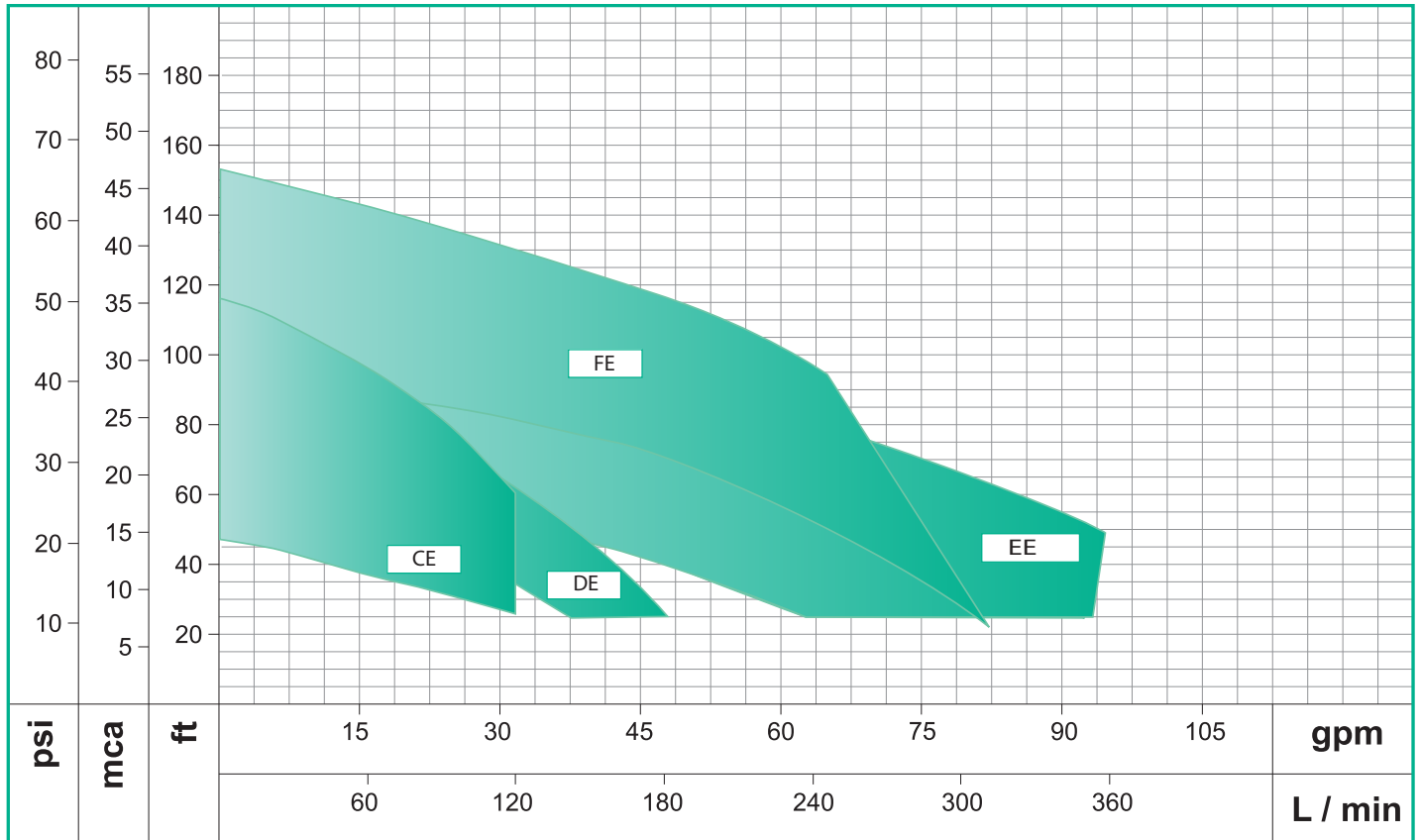
Límites de Operación

Gasto	Hasta 95 gpm
Carga	Hasta 46 m
Temperatura	Hasta 70 °C
Descarga	Hasta de 1.5"
Presión máxima	66 psi

- ① Construcción en hierro vaciado de alta resistencia
- ② Succión y descarga de hasta 1 ½"
- ③ Impulsor cerrado
- ④ Sello mecánico estándar



Gráfica de selección



Modelo	Suc.	Desc.	hp
CE 1	1 - 1.25"	1"	0.25 - 1
DE 1	1.25"	1"	0.5 - 1
EE 1.25	1.25"	1.25"	0.5 - 0.75
EE 1.5	1.5"	1.5"	1 - 2
FE 1	1.25"	1"	1.5 - 2

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VSE

Bombas Multietapas Verticales

WDM Water Systems

Beneficios

- Variedad de tamaños
- Diseño de alta eficiencia
- Lista para instalar
- Fácil mantenimiento
- Motor incluido
- Métodos flexibles de instalación

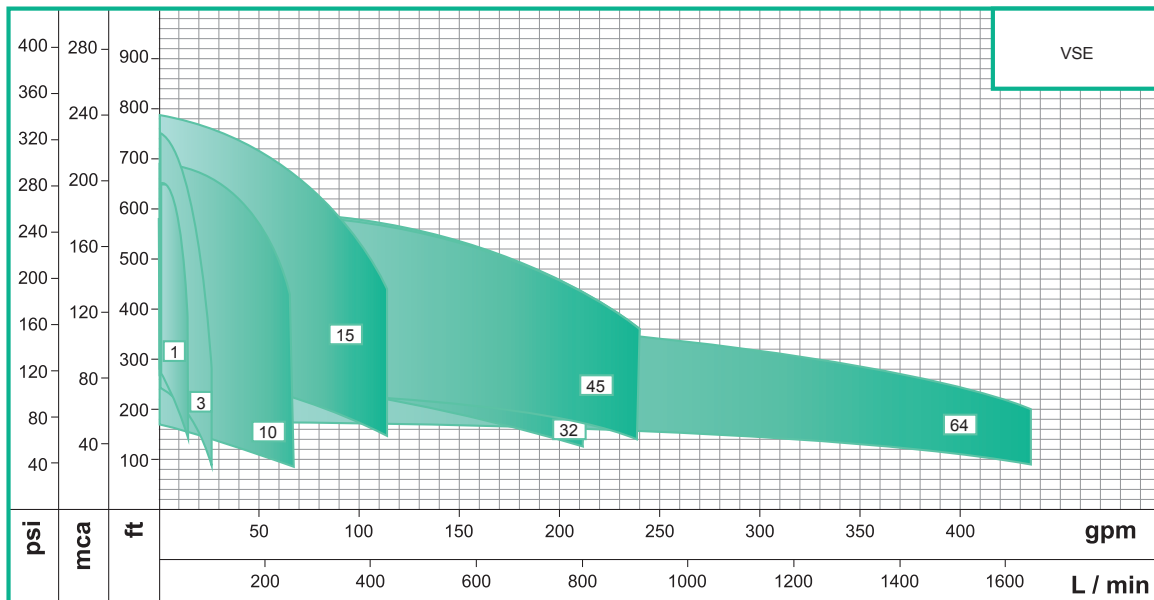
Aplicaciones

- Llenado de tanques elevados
- Sistemas contra incendio
- Lavaderos
- Sistemas de presión



Límites de Operación	
Gasto	Hasta 436 gpm
Carga	Hasta 240 mca
Temperatura	Hasta 70 °C
Descarga	Hasta de 4"
Presión máxima	341 psi

Gráfica de selección



Modelo	Suc.	Desc.	hp
VSE 1	1.25"	1"	1 - 3
VSE 3	1.25"	1"	1.5 - 5
VSE 10	1.5"	1.5"	3 - 15
VSE 15	2"	2"	7.5 - 25
VSE 32	2.5"	2.5"	10 - 40
VSE 45	3"	3"	20 - 40
VSE 64	4"	4"	20 - 40

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 **GE / GU**

Bombas para Servicios Generales

WDM Water Systems

Beneficios

- Rápida entrega
- Métodos flexibles de instalación
- Larga duración de servicio
- Fácil mantenimiento
- Variedad de tamaños



GE



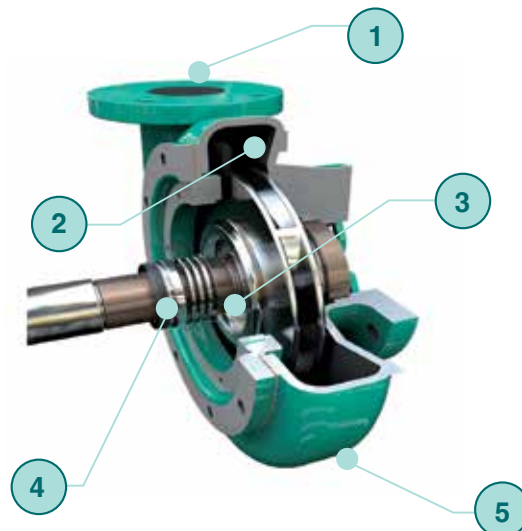
GU

Aplicaciones

- Equipos de calefacción, refrigeración y ventilación
- Torres de enfriamiento
- Suministro de agua
- Riego
- Servicios de construcción
- Aplicaciones de lavado
- Recirculación
- Industrial
- Acueductos

Límites de Operación

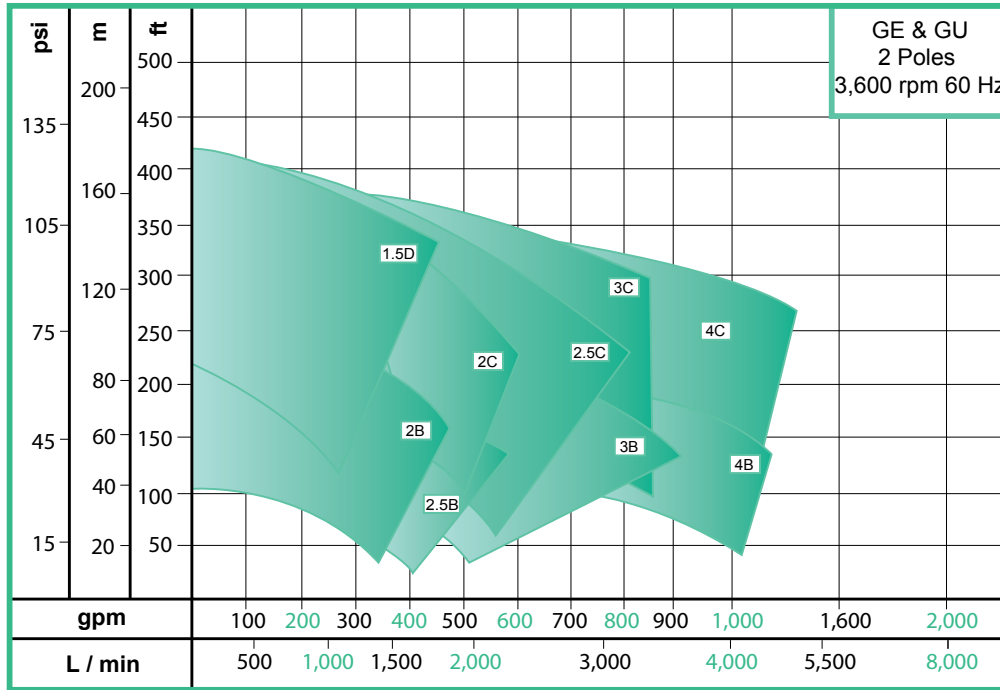
Gasto	Hasta 4,200 gpm
Carga	Hasta 140 mca
Temperatura	Hasta 70 °C
Descarga	Hasta 8"
Presión máxima	199 psi



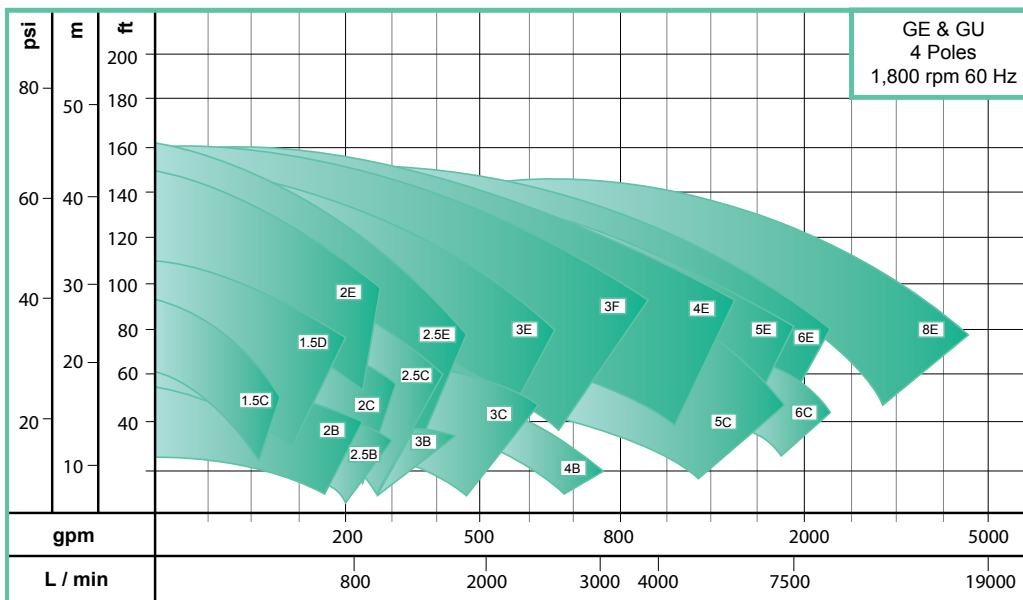
- ① Bridas ANSI de hasta 8"
- ② Impulsor cerrado
- ③ Anillos de desgaste en bronce

- ④ Sello mecánico estándar de cerámica/ carbón/Buna-N
- ⑤ Cubierta de hierro

Gráfica de Selección



Modelo	Suc.	Desc.	hp
1.5C-2	2"	1.5"	10 - 25
1.5D-2	2"	1.5"	20 - 60
2B-2	2.5"	2"	75 - 250
2C-2	2.5"	2"	20 - 60
2.5-B1-/2	3"	2.5"	7.5 - 30
2.5C-2	3"	2.5"	20 - 75
3B-2	4"	3"	7.5 - 40
3C-2	4"	3"	25 - 75
4B-2	5"	4"	25 - 50
4C-2	5"	4"	50 - 125



Modelo	Suc.	Desc.	hp
1.5C-1	2"	1.5"	1.5 - 5
1.5D-1	2"	1.5"	2 - 7.5
2B-1	2.5"	2"	3/4 - 3
2C-1	2.5"	2"	2 - 7.5
2E-1	2.5"	2"	5 - 15
2.5B-1	3"	2.5"	7.5 - 20
2.5C-1	3"	2.5"	2 - 7.5
2.5E-2	3"	2.5"	7.5 - 20
3B-1	4"	3"	1 - 5
3C-1	4"	3"	3 - 10
3E-2	4"	3"	10 - 25
3F-2	4"	3"	15 - 30
4B-1	5"	4"	3 - 7.5
4E-2	5"	4"	15 - 50
5C-2	6"	5"	10 - 30
5E-2	6"	5"	20 - 50
6C-2	8"	6"	15 - 40
6E-2	8"	6"	25 - 75
8E-3	10"	8"	60 - 125

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NE

Bombas Sumergibles para Aguas Residuales

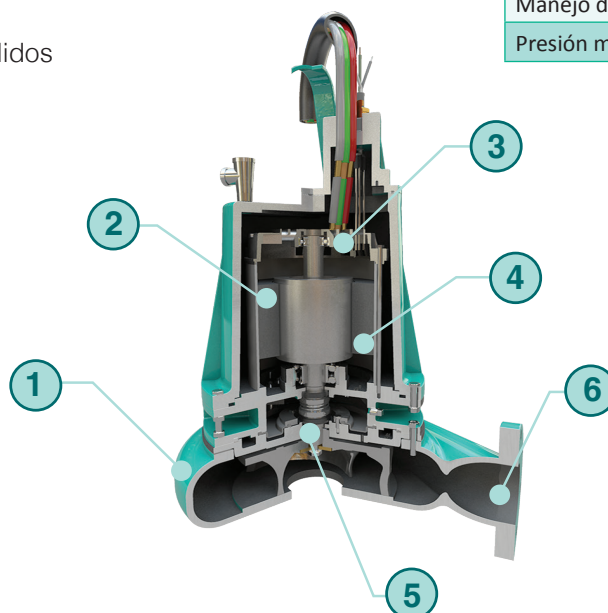
WDM Water Systems

Beneficios

- Diseño de alta eficiencia
- Impulsores cerrados, doble succión, proporciona el equilibrio hidráulico eliminando empuje axial.
- Variedad de tamaños
- Variedad de aplicaciones
- Fácil mantenimiento

Aplicaciones

- Industria en general
- Torres de enfriamiento
- Municipal
- Minería
- Manejo de aguas residuales
- Industria azucarera
- Industria papelera
- Bombeo de agua con sólidos en suspensión
- Power generation

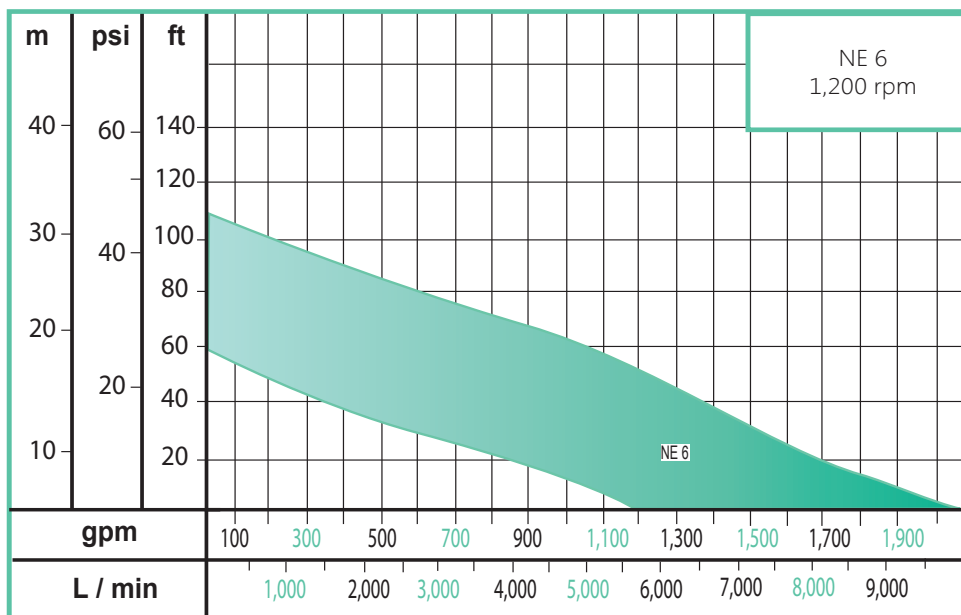
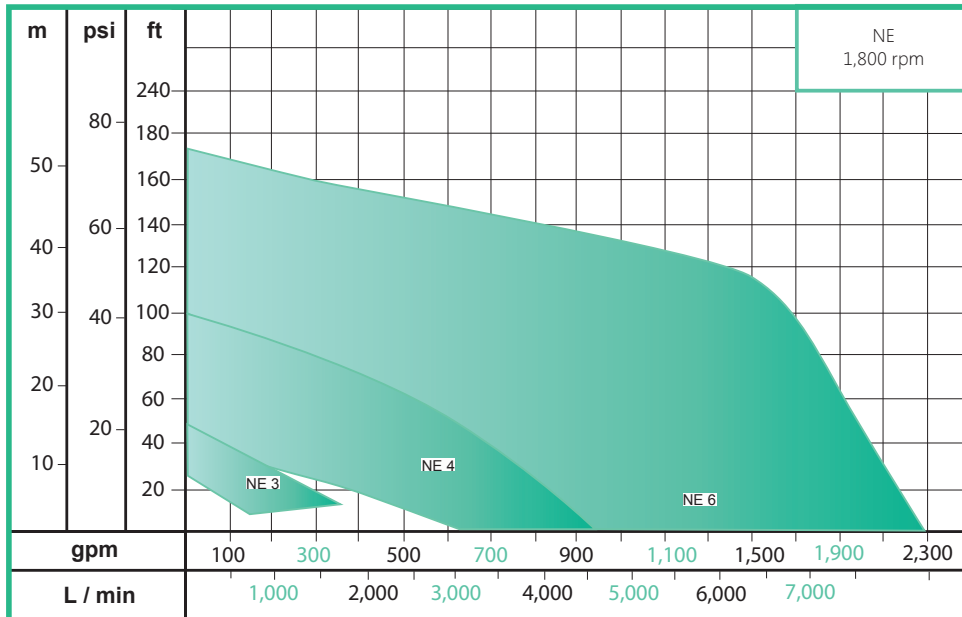


- | | | | |
|---|---|---|--|
| 1 | Construcción del cuerpo en hierro | 4 | Doble sello mecánico estándar Tipo 1 de silicón/Buna-N |
| 2 | Partes húmedas y construcción en hierro fundido | 5 | Impulsor de hierro semi abierto |
| 3 | Motores NEMA B sumergibles, de hasta 60 hp | 6 | Descarga de hasta 6" |

Límites de Operación

Gasto	Hasta 2,275 gpm
Carga	Hasta 50 mca
Temperatura	Hasta 70 °C
Descarga	Hasta 6"
Manejo de Sólidos	Hasta 3"
Presión máxima	71 psi

Gráfica de Selección



Model	Suc.	Desc.	hp
NE 2	1.75"	2"	0.4
NE 3	1.75"	3"	0.5 - 2
NE 4	3.5"	4"	4.5 - 15
NE 6	5.5"	6"	9 - 75

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INGE

Bombas Sumergibles para Aguas Residuales

WDM Water Systems

Línea Bomba Trituradora NGE

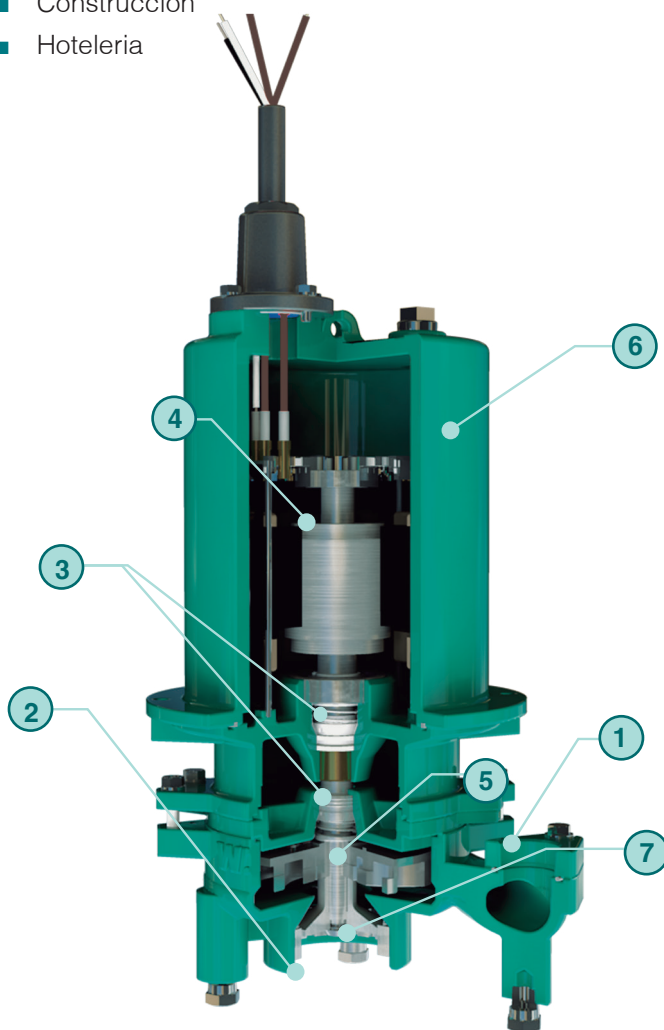


Beneficios

- Bomba sumergible, construcción en hierro fundido ATSM A-48, clase 30.
- Descarga de 1 1/4".
- Impulsor abierto tipo Vortex, balanceado dinámicamente en hierro fundido.
- Motores eléctricos de 2.0hp a 3,600rpm, trifásico.
- Triturador en Acero Inox. 440C, con dureza de 55 Rc.

Aplicaciones

- Bombeo y trituración de agua con tejidos y partes plásticas.
- Evacuación efectiva y económica
- Industrial
- Agricultura
- Construcción
- Hotelería



Límites de Operación

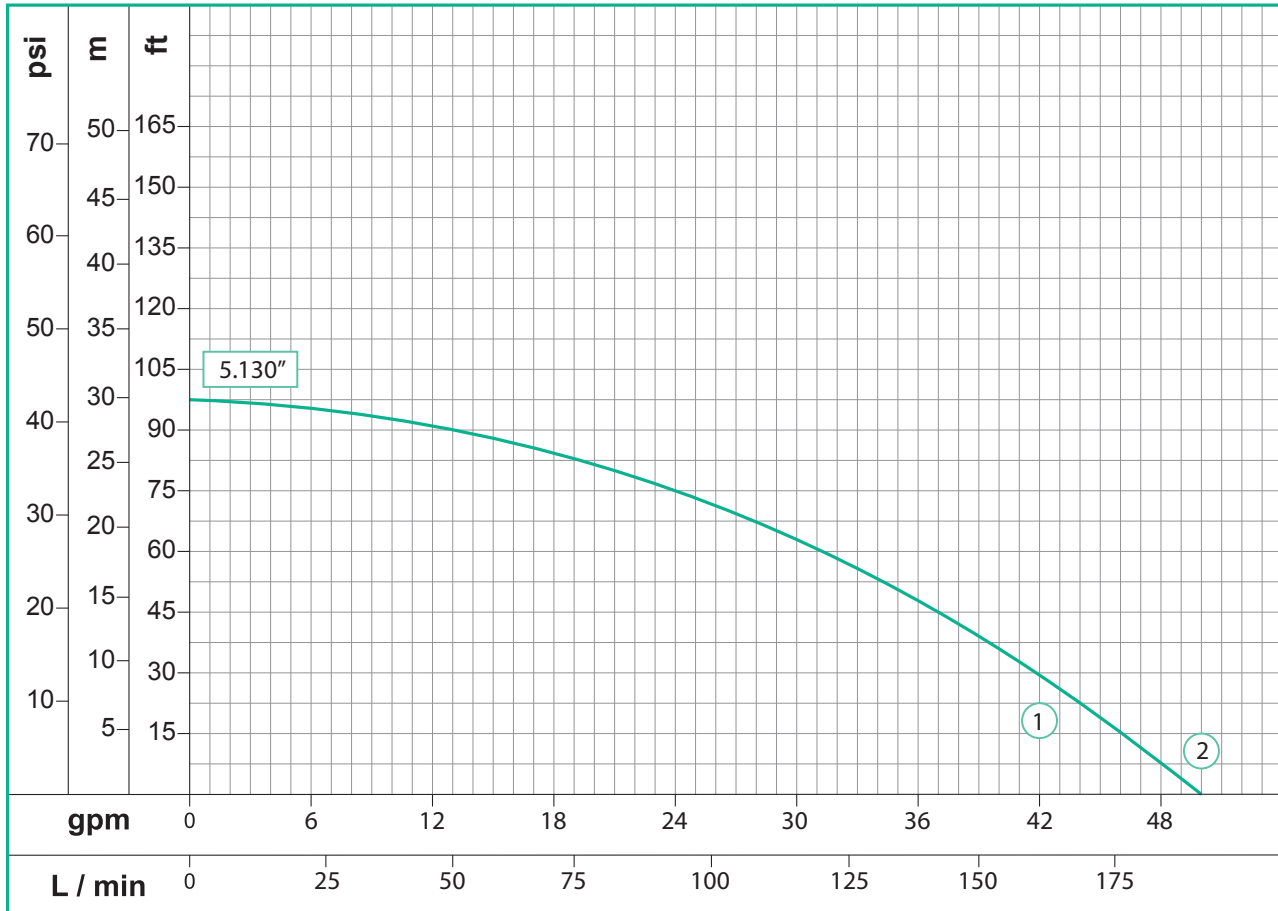
Gasto	Hasta 42 gpm
Temperatura	Hasta 70°C
Presión máxima	43 psi

- 1 Descarga de la bomba
- 2 Succión de la bomba
- 3 Sello Mecánico
- 4 Motor
- 5 Impulsor en hierro tipo vortex
- 6 Carcasa en hierro fundido
- 7 Triturador

Línea Bomba Trituradora NGE



Gráfica de selección



No.	Modelo	Ref.	Ø Descarga	Potencia (hp)	Voltaje (V)	Peso (kg)	H max. (mca)*	Q max (gpm)**
1	NG 1.25-20-220	1C0120	1 1/4"	2.0	230	46	30	51
2	NG 1.25-20-440	1C0121	1 1/4"	2.0	460	46	30	51

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SP / ST

Bombas Sumergibles para Pozo Profundo

WDM Water Systems

Beneficios

- Variedad de tamaños
- Larga duración de servicio
- Lista para instalar
- Fácil mantenimiento
- Métodos flexibles de instalación

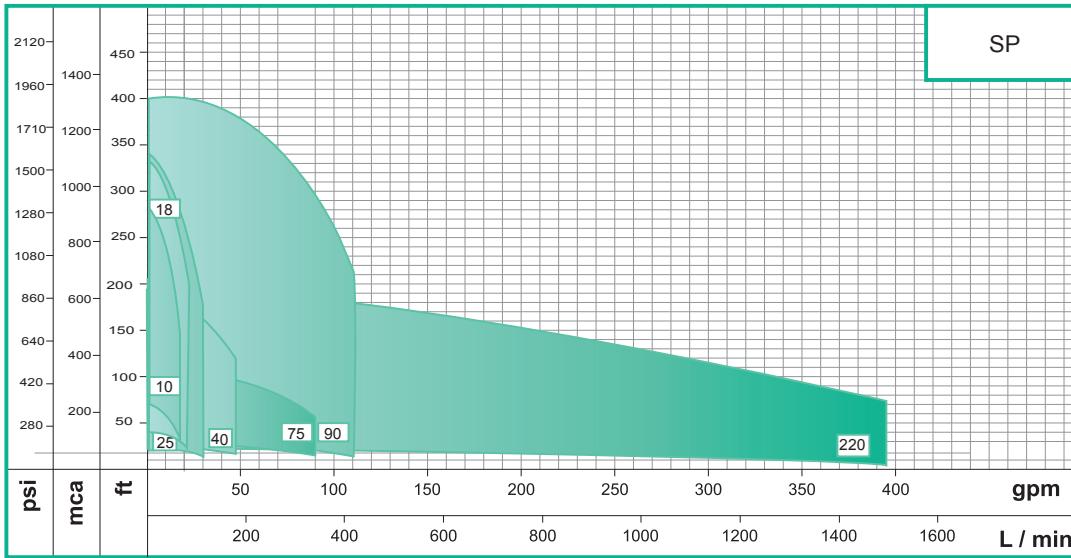
Aplicaciones

- Aprovechamiento de aguas limpias
- Recirculación de agua en piscinas
- Extracción de agua en pozos profundos
- Riego por aspersión
- Llenado de tanques elevados
- Bombeo de aguas limpias sin cuerpos abrasivos

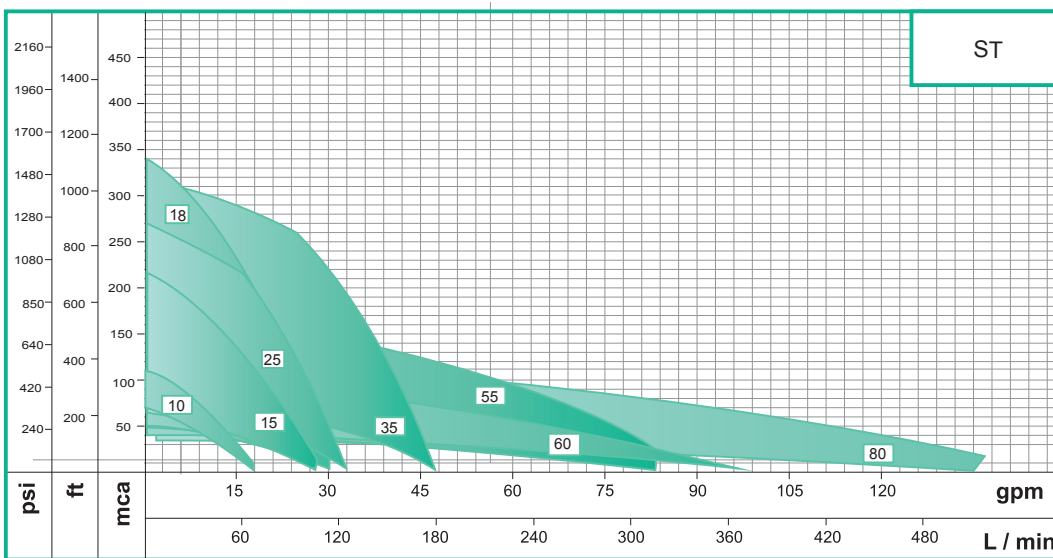


Límites de Operación	
Gasto	Hasta 396 gpm
Carga	Hasta 490 mca
Temperatura	Hasta 70 °C
Descarga	Hasta de 3"
Presión máxima	696 psi

Gráfica de Selección



Model	Desc.	hp
SP 10	1.25"	0.5 - 3
SP 18	1.25"	0.5 - 5
SP 25	1.5"	0.5 - 7.5
SP 40	2"	1 - 7.5
SP 75	2"	2 - 7.5
SP 90	3"	3 - 30
SP 140	3"	5 - 30
SP 220	3"	7.5 - 40



Model	Desc.	hp
ST 10	1.25"	0.5 - 1
ST 15	1.25"	0.5 - 3
ST 18	1.25"	0.5 - 5.5
ST 25	1.5"	1 - 5
ST 35	2"	1 - 7.5
ST 55	2"	1.5 - 7.5
ST 60	2"	2 - 5
ST 80	2"	2 - 7.5

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SISTEMAS DE PRESIÓN
Presión Variable AQUA - PRESS
Presión Constante VARI - PRESS

Componentes

Los sistemas de presión AquaPress mantienen una presión variable entre rangos de presión requeridos en un sistema de demanda de agua contralados por medio de presostatos o switch de presión. El tablero de control tiene un sistema que permite alternar y adicionar bombas, el tablero incluye elementos de monitoreo del estado del sistema y protecciones a los motores. Los sistemas de presión variable AquaPress son los más confiables del mercado.

Usamos bombas VSE centrífugas verticales multietapas o bombas centrífugas de un impulsor.



Componentes

- Bombas de acuerdo a la selección de caudal y presión
- Manómetros
- Válvulas check bridada y válvulas bridadas de paso con seguro
- Cabezal de descarga bridado bidireccional con diámetro en función del gasto del equipo
- Se requiere switch flotador para activar la protección de trabajo en seco.
- Uniones, tuberías ranurados y accesorios
- Tornillería y switches de presión
- Tanque hidroneumático (tanque precargado)
- Mangueras y conexiones al tablero para control
- Tablero de control con arrancadores y alternador simultaneado.
- Todo montado en una base estructural de canal de 5" o de mayor espesor según el tamaño del equipo.

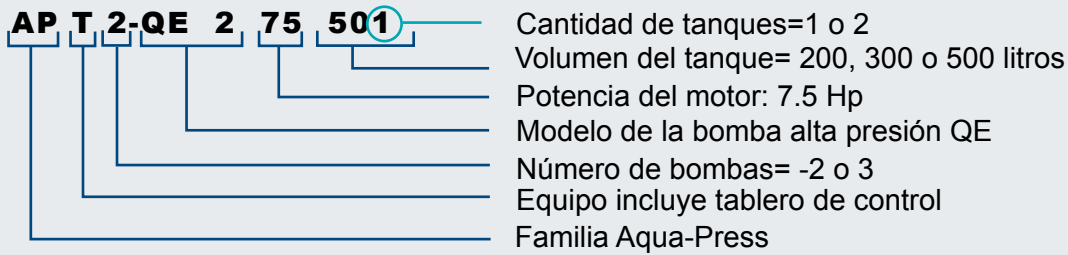
Ventajas

- Sencillez de operación
- Facilidad de instalación
- Espacio físico reducido
- Responsabilidad de un solo proveedor
- Facilidad de mantenimiento
- Entregado en un lugar solo lugar y en un solo envío
- Revisado y probado por personal técnico especializado

Aplicaciones

- Edificaciones donde se requiera un suministro confiable
- Edificios habitacionales
- Conjuntos residenciales
- Procesos industriales
- Hospitales
- Centros comerciales
- Tiendas de autoservicio, etc.

Nomenclatura



Tipos de bombas

Equipo múltiple con bombas verticales multietapas en línea con motores de alta eficiencia o eficiencia Premium. Armados tipo paquete con accesorios, listos para instalar, es decir, solo conectarlo a la succión, descarga y energía eléctrica.

También se suministran por separado, solo bombas, tablero y tanques precargados para instalaciones que así lo requieran.



También se pueden seleccionar con bombas sumergibles para pozo profundo con su tablero para presión constante o variable.

AQUA - PRESS y VARI - PRESS



TABLERO DE CONTROL PARA AQUA - PRESS

Descripción

Los tableros de control para equipos AQUA - PRESS son equipos totalmente ensamblados y cableados, listos para instalarse. En su construcción se utilizan componentes de excelente calidad, lo que garantiza un largo período de vida.

Estos tableros han sido diseñados para poder operar y controlar de forma sencilla y segura equipos de bombeo formados de dos, tres o cuatro bombas, teniendo la opción de controlar en forma manual o automática.

Alternación Manual

Incluyen guarda motores para protección de los motores en caso de cortocircuito, sobrecarga y falta de fase; contactores con bobinas, con la capacidad de corriente según la potencia del motor; selectores de tres posiciones para el funcionamiento en "Automático - Off - Manual"; Pilotos de señalización; alternación manual y adición de las motobombas; borneras de fuerza y control; interruptor para la protección del circuito de control; marquillas de identificación; cableado de fuerza y control; plano de conexiones; caja metálica.

Alternación Automática

Incluyen guarda motores para protección de los motores en caso de cortocircuito, sobrecarga y falta de fase; contactores con bobinas, con la capacidad de corriente según la potencia del motor; selectores de tres posiciones para el funcionamiento en "Automatico - Off - Manual"; lámparas LED de señalización; alternador automático con adición de las motobombas; borneras de fuerza y control; interruptor termo magnético bipolar para la protección del circuito de control; marquillas de identificación; cableado de fuerza y control; plano de conexiones; caja metálica.



Características

- 3 modos de control de bombas.
- Protección contra trabajo en seco o falta de agua en la cisterna
- Protección contra trabajo en seco o falta de agua
- Adición de Bombas
- Alternación de Bombas para que el desgaste se uniforme en todos los equipos.
- Presión confiable todo el tiempo
- Todo montado en una base estructural de canal de 5" o mas grande dependiendo del tamaño del equipo.

TANQUES HIDROACUMULADORES CON MEMBRANA VERTICAL



Descripción

Los tanques hidroacumuladores con membrana son tanques presurizados donde el agua y el aire están separados por una membrana flexible permitiendo que el agua se expanda y absorba los picos de presión.

Los tanques hidroneumáticos de membrana se usan comúnmente en la tubería de descarga para presurizar el sistema en situaciones de baja demanda donde el sistema de presión podría fallar. Disminuye el tiempo de funcionamiento de los equipos de presión, haciendo que el sistema sea más eficiente en términos de energía.



Características

- El tanque acumulador es fabricado en lámina Cold Rolled ASTM 424 cal 14.
- El tanque viene con una válvula de precarga de aire el cual debe ser calibrado con una presión de 2 PSI por debajo de la presión de arranque del equipo.
- Membrana en EPDM intercambiable que brinda un diseño único y durable
- Están disponibles para trabajo desde una presión de 1.5 bar hasta 10bar
- Temperatura de operación desde -10°C hasta 100°C.



Dimensiones Generales

Ref.	Capacidad	H	øA	D
25135	200 Lts	108.5cm	60.0 cm	1-1/4" NPT
25136	300 Lts	124.0cm	65.0 cm	1-1/4" NPT
25137	500 Lts	149.0cm	75.0 cm	1-1/4" NPT

Descripción

Los Sistemas de presión Vari-Press mantienen siempre una presión constante requerida en un sistema de demanda de agua. El tablero de control tiene un variador por bomba lo cual permite un control más rápido de la presión, el control permite alternar y adicionar bombas, el tablero incluye transductor de presión que asegura la medición de la presión al instante, elementos de monitoreo del estado del Sistema y protecciones a los motores. Los sistemas de presión constante Vari-Press son más eficientes y reducen el consumo de energía entre un 10% y un 30% aproximadamente.

El tanque hidroacumulador es fabricado en lámina de acero con una membrana en EPDM de alta resistencia que evita el contacto del agua con el metal y viene precargado de aire de tal forma que el sistema entra en funcionamiento cubriendo inmediatamente el 100% de la demanda estimada para el sistema. El tablero de control tiene un variador por bomba lo cual permite un control más rápido de la presión, el tablero incluye transductor de presión que asegura la medición de la presión al instante.



Componentes

- Bombas de acuerdo a la selección de caudal y presión.
- Manómetros
- Válvulas check bridada y válvulas bridadas de paso con seguro.
- Cabezal de descarga bridado bidireccional con diámetro en función del gasto del equipo.
- Se requiere switch flotador para activar la protección de trabajo en seco.
- Uniones, tuberías, ranurados y accesorios.
- Tornillería y switches de presión.
- Tanque hidroneumático (tanque precargado).
- mangueras y conexiones al tablero para control.
- Tablero de control con variador de velocidad y transductor de presión.
- Tanques hidroacumuladores con membrana de volúmenes más pequeños que en sistemas convencionales.
- Todo montado en una base estructural de canal de 5" o de mayor espesor según el tamaño del equipo.

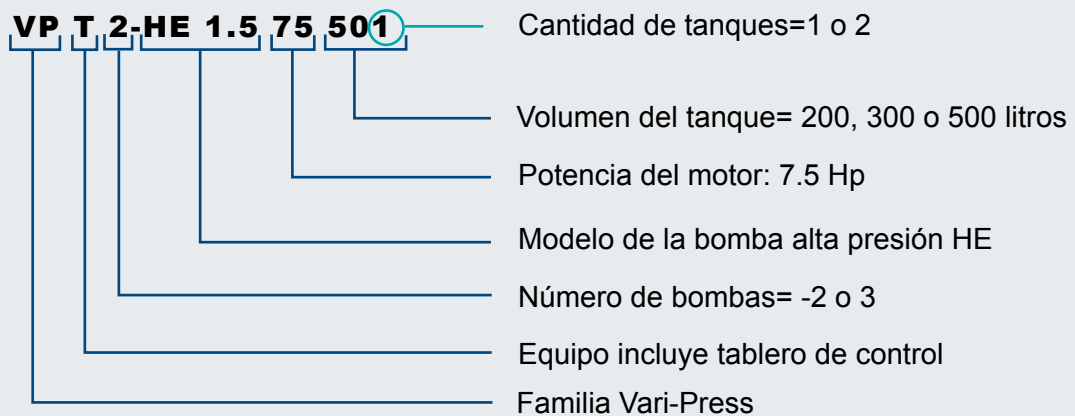
Ventajas

- Sencillez de operación
- Espacio físico reducido
- Facilidad de mantenimiento
- Bajos niveles de ruido
- Bajos niveles de vibración
- Ahorro de energía
- Entregado en un lugar solo lugar y en un solo envío.
- Revisado y probado por personal técnico especializado.

Aplicaciones

- Edificios habitacionales
- Centros comerciales
- Conjuntos residenciales
- Procesos industriales
- Hospitales
- Edificaciones donde se requiera un suministro de agua con presión constante confiable.

Nomenclatura





Descripción

Variador diseñado especialmente para sistemas de bombeo, con excelente control de presión constante, maximizando la eficiencia de la bomba y generando un incremento significativo en el ahorro de energía.

Sistema inteligente de presión constante. Equipo diseñado específicamente para sistemas de bombeo. Este variador ofrece una fácil configuración y protección tanto para la bomba, como para el motor. Posee un software específico integrado que permite al operador utilizar los parámetros del grupo "P" con una amplia gama de usos.

El variador ajustará automáticamente condiciones de funcionamiento de la bomba a los cambios del proceso, manteniendo una protección constante de la bomba y del sistema. El control del variador mantiene el punto de ajuste para el control en lazo cerrado en bombas, controlando la presión, el flujo o la temperatura.

Este variador fue diseñado teniendo en cuenta a los operadores y dueños de sistemas de bombas. Ofrece facilidad de configuración y características de protección de la bomba y del motor. Su software integrado y sus parámetros de configuración permiten al operador especificar valores de control para un amplio rango de aplicaciones.



Características

- 3 modos de control de bombas.
- Autodiagnóstico de mantenimiento.
- 5 aplicaciones pre-configuradas.
- Unidades de ingeniería seleccionadas y personalizables.
- Flujo mínimo, "sleep mode".
- Control de pre-carga de tubería.
- Arranques suaves sin golpes de ariete
- Presión constante y confiable
- Se utiliza un tanque precargado para amortiguar, no para depósito
- Se puede instalar para bombas horizontales, multi-etapas verticales o sumergibles para pozo profundo en cisternas.



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Villahermosa

Teléfono: (993) 128 9458

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Ciudad de Panamá

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Dirección: Aut. Bogotá - Medellín KM 7,5 Costado
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PBX: (+1) 743 9090

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Lima

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Teléfono: (+511) 9878 15371

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Provincia de Buenos Aires

Dirección: Le Corbusier 240 (B1616AEF)

Teléfono: (+5411) 4463 1477 / (+5411) 4463 3000

ESTADOS UNIDOS:

Tulsa, Oklahoma

Dirección: 4501 S 86th East Ave, OK 74145

Teléfono: 800 783 6756 / 214 337 8780

GUATEMALA:

Ciudad de Guatemala

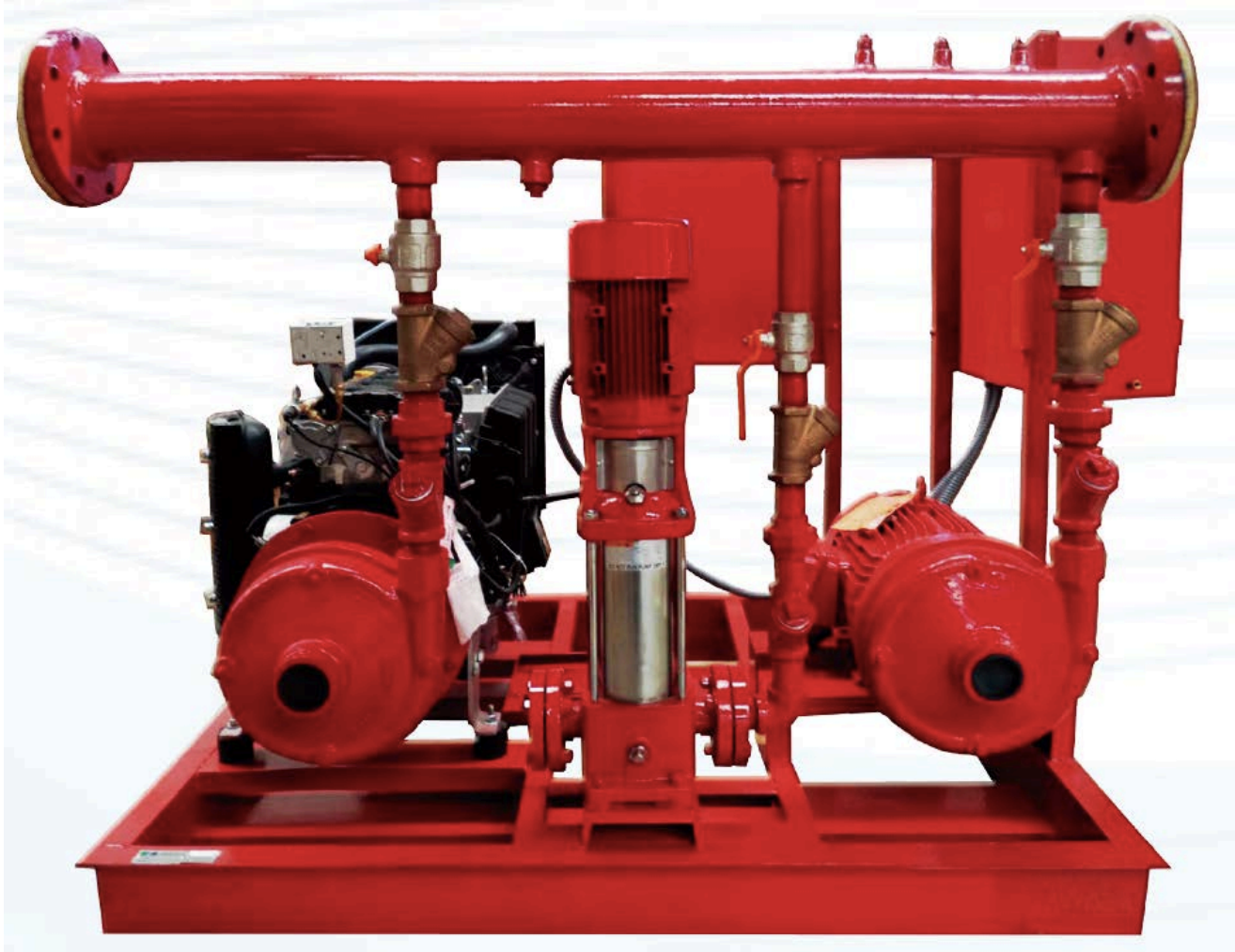
Dirección: 2a. Ave. 13-35, Zona 17 Ofibodega N. 16,
Los Almendros

Teléfono: (+502) 2255 1796 / (+502) 2255 5937





Equipo contra incendio WDM



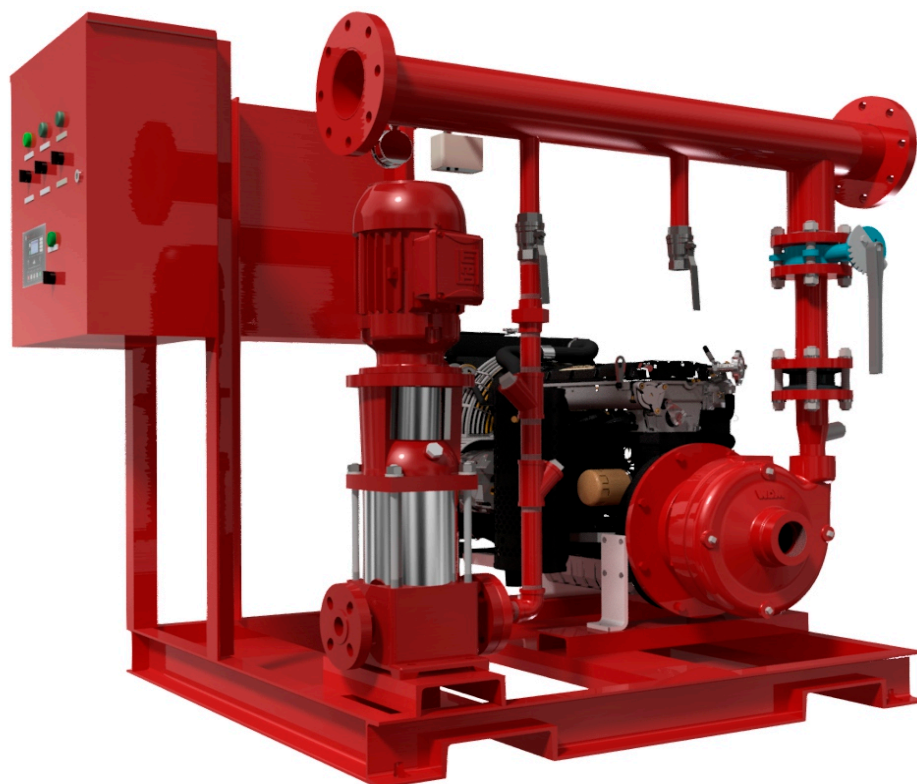
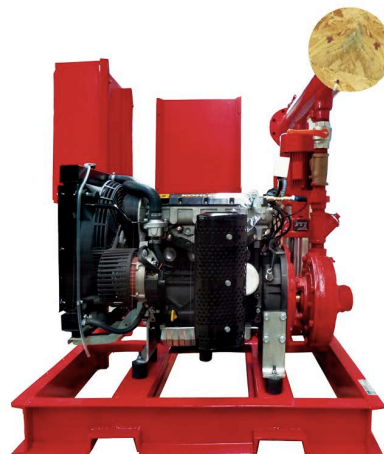
Equipo contra incendio tipo paquete
con tres bombas no aprobado

Equipo contra incendio tipo paquete

Somos una empresa multinacional que desde 1961 fabrica bombas para agua y sistemas de bombeo con tecnología, calidad y respaldo técnico de orden mundial ofreciendo soluciones integrales a la industria, la construcción y los sectores institucional y agrícola. Contamos con presencia en toda América, incluyendo EEUU, con plantas instaladas en México, Estados Unidos, Colombia, Argentina y Panamá.

Nuestra línea de equipos contra incendio está construida con la más alta calidad, asegurando el correcto funcionamiento del equipo en caso de alguna contingencia. Nuestros equipos contra incendio son diseñados de acuerdo a los requerimientos de nuestros clientes, esto nos da libertad de ajustarnos al ambiente en donde serán instalados. Estos pueden ser instalados en edificios departamentales, oficinas corporativas, hospitales, hoteles, tiendas de autoservicio, escuelas, locales comerciales, etc.

Todos los equipos son probados antes de que sean enviado al cliente, esto para comprobar el correcto funcionamiento del mismo en caso de que se requiera. Para la selección del equipo contra incendio favor de contactar a nuestros ingenieros de ventas.



Validar Referencia que incluye componentes en el listado de producto

Guía de productos para sistemas contra incendio

Bomba piloto o jockey

1. Bomba VSE - vertical multietapas en línea acoplada a motor eléctrico TCCVE eficiencia premium



H máx	Q máx	HP
240 mca	436 gpm	1 hp - 40 hp

Bomba eléctrica Principal

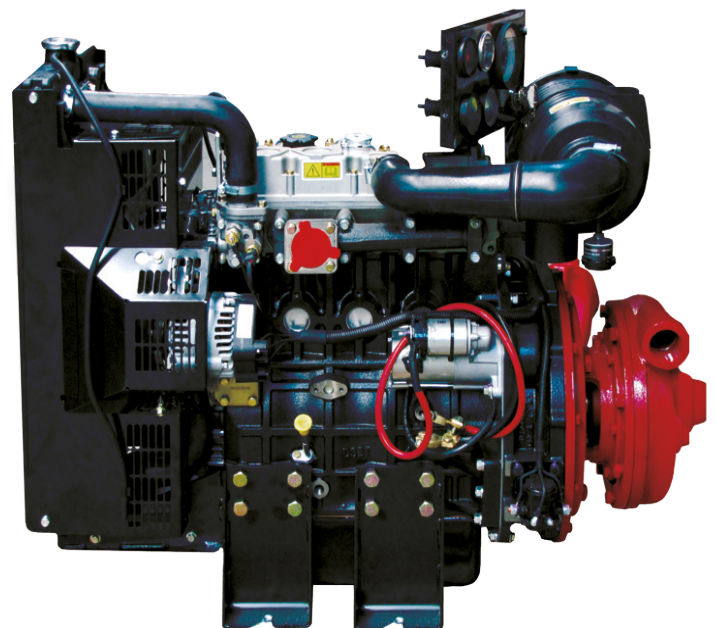
2. Bomba GE - Servicios generales acoplada a motor eléctrico TCCVE



H máx	Q máx	Succ y Desc.	HP
1,400mca	4,200 gpm	Hasta 4"	3 fases 1.5-200hp

Bomba de combustión

3. Bomba GDI - Servicios generales acoplada directamente o mediante cople flexible a motor de combustión interna enfriado por aire o agua, turbo cargado o con aspiración natural. manejamos varias marcas.



Modelo	Succ. y Desc.	HP	RPM
GDI 2C 600 PK	2 1/2" x 2" (R)	60	3000

Guía de productos para sistemas contra incendio

Componentes

- Bombas de acuerdo a la selección de caudal y presión
- Manómetros y switch de presión
- Válvulas check bridada y válvulas de paso con seguro
- mangueras y conexiones para el control en los tableros
- se requiere Switch flotador para habilitar protección contra trabajo en seco.
- Uniones, tuberías Ranurados y Accesorios
- Tornillería
- Tanque de combustible en base a la potencia del motor de combustión
- Todo montado en una base estructural de canal de 5" o mayor en base a la potencia de las bombas.
- Cabezal de descarga con un diámetro en función del gasto del equipo bidireccional bridado en cada lado
- Tablero de control con arrancadores y protección para las bombas eléctricas y en el caso de la bomba de combustión automatizada



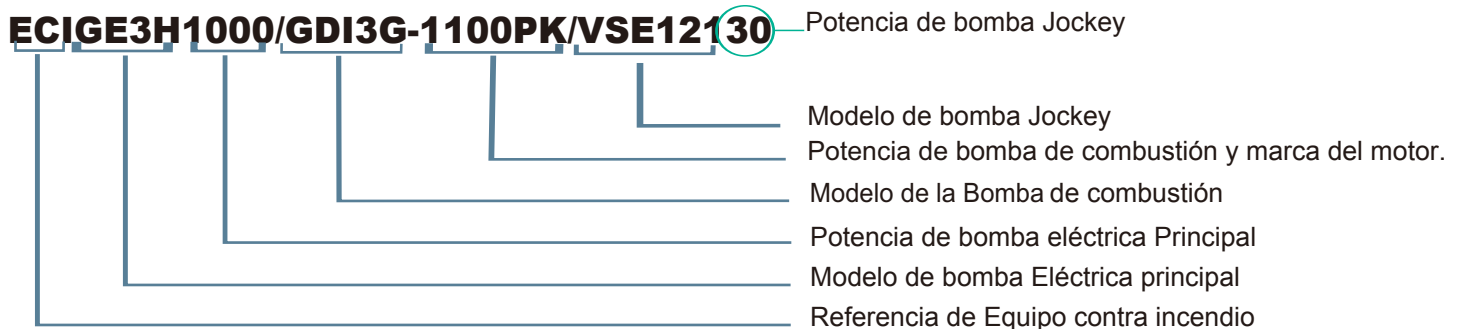
Ventajas

- Sencillez de operación
- Facilidad de instalación
- Entregado en lugar de instalación en un solo envío
- Espacio físico reducido
- Facilidad de mantenimiento
- Responsabilidad de un solo proveedor
- Tenemos paquete de tres bombas o dos (combustión y jockey)

Aplicaciones

- Edificios habitacionales
- Conjuntos residenciales
- Procesos industriales
- Centros comerciales
- Hospitales
- Plazas, tiendas de autoservicio
- Y edificaciones donde se requiera un equipo contra incendio

Nomenclatura

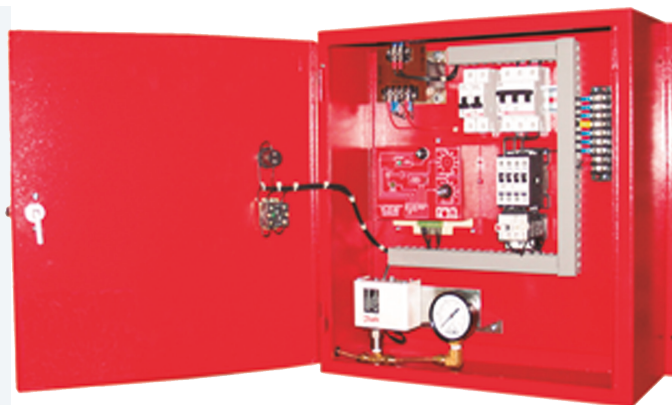


Guía de productos para sistemas contra incendio

Tablero de control para ECI

Su función es el control, maniobra y protección de los distintos elementos que componen el grupo contraincendios. Dependiendo de las características del grupo, el cuadro puede presentar diferentes componentes pero básicamente se compone de bornero de conexiones, fusibles de protección, contactores, protectores, transformador, batería, cargador de batería, sirena, etc....

WDM Water Systems SA de CV, ofrece paneles o tableros de control eléctricos (a plena carga y a tensión reducida), diesel y jockey. Con configuraciones para operar uno o más motores y pueden ser programados en modo manual o automático.



Características



- Botón de paro manual.
- Voltímetros y amperímetros digitales para cada batería. en el caso de combustión
- Protección por:
 - Baja presión de aceite.
 - Alta temperatura del agua.
 - Falla de arranque.
 - Sobre velocidad.
- Retardo de arranque y retardo de paro ajustable 0-6 Min.
- Contacto remoto de alarma o contacto para control de la válvula solenoide de retorno.
- Monitoreo via Modbus RTU o Modbus TCP-IP. (Opcional)
- Alarma auditiva.
- Indicadores de:
 - Falla de arranque.
 - Falla de baja presión del aceite.
 - Falla de alta temperatura del agua.
 - Falla de sobre velocidad.
- Gabinete en color rojo, con llave de seguridad, IP55 de 50 X 40 X 20 Cm. a prueba de polvo y agua.
- Combinación de arrancador a Tensión Plena, consta de Termomagnético, contactor a 127Vca y relevador de sobrecarga adecuado a la potencia del motor eléctrico,
- Selector de Operación Mano Fuera Auto de 22mm de diámetro
- Luz Piloto de Bomba Operando de 22mm de diámetro a 127Vca en color verde
- Tablilla Terminal de conexiones con capacidad de acuerdo a la potencia del motor eléctrico y señales
- Gabinete Metálico Nema12 Para uso interior servicio Industrial,
- Tamaño adecuado, de acero al carbón de calibre 0.0475", con acabado en pintura epóxica Homeada en color combinado Rojo.
- Manual de Operación e Instalación del Tablero, Incluye diagramas
- Tren Neumático Que Consta de Un Interruptores de Presión, Un manómetro y conexiones
- Voltaje de Operación en 220Vca o 440Vca en caso de 440Vca. Cuenta con Transformador de control de 440/220/127Vca.

Guía de productos para sistemas contra incendio

Componentes del tablero para bomba Jockey

1. Gabinete metálico que cumple con las normas IP-55 a prueba de polvo y agua pintado con Poliéster-Epoxi resistente a la corrosión color Rojo tamaño 30X25X15.
2. Guardamotor con ajuste de 4 a 6.3 Amp.
3. Contactor de 9 Amp.
4. Piloto verde de Bomba Operando.
5. Selector de operación Manual- Fuera –Automático.
6. Terminal de conexión para el interruptor de presión.
7. Transformador de control de 440V / 220V.
8. Relevador de operación mínima con ajuste de 0 a 3 minutos (Opcional).
9. Interruptor de Presión de 0 a 10 Kg. (Opcional).



Componentes del tablero para bomba Eléctrica Principal



- Contactor magnético a plena tensión.
- Interruptor termomagnético de 25 KA @ 220 V y 10 KA @ 440 V (Interruptor magnético disponible)
- Detector e Indicación de bajo nivel de succión.
- Módulo de control.
- Juego de 3 electrodos para la cisterna.
- Retardo de paro ajustable de 0-6 Min.
- Selector de 22 mm. para operación Manual-Fuera-Automático de la bomba.
- Luces piloto de 22 mm. que indican: Bomba operando y bajo nivel de succión.
- Transformador de control 440/220 V para los tableros de 440 V
- Gabinete metálico con llave de seguridad IP55 a prueba de polvo y agua, color rojo.
- Tablilla de conexión de control.
- Puede llevar arrancador estado solido o a tensión reducida tipo autotransformador para motores eléctricos mas grandes

Componentes del tablero para bomba Diesel

Para un banco de baterías

- Módulo de control con pantalla iluminada LCD de 4 líneas.
- Memoria de fallas.
- Pilotos indicadores de: Tablero en automático, llamada a operación y de falla.
- Control de 6 intentos de arranque y descansos de 10 seg.
- Tacómetro digital con alarma de sobre velocidad.
- Cargador de baterías automático controlado por microprocesador, con ajuste de corte y de carga que duplica la vida de la batería, calibrado de fábrica.
- Horómetro que indica el tiempo de operación de la bomba.
- Selector para operación Manual-Fuera-Automático.
- Botones para: marcha manual, paro manual y prueba.
- Selector de paro manual/automático.
- Voltímetro y amperímetro digitales de la batería.
- Protección por:
 - Baja presión de aceite.
 - Alta temperatura del agua.
 - Falla de arranque.
 - Sobre velocidad.
- Prueba automática con programador semanal y salida para apertura automática de válvula de alivio durante la prueba.(Opcional)
- Retardo de paro ajustable 0-6 Min.
- Retardo de arranque ajustable.
- Contacto remoto de alarma.(Opcional)
- Monitoreo via Modbus RTU o Modbus TCP-IP. (Opcional)
- Alarma auditiva.
- La pantalla de LCD Indica:
 - La operación del tablero.
 - Los ajustes de retardo de arranque, retardo de paro, paro manual/automático, calibración del tacómetro, y el límite de sobre velocidad.
 - Todas las fallas incluyendo la falla de C.A. en el cargador y batería baja.
- Gabinete en color rojo, con llave de seguridad, IP55 a prueba de polvo y agua de 40 x 30 x 20 Cm.
- Peso con empaque de cartón: 12.7 kg.



Para dos bancos de baterías

- Dos cargadores de baterías automáticos controlados por microprocesador, con ajuste de corte y de carga que duplica la vida de la batería, calibrado de fábrica.
- Corte de carga al arranque.
 - Protector de sobrecarga de control.
 - Selector de 22 mm. para operación Manual-Fuera-Automático.
 - Botones de 22 mm. para marcha manual de batería #1 y #2.
 - Botón de prueba.
 - Botón para borrar memoria de fallas.
 - Selector de paro manual-automático.

Guía de productos para sistemas contra incendio

Tanque de combustible diesel

Este tipo de tanques se usa en equipos contra incendios fabricado por WDM en base a la NOM NFPA20

Características

- Tanque Horizontal contruido de lamona rolada en frio calibre 10 (astm-1012)
- Base de angulo de 1.5"
- Respirador de tubo de Ø1/4".
- Indicador de nivel de manguera transparente Ø1/4".
- Tapón de combustible de plástico Ø2".
- Toma para drenado de combustible Ø1/4".
- Válvulas de Ø1/4" en tomas de succión y descarga para capacidades de 50 a 350.
- Válvulas de Ø1/2" en tomas de succión y descarga para capacidades de 500 y 750.



	Litros	
Tanque de Combustible	100 Lts	
	150 Lts	
	200 Lts	
	300 Lts	
	500 Lts	
	750 Lts	



www.wdmpumps.com

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Monterrey:

- Dirección: Sigma 9224 Cd. Industrial Mitras, García, N.L. CP 66000.
- Tel. (81) 8000 0550

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Colonia Balcones del Sol, Zapopán, Jalisco. CP 45068.
- Tel. (33) 3812 9481

Hermosillo:

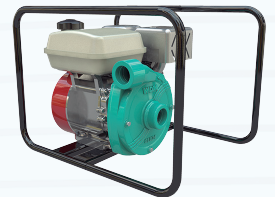
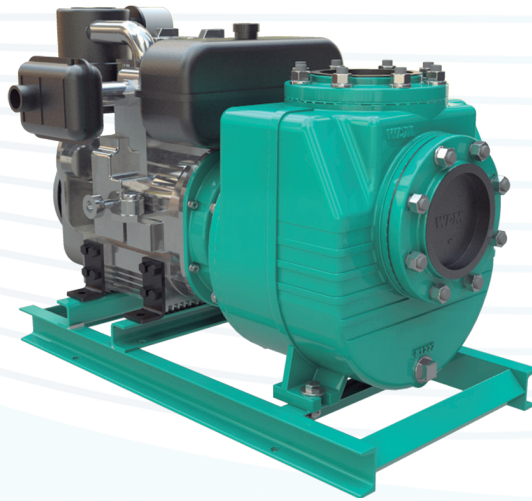
- Dirección: Guillermo Arreola No. 72 entre Tabasco y Campeche,
Colonia Olivares, Hermosillo, Sonora. CP 83180.
- Tel. (66) 2207 1158

Estado de México:

- Dirección: Boulevard Centro Industrial No. 26 Bodega B2,
Fraccionamiento Industrial Puente de Vigas, Tlalnepantla, Edo. de México.
CP 54070.
- Tel. (55) 6387 8896

WDM

PUMPS



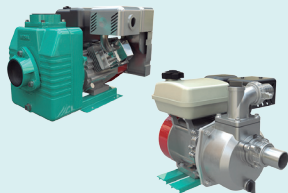
Guía de Productos

Versión 2014

WDM Water Systems

Bombas Autocebantes Gasolina

AG/AAG



- H max.= Hasta 49 mca
- Q max.= Hasta 465 gpm
- Construcción monobloque
- Motores a gasolina con potencias desde 1.5 hp hasta 18 hp
- Impulsores semiabiertos en hierro fundido

Bombas Autocebantes Diesel

AD/AAD



- H max.= Hasta 42 mca
- Q max.= Hasta 1,100 gpm
- Construcción monobloque
- Motores diesel con potencias desde 10 hp hasta 25 hp
- Impulsores semiabiertos en hierro fundido

Bombas Autocebantes Eje Libre

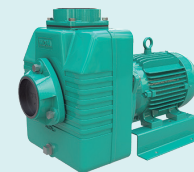
AU/AUD



- H max.= Hasta 56 mca
- Q max.= Hasta 3,600 gpm
- Construcción eje libre
- Impulsores semiabiertos en hierro fundido
- Posible acomplamiento a motores Diesel y eléctricos de acuerdo a la necesidad

Bombas Autocebantes Eléctricas

AE



- H max.= Hasta 60 mca
- Q max.= Hasta 1,200 gpm
- Construcción monobloque
- Motores eléctricos monofásicos y trifásicos con potencias desde ¼ hp hasta 25 hp
- Impulsores semiabiertos en hierro fundido

Bombas Caseras

CE/DE/EE/FE



- H max.= Hasta 46 mca
- Q max.= Hasta 95 gpm
- Construcción monobloque
- Motores eléctricos de 1 y 3 fases con potencias desde ¼ hp hasta 2 hp
- Cierre con sello mecánico
- Impulsor cerrado en plástico

Bombas Mediana Presión

ME



- H max. = Hasta de 56 mca
- Q max. = Hasta de 600 gpm
- Construcción monobloque
- Succión y descarga de hasta 4"
- Motores de 1 y 3 fases de hasta 15 hp
- Impulsor cerrado en hierro fundido

Bombas Servicios Generales

GE/GU



- H max.= Hasta 140 mca
- Q max.= Hasta 4,200 gpm
- Construcción monobloque y eje libre
- Motores eléctricos trifásicos a 1,800 o 3,600 rpm con potencias desde 1.5 hp hasta 200 hp
- Motores de combustión interna hasta de 170 hp
- Impulsores cerrados en hierro fundido/opción a Acero Inoxidable SS-316

Bombas Sumergibles para Aguas Residuales

NE



- H max.= Hasta 50 mca
- Q max.= Hasta 2,275 gpm
- Bombas tipo sumergible
- Construcción monobloque
- Impulsor cerrado o semiabierto en hierro fundido
- Motores eléctricos monofásicos y trifásicos con potencias desde 0.4 hp hasta 75 hp

Bombas Alta Presión Eléctricas

HE/QE



- H max.= Hasta 175 mca
- Q max.= Hasta 1,750 gpm
- Construcción monobloque
- Motores eléctricos monofásicos y trifásicos con potencias desde 2 hp hasta 75 hp
- Impulsores cerrados en hierro fundido

Bombas Alta Presión Gasolina

HG/QG



- H max.= Hasta 86 mca
- Q max.= Hasta 400 gpm
- Construcción monobloque
- Motores a gasolina con potencias desde 3.5 hp hasta 18 hp
- Impulsores cerrados en hierro fundido

Bombas Alta Presión Diesel

HD/QD



- H max.= Hasta 175mca
- Q max.= Hasta 1,750 gpm
- Construcción monobloque
- Motores diesel con potencias desde 10 hp hasta 18.8 hp
- Impulsores cerrados en hierro fundido

Bombas Alta Presión Eje Libre

HU/QU



- H max.= Hasta 175 mca
- Q max.= Hasta 1,750 gpm
- Construcción eje libre
- Impulsores cerrados en hierro fundido

Bombas Multietapas en Acero Inoxidable

VSE



- H max.= Hasta 240 mca
- Q max.= Hasta 436 gpm
- Motores eléctricos trifásicos con potencias desde 1.0 hp hasta 40 hp

Bombas Sumergibles tipo Lapicero para Pozo Profundo

SP/ST



- H max.= Hasta 490 mca
- Q max.= Hasta 396 gpm
- Motores eléctricos monofásicos y trifásicos con potencias desde 0.5 hp hasta 40 hp
- Para pozos profundos de 4" y 6" de diámetro

Bomba Vertical en Línea

PI



- H max.= Hasta 165 mca
- Q max.= Hasta 4,500 gpm
- Bridas descarga hasta 12"
- Cople bipartido y guardacople
- Motor integrado
- Una sola pieza
- Bridas cumplen dimensiones ANSI

Otros productos



Tanques precargados



Motores



Plantas de Luz

WDM Water Systems

Somos una multinacional que desde 1961 fabrica Bombas para Agua y Sistemas de Bombeo con tecnología, calidad y respaldo técnico de orden mundial, ofreciendo soluciones integrales a la industria, la construcción y los sectores institucional y agrícola. Actualmente tenemos presencia en toda América, con plantas instaladas en México, Estados Unidos, Colombia, Argentina, Panamá y Guatemala. Manejamos una red de distribución en toda la República Mexicana, otorgando a nuestros distribuidores todas las ventajas como mayoristas.



Nuestros productos se utilizan en la extracción, conducción y elevación de agua. Sus aplicaciones más comunes son el manejo del agua potable, agua de lluvia y aguas negras, desinundaciones, procesamiento de granos, suministro de agua en edificios, lavado de vehículos, maquinaria y establos, aumento de presión en tuberías de suministro, extinción de incendios, riego por aspersión, minería, recirculación de agua en piscinas y torres de enfriamiento, plantas de tratamiento de agua, drenajes y construcción en general.

Para cumplir con todas estas aplicaciones, dentro de nuestro portafolio contamos con Bombas Autocebantes, Multietapas, Mediana y Alta Presión, Servicios Generales, Sumergibles para Aguas Residuales, Sumergibles para Pozo Profundo y Caseras, entre otras.



- Estados Unidos
- México
- Guatemala
- Panamá
- Colombia
- Argentina

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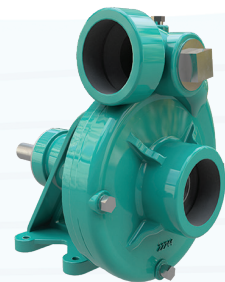
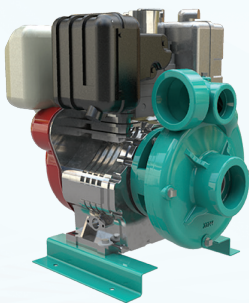
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WDM PUMPS



HE / HG / HD / HU

High Pressure Pumps

WDM Water Systems

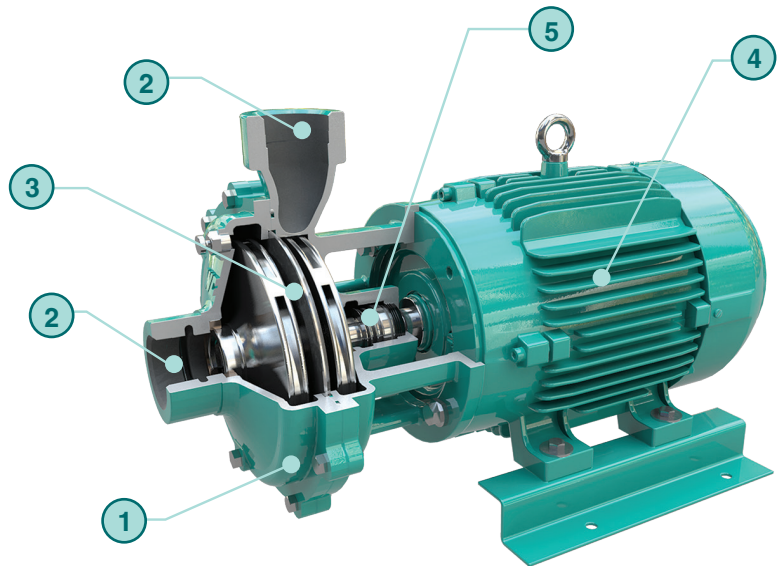
Benefits

- Variety of sizes
- Flexible Installation Methods
- Long service life
- Easy maintenance
- Any type of engine can be installed

Performance	
Flow	Up to 1,750 gpm
Head	Up to 175 mca
Temperature	Up to 158 °F
Discharge flange	Up to 6"
1 & 2 Impeller pumps	

Applications

- Construction Industry
- Municipal y Environmental
- Liquid with no abrasive particles
- Clean water or sewage with no abrasive particles
- Drain with small spaces
- Transportation of liquids
- Agriculture
- Irrigation
- Water Treatment
- Fluid Evacuation



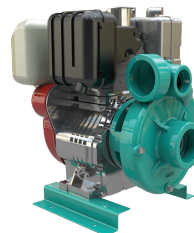
- 1 Construction of high strength iron
- 2 Suction and discharge 1 1/2 "to 6"
(Depending on the model and size it can be threaded or flanged.)
- 3 Closed impeller
- 4 2 hp Motors and 4hp
- 5 Mechanical seal
(Can be coupled with electric motor, diesel or gasoline)



HE



HG



HD

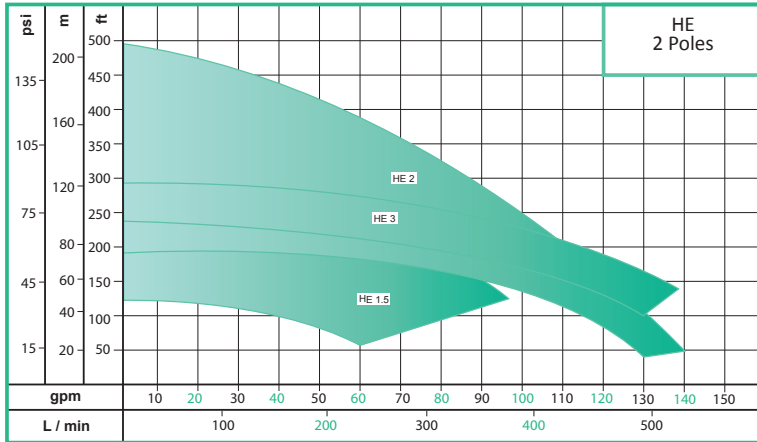


HU

HE / HG / HD / HU

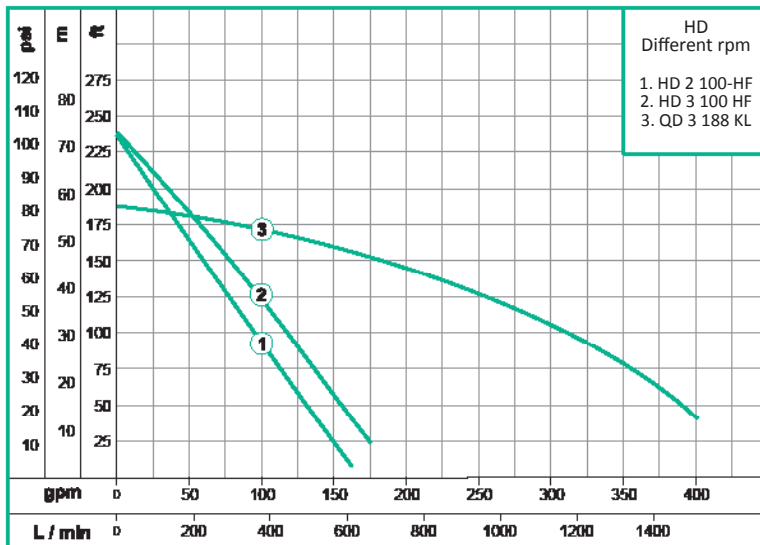
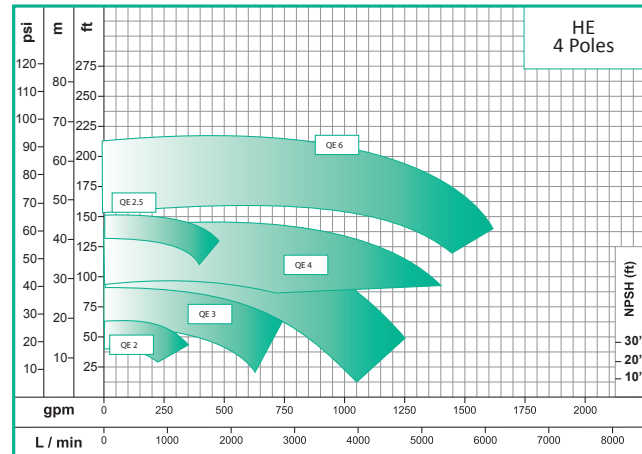


Selection Graphic



Model	Suction	Discharge	HP
HE 1.5	1.5"	1.5"	2 - 10
HE 2	2"	2"	3 - 15
HE 3	3"	3"	7.5 - 25

Model	Suction	Discharge	HP
QE 2	2.5"	2"	3.5 - 10
QE 2.5	3"	2.5"	3.5 - 18
QE 3	4"	3"	8 - 18
QE 4	5"	4"	13 - 18



Model	Suction	Discharge	HP
HD 2	2"	2"	10
HD 3	3"	3"	10
QD 3	4"	3"	18.8

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WDM PUMPS



ME

Medium Pressure Pumps

WDM Water Systems

Benefits

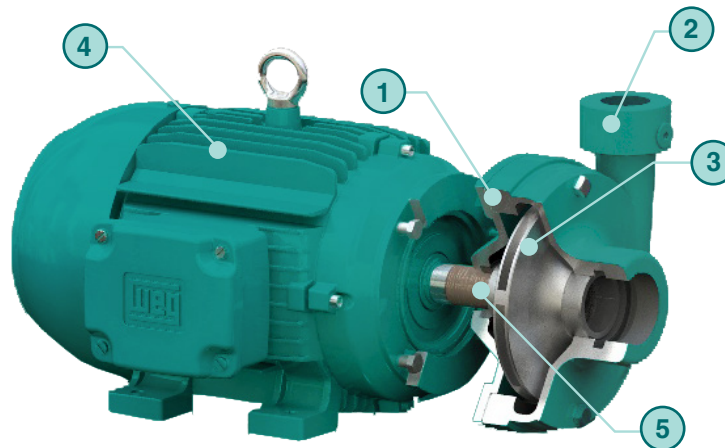
- Quick delivery
- Easy set up & installation
- Long service life
- Low maintenance
- Variety of sizes
- Rear pull out
- Ease of maintenance



Applications

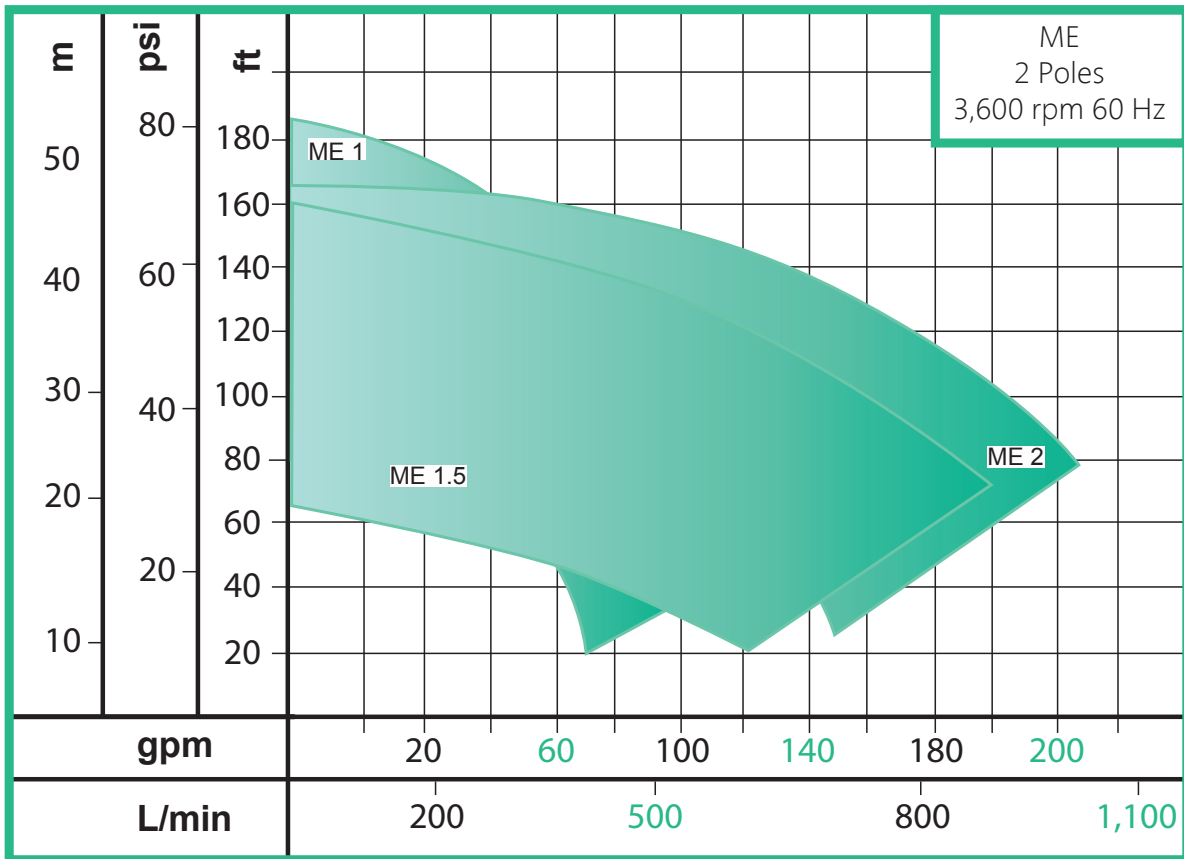
- HVAC
- Irrigation
- Coolants
- Cooling towers
- Industrial

Performance	
Flow	Up to 600 gpm
Head	Up to 184 ft
Temperature	Up to 158 °F
Discharge flange	Up to 4"
Max. working pressure	175 psi



- ① Cast Iron construction
- ② Up to 4" threaded suction and 2" discharge
- ③ Enclosed stainless impeller
- ④ 3 ph up to 15 hp
- ⑤ Mechanical seal of 1 ¼" Carbon – Ceramic Buna N Mechanical Seal

Selection Chart



Model	Suc.	Disch.	hp
ME 1	1.5"	1.5"	2 - 5
ME 1.5	2"	2"	2 - 7.5
ME 2	2.5"	2"	3 - 10

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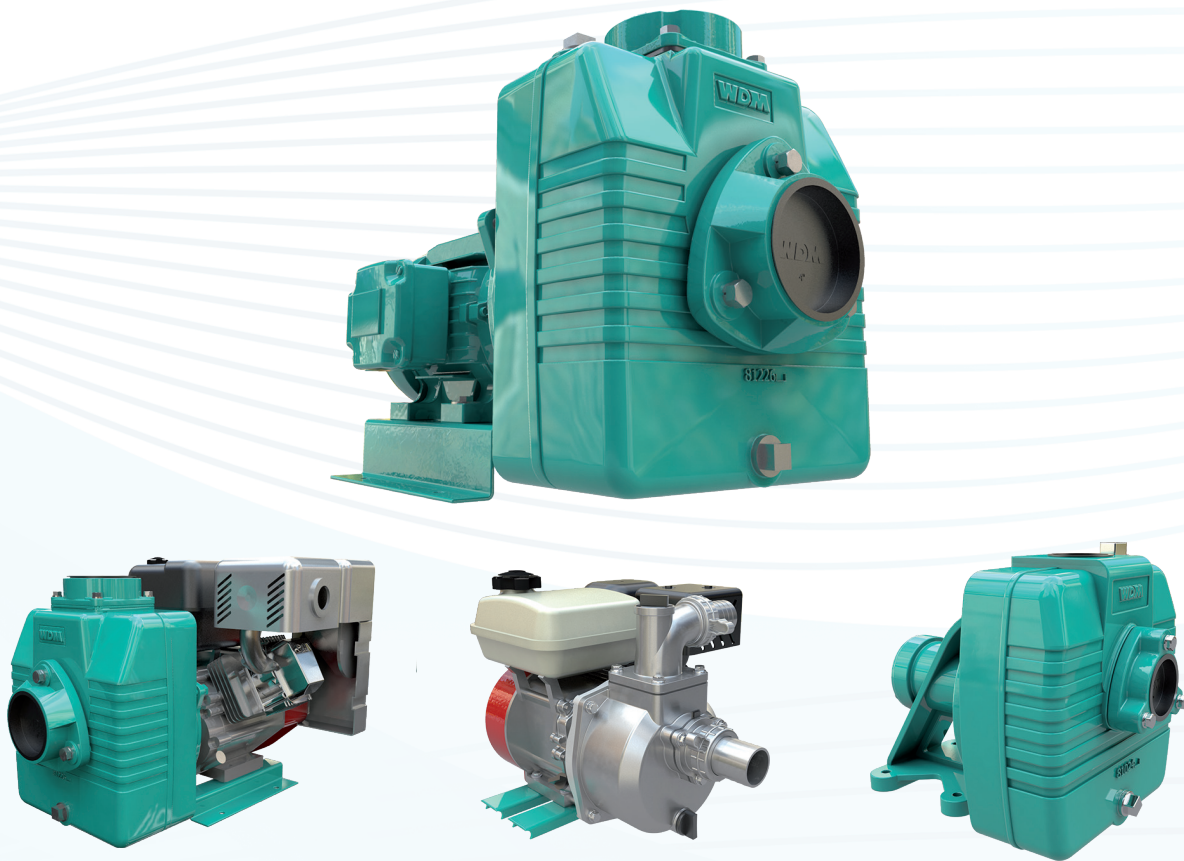


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WDM PUMPS



AE / AG / AAG / AU

Self Priming Pumps

WDM Water Systems

AE / AG / AAG / AU



Benefits

- Variety of sizes
- Flexible installation methods
- Long service life
- Easy Maintenance

Applications

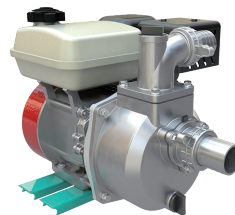
- Clean water or waste water with non-abrasives
- Construction Industry
- Small space drainage
- Transportation of liquids
- Agriculture
- Irrigation
- Recirculation
- Fluid drainage
- Municipal & environmental



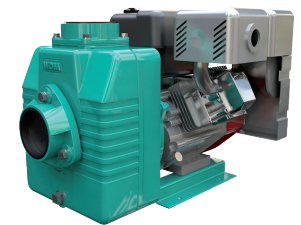
AE



AU

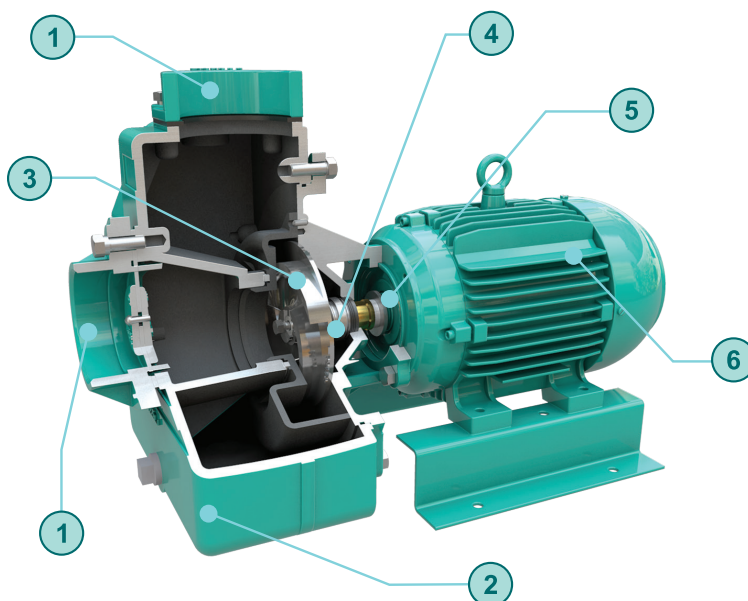


AAG



AG

Performance	
Flow	Up to 3,600 gpm
Head	Up to 196 ft
Temperature	Up to 158 °F
Discharge Flange	Up to 10"
Max. working pressure	175 psi

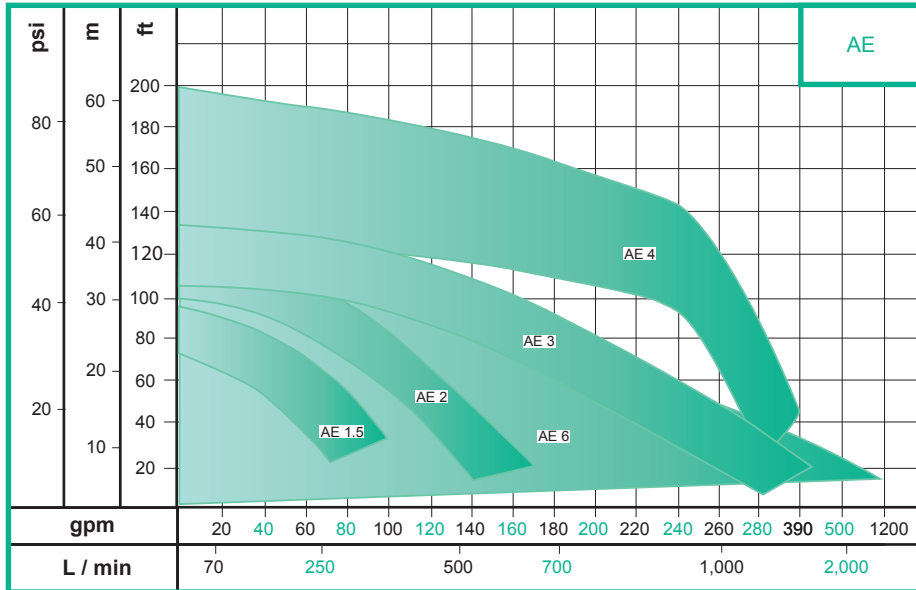


- 1 Threaded suction and discharge up to 10"
- 2 Cast iron construction
- 3 Cast iron semi-open dynamically balanced impeller
- 4 1.25" bronze sleeve
- 5 Ceramic/carbon/Buna-N mechanical seal
- 6 ODP or TEFC motors up to 15 hp

AE / AG / AAG / AU



Selection chart

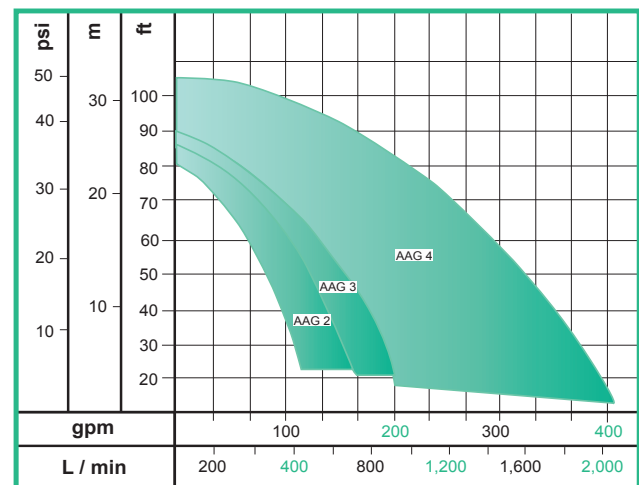
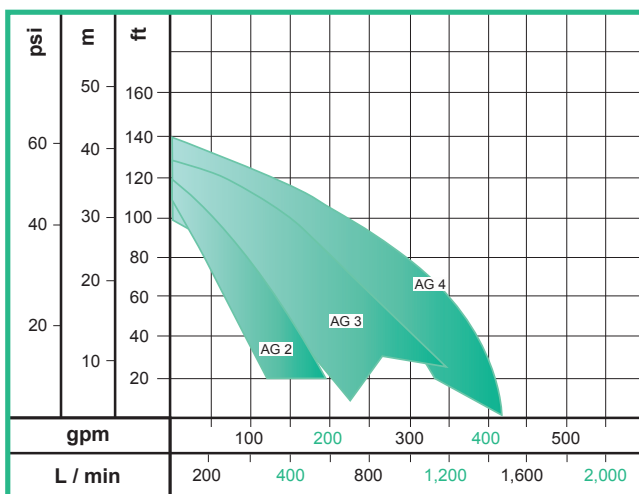


Model	Suc.	Disch.	hp
AE 1.5	1.5"	1.5"	0.75 - 2
AE 2	2"	2"	5 - 7.5
AE 3	3"	3"	5 - 7.5
AE 4	4"	4"	25

Model	Suc.	Disch.	max GPM
AU 1.5	1.5"	1.5"	125
AU 2M	2"	2"	140
AU 2N	2"	2"	187
AU 3	3"	3"	315
AU 4	4"	4"	440
AU 6	6"	6"	1,600
AU 8	8"	8"	1,600

Model	Suc.	Disch.	hp
AG 2	2"	2"	3.5 - 8
AG 3	3"	3"	13 - 6
AG 4	4"	4"	13 - 18

Model	Suc.	Disch.	hp
AAG 1	1"	1"	1.5
AAG 2	2"	2"	3.5 - 6.5
AAG 3	3"	3"	5.5-6.5
AAG 4	4"	4"	13



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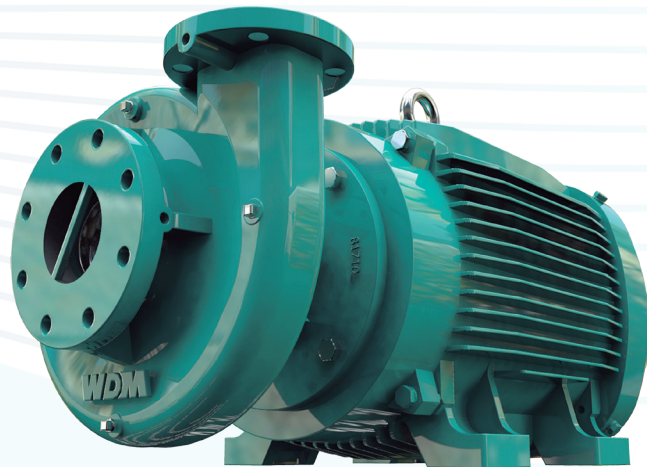
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WDM

PUMPS



 **GE / GU**

General Services Pumps

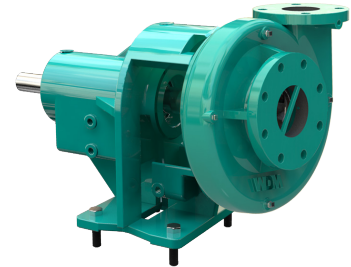
WDM Water Systems

Benefits

- Quick delivery
- Flexible installation methods
- Long service life
- Easy maintenance
- Variety of sizes



GE

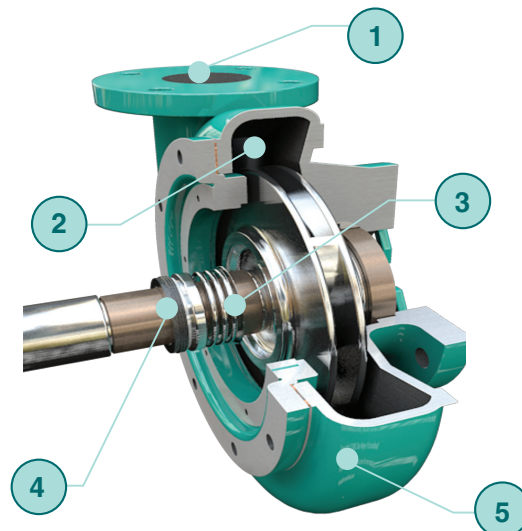


GU

Applications

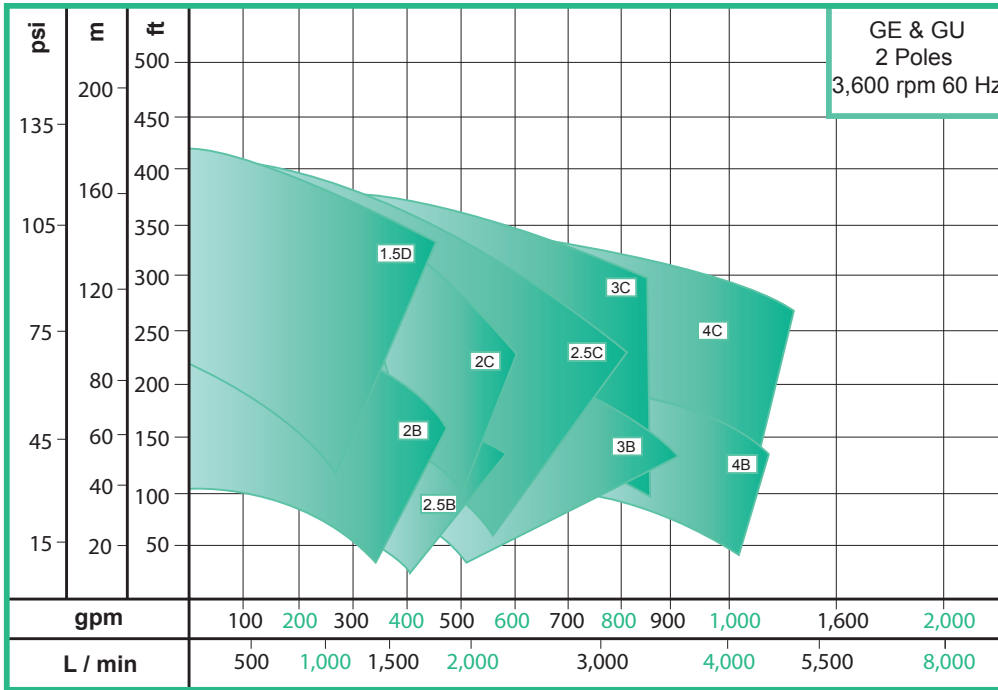
- HVAC
- Cooling towers
- Water supply
- Irrigation
- Construction Industry
- Washing applications
- Recirculation
- Industrial

Performance	
Flow	Up to 4,200 gpm
Head	Up to 431 ft
Temperature	Up to 158 °F
Discharge flange	Up to 8"
Max. working pressure	175 psi

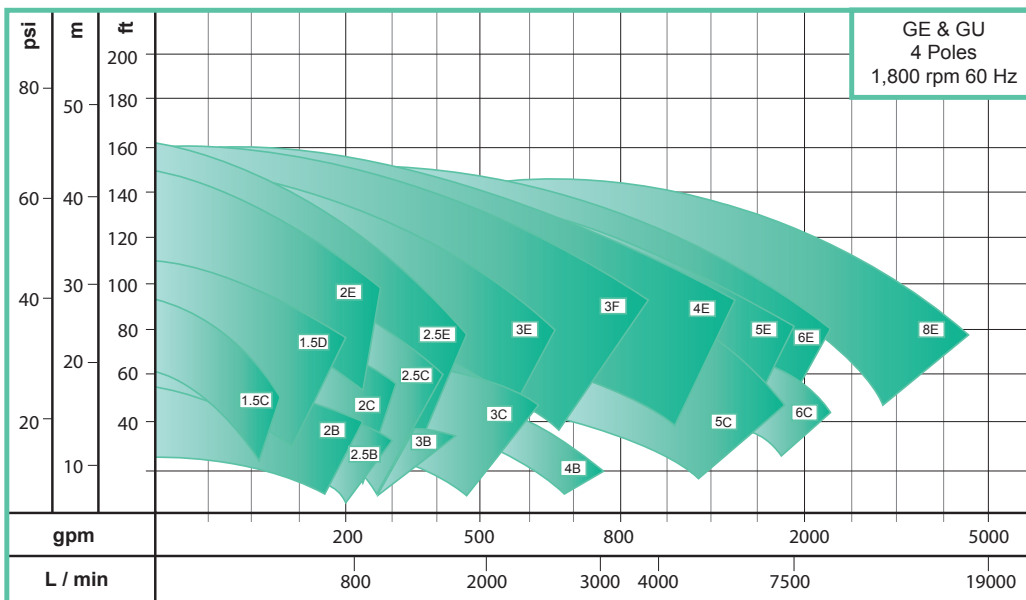


- ① ANSI flanges up to 8"
- ② Enclosed impeller. Cast S.S 304
- ③ Bronze wear rings
- ④ Ceramic/carbon/Buna-N standard mechanical seal.
- ⑤ Cast iron case

Selection Chart



Model	Suc.	Disch.	hp
1.5C-2	2"	1.5"	10 - 25
1.5D-2	2"	1.5"	20 - 60
2B-2	2.5"	2"	75 - 250
2C-2	2.5"	2"	20 - 60
2.5-B1-/2	3"	2.5"	7.5 - 30
2.5C-2	3"	2.5"	20 - 75
3B-2	4"	3"	7.5 - 40
3C-2	4"	3"	25 - 75
4B-2	5"	4"	25 - 50
4C-2	5"	4"	50 - 125



Model	Suc.	Disch.	hp
1.5C-1	2"	1.5"	1.5 - 5
1.5D-1	2"	1.5"	2 - 7.5
2B-1	2.5"	2"	3/4 - 3
2C-1	2.5"	2"	2 - 7.5
2E-1	2.5"	2"	5 - 15
2.5B-1	3"	2.5"	7.5 - 20
2.5C-1	3"	2.5"	2 - 7.5
2.5E-2	3"	2.5"	7.5 - 20
3B-1	4"	3"	1 - 5
3C-1	4"	3"	3 - 10
3E-2	4"	3"	10 - 25
3F-2	4"	3"	15 - 30
4B-1	5"	4"	3 - 7.5
4E-2	5"	4"	15 - 50
5C-2	6"	5"	10 - 30
5E-2	6"	5"	20 - 50
6C-2	8"	6"	15 - 40
6E-2	8"	6"	25 - 75
8E-3	10"	8"	60 - 125

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WDM

PUMPS



NE

Submersible Non Clog Pumps

WDM Water Systems

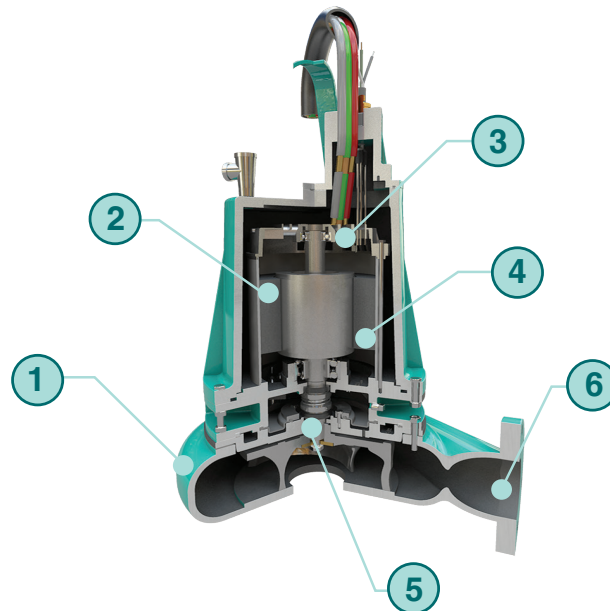
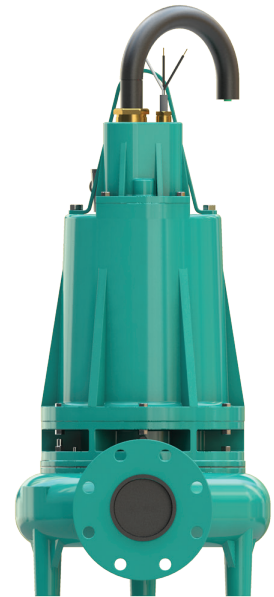
Benefits

- High efficiency design
- Semi-open impellers
- Variety of sizes
- Variety of applications
- Easy maintenance

Applications

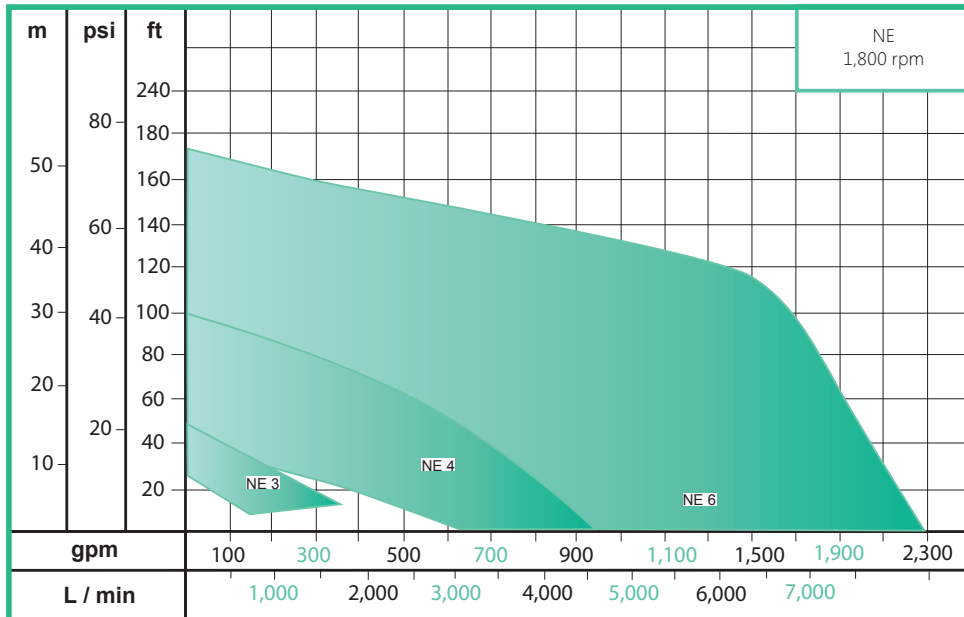
- General industry
- Cooling towers
- Municipal
- Mining
- Water
- Agriculture industry
- Paper industry
- Power generation

Performance Range	
Flow	Up to 2,300gpm
Head	Up to 176 ft
Temperature	Up to 158 °F
Discharge Flange	Up to 6"
Solid Handling	Up to 3"
Max Working Pressure	78 psi

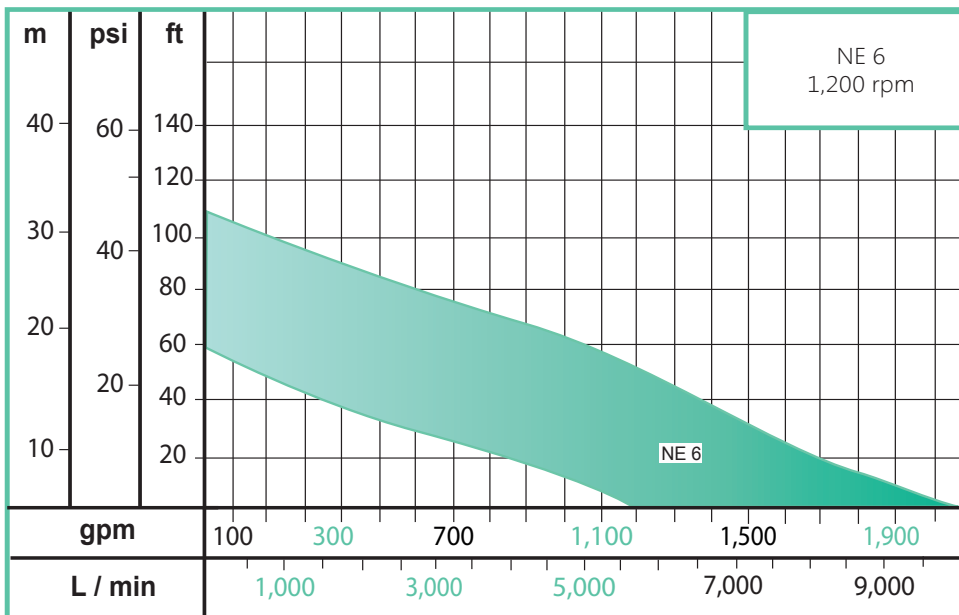


- | | |
|--|---|
| <ul style="list-style-type: none"> ① Cast iron body construction ② Cast iron wetted parts and construction ③ Submersible NEMA B motors, oil filled, squirrel cage induction type, up to 75 hp | <ul style="list-style-type: none"> ④ Double Type 1 mechanical seals standard: made of silicon/Buna-N ⑤ Semi-open cast iron impeller ⑥ Discharge up to 6" |
|--|---|

Selection Chart



*NE 3 model, also in 3,600 rpm.



Model	Suc.	Disch.	hp
NE 2	1¼"	2"	0.4
NE 3	1¼"	3"	0.5 - 2
NE 4	3½"	4"	4.5 - 15
NE 6	5½"	6"	9 - 60

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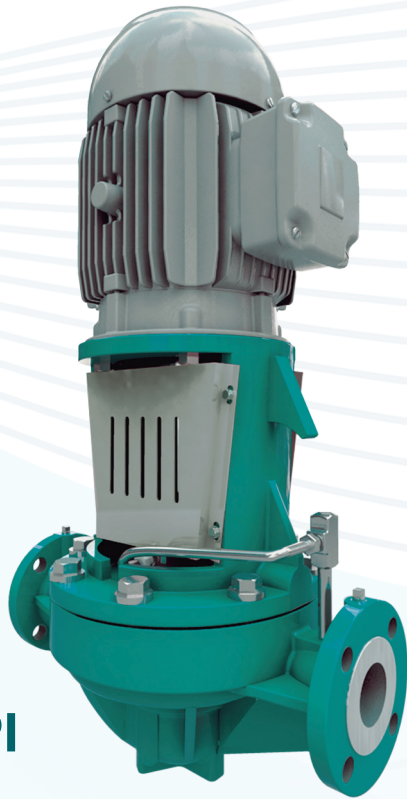
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WDM

PUMPS



PI



PI CC



Vertical In-Line Pump

WDM Water Systems

Benefits

- Two models: rigid coupling or close coupled (PI CC)
- Easy Maintenance
- Complete rotating assembly easily removed.
- Full circle register protected by confined gasket assures permanent alignment.
- Compact Designed Footprint
- Coupling Guard worker protection (PI model)

Applications

- Water
- HVAC
- Petrochemical
- Chemical
- Paint
- Automotive
- Metal

PI CC



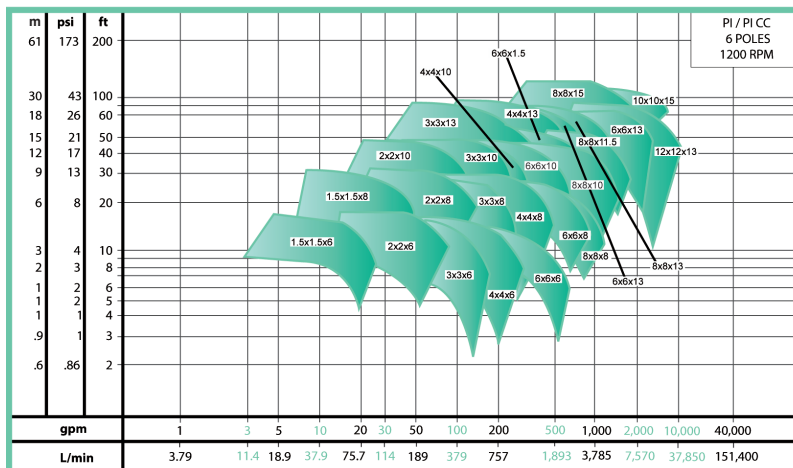
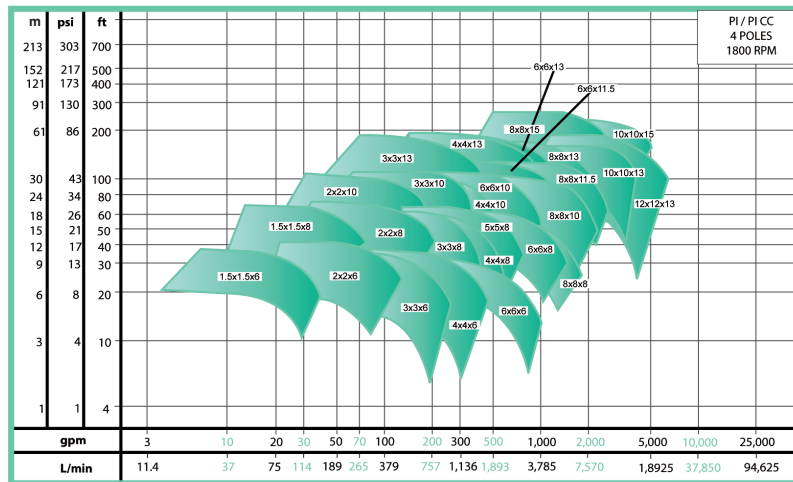
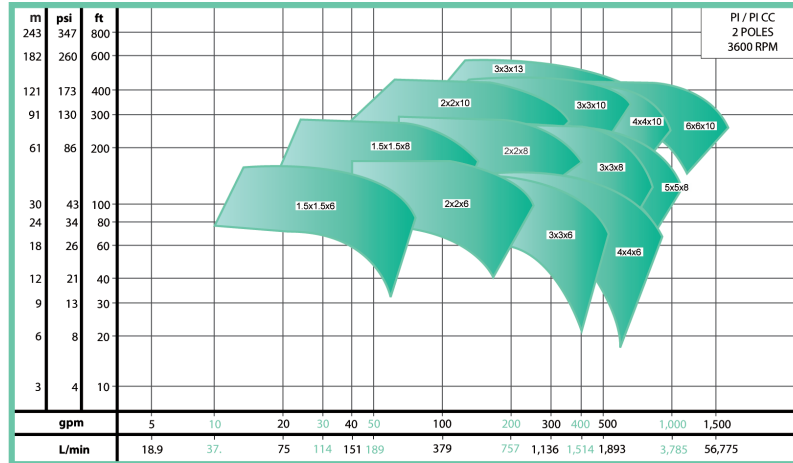
PI



PI CC Close Coupled Pump

PI rigid coupling version , or PI CC with direct coupling.

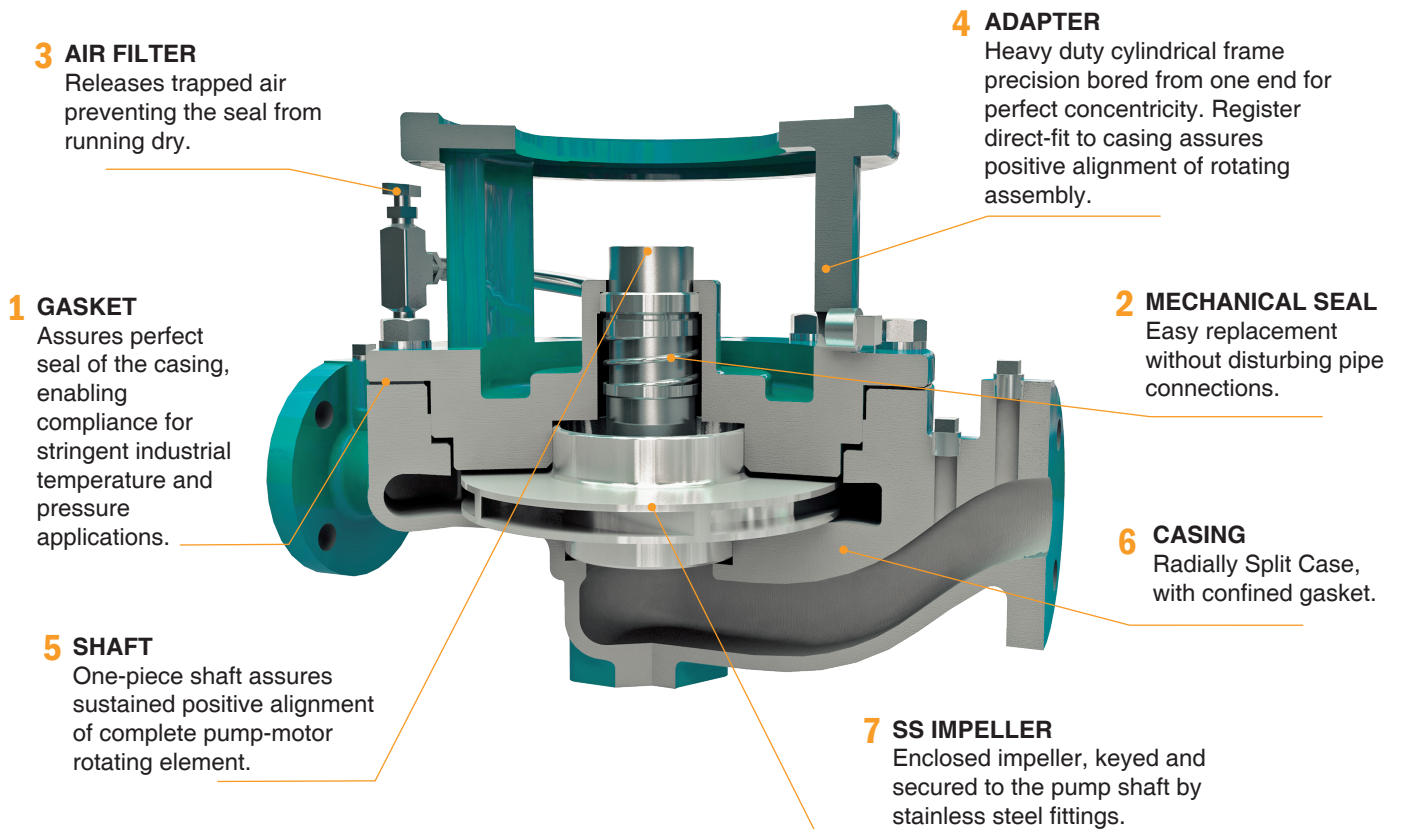
Selection Charts



Characteristics

Materials of Construction

WDM's PI CC pump is designed in Cast Iron/ SST (CF8)



PI CC Performance Data	
Flow	10,000 gpm
Head	580 ft
Temperature	-50° F to 300° F
Pressure	275 psig

- Images for general arrangement use only, not certified for construction.
- For Pump operation outside this range, please contact a WDM representative.

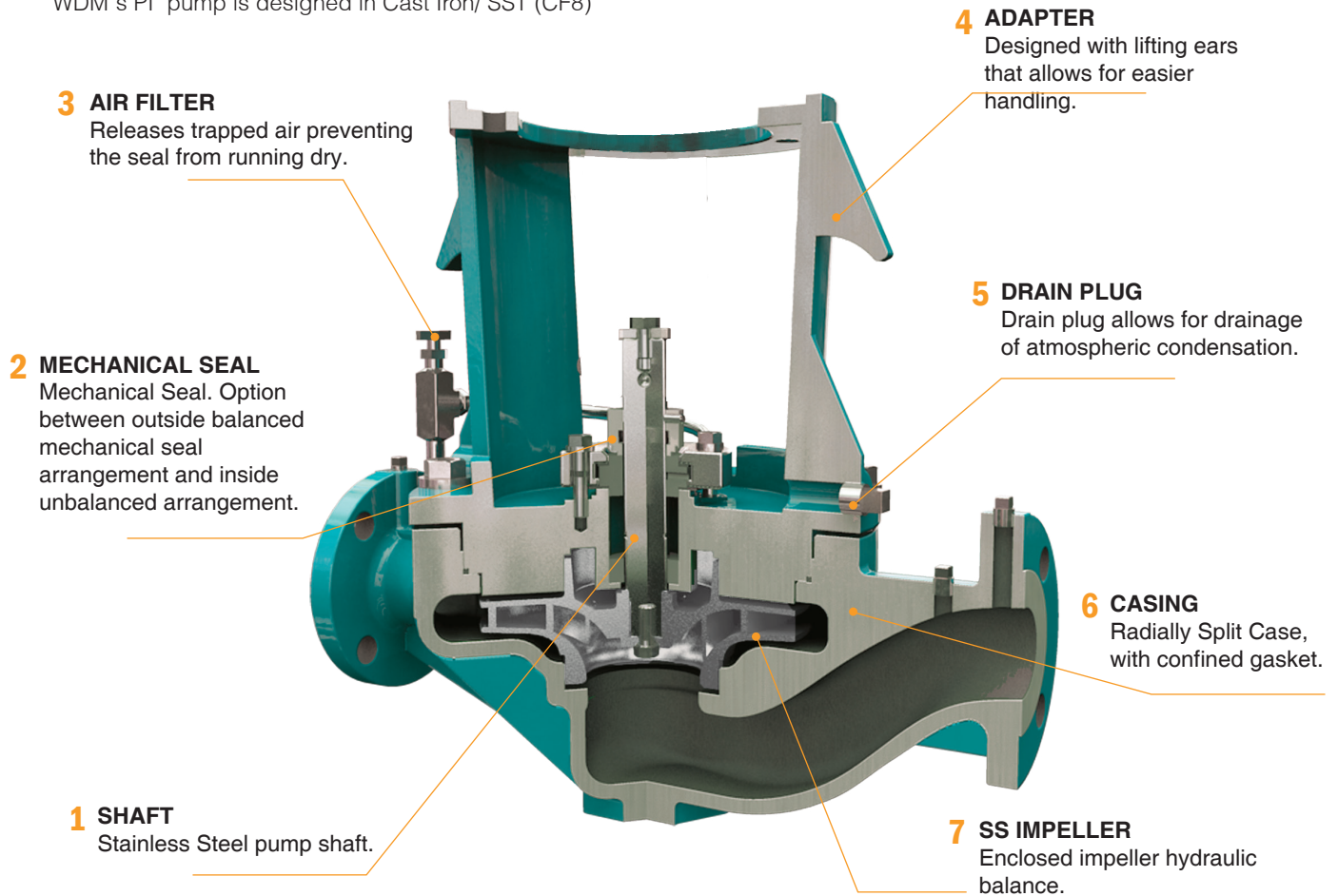
Description

- Single stage, single suction vertical in-line pump.
- Close-Coupled.
- Radially split casing with side-side suction and discharge configuration.
- Fully enclosed impeller dynamically balanced which avoids vibration.
- Top Pull-Out allows complete rotating assembly easily removed for inspection without disturbing piping.
- Flanged suction and discharge, aligned to center line.
- Case and impeller of some sizes are interchangeable between PI and PI CC models.

Characteristics

Materials of Construction

WDM's PI pump is designed in Cast Iron/ SST (CF8)



PI Performance Data	
Flow	10,000 gpm
Head	580 ft
Temperature	-50° F to 300° F
Pressure	275 psig

- Images for general arrangement use only, not certified for construction.
- For Pump operation outside this range, please contact a WDM representative.

Description

- Split-Coupling simplifies maintenance and allows an easy access to the mechanical seal without disconnecting the pump or removing the motor.
- Flanged suction and discharge in common center line.
- Designed for working with pressures up to 275 PSI. Fully enclosed, balanced, one-piece Impeller design.
- Coupling Guard for protection during operation.
- Water Drainer to avoid condensed water collection.

STANDARD MATERIALS OF CONSTRUCTION

COMPONENT	CAST IRON / SST		DUCTILE IRON / SST	
	DESCRIPTION	ASTM	DESCRIPTION	ASTM
Case	Iron 30 B /Casting	A 48 Cl. 30B	Ductile Iron/ Casting	A 536 Gr. 60-40-18
Impeller	SST 304/Casting	A 351 Gr. CF8	SST 304/Casting	A 351 Gr. CF8
Mechanical seal (stationary seat)	Silicon Carbide	-	Silicon Carbide	-
Top mechanical seal gasket	Non asbestos	-	Non asbestos	-
Bottom mechanical seal gasket	Non asbestos	-	Non asbestos	-
Mechanical Seal (rotating assy)	Silicon Carbide	-	Silicon Carbide	-
Case screw	CTS Gr.5	5AE Gr. 5	CST Gr. 5	SAE Gr. 5
Gland screw	SST 316 / Bolt	A 193 Gr. B8M Cl 2	SST - 316 / Bolt	A 193 Gr. B8M Cl 2
Driver (shaft)	Carbon Steel	-	Carbon Steel	-
Bushing	Carbon	-	Carbon	-
Gland	SST 316 / Bar	A 276 Type 316	SST 316 / Bar	A 276 Type 316
Impeller washer	SST 316 / Bar	A 276 Type 316	SST 316 / Bar	A 276 Type 316
Impeller screw	SST	5AE 304	SST	SAE 304
Motor screw	CST Gr.5	5AE Gr. 5	CST Gr. 5	SAE Gr. 5
Case o-ring	Non Asbestos	-	Non Asbestos	-
Flush pipe	SST 316	-	SST 316	-
Tubing connector	Bronze	-	Bronze	-
Valve	Bronze	-	Bronze	-
Tubing	Copper	-	Copper	-
Suction plug	Carbon Steel	-	SST 316	-
Case washer	Carbon Steel	-	Carbon Steel	-
Gland washer	SST 316 / Bolt	A 193 Gr. B8M Cl 2	SST - 316 / Bolt	A 193 Gr. B8M Cl 2
Shaft key	SST 316 / Bar	A 276 Type 316	CST 1018 / Bar	A 576 Gr. 1018
Set screw	SST 316	-	SST 316	-
Impeller key	SST 316 / Bar	A 276 Type 316	SST 316 / Bar	A 276 Type 316
Drain plug	Carbon Steel	-	SST 316	-
Motor key	SST 316 / Bar	A 276 Type 316	SST 316 / Bar	A 276 Type 316
Coupling Guard	Carbon Steel	-	Carbon Steel	-

SEALS

SEAL TYPE	CODE	MATERIAL IDENTIFICATION ROTATING FACE/ ELASTOMERS/ STATIONARY FACE	MAXIMUM STUFFING BOX PRESSURES	LIQUID RANGE TEMP	APPLICATIONS	BALANCING
Cartridge Type 5610	XF551X058	Carbon/Viton/Silicon Carbide	300 psig	-20°F - 190°F	Water, Hydrocarbon, Light Oils	Unbalanced
Outside Balance 8B2	XF511X058 H 316/HC	Carbon/Viton/Silicon Carbide	300 psig	-20°F - 190°F	Water, Hydrocarbon, Light Oils	Balanced
Inside Type 1	BF501C1	Carbon/BUNA/Silicon Carbide	300 psig	-20°F - 190°F	Water, Hydrocarbon, Light Oils	Unbalanced

Notes:

*RP's choice of manufacturers.

ENGINEERING DATA

TEFC THREE PHASE TC FRAME VERTICAL MOTORS FOR IVP PUMPS DESCRIPTION

TEFC THREE PHASE TC FRAME VERTICAL MOTORS FOR IVP PUMPS DESCRIPTION

1 - 100 HP -Round Body C-Flange, For Motor >100 HP, C-Flange, and Mill off Motor Feet.

Totally Enclosed Fan Cooled (IP54)

NEMA Premium Efficient Ratings From 1-500 HP

60 Hz - 230/460V (Usable on 208V). 150 HP and Larger is 460V Only

1.15 Service Factor - Continuous

Class B Temperature Rise

NEMA Design B Torques as a Minimum

Oversized Main Conduit Box Rotatable in 90 Degree Increments - Fully Gasketed with NPT Threaded

Entrance - F1 Mounted.

Designed for 40°C Ambient Temperature

Designed for 3300 ft. Elevation

Certified for Class 1, Div. 2, Groups B, C, D Temp Code T3C, Non Sparking, Non Static Fan

Bi-Directional Rotation Except 2-Pole Motors 5000 Frame and Larger which are Uni-directional

CCW Facing the Drive-End.

Cast Iron Frame, End Brackets, Fan Cover and Main Conduit Box

1045 Carbon Steel Shaft

Paint System: Phenolic Rust Proof Base Plus Polyurethane Top Coat

Vacuum De-Gassed Re-Greasable Bearings Frames 280TS-449T/TS with Polyrex EM Grease

Double Shielded Bearings on Frames 140T-280T Pre-Packed with MULTEMP SRL Grease

Automatic Grease Discharge on Frames on Re-Greasable Motors

Labyrinth Type Metal Flinger on Both Ends for Frames 280TS-449T/TS

Cast Iron Inner and Outer Bearing Caps for Frames 280TS-449T/TS

Rubber Flinger on Drive-End for Frames 140T - 280T

Grounding Terminal Inside Main Box

Stainless Steel Nameplate

Distributed by:



WDM Pumps has expanded its brand as an international manufacturer of fluid handling pumps by consistently meeting and exceeding the needs customers for pumps.

Continuing a tradition of more than 50 years, WDM Pumps manufactures quality electric and engine driven pumps for diverse commercial and industrial applications. Our continued growth is based on a commitment to high standards for efficient product design, production, sales, and customer support.

Our customers rely on our world-class team of experienced WDM Pumps engineers, technicians, and product application specialists.

WDM offers pump products and related equipment for a wide variety of industries, including industrial, agricultural, and construction. The WDM Pumps product line includes self priming, flexible coupled, close coupled, diesel and gasoline driven centrifugal pumps, in addition to submersible solids handling products.

WDM Pumps plants are strategically located throughout the Americas in the United States, Colombia, Mexico, Panama, Argentina, and Guatemala.



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sales@wdmpumps.com



Operation Manual

GE & GU Pumps

WDM Water Systems

1. Introduction.

This manual contains instructions for the installation and operation of your GE & GU pumps. Read these recommendations carefully before use. Keep this manual for future reference.

Congratulations! You have purchased a product developed with the latest technology from WDM Pumps, Inc. (referred to as “WDM”).

WDM designs and manufactures our products with the highest quality components. Our experience as a manufacturer and our special care and dedication in production result in products that meet the highest standards.

The information contained in this manual is important for the installation, operation and maintenance of your WDM GE & GU pumps. Read all instructions carefully before installing and using the product. Keep this manual for future reference.

Our products are factory tested to ensure proper operation. Inspect carefully and make sure there are no missing or damaged pieces from shipping. If, upon delivery, parts are damaged or missing, make a claim to the shipping company as soon as possible.

The design of this product, as well as the materials and processes used in its manufacture provide for proper operation. However product performance and lifespan depend on appropriate application, installation, periodic inspection and general preventive maintenance.



WARNING.

WDM is not responsible for any damage or accidents that occur when the instructions given in this manual have not been followed. The warranty is only valid when using WDM original spare parts. Failure to follow these guidelines in installing and starting your pump will void your warranty.

2. Safety Recommendations.

- WDM pumps are designed to operate safely when used and maintained according to this manual.
- Rotating parts of the pumps are dangerous and can cause injury. Operators and maintenance personnel should be aware of and follow safety recommendations.
- The pumps are considered heavy equipment. Handle them with care.
- Pumps should not pump hazardous material unless they have been designed and designated to do so.
- The pipes and pump should never be forced to fit if using the correct size. If you have to apply force, then get a different size.
- To reduce the risk of electrical shock, all wiring of pumps, motors, overload protection and control panels must be in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Requirements will vary depending on usage and location. Improper grounding will void the warranty.
- To reduce the risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Cable should be inspected frequently.
- Never handle connected power cords with wet hands.
- If any product is to be returned, it must be cleaned, sanitized, or decontaminated as necessary according to any applicable laws and regulations prior to shipment, to protect employees from exposure to health hazards.
- Always wear eye protection when working on pumps.
- Loose fitting clothing can easily be caught by the impeller or other moving parts, therefore do not wear loose fitting clothing when doing maintenance or service work on the pump.
- Gloves should be worn whenever handling parts that have sharp edges.
- Wear safety shoes when handling heavy parts or tools.
- For any maintenance always disconnect power.
- Never place hands in the suction or discharge openings.
- Safety handles should always be fastened securely before attempting to lift the pump.

- The pump should not be operated without the proper safety devices in place. If such devices are removed during service and repair work, make sure they are replaced before operating the pump again.
- Do not operate the pump when holding the cable assembly.
- Blocking or restricting the discharge hose may cause it to whip under the pressure.
- Do not remove the drain plugs or valves if the pump is operating.
- The pump should be isolated from a pressurized system before it is removed.
- Allow pumps time to cool sufficiently before handling or servicing them as heat and pressure build up inside during operation.
- Never apply heat in disassembling a pump as doing so could cause an explosion.
- Do not exceed manufacturer's recommendation for maximum performance, as doing so could cause the motor to overheat.
- If the discharge valve is closed, do not continue operating the pump. Doing so will decrease the life expectancy of the bearings and mechanical seal. Also, the extreme heat from doing so can cause steam to build up creating a dangerous pressure situation. A temperature or pressure relief valve should be installed on the pump body.

For pumps coupled to combustion engines.

- Make sure combustion engines have adequate ventilation.
- Never operate combustion engines in an enclosed area where fumes can collect.
- Do not refuel the tank while the engine is running. Shut off engine and wait until it cools.

3. Installation.

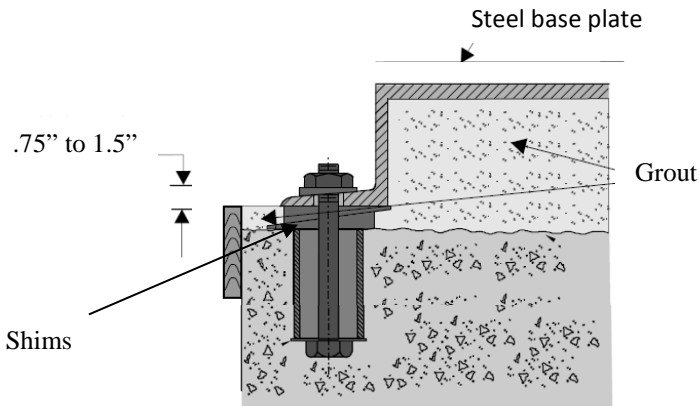
Location.

- Place the pump as close to the suction source as possible.
- Suction piping should be as short and direct as possible.
- Place the pump below the water level whenever possible. This will facilitate priming, ensures a constant flow of liquid, and provides a positive suction.
- Make sure the NPSH (Net Positive Suction Head) is accounted for at the suction end of pump relative to the whole system. Available NPSH must always exceed the required NPSH specified in the yield curve specifications of the pump.
- Always allow sufficient access for maintenance and inspection, plus space for the use of a crane strong enough to lift the unit.
- Be sure to have an adequate power supply for the pump motor. The electrical characteristics should fall within the range specified on the engine data plate.
- Protect the pump from exposure to extremely low temperatures to prevent fluid inside the pump from freezing.

The foundation for a horizontal pump.

- To absorb vibrations and prevent misalignment, horizontal pumps should be permanently installed on foundations of sufficient size, that are made of concrete or steel.
- The foundation may either be on springs or on a raised portion of the floor.
- Concrete foundations must be poured without interruption. All foundations must be between 3/4 to 1-1/2 inches below the elevation of the end pump.
- Anchor bolts should be in their designated positions along the pipe sleeves, and be long enough to go through grout, flange, nuts, and washers..
- As the foundation needs time to set, the pump should be installed several days after the foundation is laid.
- Once the foundation (if concrete) is poured and set, the

- pump's base plate should be placed on loose fitting wedges or shims located near each anchor bolt. Intervals between the wedges or shims should be less than 24" per side.
- Wedges or shims should raise the bottom of the pump about $\frac{3}{4}$ - 1 $\frac{1}{4}$ inches in order for there to be room for slurry. Wedges and shims should be adjusted to make the pump level using a spirit level.
 - Make sure that piping is aligned so as not to place stress on either flange.
 - Once the pump is aligned, putting on bolt nuts and tightening them will be sufficient to anchor the pump to the steel or concrete foundation.
 - Once any grout is completely hardened, tighten the foundation bolts as necessary. If tightening occurs then recheck pump alignment.



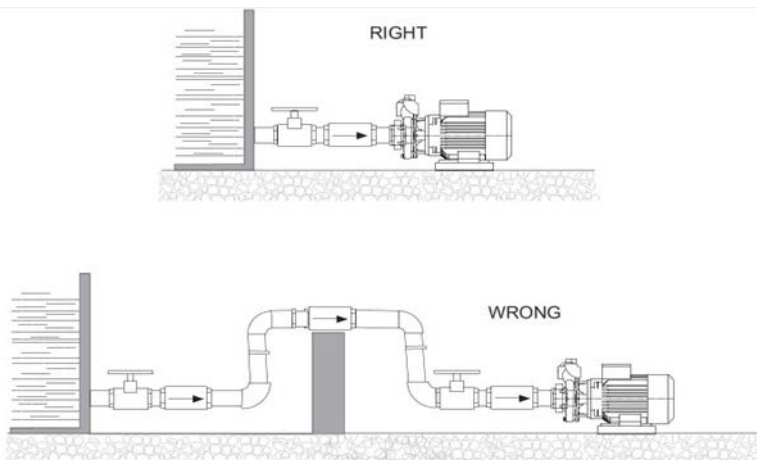
Suction (inlet) piping.

Suction piping must be selected and installed in such a way to minimize pressure loss and allow for a sufficient liquid flow during the starting and operation of the pump.

Many NPSH problems can be traced directly to improper sizing of suction piping systems.

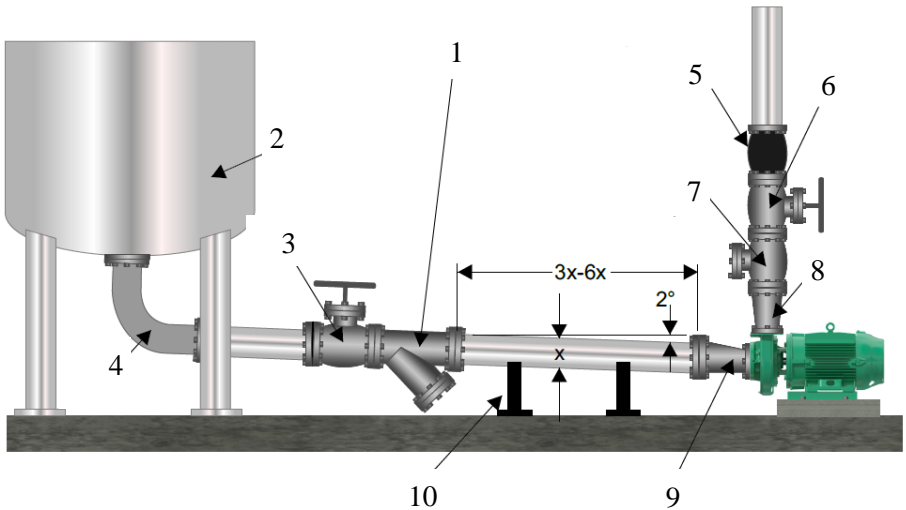
The following precautions should be noted when installing suction piping:

- Suction piping should be as direct as possible, and ideally the length should be at least ten times the pipe diameter.
- Short suction piping can be the same diameter as the suction opening.
- Depending on the length of a longer pipe, the diameter should be one or two sizes larger than the pump suction. Reduce the diameter of the pipe to match the diameter of the pump suction as it reaches pump suction opening.
- When required to reduce the pipe diameter, use an eccentric reducer with the eccentric side down.
- The pipe should never be smaller in diameter than the pump suction opening.
- For best results all horizontal suction lines should follow an even gradient. In suction lift conditions the gradient should be a gradual slope upward. For positive suction head, the gradient should be a gradual downward slope.
- In order to avoid air pockets that can throttle the system or cause erratic pumping, high points, such as pipe loops, should be avoided.



- In order to shut down the pump for maintenance or removal, a valve should be installed in the suction line. If more than one pump is on the same suction line, multiple valves should be placed in the line in order to shut down each pump individually.
- Gate valves should always be installed in positions that avoid air pockets. Globe valves should not be used.
- Valves along the suction line should always be fully open when the pump is in operation..
- Pressure gauges may be installed in gauge taps on pump nozzles (suction and discharge) if they are the correct size. These gauges will monitor the pump's performance, helping to determine if the performance of the pump lies within the parameters of the performance curve. When unstable operation conditions occur, these pressure gauges will indicate the wide fluctuation in pressure.

Positive Suction installation Diagram



1. Y fitting
2. Tank
3. Shut-off Valve
4. Elbow
5. Expansion Joint
6. Shut-off Valve
7. Check Valve
8. Concentric Reduction
9. Eccentric Reduction
10. Support

Discharge (outlet) piping.

- Discharge line should be at least the same diameter as discharge opening for short piping, for longer piping size should be 1 or 2 sizes larger according to piping length.
- For best results horizontal piping should have an even gradient.

- Trap air in high points of discharge line can affect the pump operation.
- Avoid hydraulic shock by closing the valve near the discharge before the pump shutdown.
- The discharge pipe should be as short as possible and fitted with either a check or gate valve for each pump that uses the same line. This valve is used to prevent backflow into the pump which can cause excessive flooding and damage to the pump. The valve may also be used to stop flow into the pump to help with priming and starting, shutdown, maintenance, and pump removal.

Electrical connections.

Power and Cables Control: The cable assembly mounted to the pump should not be modified in any way except for shortening to a specific application. Any splice between the pump and the control panel must be in accordance with all applicable electrical standards. Do not leave the electrical wire exposed, as it may reach the motor and cause serious damage.

The black, white, and red wires are all energy carriers or conductors. The green wire is the grounding wire.



ATTENTION.

Always use the installed handle, never the cord, to lift the pump,



ATTENTION.

WDM does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned in this operation manual and installation.

Packing gland adjustment.

With the pump running, adjust the packing gland to permit 40 to 60 drops per minute leakage. This is necessary for shaft lubrication. After the initial startup, some additional adjustment may be required.



ATTENTION.

Pumps with mechanical seals require no adjustment. If the mechanical seal is altered or replaced with a packing gland, adjustments may become necessary.

All pumps on GE & GU line of WDM Pumps are equipped with mechanical seals matched to the specific conditions for which the pump was sold.

To avoid damage to the seal, and to maximize seal life observe the following precautions:

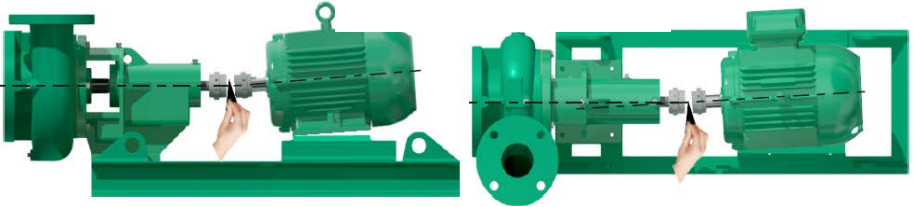
- Stay within the temperature or pressure limitations specified for the mechanical seal used.
- Do not run the pump dry or against a closed valve! Dry operation will cause seal failure within minutes.
- Clean and flush the suction piping before installing and operating pump. Abrasives including pipe scale, welding slag and others can rapidly cause seal failure.

Coupling Alignment.

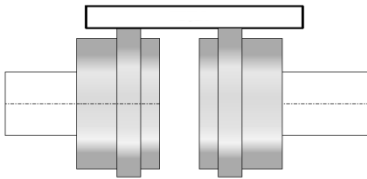
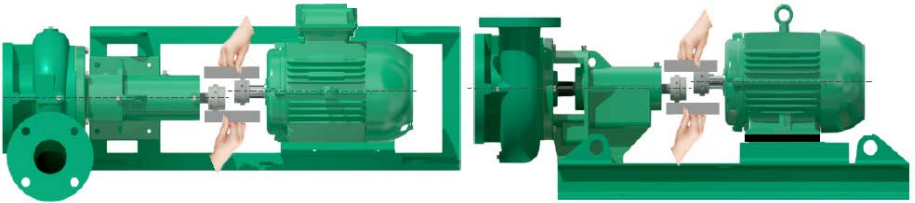
- This is a standard anchoring and alignment procedure. If performed with care, it should result in a trouble-free installation.
- If the pump and motor were shipped as an assembly, mounted on the pump base, remove the coupling guard.
- Pump and motor were align at factory but handling during shipping and receiving can shift alignment.
- Pump and motor should be realign prior to final installation an operation of the pump.

Use the following diagrams as guidance for correct alignment.

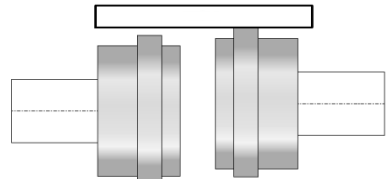
Angular Alignment



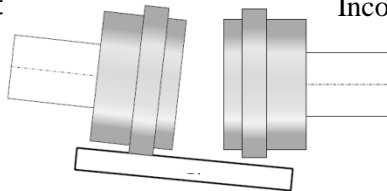
Parallel Alignment



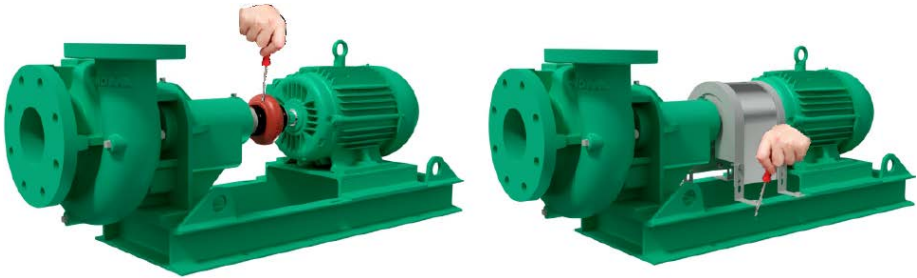
Correct



Incorrect



Install coupling and guard



Electrical installation.

- A device that can disconnect both the controller and motor from their power sources should be installed. Such devices are typically circuit breakers or fusible disconnect switches. The motor starter should be seen from the disconnecting device, and the two should never be more than about 50 feet apart from each other.
- Short circuit and ground fault protection are usually provided by means of a circuit breaker or fusible disconnect switch.

Wiring installation.

- In order for there to be an ease of installation and convenient control, control panel or motor starter(s) should be placed in close proximity to the pump.
- Incoming power sources should be checked to ensure that they are the same voltage and phase as the motors.
- Based on the voltage and phase that is available, verify that the starter is able to operate the motor.

Overload protection.

The normally closed (N / C) temperature sensor is embedded in the winding, and detects engine overheating in case of an overload condition. Thermal sensor triggers shut down when the engine is too hot and automatically restarts when the pump motor is cooled to a safe temperature. It is recommended that the thermal sensor

connects to an alarm to alert the operator that overheating occurred so that pump operation can be stopped. In case of overload, the cause should be reviewed and corrected.

Priming.

- As WDM GS pumps are not self-priming, they must be fully primed before starting. To prime the pump completely fill the suction line with liquid.
- If the suction head of the pump is positive, the suction valve should be opened allowing liquid to enter pump the casing. Then air vents should be opened, forcing all air out of the pump by liquid before closing the vents.
- If pump has a suction lift, priming may be accomplished by the use of foot valves or ejectors, or by manual filling of the pump casing and suction line.



CAUTION.

Operation of the pump while dry will result in serious damage.

Pre-start checklist.



WARNING.

The pump should be operated within the conditions on the name plate in order to protect the safety of the operator. If operated outside such conditions, the pump could fail causing injury to operating personal. In order to properly operate and maintain the pump and its components, an instruction book should be consulted.

Before starting the pump, the following inspections should be made:

- All wiring to the motor and starting device should match the wiring diagram. The motor should move in a clockwise rotation when looking at it from the back. If the motor has

been in storage for any length of time, whether used or new, then consult the motor instructions before starting. Use the motor data plate to check the voltage, phase, and line circuit frequency.

- In order to make sure it rotates freely, use your hands to turn the rotating element..
- All piping should be checked for leaks. Also all flange bolts should be checked to make sure they are tightened securely..
- Write down the serial number of the pump for future reference.
- Perform an insulation (or megger) test on the motor before putting the pump into service.
- Resistance values (ohms), voltage, and current (amps) should all be recorded and saved for future reference.

Motor rotation.



CAUTION.

To check the driver rotation, make sure pump and driver couplings are fully disconnected and separated physically. Serious damage will occur to both the pump and driver if the rotation is wrong.

Before checking motor rotation, make sure all components in the system are wired and properly connected. If so then check the motor rotation as follows::

If a 3 phase unit (only) – energize the motor briefly to make sure the rotation is going in the direction indicated by the arrow in the pump volute. If the rotation is not following the arrow, then switch the two wires from the motor starter's terminal.



CAUTION.

As pumps should not be operated while dry, be extremely cautious in making sure the motor is energized only momentarily, just long enough to determine if the rotation is proper.

4. Starting the pump.



WARNING.

If a pump is operated without an approved coupling guard in place, it may result in injury to personnel operating the pump. Coupling guard should be installed on flexible coupled units.

Once the pump is primed, start the pump by turning on the power to the motor as instructed in the motor manual and follow this recommendation:

- Check for pressure leaks, make an immediate visual inspection of the pump and suction piping.
- Upon the pump reaching full operating speed, begin to open the discharge gate valve slowly until complete system flow is achieved.
- The discharge pipe should also be checked for pressure leaks.
- If there are pressure gauges on the pump, record pressure readings to use as a reference in the future
- Also make sure the pump is falling within the parameters of the performance curve.
- Check and record Voltage, amperage per phase, and kilowatts.

Voltage regulation.

While the motor will operate satisfactorily under these voltage and frequency variations, such operation may not be in accordance with the standards established for operation in underrated conditions:

- Variation in the voltage may not exceed $\pm 10\%$ the rating specified on the motor data plate.
- Frequency variation may not exceed $\pm 5\%$ the rating specified on the motor data plate.
- The sum of the voltage and frequency variation may not exceed $\pm 10\%$ the motor rating while the frequency variation does not exceed $\pm 5\%$.

Pump shutdown.

The following shutdown procedures will apply in most normal shutdowns for the WDM pumps types GE and GU. If pump will be inoperative for an extended length of time, follow storage procedures:

- Close the discharge gate valve slowly to prevent hydraulic shock, and then cut power to the motor.
- Cut power to motor.

Short duration shutdown.

For temporary or overnight shutdowns in conditions above freezing, pumps may remain filled with liquid. Pumps should be primed again fully before restarting

Extended period shutdown.

If the shutdown is for a longer period of time, or for pump maintenance, close the suction gate valve. If a suction gate valve is not used, but there is a positive suction head, proceed to drain all liquid from suction line in order to end the liquid flow to the suction nozzle. All plugs in drains and vent traps should be removed and all liquid drained from the pump casing.

Restart:

Any time the pump is restarted, but especially when the pump has been drained, you should check to make sure the pump is refilled back to the level required.

5. Maintenance.



WARNING.

If equipment is rotating, do not attempt to complete any maintenance, inspection, repair, or cleaning until rotation has stopped as such actions could result in injury to personnel..

Before attempting any inspection or repair on the pump, the driver controls must be in the “OFF” position, locked and tagged to prevent injury to personnel performing service on the pump.

Motor lubrication.

To lubricate the motor, remove the grease drain plug (if present) and filler plug on the grease fitting. Proceed to grease with clean lubricant until you can see grease appear at the drain hole or along the motor shaft. This may be done while motor is running or resting.

Table 1. Recommended Lubrication Periods.

Motor rpm	Motor hp	Operation conditions		
		Standard	Severe	Extreme
0 - 1750	1/3-7-1/2	3 years	1 year	6 months
	10-40	1-3 years	6 months-1 year	3 months
	50-150	1 year	6 months	3 months
	200 and UP	6 months	3 months	3 months
Above 1,750	(All hp)	6 months	3 months	3 months

Standard conditions: Operation 8 hours per day, regular or light loading, clean air, below 100°F (38°C) ambient temperature.

Severe conditions: 24 hours operation, shock loading or vibration, reduced ventilation, ambient temperature between 100°F to 150°F (38°C to 66°C).

Extreme conditions: Nonstop operation, heavy shock or vibration, dirt or dust in air, under extreme ambient temperature.

One-half to one cubic inch of grease is sufficient for motors 5.0 hp and under, with proportionately more grease for greater HP motors.

- “Sealed-for-life” bearings do not require any further lubrication during the life of the motor. These are most fractional motors and some integral frame motors. Always follow motor manufacturer’s lubrication instructions. Make sure to periodically check grease fittings and drain plugs for leaks.
- Below, Table 2 lists recommended types of grease for both pump and motor lubrication. These types have all been thoroughly tested and should be used whenever possible.

Table 2. Recommended Lubricants.

Manufacturer	Lubricant
Shell	Dolium®R
Exxon	Polyrex
Chevron	SRI Grease NLGI 2
	Black Pearl-NLGI 2
Texaco	Polystar RB

- Remove grease drain plug (if present) and the filler plug in order to lubricate greased bearings, and then add clean lubricant until it appears at the drain hole or along the shaft. For units that contain a drain hole, all old grease can be cleaned out before putting new grease in. If done, leave the drain unplugged for several minutes during the pumping operation in order to allow excess grease to be forced out.
- Fresh lubricant should be applied every 1 to 3 months, depending on the severity of environment the pump is in. The better the environment, (clean, dry, and under 100 °F) the longer the interval, not to exceed 3 months. Make sure to not over grease as doing so can cause premature failure.

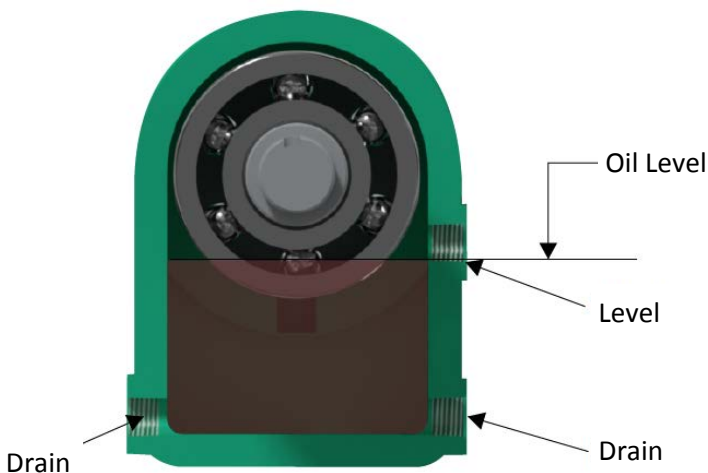
Regular oil maintenance should be maintained on all pumps. When pumps contain oil reservoirs maintain the oil level at about the centerline of the bearing. When the reservoirs get low, oil should be put in the reservoir to renew the oil level.

Service Engine and mechanical seal.

The first oil change should occur after the first 200 hours of operation. In order to change the oil, remove the drain plug and the filler plug (or vent plug) from the bottom of the bearing cover, (located at the top of the housing). Drain all the oil. Then, refill with an acceptable oil as found on Table 3, and replace the plugs. The second oil change occur at 2000 hours of operation. The third oil change should occur at 8000 hours of operation. From then on, oil changes should occur at every 8000 hours of operation or once a year.

Table 3. List of acceptable Lube Oils.

Manufacturer	Bearing oil brand name
British Petroleum Co.	BP Energol TH 100-HB
Chevron	Hydraulic Oil 11 Circulating Oil
Shell Oil Company	Shell Tellus Oil 29
The Texas Company	Texaco Ursa Oil P 20 Dea Viscobl Sera 4
Gulf Refining Company	Gulf Harmony 47 Gulf Paramount 45



6. Disassembling the pump

Below are outlined instructions to completely disassemble the pump. In order to perform maintenance, only disassemble as far as required.

- Turn off power.
- Drain system, including, flushing, if necessary.
- Closed coupled units and remove bolts that hold down the motor.
- Remove casing bolts.
- Remove back pull-out bearing frame assembly for casing.
- Unscrew impeller nut.



CAUTION.

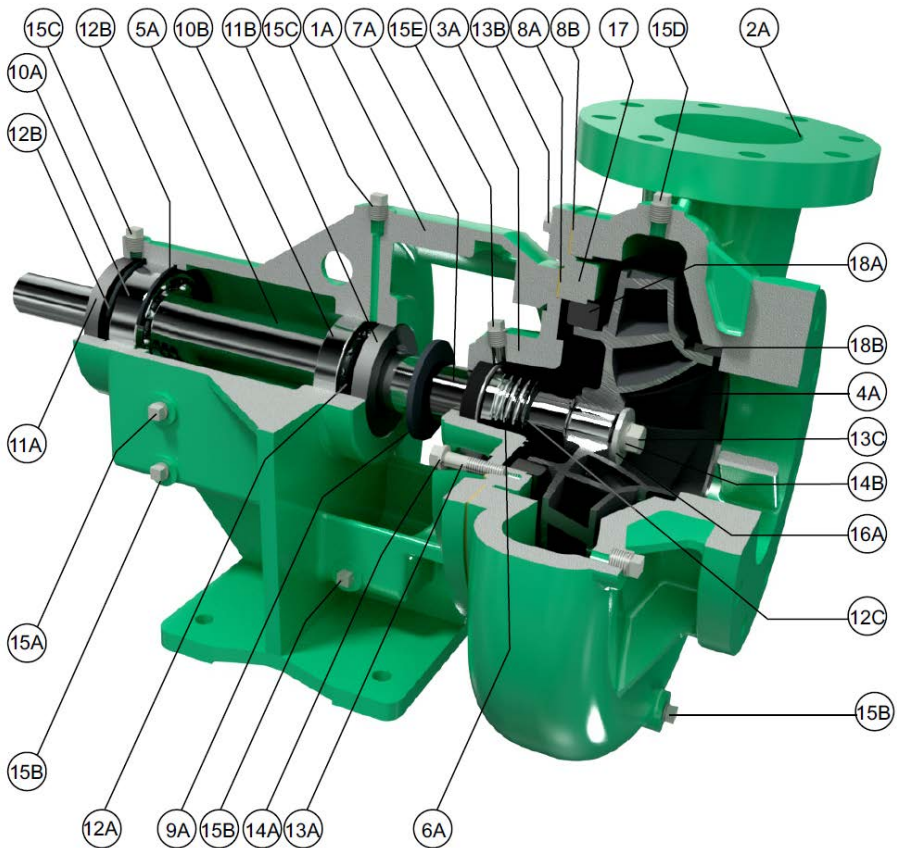
Do not insert screwdriver between impeller vanes to prevent rotation. It may be necessary to use a strap wrench around the impeller or shaft to prevent rotation.

- To remove the impeller from the shaft, use the appropriate size gear puller aligned behind the impeller vanes..
- Remove impeller key.
- Remove the backplate bolts, backplate, and seal housing.
- Place seal housing on flat surface and press out seal seat (14A).
- To replace the shaft sleeve, heat evenly to about 350°F in order to loosen the Loctite and then twist the sleeve off.
- Remove Slinger.
- Remove grease seal.
- Remove bearing house retaining ring.
- Continue to press or tap on pump end of the bearing-shaft assembly until one bearing is out..
- Once one bearing is out, remove second retaining ring, and then remove complete assembly from bearing housing.
- Remove shaft retaining ring and press off bearings.
- When pressing on new bearings, only press on the inner race of the bearing
- Reassemble frame in the reverse procedure used for disassembly.

- Observe the following when reassembling the bearing frame.
- Replace lip seals if worn or damaged.
- Replace bearings if loose, rough or noisy when rotated.
- Check shaft for runout at the sleeve area.

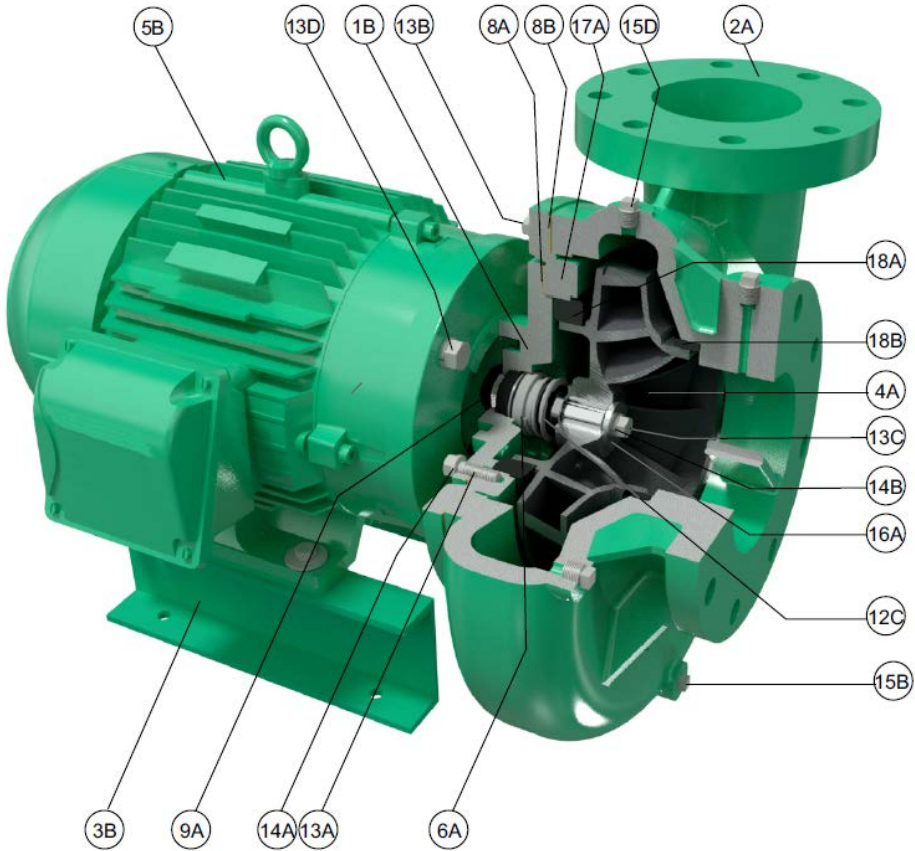
Below is a chart with the specifications necessary for the identification of each of the pump parts listed above.

GU 1 & 2 Parts List



ITEM	Description
1A	Bearing Frame
2A	Casing (Volute)
3A	Seal Support
4A	Impeller
5A	Shaft
6A	Mechanical Seal
7A	Shaft Sleeve
8A	Backplate Gasket
8B	Casing Gasket
9A	Slinger
10A	Back Bearing
10B	Front Bearing
11A	Back Lip Seal
11B	Front Lip Seal
12A	Back Snap Ring
12B	Front Snap Ring
12C	Back Ext Snap Ring
13A	Backplate Hex Bolt
13B	Casing Hex Bolt
13C	Impeller Hex Bolt
14A	Backplate Lock Washer
14B	Impeller Lock Washer
15A	Oil Level Plug
15B	Drain Plug
15C	Oil Fill Plug
15D	Priming Plug
15E	Seal Support Plug
16A	Impeller Washer
17A	Backplate
18A	Rear Wear Ring
18B	Case Wear Ring

GE Parts List



ITEM	Description
1B	Motor bracket
2A	Casing (Volute)
3B	Steel Motor Base
4A	Impeller
5B	Motor
6A	Mechanical Seal
7A	Shaft Sleeve
8A	Backplate Gasket
8B	Casing Gasket
9A	Slinger
12C	Ext Snap Ring
13A	Backplate Hex Bolt
13B	Casing Hex Bolt
13C	Impeller Hex Bolt
13D	Motor Bracket Hex Bolt
14A	Backplate Lock Washer
14B	Impeller Lock Washer
15B	Drain Plug
15D	Priming Plug
15E	Seal Support Plug
16A	Impeller Washer
17A	Backplate
18A	Rear Wear Ring
18B	Case Wear Ring

7. Reassembly of pumps.

- Before reassembly, all parts should be thoroughly cleaned.
- To identify required replacement items refer to the parts list. When ordering the parts, have the pump serial or catalog number available.
- To reassemble follow the reverse of the disassembly instructions.
- If all mechanical seal components are not in good condition, leakage may occur. In order to prevent leakage, completely replace the seal..
- New shaft sleeves are installed by bonding to shaft with hydraulic setting Loctite.

8. Trouble shooting.

Symptom	Possible cause(s)	Possible solution(s)
Pump does not start	Motor not connected	Revise that motor connections have been properly done.
Little or no discharge and unit will not prime.	1. Casing not filled with water.	1. Fill pump casing. Using a foot valve will extend pump life and facilitate immediate priming.
	2. Total head too high.	2. Shorten suction head.
	3. Suction head higher than pump designed for.	3. Lower suction head, install foot-valve and prime.
	4. Impeller partially or completely plugged.	4. Disassemble pump and clean out impeller.
	5. Hole or leak in suction line.	5. Repair or replace suction line.
	6. Foot-valve too small.	6. Match foot-valve to piping or install one size larger foot-valve.
	7. Impeller damaged.	7. Disassemble pump and replace impeller.
	8. Foot-valve or suction line not submerged deep enough in water; pulling air.	8. Submerge lower in water.
	9. Insufficient inlet pressure or suction head.	9. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.

	10. Suction piping too small	10. Increase pipe size to pump inlet size or larger.
	11. Casing gasket leaking	11. Replace.
	12. Suction or discharge line valves closed.	12. Open.
	13. Piping is fouled or damaged.	13. Clean or replace.
	14. Clogged strainer or foot valve.	14. Clean or replace.
Loss of suction after satisfactory operation.	1. Air leak in suction line.	1. Repair or replace suction line.
	2. When unit was last turned off, water siphoned out of pump casing.	2. Refill (reprime) pump casing before restarting.
	3. Suction head higher than pump designed for.	3. Lower suction head; install foot-valve and primer.
	4. Insufficient inlet pressure or suction head.	4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	5. Clogged foot-valve, strainer, or pump.	5. Unclog, clear or replace as necessary.
Pump overloads driver.	1. Total head lower than pump rating, unit delivering too much water.	1. Increase back pressure on pump by turning gate valve on discharge line to partially closed position that will not overload motor.
	2. Specific gravity and viscosity of liquid being pumped different than the pump rating	2. Consult factory.
Pump vibrates and/ or makes excessive noise.	1. Mounting plate or foundation not rigid enough.	1. Reinforce.
	2. Foreign material in pump causing unbalance.	2. Disassemble pump and remove foreign material..
	3. Impeller bent.	3. Replace impeller
	4. Cavitation present	4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line.
	5. Piping not supported to relieve any strain on pump assembly.	5. Make necessary adjustments.
Pump runs but no fluid.	1. Faulty suction piping (air leak)	1. Replace faulty suction piping
	2. Pump located too far from fluid source	2. Reposition.

	3. Gate valve closed.	3. Open
	4. Clogged strainer	4. Clean or replace
	6. Discharge height too great	6. Lower the height
	7. Fouled impeller.	7. Clean or replace.
	8. Faulty mechanical seal	8. Replace
Pump leaks at shaft	1. Worn mechanical seal.	1. Replace
	2. Replacement seal not installed properly.	2. Follow Maintenance instructions carefully

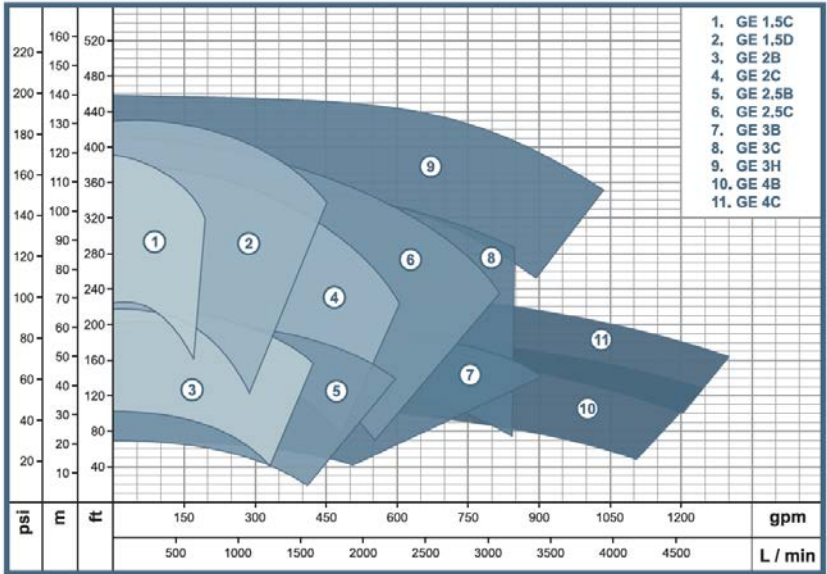
10. Warranty.

WDM guarantees its GS Pumps for a period of 12 months from the date of delivery, against defects in material and workmanship, according to the indicated in its general conditions of sale.

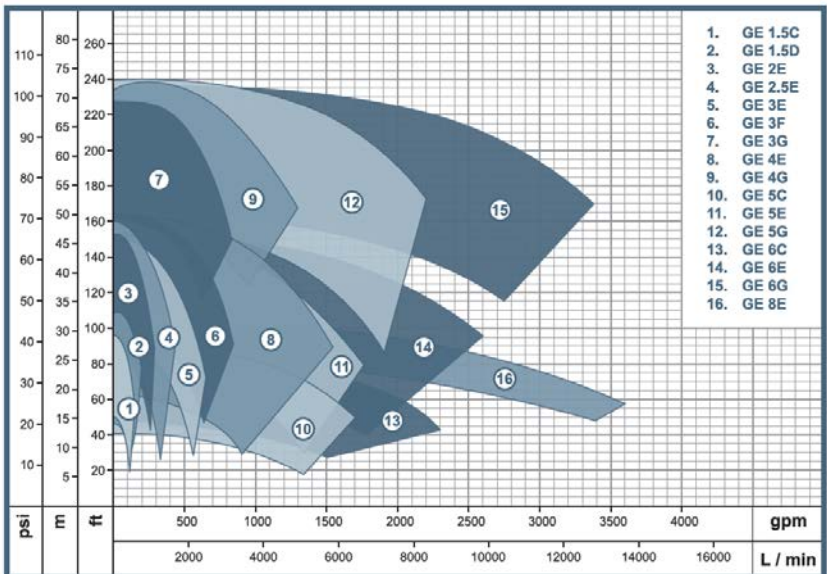
Failure to follow the suggestions and recommendations in this manual, as well as improper product use or handling, will completely invalidate the warranty.

The warranty excludes wear and tear, misuse, repair, or replacement of the defective part by the user or unskilled personnel without specific permission of WDM Pumps.

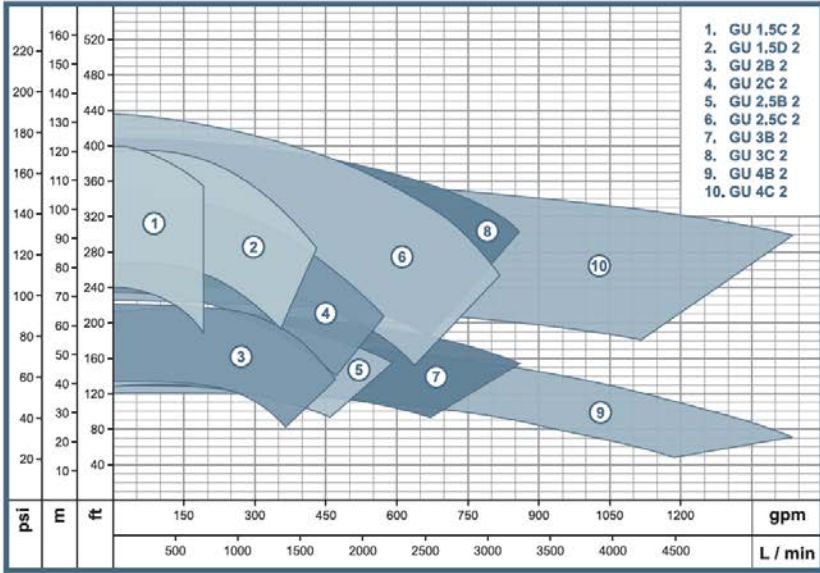
2 poles (3,600 rpm)



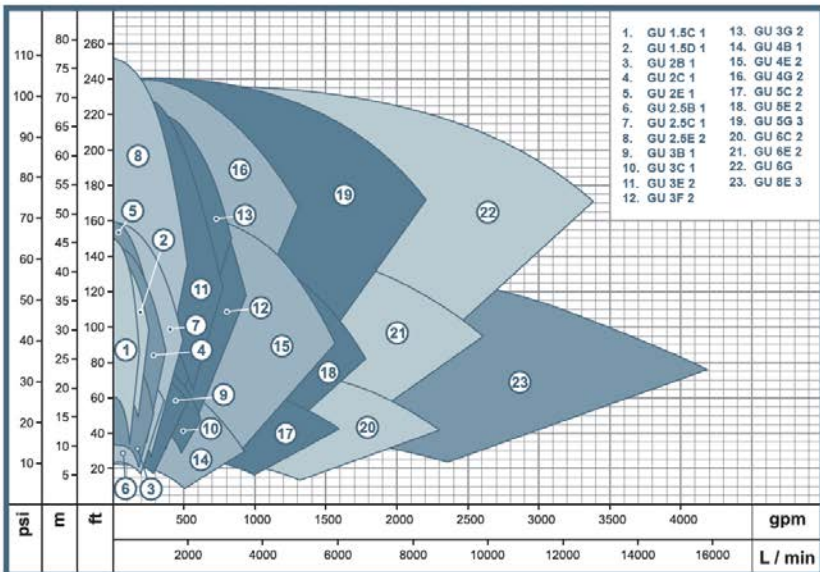
4 poles (1,800 rpm)

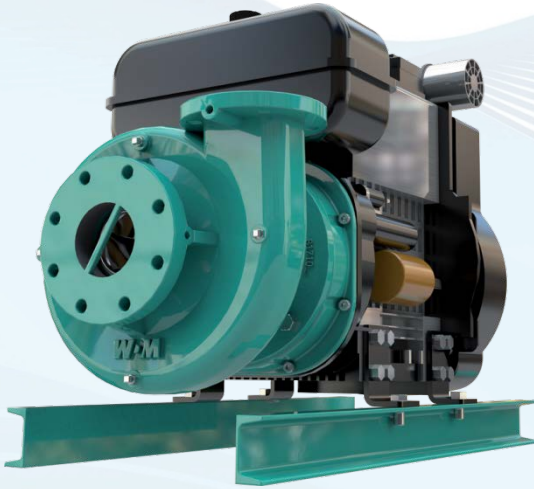


2 poles (3,600 rpm)



4 poles (1,800 rpm)





4034 Mint Way
Dallas, Texas 75237.
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WDM[®]

PUMPS



Operation Manual

Medium Pressure Pumps

WDM Water Systems

1. Introduction.

This manual contains instructions for the installation and operation of your ME pumps. Read these recommendations carefully before use. Keep this manual for future reference.

Congratulations! You have purchased a product developed with the latest technology from WDM Pumps, Inc. (referred to as “WDM”).

WDM designs and manufactures our products with the highest quality components. Our experience as a manufacturer and our special care and dedication in production result in products that meet the highest standards.

The information contained in this manual is important for the installation, operation and maintenance of your WDM ME pumps. Read all instructions carefully before installing and using the product. Keep this manual for future reference.

Our products are factory tested to ensure proper operation. Inspect carefully and make sure there are no missing or damaged pieces from shipping. If, upon delivery, parts are damaged or missing, make a claim to the shipping company as soon as possible.

The design of this product, as well as the materials and processes used in its manufacture provide for proper operation. However product performance and lifespan depend on appropriate application, installation, periodic inspection and general preventive maintenance.



WARNING.

WDM is not responsible for any damage or accidents that occur when the instructions given in this manual have not been followed. The warranty is only valid when using WDM original spare parts. Failure to follow these guidelines in installing and starting your pump will void your warranty.

2. Safety Recommendations.

- WDM pumps are designed to operate safely when used and maintained according to this manual.
- Rotating parts of the pumps are dangerous and can cause injury. Operators and maintenance personnel should be aware of and follow safety recommendations.
- The pumps are considered heavy equipment. Handle them with care.
- Pumps should not pump hazardous material unless they have been designed and designated to do so.
- The pipes and pump should never be forced to fit if using the correct size. If you have to apply force, then get a different size.
- To reduce the risk of electrical shock, all wiring of pumps, motors, overload protection and control panels must be in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Requirements will vary depending on usage and location. Improper grounding will void the warranty.
- To reduce the risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Cable should be inspected frequently.
- Never handle connected power cords with wet hands.
- If any product is to be returned, it must be cleaned, sanitized, or decontaminated as necessary according to any applicable laws and regulations prior to shipment, to protect employees from exposure to health hazards.
- Always wear eye protection when working on pumps.
- Loose fitting clothing can easily be caught by the impeller or other moving parts, therefore do not wear loose fitting clothing when doing maintenance or service work on the pump.
- Gloves should be worn whenever handling parts that have sharp edges.
- Wear safety shoes when handling heavy parts or tools.
- For any maintenance always disconnect power.
- Never place hands in the suction or discharge openings.
- Safety handles should always be fastened securely before attempting to lift the pump.

- The pump should not be operated without the proper safety devices in place. If such devices are removed during service and repair work, make sure they are replaced before operating the pump again.
- Do not operate the pump when holding the cable assembly.
- Blocking or restricting the discharge hose may cause it to whip under the pressure.
- Do not remove the drain plugs or valves if the pump is operating.
- The pump should be isolated from a pressurized system before it is removed.
- Allow pumps time to cool sufficiently before handling or servicing them as heat and pressure build up inside during operation.
- Never apply heat in disassembling a pump as doing so could cause an explosion.
- Do not exceed manufacturer's recommendation for maximum performance, as doing so could cause the motor to overheat.
- If the discharge valve is closed, do not continue operating the pump. Doing so will decrease the life expectancy of the bearings and mechanical seal. Also, the extreme heat from doing so can cause steam to build up creating a dangerous pressure situation. A temperature or pressure relief valve should be installed on the pump body.

3. Installation.

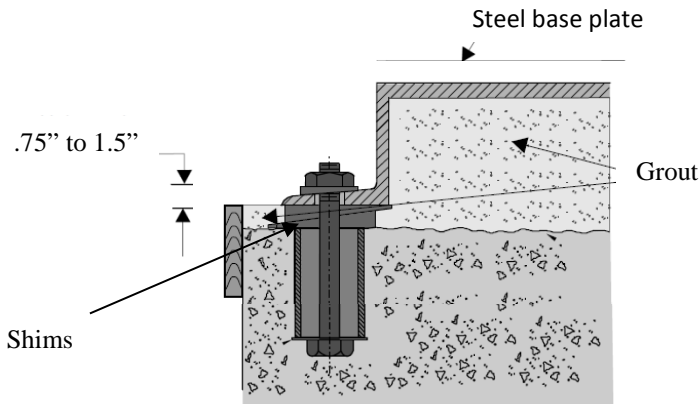
Location.

- Place the pump as close to the suction source as possible. Suction piping should be as short and direct as possible.
- Place the pump below the water level whenever possible. This will facilitate priming, ensures a constant flow of liquid, and provides a positive suction.
- Make sure the NPSH (Net Positive Suction Head) is accounted for at the suction end of pump relative to the whole system. Available NPSH must always exceed the required NPSH specified in the yield curve specifications of the pump.

- Always allow sufficient access for maintenance and inspection, plus space for the use of a crane strong enough to lift the unit.
- Be sure to have an adequate power supply for the pump motor. The electrical characteristics should fall within the range specified on the engine data plate.
- Protect the pump from exposure to extremely low temperatures to prevent fluid inside the pump from freezing.

The foundation for a horizontal pump.

- To absorb vibrations and prevent misalignment, horizontal pumps should be permanently installed on foundations of sufficient size, that are made of concrete or steel.
- The foundation may either be on springs or on a raised portion of the floor.
- Concrete foundations must be poured without interruption. All foundations must be between 3/4 to 1-1/2 inches below the elevation of the end pump.
- Anchor bolts should be in their designated positions along the pipe sleeves, and be long enough to go through grout, flange, nuts, and washers..
- As the foundation needs time to set, the pump should be installed several days after the foundation is laid.
- Once the foundation (if concrete) is poured and set, the pump's base plate should be placed on loose fitting wedges or shims located near each anchor bolt. Intervals between the wedges or shims should be less than 24" per side.
- Wedges or shims should raise the bottom of the pump about 3/4 - 1 1/4 inches in order for there to be room for slurry. Wedges and shims should be adjusted to make the pump level using a spirit level.
- Make sure that piping is aligned so as not to place stress on either flange.
- Once the pump is aligned, putting on bolt nuts and tightening them will be sufficient to anchor the pump to the steel or concrete foundation.
- Once any grout is completely hardened, tighten the foundation bolts as necessary. If tightening occurs then recheck pump alignment.



Suction (inlet) piping.

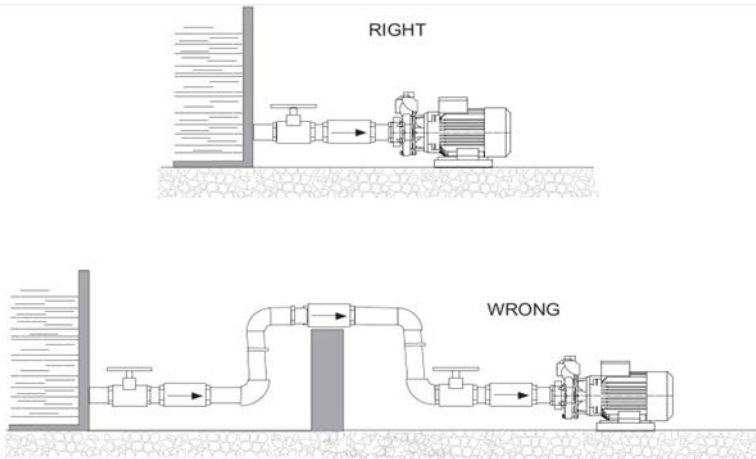
Suction piping must be selected and installed in such a way to minimize pressure loss and allow for a sufficient liquid flow during the starting and operation of the pump.

Many NPSH problems can be traced directly to improper sizing of suction piping systems.

The following precautions should be noted when installing suction piping:

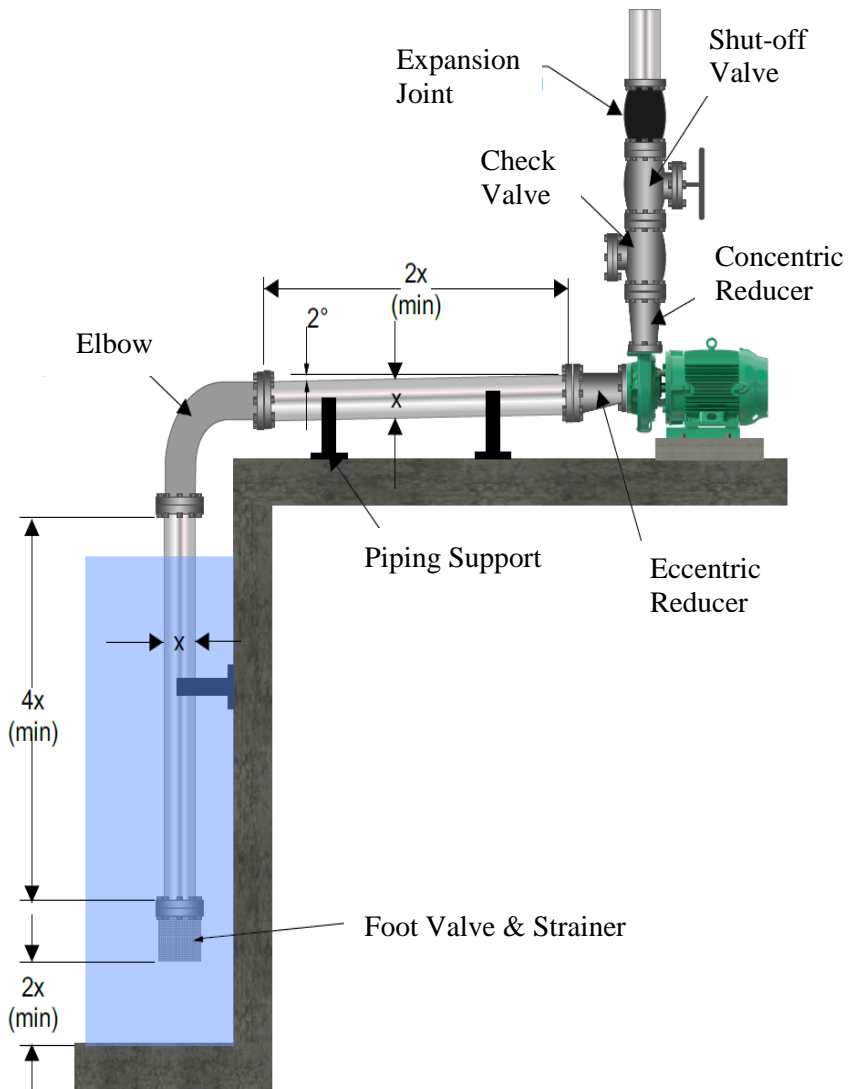
- Suction piping should be as direct as possible, and ideally the length should be at least ten times the pipe diameter.
- Short suction piping can be the same diameter as the suction opening.
- Depending on the length of a longer pipe, the diameter should be one or two sizes larger than the pump suction. Reduce the diameter of the pipe to match the diameter of the pump suction as it reaches pump suction opening.
- When required to reduce the pipe diameter, use an eccentric reducer with the eccentric side down.
- The pipe should never be smaller in diameter than the pump suction opening.

- For best results all horizontal suction lines should follow an even gradient. In suction lift conditions the gradient should be a gradual slope upward. For positive suction head, the gradient should be a gradual downward slope.
- In order to avoid air pockets that can throttle the system or cause erratic pumping, high points, such as pipe loops, should be avoided.

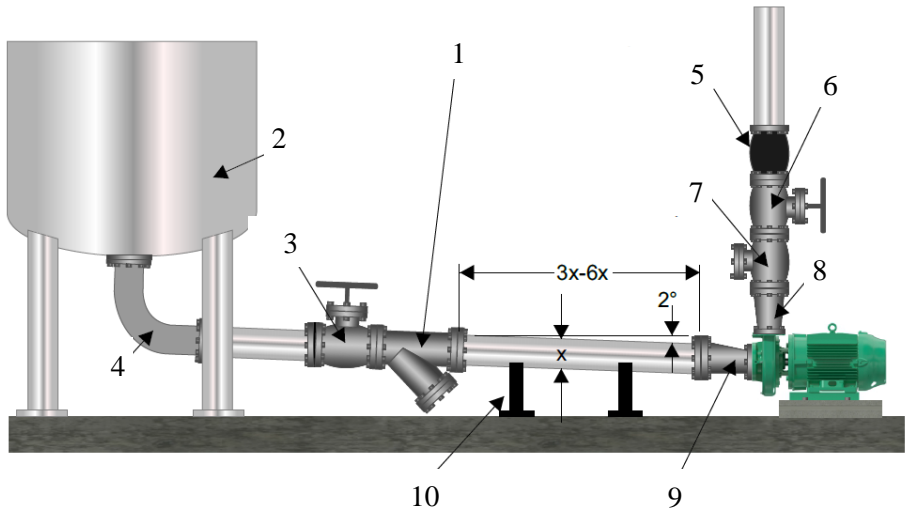


- In order to shut down the pump for maintenance or removal, a valve should be installed in the suction line. If more than one pump is on the same suction line, multiple valves should be placed in the line in order to shut down each pump individually.
- Gate valves should always be installed in positions that avoid air pockets. Globe valves should not be used.
- Valves along the suction line should always be fully open when the pump is in operation..
- Pressure gauges may be installed in gauge taps on pump nozzles (suction and discharge) if they are the correct size. These gauges will monitor the pump's performance, helping to determine if the performance of the pump lies within the parameters of the performance curve. When unstable operation conditions occur, these pressure gauges will indicate the wide fluctuation in pressure.

Negative suction installation Diagram



Positive Suction installation Diagram



1. Y fitting
2. Tank
3. Shut-off Valve
4. Elbow
5. Expansion Joint
6. Shut-off Valve
7. Check Valve
8. Concentric Reduction
9. Eccentric Reduction
10. Support

Discharge (outlet) piping.

- Discharge line should be at least the same diameter as discharge opening for short piping, for longer piping size should be 1 or 2 sizes larger according to piping length.
- For best results horizontal piping should have an even gradient.

- Trap air in high points of discharge line can affect the pump operation.
- Avoid hydraulic shock by closing the valve near the discharge before the pump shutdown.
- The discharge pipe should be as short as possible and fitted with either a check or gate valve for each pump that uses the same line. This valve is used to prevent backflow into the pump which can cause excessive flooding and damage to the pump. The valve may also be used to stop flow into the pump to help with priming and starting, shutdown, maintenance, and pump removal.

Electrical connections.

Power and Cables Control: The cable assembly mounted to the pump should not be modified in any way except for shortening to a specific application. Any splice between the pump and the control panel must be in accordance with all applicable electrical standards. Do not leave the electrical wire exposed, as it may reach the motor and cause serious damage.

The black, white, and red wires are all energy carriers or conductors. The green wire is the grounding wire.



ATTENTION.

Always use the installed handle, never the cord, to lift the pump,



ATTENTION.

WDM does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned in this operation manual and installation.



ATTENTION.

Pumps with mechanical seals require no adjustment. If the mechanical seal is altered or replaced with a packing gland, adjustments may become necessary.

All pumps on ME line of WDM Pumps are equipped with mechanical seals matched to the specific conditions for which the pump was sold.

To avoid damage to the seal, and to maximize seal life observe the following precautions:

- Stay within the temperature or pressure limitations specified for the mechanical seal used.
- Do not run the pump dry or against a closed valve! Dry operation will cause seal failure within minutes.
- Clean and flush the suction piping before installing and operating pump. Abrasives including pipe scale, welding slag and others can rapidly cause seal failure.

Electrical installation.

- A device that can disconnect both the controller and motor from their power sources should be installed. Such devices are typically circuit breakers or fusible disconnect switches. The motor starter should be seen from the disconnecting device, and the two should never be more than about 50 feet apart from each other.
- Short circuit and ground fault protection are usually provided by means of a circuit breaker or fusible disconnect switch.

Wiring installation.

- In order for there to be an ease of installation and convenient control, control panel or motor starter(s) should be placed in close proximity to the pump.
- Incoming power sources should be checked to ensure that they are the same voltage and phase as the motors.

- Based on the voltage and phase that is available, verify that the starter is able to operate the motor.

Overload protection.

The normally closed (N / C) temperature sensor is embedded in the winding, and detects engine overheating in case of an overload condition. Thermal sensor triggers shut down when the engine is too hot and automatically restarts when the pump motor is cooled to a safe temperature. It is recommended that the thermal sensor connects to an alarm to alert the operator that overheating occurred so that pump operation can be stopped. In case of overload, the cause should be reviewed and corrected.

Priming.

- As WDM ME pumps are not self-priming, they must be fully primed before starting. To prime the pump completely fill the suction line with liquid.
- If the suction head of the pump is positive, the suction valve should be opened allowing liquid to enter pump the casing. Then air vents should be opened, forcing all air out of the pump by liquid before closing the vents.
- If pump has a suction lift, priming may be accomplished by the use of foot valves or ejectors, or by manual filling of the pump casing and suction line.



CAUTION.

Operation of the pump while dry will result in serious damage.

Pre-start checklist.



WARNING.

The pump should be operated within the conditions on the name plate in order to protect the safety of the operator. If operated outside such conditions, the pump could fail causing injury to operating personal. In order to properly operate and maintain the pump and its components, an instruction book should be consulted.

Before starting the pump, the following inspections should be made:

- All wiring to the motor and starting device should match the wiring diagram. The motor should move in a clockwise rotation when looking at it from the back. If the motor has been in storage for any length of time, whether used or new, then consult the motor instructions before starting. Use the motor data plate to check the voltage, phase, and line circuit frequency.
- In order to make sure it rotates freely, use your hands to turn the rotating element..
- All piping should be checked for leaks. Also all flange bolts should be checked to make sure they are tightened securely..
- Write down the serial number of the pump for future reference.
- Perform an insulation (or megger) test on the motor before putting the pump into service.
- Resistance values (ohms), voltage, and current (amps) should all be recorded and saved for future reference.

Motor rotation.



CAUTION.

To check the driver rotation, make sure pump and driver couplings are fully disconnected and separated physically. Serious damage will occur to both the pump and driver if the rotation is wrong.

Before checking motor rotation, make sure all components in the system are wired and properly connected. If so then check the motor rotation as follows::

If a 3 phase unit (only) – energize the motor briefly to make sure the rotation is going in the direction indicated by the arrow in the pump volute. If the rotation is not following the arrow, then switch the two wires from the motor starter’s terminal.



CAUTION.

As pumps should not be operated while dry, be extremely cautious in making sure the motor is energized only momentarily, just long enough to determine if the rotation is proper.

4. Starting the pump.



WARNING.

If a pump is operated without an approved coupling guard in place, it may result in injury to personnel operating the pump. Coupling guard should be installed on flexible coupled units.

Once the pump is primed, start the pump by turning on the power to the motor as instructed in the motor manual and follow this recommendation:

- Check for pressure leaks, make an immediate visual inspection of the pump and suction piping.
- Upon the pump reaching full operating speed, begin to open the discharge gate valve slowly until complete system flow is achieved.
- The discharge pipe should also be checked for pressure leaks.
- If there are pressure gauges on the pump, record pressure readings to use as a reference in the future
- Also make sure the pump is falling within the parameters of the performance curve.

- Check and record Voltage, amperage per phase, and kilowatts.

Voltage regulation.

While the motor will operate satisfactorily under these voltage and frequency variations, such operation may not be in accordance with the standards established for operation in underrated conditions:

- Variation in the voltage may not exceed $\pm 10\%$ the rating specified on the motor data plate.
- Frequency variation may not exceed $\pm 5\%$ the rating specified on the motor data plate.
- The sum of the voltage and frequency variation may not exceed $\pm 10\%$ the motor rating while the frequency variation does not exceed $\pm 5\%$.

Pump shutdown.

The following shutdown procedures will apply in most normal shutdowns for the WDM pumps types ME. If pump will be inoperative for an extended length of time, follow storage procedures:

- Close the discharge gate valve slowly to prevent hydraulic shock, and then cut power to the motor.
- Cut power to motor.

Short duration shutdown.

For temporary or overnight shutdowns in conditions above freezing, pumps may remain filled with liquid. Pumps should be primed again fully before restarting

Extended period shutdown.

If the shutdown is for a longer period of time, or for pump maintenance, close the suction gate valve. If a suction gate valve is not used, but there is a positive suction head, proceed to drain all liquid from suction line in order to end the liquid flow to the suction nozzle. All plugs in drains and vent traps should be removed and all liquid drained from the pump casing.

Restart: Any time the pump is restarted, but especially when the pump has been drained, you should check to make sure the pump is refilled back to the level required.

5. Maintenance.



WARNING.

If equipment is rotating, do not attempt to complete any maintenance, inspection, repair, or cleaning until rotation has stopped as such actions could result in injury to personnel..

Before attempting any inspection or repair on the pump, the driver controls must be in the “OFF” position, locked and tagged to prevent injury to personnel performing service on the pump.

Motor lubrication.

To lubricate the motor, remove the grease drain plug (if present) and filler plug on the grease fitting. Proceed to grease with clean lubricant until you can see grease appear at the drain hole or along the motor shaft. This may be done while motor is running or resting.

Table 1. Recommended Lubrication Periods.

Motor rpm	Motor hp	Operation conditions		
		Standard	Severe	Extreme
0 - 1750	1/3-7-1/2	3 years	1 year	6 months
	10-40	1-3 years	6 months-1 year	3 months
	50-150	1 year	6 months	3 months
	200 and UP	6 months	3 months	3 months
Standard conditions: Operation 8 hours per day, regular or light loading, clean air, below 100°F (38°C) ambient temperature.				
Severe conditions: 24 hours operation, shock loading or vibration, reduced ventilation, ambient temperature between 100°F to 150°F (38°C to 66°C).				
Extreme conditions: Nonstop operation, heavy shock or vibration, dirt or dust in air, under extreme ambient temperature.				

One-half to one cubic inch of grease is sufficient for motors 5.0 hp and under, with proportionately more grease for greater HP motors.

- “Sealed-for-life” bearings do not require any further lubrication during the life of the motor. These are most fractional motors and some integral frame motors. Always follow motor manufacturer’s lubrication instructions. Make sure to periodically check grease fittings and drain plugs for leaks.
- Below, Table 2 lists recommended types of grease for both pump and motor lubrication. These types have all been thoroughly tested and should be used whenever possible.

Table 2. Recommended Lubricants.

Manufacturer	Lubricant
Shell	Dolium®R
Exxon	Polyrex
Chevron	SRI Grease NLGI 2
	Black Pearl-NLGI 2
Texaco	Polystar RB

- Remove grease drain plug (if present) and the filler plug in order to lubricate greased bearings, and then add clean lubricant until it appears at the drain hole or along the shaft. For units that contain a drain hole, all old grease can be cleaned out before putting new grease in. If done, leave the drain unplugged for several minutes during the pumping operation in order to allow excess grease to be forced out.
- Fresh lubricant should be applied every 1 to 3 months, depending on the severity of environment the pump is in. The better the environment, (clean, dry, and under 100 °F) the longer the interval, not to exceed 3 months. Make sure to not over grease as doing so can cause premature failure.

6. Disassembling the pump

Below are outlined instructions to completely disassemble the pump. In order to perform maintenance, only disassemble as far as required.

- Turn off power.
- Drain system, including. flushing, if necessary.
- Closed coupled units and remove bolts that hold down the motor.
- Remove casing bolts.
- Remove back pull-out casing.
- Unscrew impeller nut.



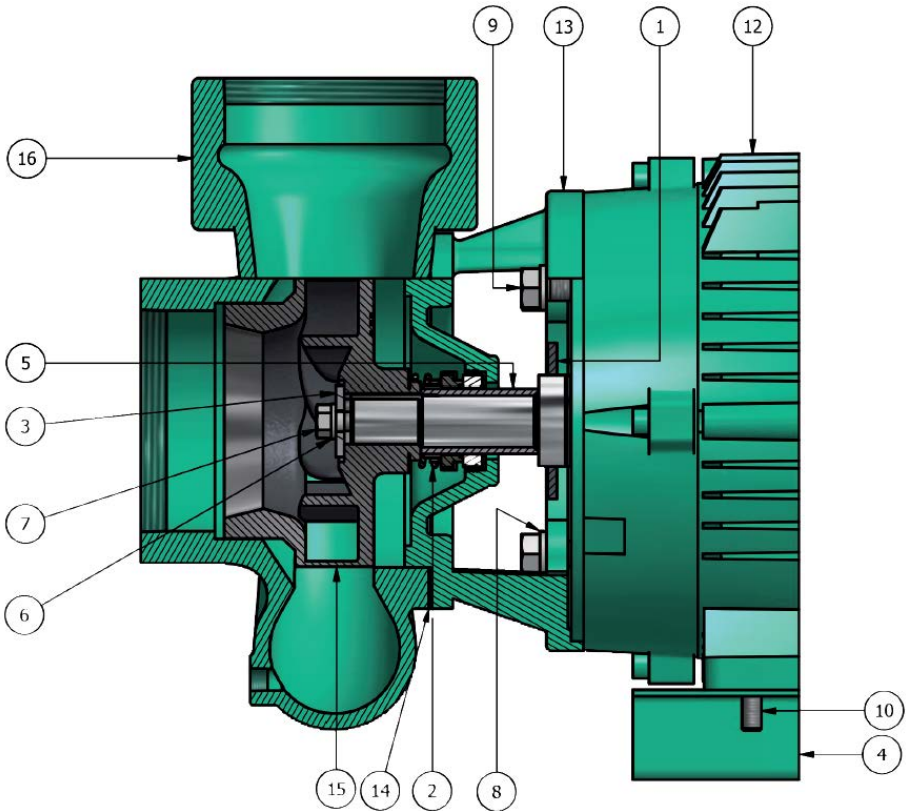
CAUTION.

Do not insert screwdriver between impeller vanes to prevent rotation. It may be necessary to use a strap wrench around the impeller or shaft to prevent rotation.

- To remove the impeller from the shaft, use the appropriate size gear puller aligned behind the impeller vanes.
- Remove impeller key.
- Remove the backplate bolts and backplate.
- To replace the shaft sleeve, heat evenly to about 350°F in order to loosen the Loctite and then twist the sleeve off.
- Remove motor bracket.
- Remove Slinger.
- Replace lip seals if worn or damaged..
- Check shaft for runout at the sleeve area.

Below is a chart with the specifications necessary for the identification of each of the pump parts listed above.

ME Parts List



ITEM	Description
1	Slinger
2	Mechanical Seal
3	Impeller Washer
4	Steel base brackets
5	Shaft Sleeve
6	Lock Washer
7	Impeller Hex Bolt
8	Bracket Lock Washer
9	Bracket Hex Bolt
10	Base Hex Bolt
11	Washer
12	Motor
13	Motor Bracket
14	Casing Gasket
15	Impeller
16	Casing (Volute)

7. Reassembly of pumps.

- Before reassembly, all parts should be thoroughly cleaned.
- To identify required replacement items refer to the parts list. When ordering the parts, have the pump serial or catalog number available.
- To reassemble follow the reverse of the disassembly instructions.
- If all mechanical seal components are not in good condition, leakage may occur. In order to prevent leakage, completely replace the seal..
- New shaft sleeves are installed by bonding to shaft with hydraulic setting Locktite.

8. Trouble shooting.

Symptom	Possible cause(s)	Possible solution(s)
Pump does not start	Motor not connected	Revise that motor connections have been properly done.
Little or no discharge and unit will not prime.	1. Casing not filled with water.	1. Fill pump casing. Using a foot valve will extend pump life and facilitate immediate priming.
	2. Total head too high.	2. Shorten suction head.
	3. Suction head higher than pump designed for.	3. Lower suction head, install foot-valve and prime.
	4. Impeller partially or completely plugged.	4. Disassemble pump and clean out impeller.
	5. Hole or leak in suction line.	5. Repair or replace suction line.
	6. Foot-valve too small.	6. Match foot-valve to piping or install one size larger foot-valve.
	7. Impeller damaged.	7. Disassemble pump and replace impeller.
	8. Foot-valve or suction line not submerged deep enough in water; pulling air.	8. Submerge lower in water.
	9. Insufficient inlet pressure or suction head.	9. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	10. Suction piping too small	10. Increase pipe size to pump inlet size or larger.
	11. Casing gasket leaking	11. Replace.
	12. Suction or discharge line valves closed.	12. Open.
	13. Piping is fouled or damaged.	13. Clean or replace.
	14. Clogged strainer or foot valve.	14. Clean or replace.
Loss of suction after satisfactory operation.	1. Air leak in suction line.	1. Repair or replace suction line.
	2. When unit was last turned off, water siphoned out of pump casing.	2. Refill (reprime) pump casing before restarting.
	3. Suction head higher than pump designed for.	3. Lower suction head; install foot-valve and primer.

	4. Insufficient inlet pressure or suction head.	4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	5. Clogged foot-valve, strainer, or pump.	5. Unclog, clear or replace as necessary.
Pump overloads driver.	1. Total head lower than pump rating, unit delivering too much water.	1. Increase back pressure on pump by turning gate valve on discharge line to partially closed position that will not overload motor
	2. Specific gravity and viscosity of liquid being pumped different than the pump rating	2. Consult factory.
Pump vibrates and/ or makes excessive noise.	1. Mounting plate or foundation not rigid enough.	1. Reinforce.
	2. Foreign material in pump causing unbalance.	2. Disassemble pump and remove foreign material..
	3. Impeller bent.	3. Replace impeller
	4. Cavitation present	4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line.
	5. Piping not supported to relieve any strain on pump assembly.	5. Make necessary adjustments.
Pump runs but no fluid.	1. Faulty suction piping (air leak)	1. Replace faulty suction piping
	2. Pump located too far from fluid source	2. Reposition.
	3. Gate valve closed.	3. Open
	4. Clogged strainer	4. Clean or replace
	6. Discharge height too great	6. Lower the height
	7. Fouled impeller.	7. Clean or replace.
	8. Faulty mechanical seal	8. Replace
Pump leaks at shaft	1. Worn mechanical seal.	1. Replace
	2. Replacement seal not installed properly.	2. Follow Maintenance instructions carefully

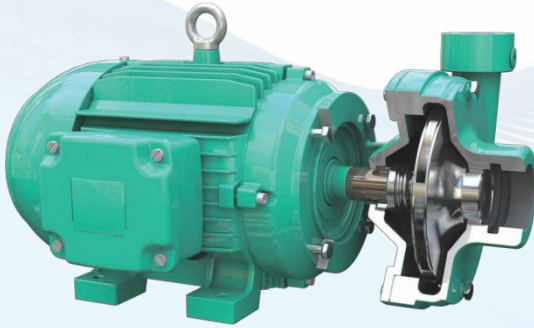
10. Warranty.

WDM guarantees its ME Pumps for a period of 12 months from the date of delivery, against defects in material and workmanship, according to the indicated in its general conditions of sale.

Failure to follow the suggestions and recommendations in this manual, as well as improper product use or handling, will completely invalidate the warranty.

The warranty excludes wear and tear, misuse, repair, or replacement of the defective part by the user or unskilled personnel without specific permission of WDM Pumps.

Notes:



4034 Mint Way
Dallas, Texas 75237.
Tel. 800-783-6756 / 214-337-8780



Operation Manual

Submersible Non-clog pumps

4" & 6"

NE Series.

WDM Water Systems

1. Introduction.

This manual contains instructions for the installation and operation of your NE pumps. Read these recommendations carefully before use. Keep this manual for future reference.

Congratulations! You have purchased a product developed with the latest technology from WDM Pumps, Inc. (referred to as “WDM”).

WDM designs and manufactures our products with the highest quality components. Our experience as a manufacturer and our special care and dedication in production result in products that meet the highest standards.

The information contained in this manual is important for the installation, operation and maintenance of your WDM NE pumps. Read all instructions carefully before installing and using the product. Keep this manual for future reference.

Our products are factory tested to ensure proper operation. Inspect carefully and make sure there are no missing or damaged pieces from shipping. If, upon delivery, parts are damaged or missing, make a claim to the shipping company as soon as possible.

The design of this product, as well as the materials and processes used in its manufacture provide for proper operation. However product performance and lifespan depend on appropriate application, installation, periodic inspection and general preventive maintenance.



WARNING.

WDM is not responsible for any damage or accidents that occur when the instructions given in this manual have not been followed. The warranty is only valid when using WDM original spare parts. Failure to follow these guidelines in installing and starting your pump will void your warranty.

2. Safety Recommendations.

- Wastewater pumps NE, NE 4 and NE 6 are not recommended for use in pools or water recreation facilities.
- WDM pumps are designed to operate safely when used and maintained according to this manual.
- Rotating parts of the pumps are dangerous and can cause injury. Operators and maintenance personnel should be aware of and follow safety recommendations.
- The pumps are considered heavy equipment. Handle them with care.
- Pumps should not pump hazardous material unless they have been designed and designated to do so.
- The pipes and pump should never be forced to fit if using the correct size. If you have to apply force, then get a different size.
- To reduce the risk of electrical shock, all wiring of pumps, motors, overload protection and control panels must be in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Requirements will vary depending on usage and location. Improper grounding will void the warranty.
- To reduce the risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Cable should be inspected frequently.
- Never handle connected power cords with wet hands.
- If any product is to be returned, it must be cleaned, sanitized, or decontaminated as necessary according to any applicable laws and regulations prior to shipment, to protect employees from exposure to health hazards.
- Always wear eye protection when working on pumps.
- Loose fitting clothing can easily be caught by the impeller or other moving parts, therefore do not wear loose fitting clothing when doing maintenance or service work on the pump.
- Gloves should be worn whenever handling parts that have sharp edges.
- Wear safety shoes when handling heavy parts or tools.
- For any maintenance always disconnect power.
- Never place hands in the suction or discharge openings.
- Safety handles should always be fastened securely before

- attempting to lift the pump.
- The pump should not be operated without the proper safety devices in place. If such devices are removed during service and repair work, make sure they are replaced before operating the pump again.
 - Do not operate the pump when holding the cable assembly.
 - Blocking or restricting the discharge hose may cause it to whip under the pressure.
 - Do not remove the drain plugs or valves if the pump is operating.
 - The pump should be isolated from a pressurized system before it is removed.
 - Allow pumps time to cool sufficiently before handling or servicing them as heat and pressure build up inside during operation.
 - Never apply heat in disassembling a pump as doing so could cause an explosion.
 - Do not exceed manufacturer's recommendation for maximum performance, as doing so could cause the motor to overheat.
 - If the discharge valve is closed, do not continue operating the pump, the extreme heat from doing so can cause steam to build up creating a dangerous pressure situation. A temperature or pressure relief valve should be installed on the pump body.



CAUTION.

If operating the pump with a plug-in type power cord, it should have a ground fault circuit breaker.



CAUTION.

The pumps are not recommended for: Pumping flammable liquids, for use in areas considered dangerous; for use in pools or water recreation facilities, for pumping liquids with abrasive solids or operating above the recommended submergence level.

The use of these pumps in the cases mentioned will cause the loss of your warranty.

3. Installation.

Receiving

Pumps should be inspected upon receipt. Make note of damage or missing parts, if any, and immediately file a claim with the shipping company. During inspection, if the manual is removed, do not lose or misplace it.

Location.

- Never install the pumps in soft ground trenches. This causes the pump to sink and suction to be covered.
- Upon installation, make sure there is enough room to access the pump for maintenance and inspection. Also make sure a crane can access and lift the pump during removal.
- Be sure there is enough power for the motor to work.
- In order to ensure there is enough power for the motor, electrical characteristics and limits on the motor data plate should be followed.

The recommended the level of submergence is shown in diagram No. 1.

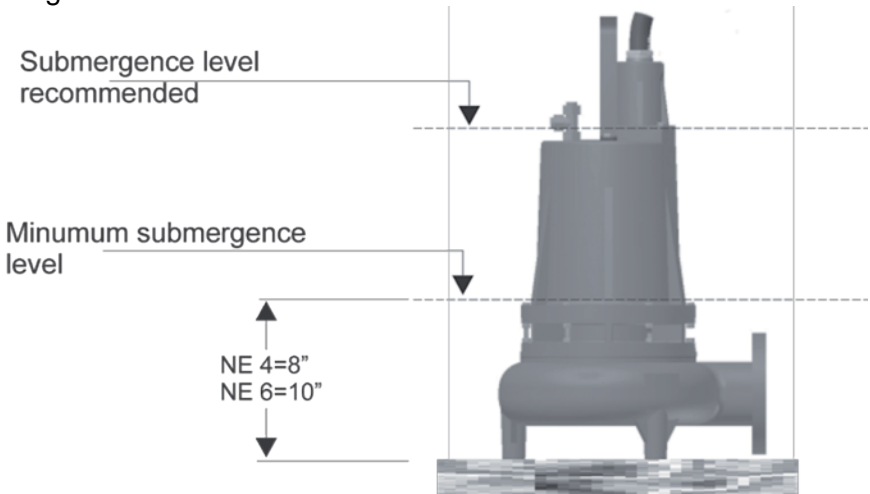


Diagram No. 1



ATTENTION.

WDM does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned in this manual.

Always use the handle, and never the cord, to lift the pump.



WARNING.

Pumps and pipes should be supported independently and their connections must never be forced. Doing so will generate stress on the pump and cause the pump to fail.

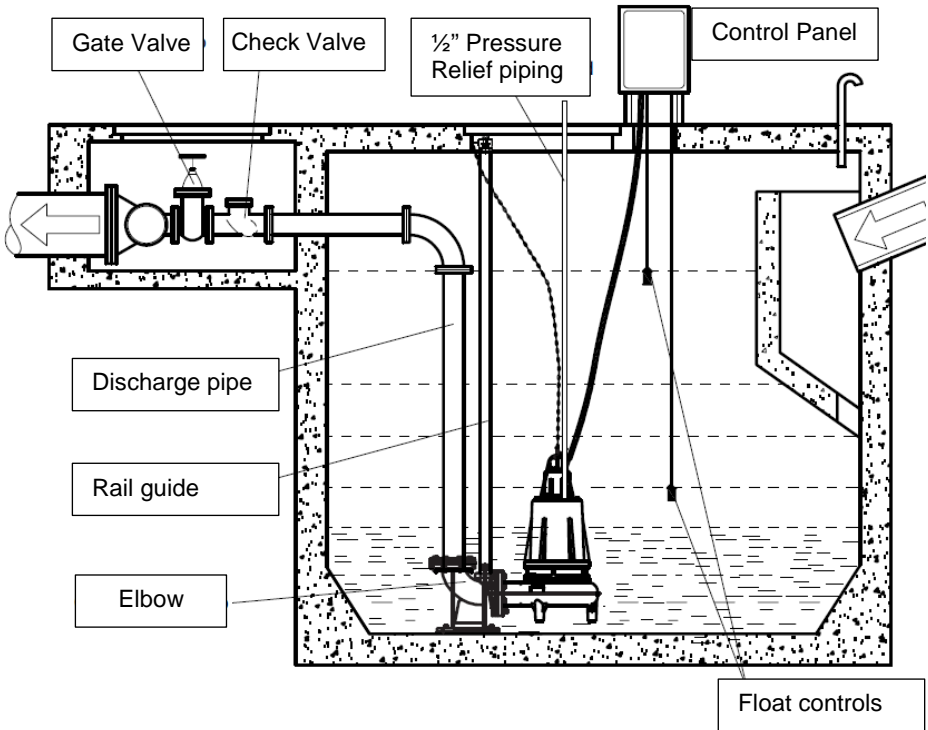
Discharge (outlet) piping.

The discharge pipe should be as short as possible and fitted with either a check or gate valve for each pump that uses the same line. This valve is used to prevent backflow into the pump which can cause excessive flooding and damage to the pump. The valve may also be used to stop flow into the pump to help with priming and starting, shutdown, maintenance, and pump removal.

- The discharge gate valve should be closed before the pump is shut down if check valves are used.
- If the piping is short then it may be the same diameter as the discharge opening.
- Like the suction piping, discharging piping's diameter should be 1 - 2 sizes larger the longer the pipe.
- If the discharge piping is horizontal, it is best to have an even gradient.
- Air or gas may get trapped in high points along the piping which retards the pump's operation.

The NE pump is designed to allow installation or removal without requiring personal to enter the well. If need it you can use WDM slide rail system (Sold separately, does not includes rails).

Installation Diagram



Liquid level controls:

Float controls are supported by mounting a bracket which is attached to the borehole wall, deck, or junction box. Use cable grips to hold the cables in place during installation. The level of control can be changed by loosening the handle and adjusting the cable length according to the plans and specifications. Make sure the float controls are correctly placed and the pump is completely submerged when the level control is "Off".

Electrical connections.

Power and Cables Control: The cable assembly mounted to the pump should not be modified in any way except for shortening to a specific application. Any splice between the pump and the control panel must be in accordance with all applicable electrical standards.

Do not leave the electrical wire exposed, as it may cause serious damage. The black, white, and red wires are all energy carriers or conductors. The green wire is the grounding wire.

Overload protection:

For 3 phase pumps a normally closed (N/C) temperature sensor has been embedded to detect when the motor is overheating because of overload conditions. These thermal sensors trigger a shutdown when the motor is too hot, and will automatically restart the pump once the motor has cooled to a safe temperature. We recommend connecting the sensors to an alarm that alerts the operator an overheating situation has occurred and to stop the operation. If this situation occurs, it should be reviewed to determine the cause and correct the situation.



ATTENTION.

Always use the installed handle, never the cord, to lift the pump.



ATTENTION.

WDM does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned in this operation manual and installation.



ATTENTION.

Do not continue to operate the pump if an overload situation arises.

Humidity sensor

A normally open (N/O) contact is installed in the seal chamber in order to detect if any moisture is present in the pump. We recommend that this sensor be connected to an alarm to alert the operator that moisture has been detected. If moisture is detected the pump should be inspected and repaired.

Wire Size

A licensed electrician should be consulted to determine what wire size should be used if more power is required. Consult the table for electrical information.

Model	hp	V	Phases	rpm	Amps (max.)	Amps (max) at locked rotor	Winding resistance at Start-up	Cable size
NE 4 45-4-220	4.5	220	3	1,750	18.2	56.0	1.43	10/4
NE 4 45-4-440	4.5	440	3	1,750	9.1	28.0	5.71	10/4
NE 4 75-4-220	7.5	220	3	1,750	26.8	80.0	0.71	10/4
NE 4 75-4-440	7.5	440	3	1,750	13.0	40.0	2.85	10/4
NE 4 113-4-220	11.3	220	3	1,750	28.0	126.0	0.43	10/4
NE 4 113-4-440	11.3	440	3	1,750	14.0	63.0	1.72	10/4
NE 4 150-4-220	15.0	220	3	1,750	38.0	160.0	0.35	8/4
NE 4 150-4-440	15.0	440	3	1,750	19.0	80.0	1.45	8/4
NE 6 90-6-220	9.0	220	3	1,150	36.0	162.0	0.445	2/5
NE 6 90-6-440	9.0	440	3	1,150	18.0	81.0	1.780	2/5
NE 6 180-6-220	18.0	220	3	1,150	50.0	232.0	0.080	2/5
NE 6 180-6-440	18.0	440	3	1,150	25.0	116.0	0.320	2/5
NE 6 240-6-220	24.0	220	3	1,150	64.0	290.0	0.235	2/5
NE 6 240-6-440	24.0	440	3	1,150	32.0	145.0	0.940	2/5
NE 6 300-6-220	30.0	220	3	1,150	82.0	364.0	0.123.	2/5
NE 6 300-6-440	30.0	440	3	1,150	41.0	182.0	0.490	2/5
NE 6 180-4-220	18.0	220	3	1,750	50.6	232.0	0.270	2/5
NE 6 180-4-440	18.0	440	3	1,750	25.3	116.0	1.080	2/5
NE 6 240-4-220	24.0	220	3	1,750	62.8	290.0	0.205	2/5
NE 6 240-4-440	24.0	440	3	1,750	31.4	145.0	0.820	2/5
NE 6 300-4-220	30.0	220	3	1,750	76.0	364.0	0.188	2/5
NE 6 300-4-440	30.0	440	3	1,750	38.0	182.0	0.750	2/5
NE 6 360-4-220	36.0	220	3	1,750	90.0	434.0	0.110	2/5
NE 6 360-4-440	36.0	440	3	1,750	45.0	217.0	0.440	2/5
NE 6 480-4-440	48.0	440	3	1,750	65.0	290.0	0.540	2/5
NE 6 600-4-440	60.0	440	3	1,750	78.0	363.0	0.310	2/5
NE 6 750-4-440	75.0	440	3	1,750	96.0	576.0	0.187	2/5

Pre-start checklist.

To avoid damage to the seal, and to maximize seal life observe the following precautions:

- Stay within the temperature or pressure limitations specified for the mechanical seal used.
- Do not run the pump dry or against a closed valve! Dry operation will cause seal failure within minutes.



CAUTION.

Operation of the pump while dry will result in serious damage.



WARNING.

The pump should be operated within the conditions on the name plate in order to protect the safety of the operator. If operated outside such conditions, the pump could fail causing injury to operating personal. In order to properly operate and maintain the pump and its components, an instruction book should be consulted.

Before starting the pump, the following inspections should be made:

- All wiring to the motor and starting device should match the wiring diagram. The motor should move in a clockwise rotation when looking at it from the back. If the motor has been in storage for any length of time, whether used or new, then consult the motor instructions before starting. Use the motor data plate to check the voltage, phase, and line circuit frequency.
- In order to make sure it rotates freely, use your hands to turn the rotating element..
- All piping should be checked for leaks. Also all flange bolts should be checked to make sure they are tightened securely..
- Write down the serial number of the pump for future reference.

- Perform an insulation (or megger) test on the motor before putting the pump into service.
- Resistance values (ohms), voltage, and current (amps) should all be recorded and saved for future reference.

Motor rotation.



CAUTION.

To check the driver rotation, make sure pump and driver couplings are fully disconnected and separated physically. Serious damage will occur to both the pump and driver if the rotation is wrong.

Before checking motor rotation, make sure all components in the system are wired and properly connected. If so then check the motor rotation as follows.

If a 3 phase unit (only) – energize the motor briefly to make sure the rotation is going in the direction indicated by the arrow in the pump volute. If the rotation is not following the arrow, then switch the two wires from the motor starter's terminal.



CAUTION.

As pumps should not be operated while dry, be extremely cautious in making sure the motor is energized only momentarily, just long enough to determine if the rotation is proper.

Pump should be lowered into sump or basin, you can use NE lift rail system sold separately to do so.

4. Starting the pump.

Start the pump by turning on the power to the motor as instructed in the motor manual and follow this recommendation:

- Upon the pump reaching full operating speed, begin to open the discharge gate valve slowly until complete system flow is achieved.
- If there are pressure gauges on the pump, record pressure readings to use as a reference in the future
- Also make sure the pump is falling within the parameters of the performance curve.
- Check and record Voltage, amperage per phase, and kilowatts.
- Check system by filling the sump and allowing pump to operate.

Voltage regulation.

While the motor will operate satisfactorily under these voltage and frequency variations, such operation may not be in accordance with the standards established for operation in underrated conditions:

- Variation in the voltage may not exceed $\pm 10\%$ the rating specified on the motor data plate.
- Frequency variation may not exceed $\pm 5\%$ the rating specified on the motor data plate.
- The sum of the voltage and frequency variation may not exceed $\pm 10\%$ the motor rating while the frequency variation does not exceed $\pm 5\%$.

Pump shutdown.

The following shutdown procedures will apply in most normal shutdowns for the WDM pumps types NE.

- Close the discharge gate valve slowly to prevent hydraulic shock, and then cut power to the motor.
- Cut power to motor.

5. Maintenance.



WARNING.

If equipment is rotating, do not attempt to complete any maintenance, inspection, repair, or cleaning until rotation has stopped as such actions could result in injury to personnel..

Before attempting any inspection or repair on the pump, the driver controls must be in the “OFF” position, locked and tagged to prevent injury to personnel performing service on the pump.

Motor lubrication.

As the motor is filled with oil, there is no need to add lubricant of any kind or additional motor maintenance work as these pumps are generally very reliable and in most cases are able to continue to operate smoothly for many years with little problems.

Preventative maintenance should be performed regularly, including:

1. Inspecting the motor and seal chambers for proper oil levels and the presence of contamination and repair as necessary.
2. Inspecting the impeller and body for any excessive build-up or clogging and repair as necessary.
3. Inspecting the motor and bearings and repair as necessary.
4. Inspecting the seal and diaphragm for any leakage or wear and repair as necessary.

The pump is supplied from the factory with oil for cooling the motor, only replace the oil if there is a failure or if you perform internal maintenance work; use Texaco dielectric oil Diala-Oil-AX or Mobil DTE Oil Light as the recommended in the following table:

Model	Casing		Seal chamber	
	Gallons	Liters	Gallons	Liters
NE 4 450/750/1130/1500	2.5	9.5	0.3	1.1
NE 6 9/180/240	15.0	56.8	0.4	1.5
NE 6 300/480/600/750	11.0	41.6	0.4	1.5



CAUTION.

Do not completely fill the motor casing with oil as this can cause buildup dangerous pressure that may destroy the pump. Allow 1.75" of air space below top of the motor housing.

Pressure Test

Casing: The oil should be at the correct level to check for any leaks around the shaft seal, square rings, and cables. Remove the pressure valve (22) from the motor housing (16). Apply the sealant and then tighten the pressure gauge into the pressure valve (Diagram No. 3). Apply air pressure into the motor housing at 10 P.S.I. Next, pour soapy water around the sealed areas to see if any "air bubbles" occur. If after 5 minutes at a constant air pressure of 10 P.S.I. no "bubbles" occur then remove the pressure gauge and air pressurizer and replace the valve and seal. If "bubbles" do occur, then there is a leak that must be located and repaired.

Seal Chamber: Remove the pipe plug (31) and check that the chamber is full of oil. Then apply pipe sealant to the pressure gage and tighten into the bearing bracket's hole. Pressurize the seal to 20-25 P.S.I. and follow the steps above to see if any "bubbles" occur indicating a leak.

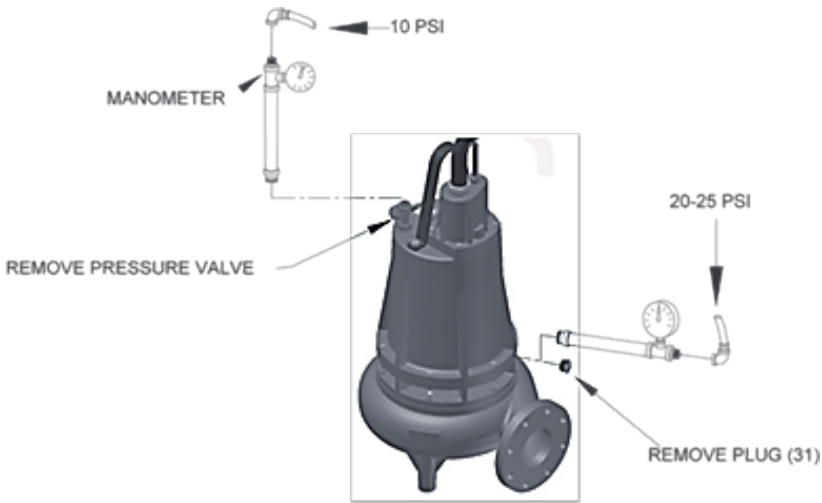


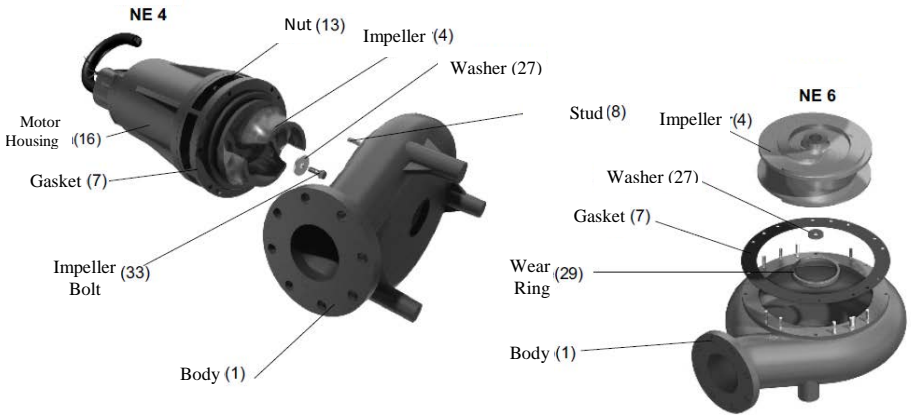
Diagram No. 3

Cleaning.

If the pump is used for portable applications, pump clean water through it after each use to prevent deposits of dirt and scale from forming.

Impeller replacement.

In cleaning out the body (1), replacing the impeller (4), or replacing the wear ring (on NE 6 pumps), disconnect the power, remove any hex screws (13), and then lift the vertical motor and seal out of the body. If necessary clean the body. Clean and examine the impeller (4) for any pitting or wearing and replace as necessary. Inspect the gasket (7) for any cuts or damage and replace as necessary. If the impeller needs to be replaced remove the screw (33) and washer. As the impeller is keyed onto the shaft with a square key (#), the impeller should be pulled straight off the shaft using a wheel puller as necessary. In the NE 6 pump, if the wear ring needs to be replaced simply cut the ring (29) and remove being careful not to damage the body (1).



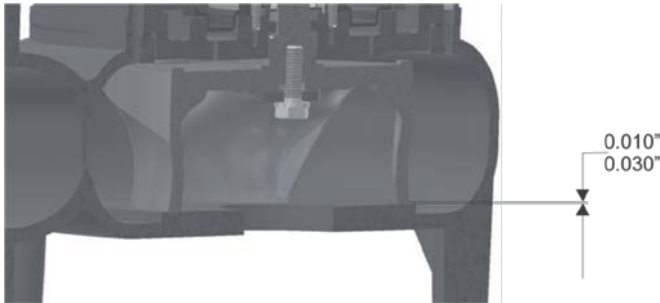
Mounting.

To install a new wear ring in the NE 6 apply a retaining compound into the body wear ring housing (26) and press the wear ring in until seated. In all models, when installing an impeller, apply a thin coat of motor oil to the shaft and slide the impeller up and down the shaft while keeping the keyways aligned. Then drive the key (#) into the keyway, locate and affix the washer, and apply thread lock, set according to the manufacturer's instructions. Apply the thread locking compound on the screw (33) then thread into the shaft and torque to 35lb/ft. Place the gasket (41) on the flange of the body and install the impeller and motor housing on the posts and spiral (26). Next apply the thread locking compound onto the threads of each bolt (24) and nut (20) on the stud (24). Then torque to 24 ft/lb. Finally check to see if motor and impeller rotate freely.



ATTENTION.

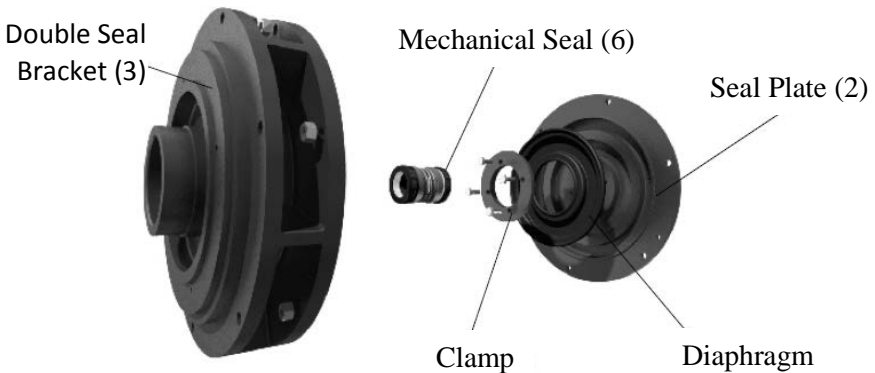
When installing the pump impeller in a NE 4 unit, check that the clearance between the impeller and the flat face of the body is within 0.010" (0.25mm) to 0.030" (0.7mm).



Servicing Motor and Mechanical Seal:

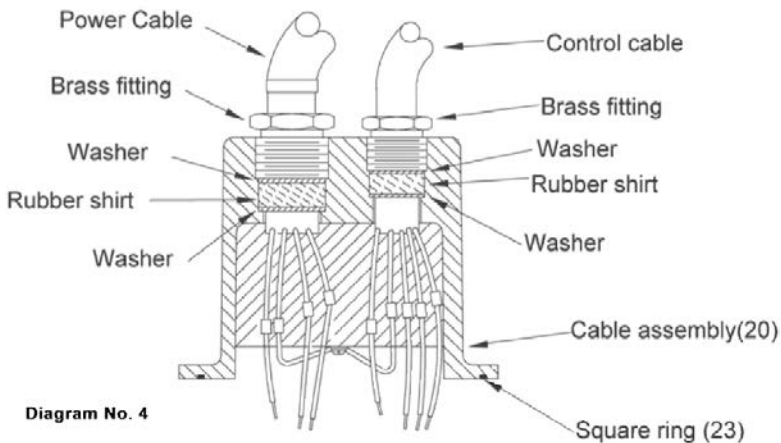
- Remove the body (1) and impeller (4) as stated above.
- Drain the oil from the casing (16) and remove the valve (22).
- Remove the screws (13) and separate the motor (5) with the coupling (3) from the casing (16).
- Disconnect the motor (5) from the cable assembly (20), release the coupling screws and remove the seal plate (2) together with the stationary part of the seal (6) of the motor (5).
- Now examine the motor, bearings, and seal components.
- Upon observation, replace what is worn or damaged.
- If a replacement requires a seal component, then replace everything.
- Carefully reassemble the seal, making sure not to scratch or mark up the new surfaces.
- When replacing the seal remove the rotating component, motor shaft spring, and the fixed part of the coupling. Then clean the double seal cavity (3).
- Place the new component into the double seal plate (3) with the hard side of the fixed part in the seal plate (2). Make sure the spring on the rotating component is set properly.

Carefully assemble the double seal bracket (3) onto the motor (5) using motor screws. Then tighten the screws and insert into the body housing (16). Secure the coupling with nuts (13) and then add oil as specified above.



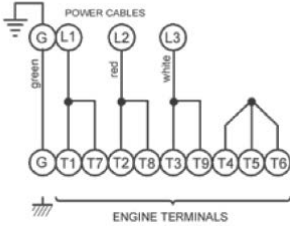
Electrical connections.

Check the cables to ensure there are no tears or defects. In case of damage, replace the entire cable assembly cover (20). Remove the motor cables through the top of the pump housing, check their sleeves, and replace as necessary. Place the square ring (23) in the conduit housing (20) reconnecting motor leads to power cables and moisture and temperature sensors to control cables as shown in Diagram 4.

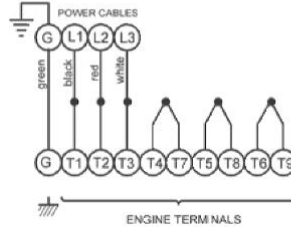


CONNECTIONS NE 4

CONNECTION DIAGRAM
TRIPHASE 230v

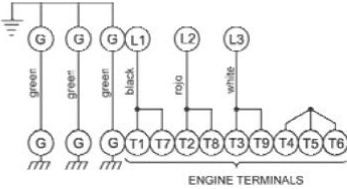


CONNECTION DIAGRAM
TRIPHASE ENGINE 460V

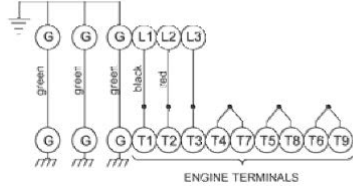


CONNECTIONS NE 6

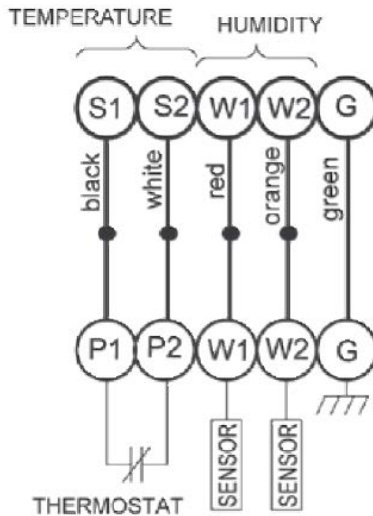
CONNECTION DIAGRAM
TRIPHASE 230v



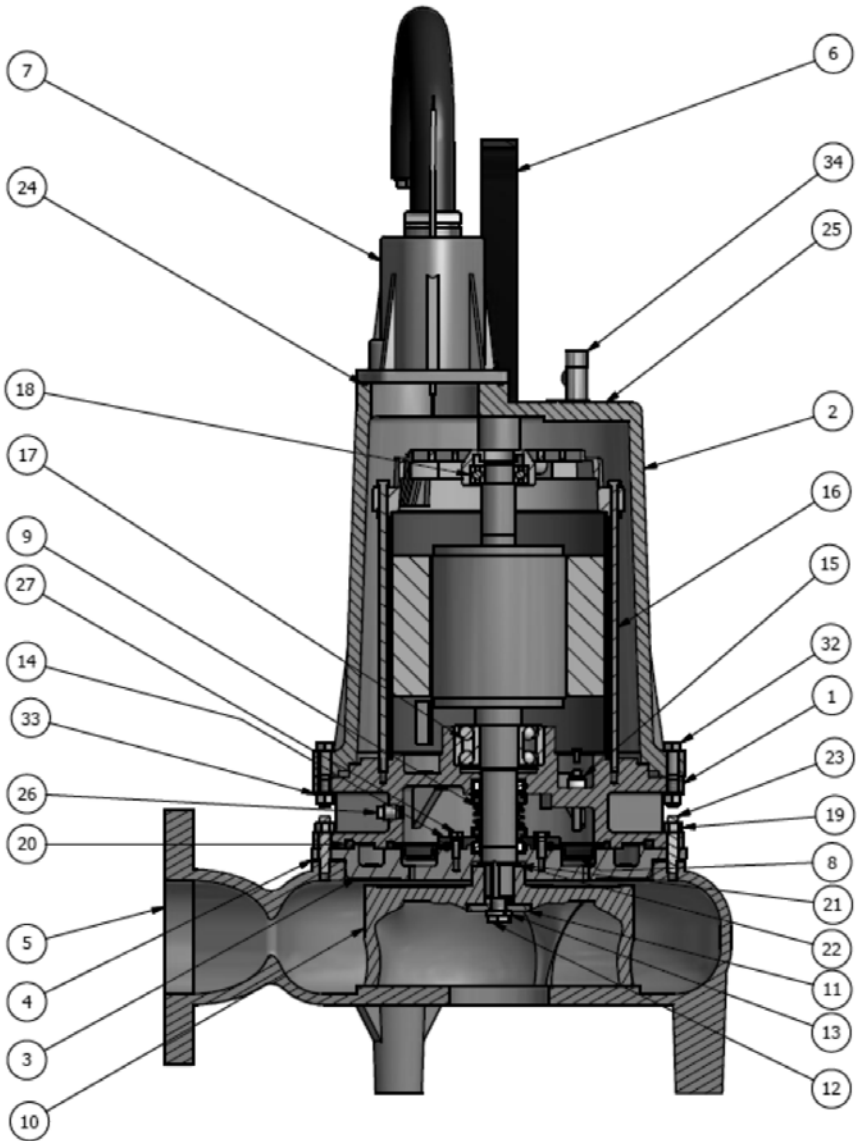
CONNECTION DIAGRAM
TRIPHASE ENGINE 460V



Humidity and Temperature Sensor



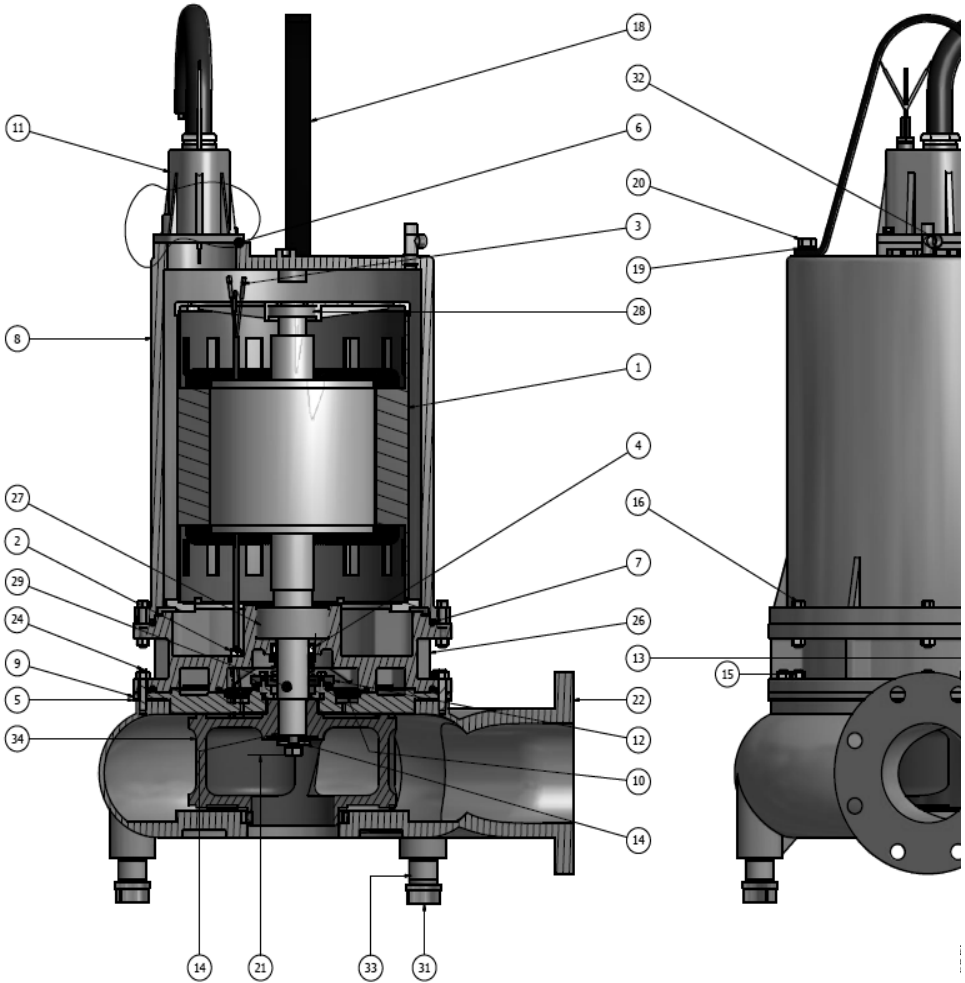
NE 4





Parts List	
ITEM	DESCRIPTION
1	BEARING BRACKET
2	MOTOR HAUSING
3	SEAL PLATE
4	GASKET
5	VOLUTE
6	S.S. LIFTING STRAP
7	CABLE ASSEMBLY
8	DIAPHRAGM
9	SHAFT SEAL
10	IMPELLER CAST IRON
11	IMPELLER WASHER
12	HEX CAP SCREW
13	LOCK WASHER
14	DIAPHRAGM CLAMP RING
15	MOISTURE SENSOR WIRE
16	MOTOR
17	BEARING
18	BEARING
19	HEX NUTS
20	SQUARE RING
21	WASHER
22	WASHER
23	STUD
24	SQUARE RING
25	PLATE SERIES
26	PIPE PLUG
27	CAP SCREW
28	KEY
29	CAP SCREW
30	CAP SCREW
31	SOCKET HEAD CAP
32	CAP SCREW
33	LOCK WASHER
34	PRESSURE RELIEF VALVE

NE 6



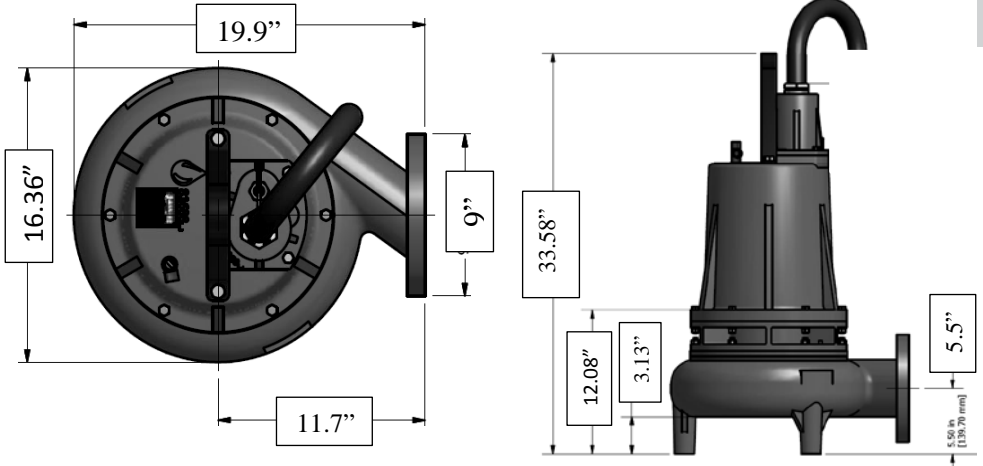
Parts List	
ITEM	DESCRIPTION
1	MOTOR
2	MOISTURE SENSOR WIRE
3	GROUNDING
4	SHAFT SEAL
5	GASKET
6	SQUARE RING
7	O-RING
8	MOTOR HOUSING
9	SEAL PLATE
10	DIAPHRAGM
11	CABLE ASSEMBLY
12	DIAPHRAGM CLAMP
13	SOCKET HEAD CAP
14	WASHER
15	HEX NUTS
16	CAP SCREW
18	LIFTING STRAP
19	LOCK WASHER
20	CAP SCREW
21	CAP SCREW
22	BODY
23	WEAR RING
24	STUD
25	HEX NUTS
26	BEARING BRACKET
27	BEARING
28	BEARING
29	CAP SCREW
30	PIPE PLUG
31	CAP
32	PRESSURE VALVE
33	LEG
34	IMPELLER
37	Hex Bolt

6. Trouble Shooting

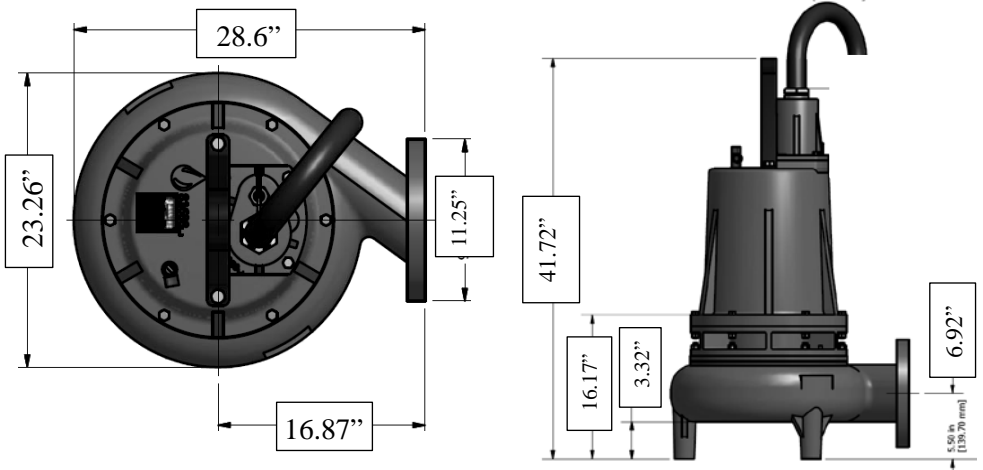
Symptoms	Possible cause(s)	Possible solution(s)
1. The pump does not start.	There may not be power to the motor's connections.	Check and correct.
	Impeller is blocked by solids larger than the pump can handle.	Measure the current in the motor terminals as it cannot exceed $\pm 20\%$. If amps are blocked switch off the pump and remove the obstruction.
	Overload protector is tripped.	If the current in the motor terminals is zero in single phase, disconnect, let it cool then reconnect. In 3 phase allow protector to cool, press, and measure current again. Even if zero, check installation connections of the pump, starter, or cables in general. In 3 phase motors, after placing guards, if the current is within the limits.
2. Pump runs on manual but not automatically.	Faulty float switch.	Check the connections to the switch in the pit. Make sure there is enough water to operate the controls. If an ohmmeter is available, place the switch terminals, use a scale of 100 phmnios, operate manually and observe if hits zero when closed.
3. Pump starts but quickly activates the overload relay.	a) Failure of supply phase.	a) Check the phase equilibrium.
	b) Phase unbalance.	b) Check the setting and replace the overload relay as necessary.
	c) Poor regulation or defective relay and locked rotor.	c) Send to the service shop.
	d) The supply voltage does not match the engine.	d) Replace the engine or power control.
4. Pump is running but not draining the sump.	a) Pump Suction is totally or partially obstructed.	a) Remove the obstruction.
	b) The discharge line is clogged.	b) Clean the pipe.
	c) The discharge valve is closed.	c) Open valve.
	d) Air is trapped in the body of the pump.	d) Proceed up and back down the pump or valve open until all the air.
	e) Actual altitude is much higher than expected.	e) Replace with another model.

7. Dimensions

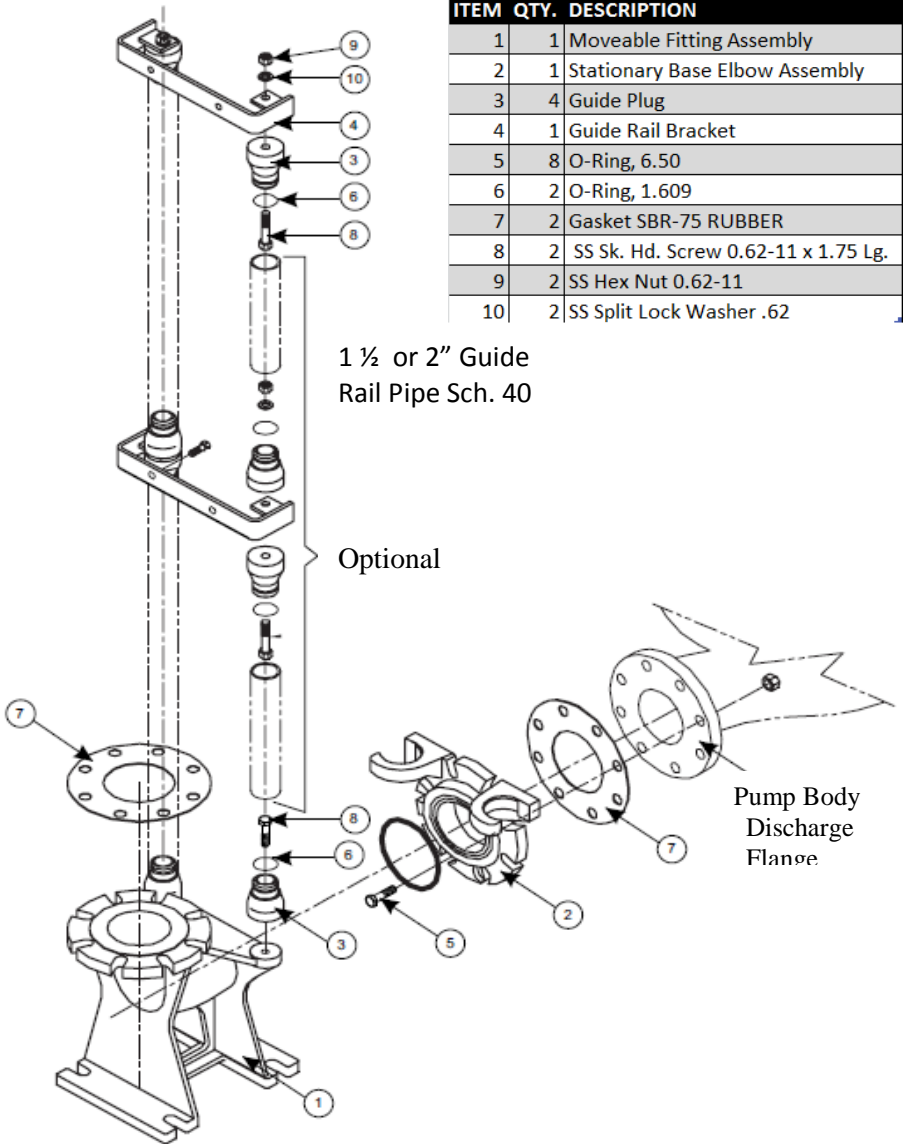
NE 4



NE 6



8. Rail Lift System (Accessory)

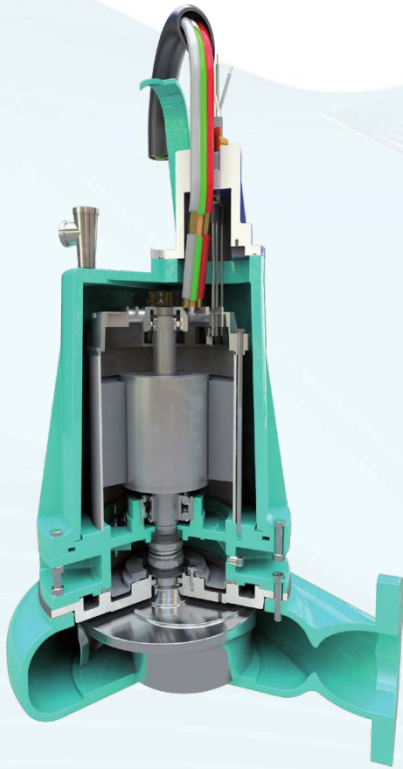


9. Warranty.

WDM guarantees its NE Pumps for a period of 12 months from the date of delivery, against defects in material and workmanship, according to the indicated in its general conditions of sale.

Failure to follow the suggestions and recommendations in this manual, as well as improper product use or handling, will completely invalidate the warranty.

The warranty excludes wear and tear, misuse, repair, or replacement of the defective part by the user or unskilled personnel without specific permission of WDM Pumps.



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Operation Manual

In-Line Vertical Pump PI

WDM Water Systems

PI Operation Manual

FOREWORD

These units are vertical process pumps of the overhung configuration and identified by WDM Pumps as PI.

It is recommended that the services of a WDM Pumps installation technician be employed for the installation and initial starting of the pump. Such service will help to ensure the user that the equipment is properly installed, and will provide an excellent opportunity for the plant operator to receive useful tips and guidelines relative to the unit. The tools and/or equipment referenced in this manual are not supplied by WDM Pumps unless specifically ordered. This pump design can be serviced with standard maintenance tools.

Instructions in this manual are written for trained, experienced technicians who are familiar with the basic principles and tools involved in the installation, care and service of a pump and who, as part of their trade education have acquired the ability to interpret and follow the detailed specifications required for such installation, care, and service. Successful operation of the unit is dependent on careful study of the manual and a well-planned maintenance program.

A complete reading of this manual by personnel in contact with the pump is essential to safety. Incorrect installation, operation or maintenance can result in personal injury or death to personnel and damage to the pump and plant.

Before performing any service function be certain that the unit is separate from its power source or that the power source is locked out to prevent any form of energy from entering the equipment.

Contact with hot surfaces of the pump can cause severe burns. Care must be taken where such surfaces are exposed. Care must also be taken to prevent ignition of flammable fluids or other material.

Information in this manual is believed to be reliable, but it is not guaranteed by WDM Pumps as to its completeness or accuracy.

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1. SECTION ONE - PRODUCT DESCRIPTION

These operating instructions contain important information about the installation, operation and service of the unit. It is therefore imperative that the installing engineer and the responsible specialist/operating personnel read and understand these operating instructions before installation and commencement of operation.

This manual must always be available in the operational area of the machine/plant.

Please contact a WDM Pumps dealer should problems arise. The pump may only be opened by a WDM Pumps approved technician during the guarantee period.

In case of queries, please have your project number and type designation of the pump available. You can find both of these on the first page of these operating instructions or on the rating plate fixed to the pump.

When ordering spare parts we would further request that you give the description of the required parts, together with their part numbers and identity numbers. You can find these on the sectional drawing and spare part list enclosed.

1.1 Introduction

WDM Pumps of type PI are In-Line Vertical pumps, vertically (radially) split case, centerline supported with an overhung impeller.

The PI is a single stage, single suction pump. For these pumps, rotation is clockwise as viewed from the motor (coupling) end. These pumps have a top Pull-Out which simplifies maintenance. The complete rotor assembly is easily removed for inspection without disturbing the pump's piping. When performing maintenance to the mechanical seal, it is not necessary to remove the complete top assembly, as this pump has a split coupling that allows easy removal and access to the mechanical seal without removing the motor (driver) or adapter.

The PI pump has a carbon made bushing for pump shaft alignment.

The following information is included in the nameplate of your pump unit:

- Serial number
- RPM
- Head

PI Operation Manual

1.2 PUMP CASE, IMPELLER, AND ADAPTER

1.2.1 Pump Case

Developed in cast iron, it is radially split with four bosses for cooling purposes, venting valve to extract air from the system, and manometers inspection.

1.2.2 Impeller

Single-suction, closed-cast impeller, in one piece, dynamically balanced with balancing holes near the hub, designed to meet high performance during the pumps life.

1.2.3 Adapter

The adapter connects the vertical motor with the case to transmit the power to the impeller through the shafts (motor and pump) and the split coupling. This part has with two lifting ears that allow an easier carry and handle. The bracket has a drainer plug, which avoids accumulation of condensed water inside the pump.

1.3 SEAL CHAMBER

The PI pump has an outside balanced mechanical seal option, inside unbalanced mechanical seal option, as well as packaging option. Mechanical seal (stationary part) holder with cooling system.

2. SECTION TWO - SAFETY

This operation manual gives basic instructions that should be observed during installation, operation and maintenance of the pump. It is therefore imperative that this manual be read by the responsible personnel/operator prior to assembly and commissioning.

It must always be kept available at the installation site. Not only are the general safety instructions contained under this SECTION TWO - SAFETY that must be observed but also the specific information provided in other sections.

2.1 IDENTIFICATION OF SAFETY INSTRUCTIONS IN THE OPERATING MANUAL

Safety instructions given in this manual whose non-compliance would affect personal and equipment safety are identified by the following symbol.



Where electrical safety is involved, the following symbol is shown.



The **ATTENTION** symbol is inserted in safety instructions whenever non-compliance might endanger the machine or its function.

It is imperative that signs affixed to the machine are observed and kept legible, for example:

- arrow indicating the direction of rotation
- symbols indicating fluid connections

PI Operation Manual

2.2 QUALIFICATION AND TRAINING OF OPERATING PERSONNEL

The personnel responsible for operation, maintenance, inspection and assembly must be adequately qualified. The responsibilities and supervision of the personnel must be exactly defined by the plant operator. If the staff does not have the necessary knowledge, they must be trained and instructed. Training may be performed by a WDM Pumps representative on behalf of the plant operator. Moreover, the plant operator is to make sure that the contents of the operating manual are fully understood by the personnel.

2.3 HAZARDS IN THE EVENT OF NON-COMPLIANCE WITH THE SAFETY INSTRUCTIONS

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the unit and results in loss of any right to claim damages.


Non-compliance may involve the following hazards:


- Risk of injury or death.
- Failure of important functions of the machine/plant.
- Exposure of people to electrical, mechanical, chemical, and thermal hazards.
- Endangering or damaging the environment due to hazardous substances being released.


2.4 COMPLIANCE WITH REGULATIONS PERTAINING TO SAFETY AT WORK

When operating the pump, the safety instructions contained in this manual, the relevant national accident prevention regulations, local and federal health and safety regulations, quality system requirements, and any other service and safety instructions issued by the plant operator must be observed

2.5 SAFETY INSTRUCTIONS RELEVANT FOR OPERATION

 If hot or cold machine components involve hazards, they must be guarded against accidental contact (attach warning signs).

 Any leakage of hazardous fluids must be drained away to prevent any risk to persons or the environment. Statutory regulations are to be complied with.

 Hazards resulting from electricity must be prevented.

2.6 SAFETY INSTRUCTIONS RELEVANT FOR MAINTENANCE, INSPECTION AND ASSEMBLY WORK

It is the plant operator's responsibility to ensure that all maintenance, inspection and assembly work is performed by authorized and qualified personnel who have adequately familiarized themselves with the subject in matter by studying this manual in detail.

Any work on the machine shall only be performed when it is at a standstill. To shut off the machine it is imperative to follow the procedure for shutting down the machine as described in SECTION 5.4-STOPPING.

Pumps and pump units that convey hazardous materials must be decontaminated before any maintenance work is performed.

On completion of work all safety and protective facilities must be re-installed and made operative again.

Prior to restarting the machine, follow the instructions listed under *SECTION 5.2-STARTUP*.

2.7 UNAUTHORIZED ALTERATIONS AND SPARE PARTS

Modifications may be made to the machine only after consultation with a WDM Pumps representative.

Using spare parts and accessories authorized by WDM Pumps is in the interest of safety. The use of parts not authorized by the dealer exempt the manufacturer from any liability, voiding the warranty.

2.8 UNAUTHORIZED MODES OF OPERATION

The reliability of the machine is guaranteed if and only if it is used in the intended manner, in accordance with the statutes of this manual. The limit values specified in the data sheet must never be exceeded under any circumstance.

PI Operation Manual

3. SECTION THREE - TRANSPORT & STORAGE

3.1 SHIPPING ARRANGEMENTS

A wooden skid is furnished for support and ease of transportation. Other required items (e.g. hardware, spare parts, etc.) are boxed or secured to the skid.

3.2 UNLOADING AND CHECKING EQUIPMENT

The following steps should be completed for all pumps when received.

1. Handle all equipment carefully.
2. Remove unit only by properly supporting the wooden shipping skid.
3. After unloading, inspect the pump, check the shipment against the packing list, and report damages or shortages immediately to freight carrier and to the designated WDM Pumps representative.

3.3 TRANSPORT



To avoid damage, the unit must be transported and handled with care. It should be gently lowered onto an even surface. Pay attention to and identify the signs marking the points of equilibrium and fastening places for ropes, or the openings for forklift trucks.



Observe the plant's safety precautions when lifting heavy components.



Since the unit is shipped horizontally, it must first be placed vertically to remove it from the pallet. To do such operation, use the lifting lug on the motor (driver), to tilt the unit until it is in vertical position. To prevent the pallet from moving, secure it before starting this operation. Once the pump is in vertical position and correctly supported, the rope or chain is placed under the driver and through the adapter. Both techniques are illustrated in Figure 3.1.



On some pumps, it may be necessary to remove the coupling guard before placing the rope or chain under the driver and through the adapter. After moving the pump, and before start-up, the coupling guard must be placed back in place.

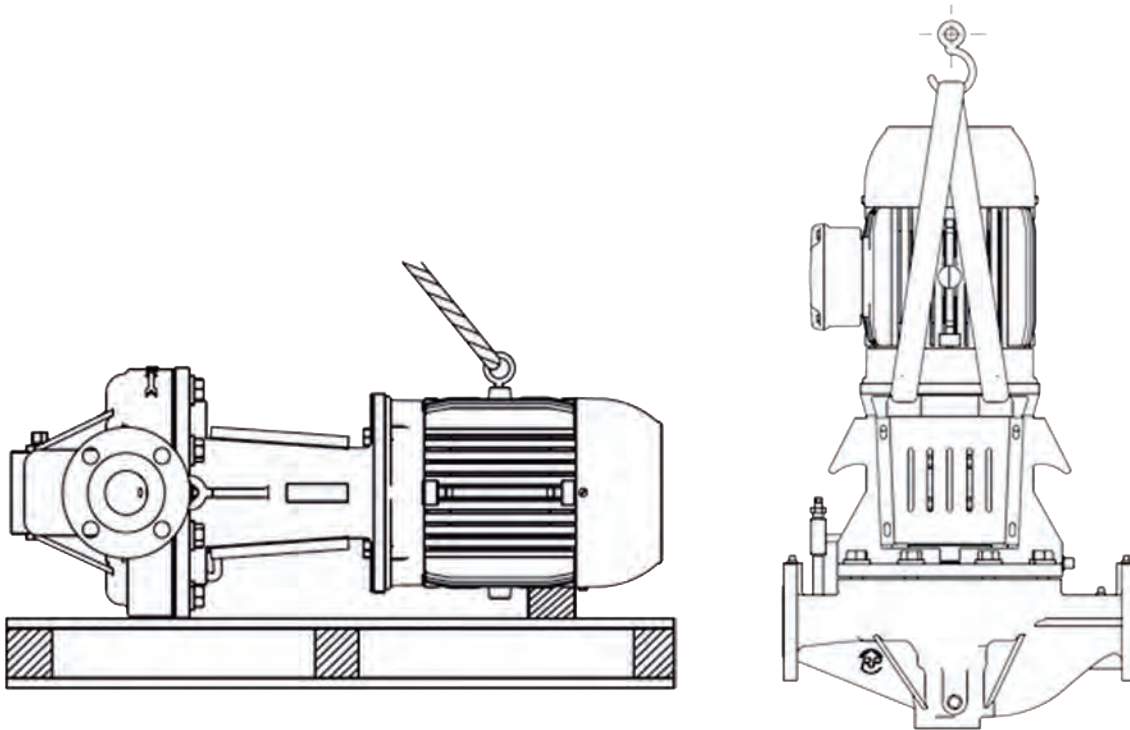


Figure 3.1. Correct Position of the lifting ropes or chains. On the left, to tilt the unit to a vertical position; on the right, to lift the unit.

3.4 STORING

If the pump is not installed immediately (within one month after shipping date), it should be safely stored prior to installation in a dry location free of dirt and grit. Furthermore, the pump unit (pump, driver, etc.) should not be subject to sudden temperature changes or vibrations.

Observe the following steps:

1. Remove pump from shipping crate, but do not damage the crate because the unit is to be reboxed.
2. Remove all instruments and mechanical seal; store them safely.
3. Plug the instrument taps.
4. Thoroughly dry the pump with hot air.
5. Any painted surface damaged in shipment should be repainted or sprayed with oil.
6. Keep the pump moisture-free by the following two means:
 - a. Spray the pump case with acid-free, moisture-free, protective oil or kerosene.
 - b. Place desiccant or humidor bags inside the suction and discharge areas of the pump.

PI Operation Manual

ATTENTION

Attach red tags with a “Remove Moisture Absorbent Material Bags Prior to Installing” to warn about the presence of this desiccant material.

7. Cover all the openings with plywood or metal covers. Recheck the condition of these covers every month and replace as necessary.
8. If the pump’s external parts have protective coatings, periodically inspect and renew the coating as required.
9. Rotate the shaft 1 ¼ revolutions every week.

ATTENTION

The client must keep a record of the weekly rotation of the shaft. Failure to document and present these records as evidence will void the warranty.

10. Check the packaging for damage every month.
11. Ensure pump flange covers remain in place.
12. Return the unit to the shipping crate.
13. When the pump is to be installed, remove all the protective coatings and desiccant or drain all oils.

One month before installation, a WDM Pumps representative should be employed to conduct a final inspection.

To properly store the motor (driver) for periods longer than one month, follow these steps:

1. Store the motor in a clean, dry area, or cover it with a loose tarp (the tarp must be loose in order to prevent condensation).
2. Exercise precautions to avoid transit or nesting of rodents, snakes, birds, and insects.
3. Inspect and, if necessary, recoat the rust preventive coating of external machined surfaces.
4. Fill with lubricant the grease-lubricated cavities of the motor, but first remove the drain plug and fill the cavity until the grease starts to purge.

ATTENTION

Follow the instruction manual of the driver manufacturer to ensure the lubrication is performed properly.

5. Upon receipt, considering that the oil-lubricated drivers are not shipped oil-filled, fill the reservoir to maximum level with properly selected oil with rust and corrosion inhibitors.

ATTENTION

Always drain the oil before moving the pump, to avoid any damages, and refill the motor on its new location.

6. Rotate the shaft of the motor once a month.

7. Some form of heating must be used to prevent condensation. This heating should maintain the winding temperature at a minimum of 9 °F (5 °C) above the surrounding ambient temperature. There are three options:

- If space heaters are supplied, they should be energized.
- If none are available, single phase or “trickle” heating may be utilized by energizing one phase of the motor’s windings with a low voltage, producing heat in the winding conductor.

ATTENTION

Request the required voltage and transformer capacity from the driver manufacturer.

- A third option is to use an auxiliary heat source and keep the windings warm by either convection or blowing warm dry air into the motor.

ATTENTION

Be careful not to overheat, since keeping the temperature of the motor frame 9 °F (5 °C) above the surrounding ambient temperature is sufficient.

After the storing period, follow the next steps as start-up preparations:

1. Motor should be thoroughly inspected and cleaned to restore to an “As Shipped” condition.
2. Motors, which have been subjected to vibration, must be disassembled and each bearing inspected for damage.
3. Oil and/or grease must be completely changed using lubricants and methods recommended on the motor’s lubrication plate, in the “LUBRICATION” section of the driver manufacturer’s manual.
4. If storage has exceeded one year, the motor manufacturer’s Quality Assurance Department must be contacted prior to equipment start-up for any special recommendations.

PI Operation Manual

3.5 CONSERVATION

All exposed, machined, working surfaces (flanges, seals, surfaces supporting the motor), shaft ends, and the like have been cleaned and treated with anticorrosive agents. After being cleaned, all parts inside the pump housing have been sprayed with anticorrosive agents.

The period of protection offered by these conservation measures is approximately 18 months if stored in a dry place. If stored under unfavorable climatic conditions, this protective period may be considerably reduced. Should the anticorrosive layer become damaged, it can be repaired by repainting or respraying.



Anticorrosive layers inside the pump housing must be removed with process neutral solvents before commencing pump operation.



When removing the protective coating with a neutral solvent, follow the safety instructions of the solvent manufacturer carefully.

ATTENTION

The anticorrosive layer applied to the exposed parts does not need to be removed before putting the pump into operation.

4. SECTION FOUR - PIPING



These units are furnished for a specific service condition. Any change in the hydraulic system may affect the pump performance adversely.



The connection of the piping must be carried out with utmost care; otherwise, the pumping medium can escape during operation, which can seriously endanger the operating personnel.



In a new installation, great care should be taken to prevent dirt, scale, welding beads, and other items from entering the pump. The suction system should be thoroughly flushed before installing the suction strainer and suction piping.

ATTENTION

Suction and discharge piping should be of ample size, be installed in direct runs with minimum bends.

ATTENTION

Short radius elbows shall be avoided near the suction nozzle. If an elbow is necessary, it should be of the long radius type.

ATTENTION

Suction and discharge piping configurations should be in accordance with the Hydraulic Institute Standards.

ATTENTION

Suction and discharge piping, fittings, and valves must be adequately supported and anchored close to the pump flanges to eliminate strains imposed on the pump casing, prevent excessive nozzle loads, maintain pump/driver alignment, and avoid pipe-induced vibration.

4.1 PIPING THE SYSTEM

1. Check whether the piping is loosely laid, so that no strain is placed on the pump.



Piping layout and installation shall provide adequate maintenance and operation accessibility. Field installed auxiliary equipment shall not interfere with removal of the machine or driver.

PI Operation Manual

2. Remove the covers of the pump flanges.
3. Check whether the seals are correctly mounted.
4. Install a check valve and a gate valve in the discharge pipe. When the pump is stopped, the check valve will protect the pump against excessive back-flow pressure and will prevent the pump from running backward.

ATTENTION

The check valve should be installed between the gate valve and discharge flange in order to permit its inspection.

5. A spool piece should be installed in suction line so that the suction strainer may be installed and removed with a pressure gauge between the strainer and pump.
6. The suction strainer should be installed between 5 to 20 pipe diameters upstream from the suction flange.
7. Cone type strainers (otherwise known as “witches – hat” strainers) should be mounted as recommended by the Hydraulic Institute, with the cone pointing upstream away from the pump, into the oncoming flow. As the strainer gradually gathers particles from the liquid and blocks up, this direction will result in the lowest turbulence impact onto the liquid flow entering the pump.

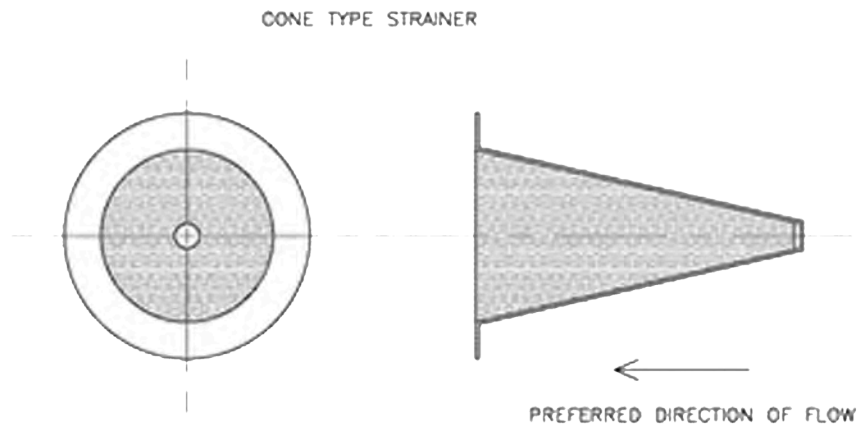


Figure 4.1. Correct mounting of a cone type strainer.

8. Pump and pipe flanges must be parallel; they should mate together without effort, and with the bolt holes properly in line.

9. Proceed in the same way with the discharge pipe.



Make sure that there are isolation block valves at the pump for each type of auxiliary piping.

ATTENTION

Consider a slope in the suction piping to avoid high points.

ATTENTION

In horizontal suction lines, reducers should be eccentric (with the flat side of the reducer on top).



No obstruction within at least five pipe diameters of the suction flange should be fitted.



Do not install unsupported piping on the pump.

ATTENTION

Make sure electrical connections do not impose any stress on the pump unit.

PI Operation Manual

5. SECTION FIVE - OPERATION

5.1 PRIMING

The most common method used for warming a pump, or maintaining a standby pump in a warm condition, is the use of a warming line and orifice, thus circulating the hot pumpage through the idle pump.

ATTENTION

It is recommended that the pump be warmed at the rate of 100 °F (55 °C) rise per hour for normal warming, or 268 °F (149 °C) rise per hour for emergency warming.

ATTENTION

It is recommended that the idle pump temperature be maintained within 36 °F (20 °C) of the system operating temperature.

Circulation can be easily accomplished by guiding a small amount of flow from the discharge side of the system beyond the check valve via a multiple breakdown orifice into the bottom of the pump case. The hot liquid will then pass through the case and out the suction and return to some low pressure point in the system. In many cases, the pump drain line is used for the warming connection.

Note: Many variations are possible and one that is compatible with the customer's particular installation should be considered.

5.2 STARTUP



Every time before the pump is started up the safety devices must be mounted and fastened.



In order to avoid risks of injury or damage, all pump units must be equipped with emergency-stop devices.



For operation of electrical drives, control systems and their cable routes, the safety instructions issued by their manufacturers must be observed.


The startup procedure is as follows:

1. Before starting the pump, check the security of all bolting, piping, and wiring.
2. Check all gauges, valves and instruments for proper working order.
3. Check all equipment for proper rotation.
4. Verify that the discharge valve is closed.
5. Open the suction valve.
6. Open discharge valve and allow pump to fill with fluid. Since the pump is not self-venting, the venting valve located in the discharge side must be opened, to allow any trapped air to vent when the pump is filling with fluid. Once the air has come out and fluid leaves through the venting valve, close the venting valve.
7. Keep the valves open approximately 60 seconds to ensure that pump is completely full of fluid.
8. Close discharge valve.
9. Start, and IMMEDIATELY STOP, the driver and observe the rotation of the shaft.
10. Correct rotation should be in direction of rotation arrow.

ATTENTION

If shaft rotation is incorrect, consult driver manufacturer's instructions in order to change rotation.

11. Priming accomplished and correct shaft rotation established, the pump is ready for continued operation.
12. Ensure the discharge valve is open to approximately $\frac{1}{4}$ fully open.
13. Start driver again, and completely open the discharge valve IMMEDIATELY when the operating speed has been reached.

 **Danger:** Do not allow discharge valve to remain closed for any length of time. Pumped fluid temperature will rise excessively causing damage to pump.

5.3 OPERATING CHECK

During the initial operating hours, the pump should be monitored constantly. It is thus possible to detect irregularities immediately and to take appropriate measures for their elimination (See SECTION NINE - TROUBLESHOOTING CHART).

PI Operation Manual

To monitor flow, pressure, and temperature, regular visual inspection and monitoring is advisable and/or necessary during operation.

WDM Pumps recommends checking the pump constantly at regular intervals in order to detect problems early, in case they arise.

The operational check routine must include minimum the following points:



Beware of freely rotating parts, when the pump is in operation there is a high risk of injury.

- Check at regular intervals that the safety equipment is sound and is arranged and fastened according to the regulations, and energized where applicable.
- Check the security of all bolting, piping, and wiring.
- Check all gauges, valves and instruments for proper working order.
- Check all equipment for correct rotation.
- Check that the pumping unit is running quietly and without vibrating.



Unusual or too loud noises point towards a possible fault.

- Monitor the power consumption of the drive motor. Low or excessive power consumption indicates a possible fault.
- Check the sealing system:
 - a. Refer to the seal manufacturer for his estimate of maximum acceptable leakage rate, as this will depend on application, design, location and the sealed liquid characteristics.
 - b. If leakage is excessive, switch the pump off as quickly as possible, isolate the pump by closing the discharge and suction valves or using some other approved method designated as safe for your system, and check the rotating seal ring and the stationary seal ring.

ATTENTION

If the sealing system of the mechanical seal fails, the pump must be taken out of operation immediately.



The pump may only be operated under the minimum operating range for short periods. The minimum pump flow is given in the characteristic line.

5.4 STOPPING

1. Throttle pump discharge to minimum flow.



Warning: do not close suction valve, this will cause the pump to run dry.

2. Turn the power off to the driver.
3. Close the pump discharge valve
4. Observe the run - down of the pump until full stop.



If the rotor is jerky or suddenly stops, there is a danger that the rotor has become blocked. The pump must be opened and all running clearances checked.

5. Close the suction valve when the pump shaft stops rotating as the pump must be isolated before examination and made safe.



Do not close the suction valve until the pump has come to a full stop, as it may cause the pump to run dry.

6. Ensure the drive motor cannot be unintentionally turned on.
7. Ensure the shut-off devices in the suction and pressure pipes cannot be unintentionally opened.
8. Drain the pump and the auxiliary piping.



If the outside temperature is below 32 °F (0 °C), all cooling chambers must be emptied, and all seal system cooling coils must be drained.

5.5 SHORT-TERM SHUTDOWN

If the pump was switched off correctly and has not suddenly come to a halt, it may be re-started without the need to take any special measures.

If the pump comes to a sudden halt, or if the pump was switched off because of a possible danger, it must be checked for damage.

PI Operation Manual

5.6 LONG-TERM SHUTDOWN

1. Follow the stopping procedure described in SECTION 5.4 – STOPPING.
2. While the unit is idle:
 - a. If the plant is in an operational state, warm up and start the unit at monthly intervals (see *SECTION 5.2 - STARTUP* for details).
 - b. If the plant is not in an operational state, turn the unit over by hand a couple of times at monthly intervals, ensuring the shaft is not returned to the same position, to allow the shaft to rest in a different position every time.
3. If there is danger of freezing, drain the pump and all the auxiliary piping.

6. SECTION SIX – MAINTENANCE

To perform the maintenance of the PI pump, no special (custom made) tools are needed.



Before initiating maintenance procedures disconnect all power sources to the equipment and discharge any parts which may retain an electric charge. Use proper locks to avoid accidental start-up of the pump system. Failure to comply may result in severe personal injury.



When performing the maintenance of the pump, use the safety equipment appropriate for the pumped fluid, materials, and location of the equipment, such as gloves, safety glasses, harnesses and other equipment regarded as mandatory by the plant's safety instructions.

6.1 DISASSEMBLY

Depending on the extent of the required disassembly, follow the next steps to disassemble your PI pump.

1. Stop the pump. See *SECTION 5.4 - STOPPING*.
2. Drain all possible fluids from the pump case.
3. Disconnect any auxiliary piping and wiring that could interfere with disassembly.
4. When disassembling the pump, match mark, tag or otherwise identify all parts, and provide separate containers for small parts. Refer to the pump sectional drawing included in *SECTION EIGHT - PARTS INFORMATION* for proper identification of parts.
5. Remove the coupling guard, first loosen the screws and remove them, then remove both coupling guards.
6. Remove coupling as follows:
 - a. Unscrew the bolts from both parts of the coupling.
 - b. Remove the washers from both parts of the coupling.
 - c. Draw out of the shaft both parts of the coupling.
7. Loosen the setscrews on the mechanical seal.
8. Remove keys from the motor and the shaft.

Note: For maintenance on Outside Balanced Mechanical Seal only, skip step 9 and proceed to step 10 (a – h) as motor removal is not required.

9. Unscrew the motor (driver) from the adapter and remove it.

PI Operation Manual

ATTENTION

The use of a crane with a chain or sling to lift the motor (driver) is suggested.

10. Exercise care and remove mechanical seal as follows:
 - a. Loosen and remove the shaft screw from the upper part of the coupling side.
 - b. Remove the washer from the shaft.
 - c. Remove the rotating part of the mechanical seal, with its setscrews.
 - d. Remove the adapter's screws and washers.
 - e. Draw out the adapter from the shaft.
 - f. Remove the gasket that was used with the adapter.
 - g. Draw out the stationary part of the mechanical seal.
 - h. Remove the gasket that was used with the stationary part of the mechanical seal.

Note: If no further maintenance beyond that of Outside Balanced Mechanical Seal is required, proceed to Section 6.3 Reassembly, step 12.

11. Unscrew the adapter from the casing. First, remove the screws and washers and then remove the adapter.
12. Remove the gasket from the adapter.
13. Remove the bushing from the adapter.
14. Exercise care and remove the shaft-impeller assembly from the casing.



Avoid bumping the impeller with the sidewalls of the casing.

15. To remove the impeller, first remove the impeller screw, lockwasher and finally the key.

ATTENTION

Do not heat the impeller.



Impeller nut is a right hand thread.

6.2 INSPECTION AND CLEANING

1. Thoroughly clean all parts with kerosene or equivalent and dry all parts with compressed air or a clean, lint free cloth.
2. Inspect all components for corrosion, erosion, pitting, and scoring. If required, replace with WDM Pumps O.E.M. genuine replacement parts.
 - a. Visually check all individual parts for any damage.
 - b. Check the casing for wear.
 - c. Check the impeller for wear.
 - d. Check the radial clearance for wear.
 - e. Check all auxiliary piping.
 - f. Check for sealing elements.
 - g. Check the bushing.
 - h. Check for transmission elements of the coupling.

6.3 REASSEMBLY

6.3.1 PI Mechanical Seal Option

Please follow the steps detailed on this section to reassemble the PI Mechanical Seal pump. To reassemble the PI Packing pump refer to *SECTION 6.3.2* – PI Packing Option.

Reassemble as follows:



Observe the plant's safety precautions when lifting heavy components. Request help when moving or positioning them.

ATTENTION

Mounting of bearings should be carried out in a dry, dust free area away from metal working or other machines producing shavings and dust to avoid contamination of bearings.

PI Operation Manual

ATTENTION

The bearings should remain in their original packaging. Once they are to be assembled onto the shaft, they must be removed from their packaging, and the preservative in the outside diameter and the bore must be wiped out.

ATTENTION

Bearings should be demagnetized before mounting them, to avoid contamination.

ATTENTION

During assembly, all threads must be protected with an anti-seize agent.

1. Insert the shaft key in the keyway on the impeller side of the shaft.

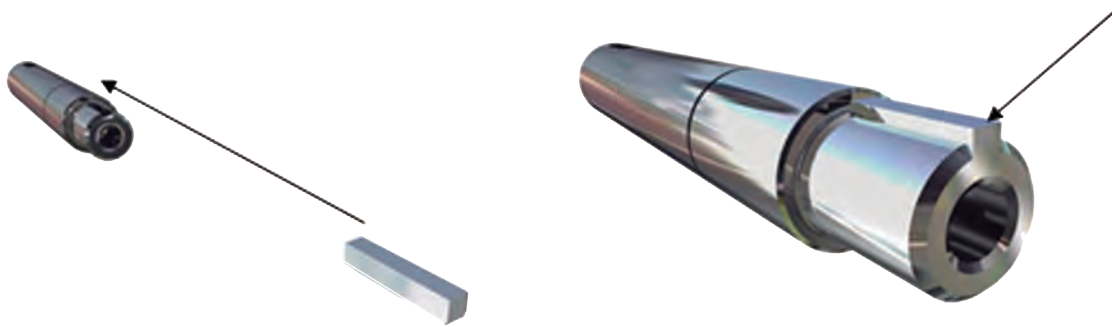


Figure 6.1 Inserting the shaft key in the keyway on the impeller side of the shaft.

ATTENTION

In case that the pump is PI Fire or Close Coupled, the shaft must be assembled with a shaft sleeve.

2. If applicable, insert the shaft sleeve into the shaft. Make sure that the sleeve enters completely.



Figure 6.2 Inserting the shaft sleeve into the shaft.

3. Introduce the shaft inside the impeller until it reaches the step on the shaft.



Figure 6.3 Introducing the shaft inside the impeller until it reaches the step on the shaft.

4. Place the impeller lockwasher into the shaft's impeller side.

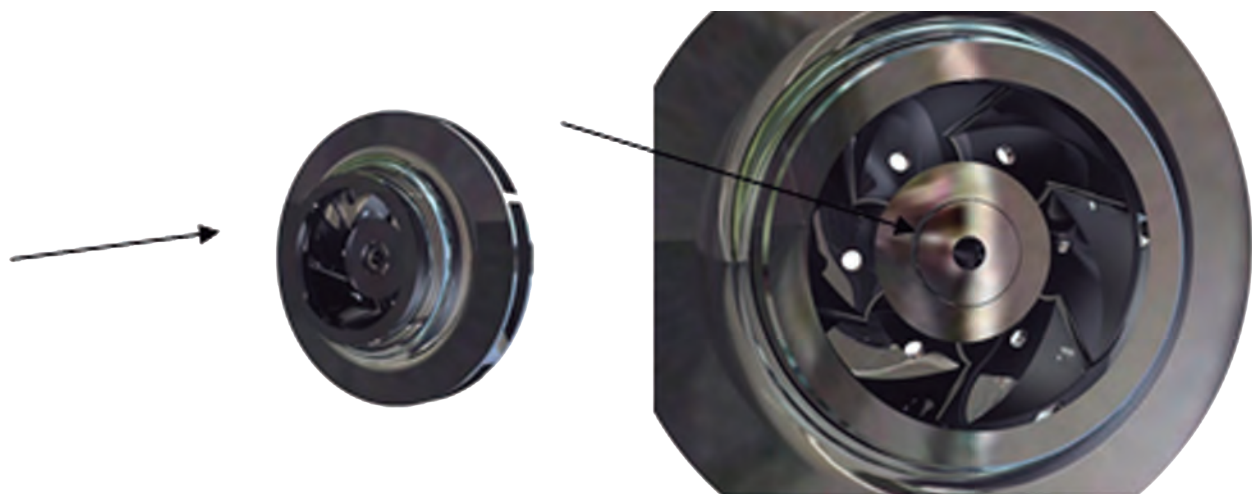


Figure 6.4 Placing the impeller lockwasher into the shaft's impeller side.

PI Operation Manual

5. Tighten the impeller screw into the shaft's impeller side.

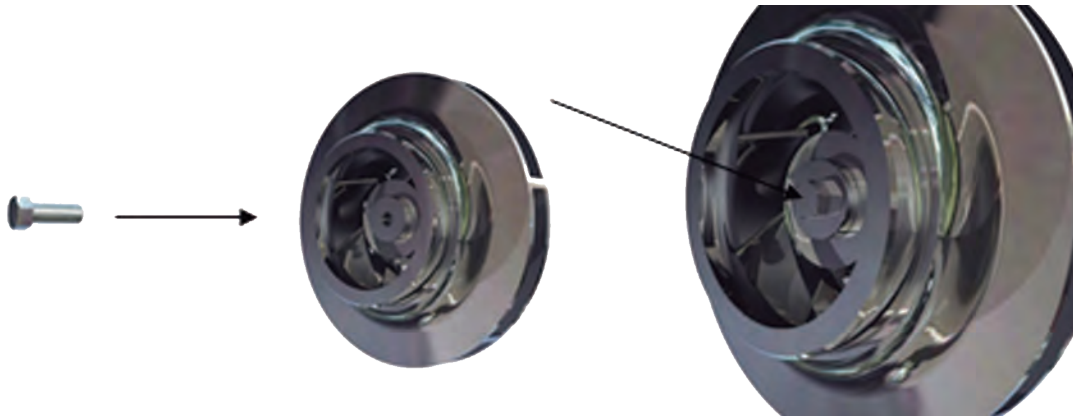


Figure 6.5 Tightening the impeller screw into the shaft's impeller side.

6. Placing the impeller-shaft assembly in the casing.

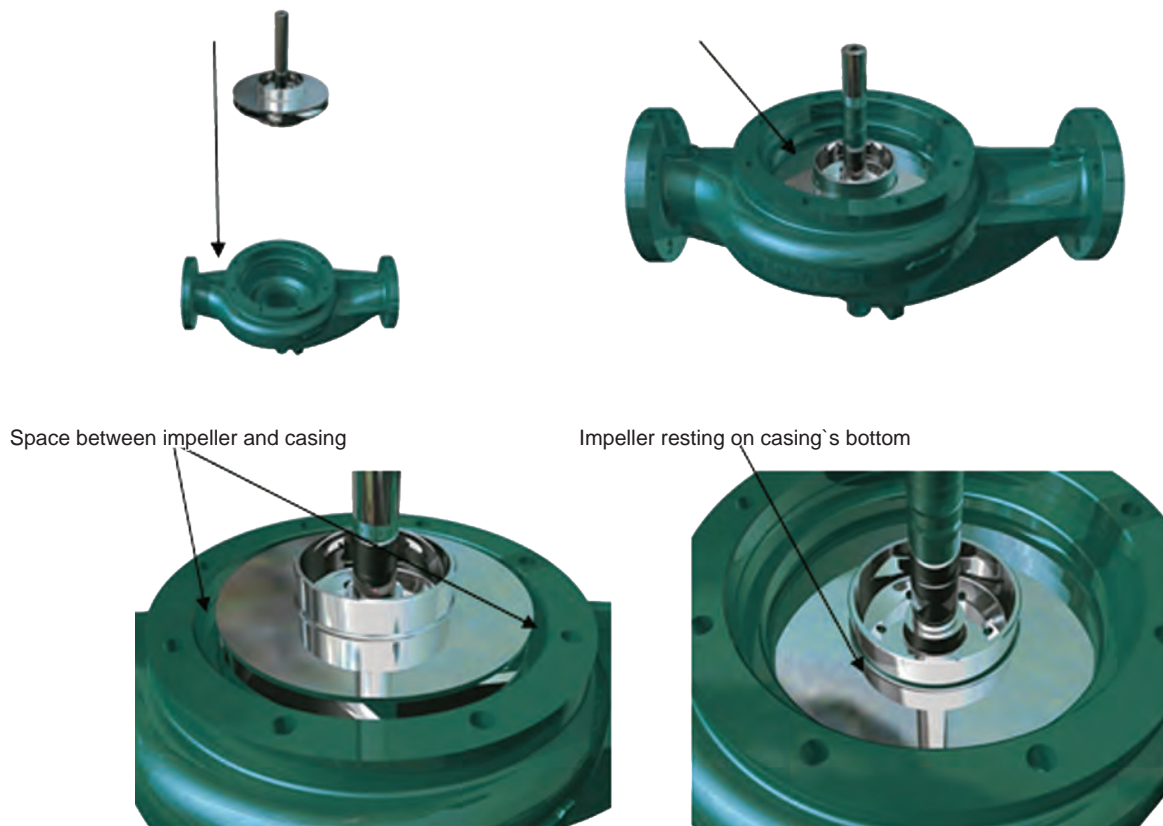


Figure 6.6 Placing the impeller-shaft assembly in the casing.

7. Using a hydraulic press, insert the bushing in the central bore of the adapter, making sure it is well positioned in the bottom of the adapter.

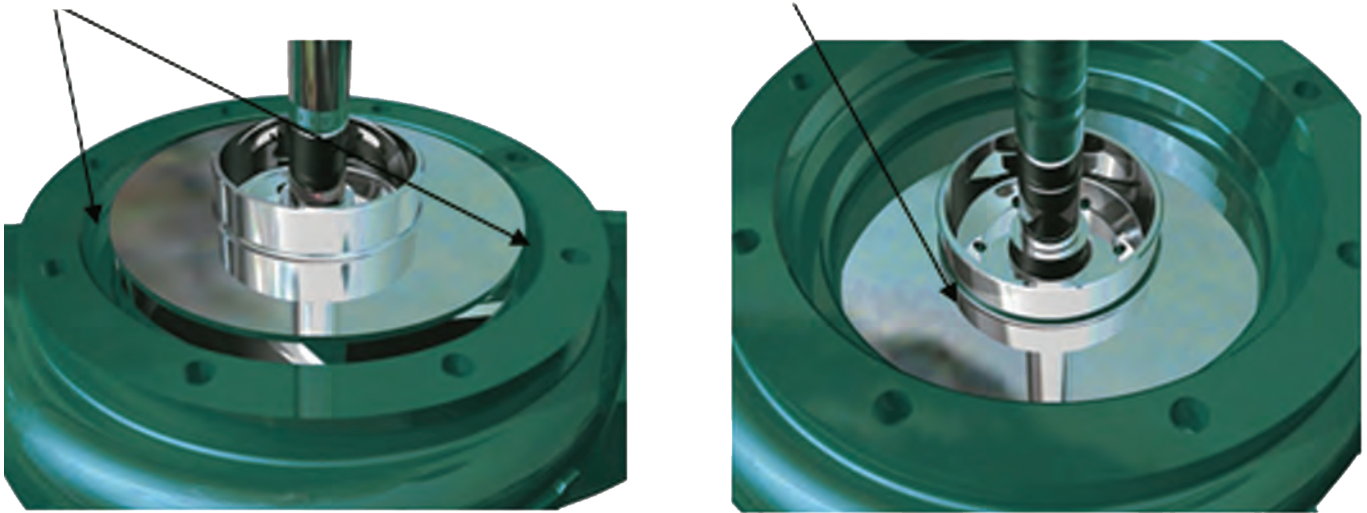


Figure 6.7 Inserting the bushing in the central bore of the adapter.

ATTENTION

Do not force the insertion of the carbon bushing beyond the limit with the hydraulic press, as the bushing may be broken.

8. Place the corresponding gasket in the adapter; make sure to match the holes in the adapter. It is recommended to grease the gasket once in place, in order to accomplish the next reassembly step.

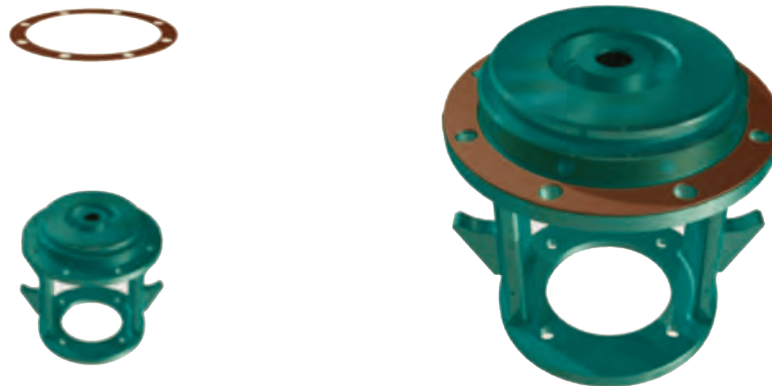


Figure 6.8 Placing the corresponding gasket over the adapter.

9. Position the adapter in the casing, the shaft must pass through the central bore. Make sure that the adapter's ears are aligned with the suction side and the screwholes match.



Figure 6.9 Positioning the adapter in the casing.

ATTENTION

The ears of the adapter are aligned with the suction and discharge flanges, with the drain on the adapter specifically aligned with the suction side. This arrangement will allow the correct installation of the mechanical seal.

10. Place the corresponding washers on the adapter matching the screwholes.



Figure 6.10 Placing the corresponding washers on the adapter matching the screwholes.

11. Fasten the corresponding screws on the adapter.

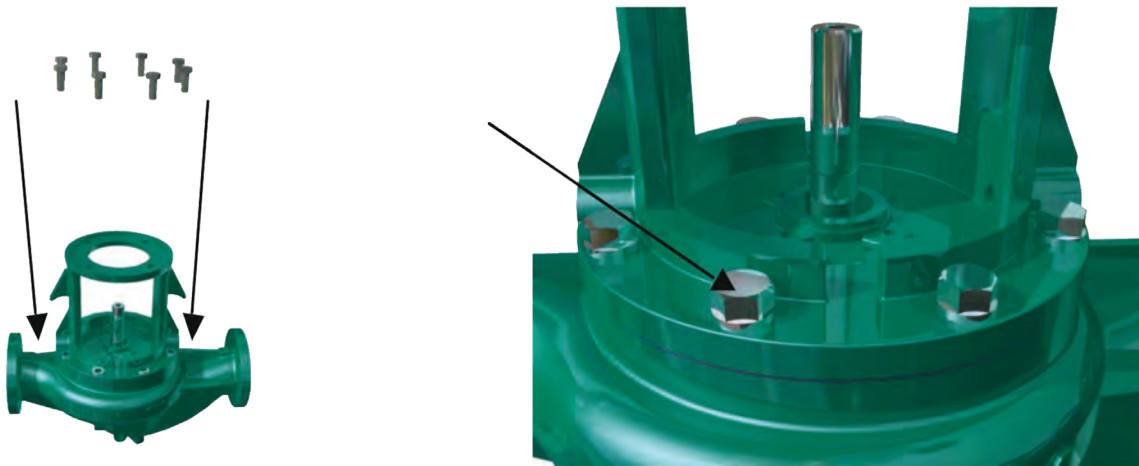


Figure 6.11 Fastening the corresponding screws on the adapter.

12. Insert the corresponding gasket of the mechanical seal into the shaft. Make sure the gasket is well positioned in the bottom of the adapter.

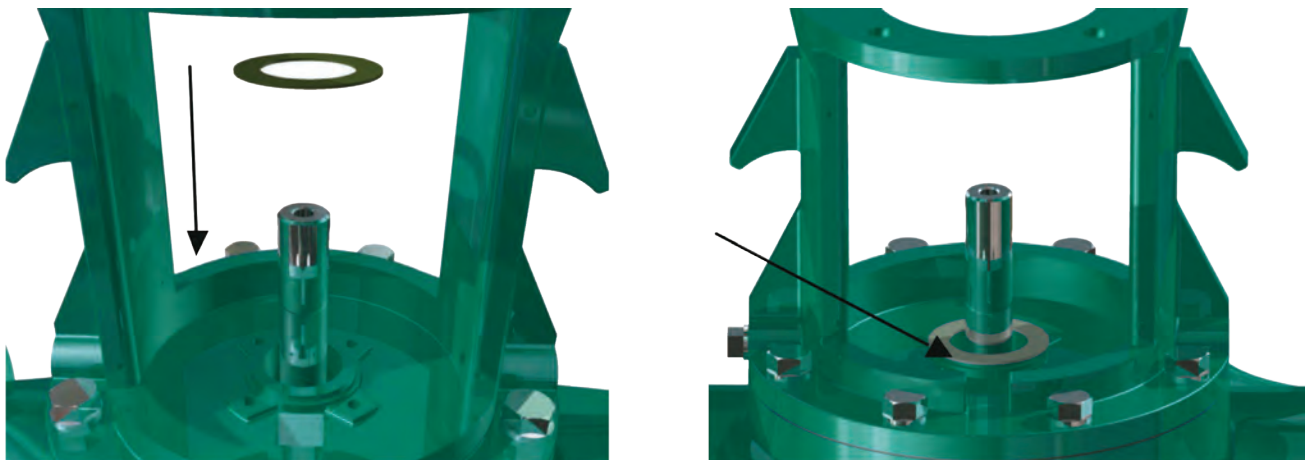


Figure 6.12 Inserting the gasket of the mechanical seal into the shaft.

13. Place the stationary part of the mechanical seal over the gasket.

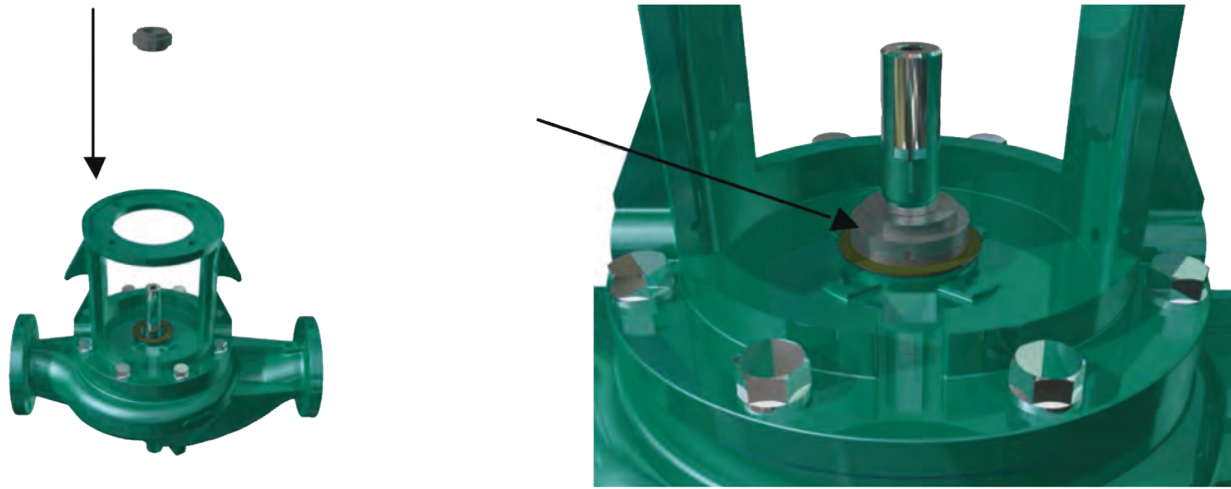


Figure 6.13 Placing the stationary part of the mechanical seal over the gasket.

ATTENTION

The holes in the stationary part of the mechanical seal should be aligned perpendicular (90°) to the suction and discharge flanges. This orientation will allow the flushing to match directly with these holes on either side.

14. Insert the corresponding gasket over the stationary part of the mechanical seal.

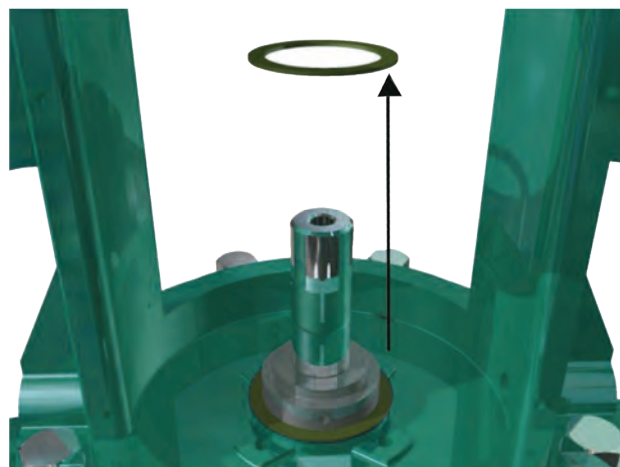


Figure 6.14 Inserting the corresponding gasket over the stationary part of the mechanical seal.

15. Introduce the mechanical seal head in the shaft. Make sure that the mechanical seal is well positioned.

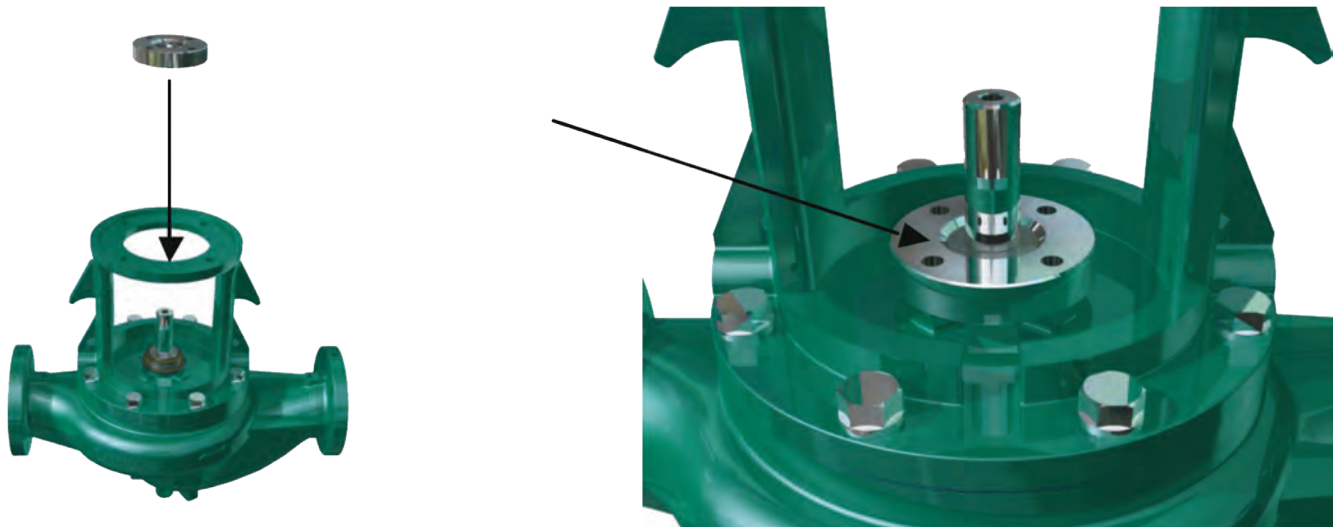


Figure 6.15 Introducing the mechanical seal head in the shaft.

16. Place the corresponding washers on the adapter matching the screwholes.

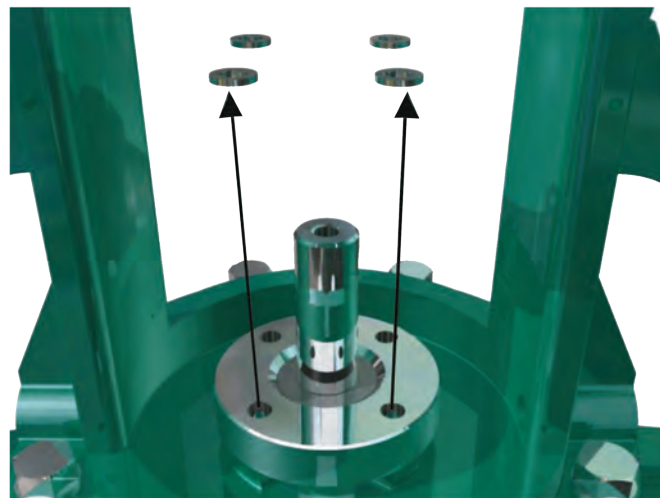


Figure 6.16 Placing the corresponding washers on the adapter matching the screwholes.

PI Operation Manual

17. Fasten the corresponding screws on the seal gland.



Figure 6.17 Fastening the corresponding screws on the seal gland.

ATTENTION

The NPT hole in the mechanical seal head should be aligned at 90° from the suction and discharge flanges, that is, perpendicular to the suction and discharge flanges, pointing towards either side of the pump. This will simplify the connection of the flushing line to the mechanical seal head.

18. Place the rotating part of the mechanical seal. Do not tighten the setscrews.

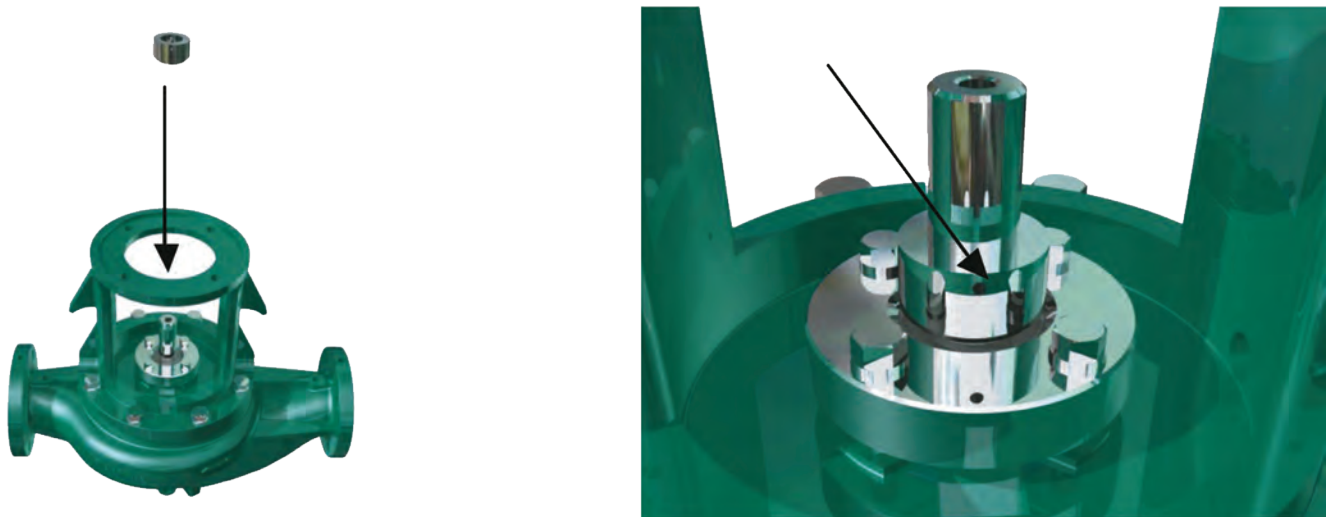


Figure 6.18 Placing the rotating part of the mechanical seal.

19. Place the lockwasher on the shaft, making sure that the screwholes match.



Figure 6.19 Placing the lockwasher on the shaft.

20. Tighten the shaft screw on the upper end of the shaft.

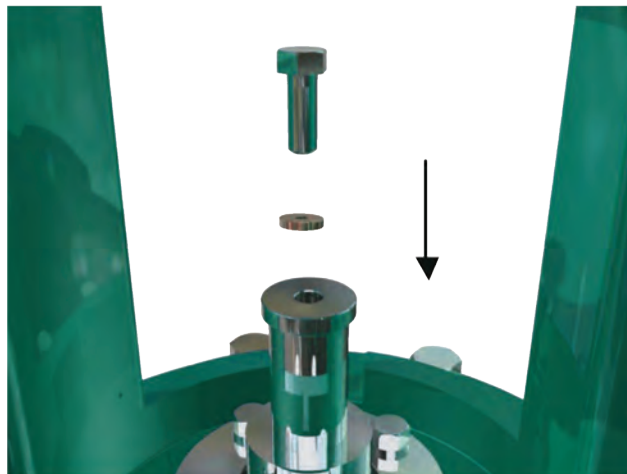


Figure 6.20 Tightening the shaft screw on the upper end of the shaft.

ATTENTION

Manually rotate the shaft to make sure it moves without any obstruction.

PI Operation Manual

21. Position the motor vertically and place it over the upper face of the adapter with the shaft of the motor facing downwards.



Figure 6.21 Positioning the motor in the adapter.

22. Place and tighten the motor screws. Tighten the screws crosswise to ensure a uniform assembly.

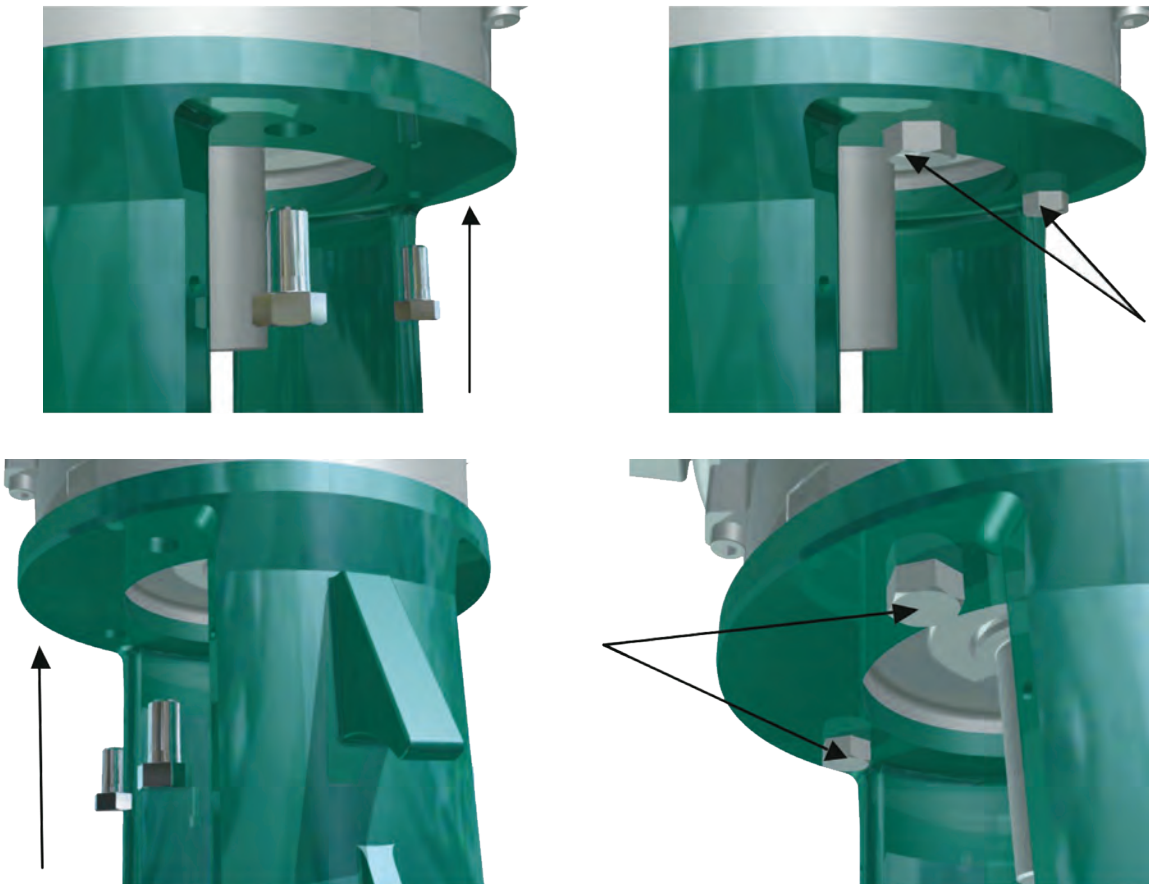


Figure 6.22 Placing and tighten the motor screws.

23. Insert the motor shaft key into its groove.

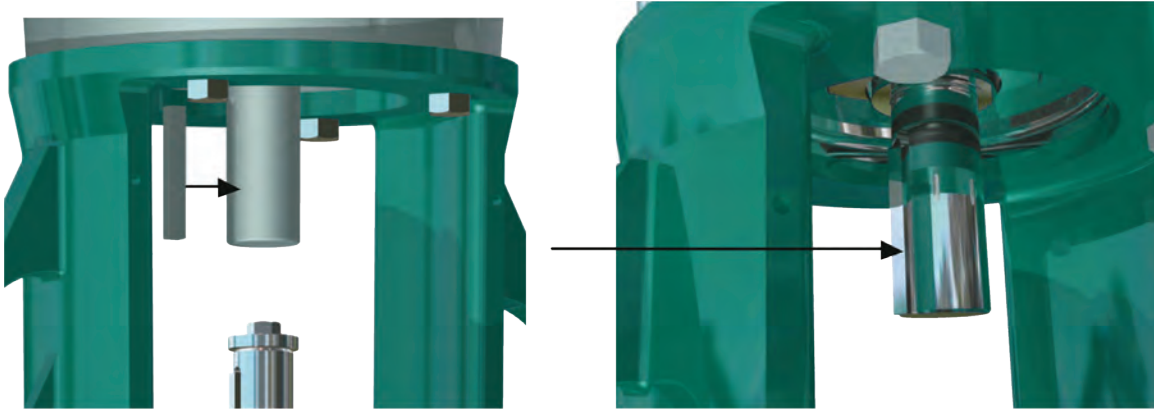


Figure 6.23 Inserting the motor shaft key into its groove.

24. Insert the impeller shaft key into its groove.

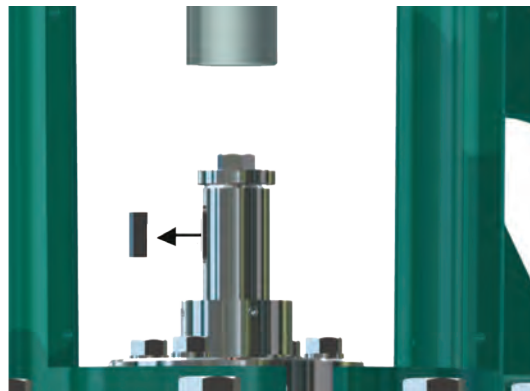


Figure 6.24 Inserting the impeller shaft key into its groove.

25. Insert the half of the coupling that has the keyways in its interior and adjust it to the motor and impeller shafts. Make sure to match the keyways of the coupling.



Figure 6.25 Inserting one-half of the coupling and adjust it to the motor and impeller shafts.

PI Operation Manual

ATTENTION

A lever (eg., a bar) should be used to lift the rotor, supported in the adapter and pressing against the bottom face of the half coupling, in order to hold it in its position once the rotor has been correctly matched in the half coupling, while performing the next steps.

26. Place the second half of the coupling in the shaft.



Figure 6.26 Placing the second half of the coupling in the shaft.

27. Place the lockwasher on both couple halves, making sure that the screwholes match.

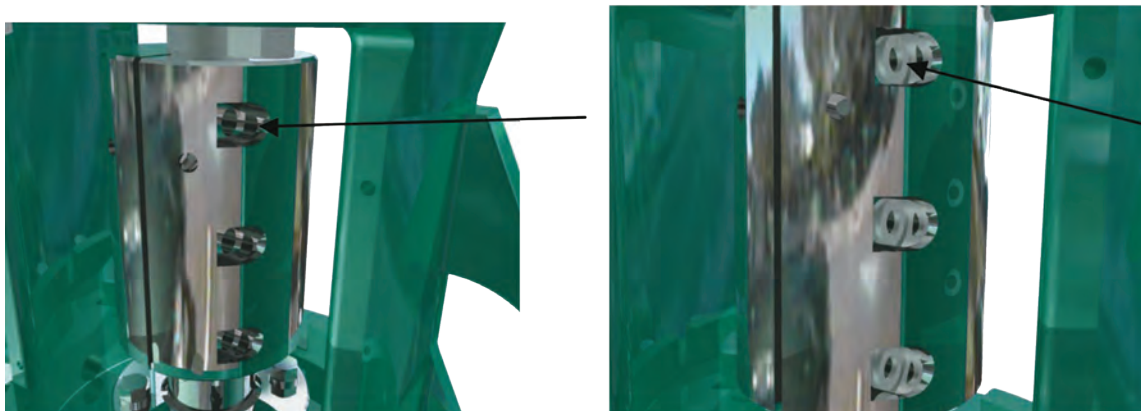


Figure 6.27 Placing the lockwasher on both couple halves.

28. Place and tighten the coupling screws. Tighten the screws crosswise to ensure a uniform assembly.



Figure 6.28 Placing and tightening the coupling screws.

ATTENTION Inspection point: Rotate the rotor by hand to verify that the coupling has been installed correctly. If not, disassemble the coupling and repeat the last six steps.

29. Tighten the setscrews of the rotating part of the mechanical seal. To ensure future effective performance of the mechanical seal press down the rotating part while tightening the setscrews.



Figure 6.29 Tightening the setscrews of the rotating part of the mechanical seal.

30. Insert the tubing connector in the seal pipe.



Figure 6.30 Inserting the tubing connector in the seal pipe.

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31. Insert the vent valve into the tubing connector.

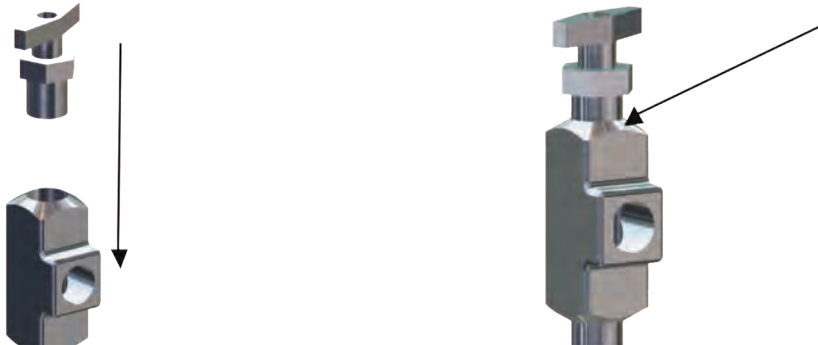


Figure 6.31 Inserting the vent valve into the tubing connector.

32. Insert the vent assembly into its corresponding position on the casing.

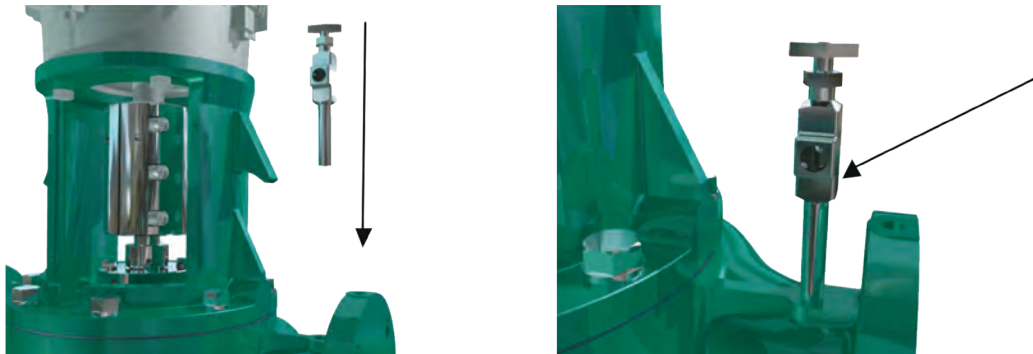


Figure 6.32 Inserting the vent assembly into its corresponding position on the casing.

33. Connect the valve and venting hose to the mechanical seal for its lubrication.

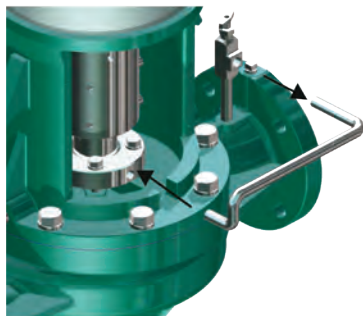


Figure 6.33 Connecting the valve and venting hose to the mechanical seal.

34. Install the coupling guard over the adapter.

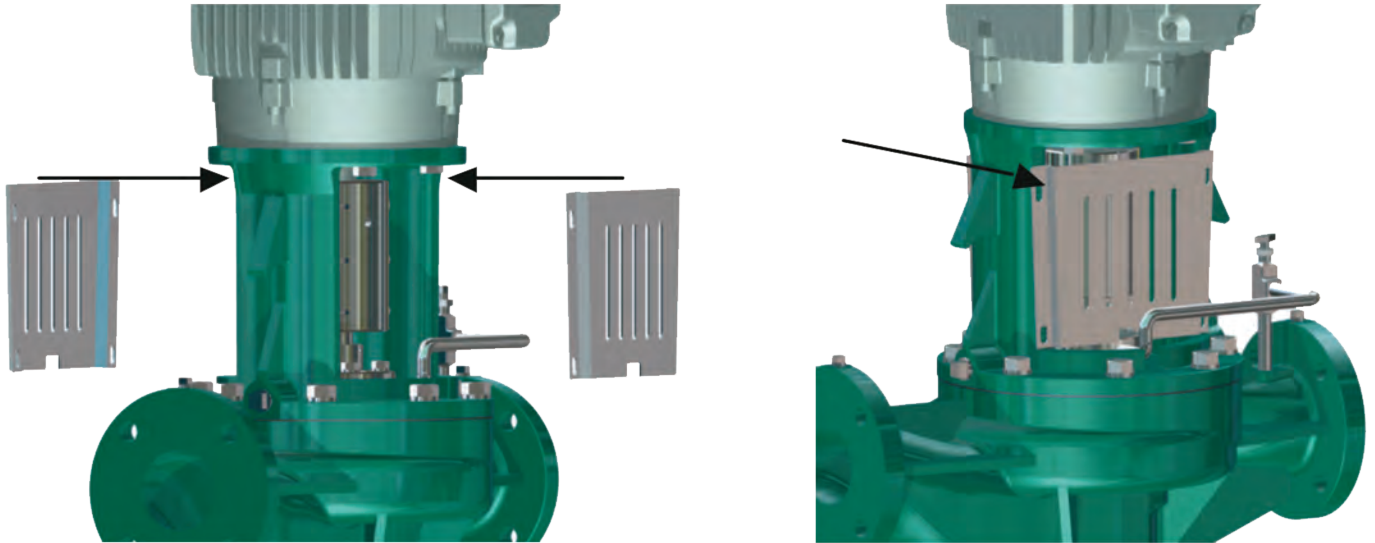


Figure 6.34 Installing the coupling guard over the adapter.

35. Tighten the coupling guard screws in position.

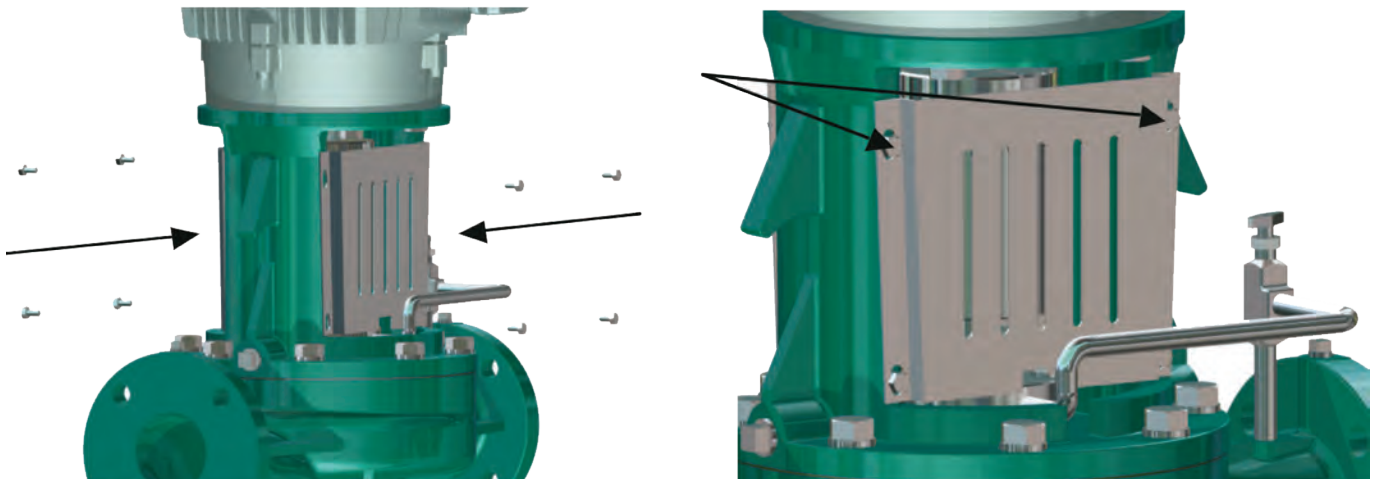


Figure 6.35 Tightening the coupling guard screws in position.

36. At this point, the pump has been completely assembled.

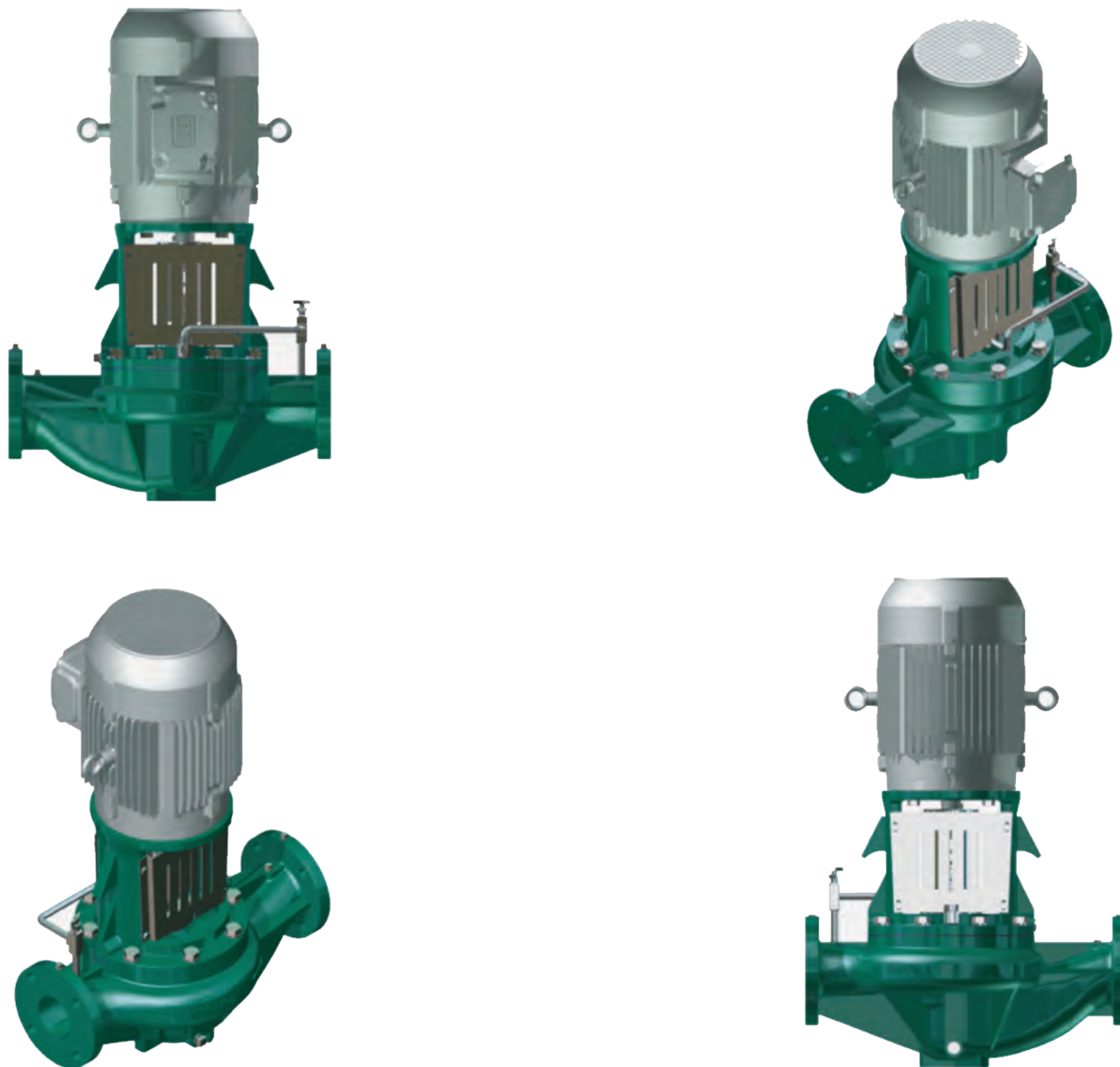


Figure 6.36 Assembled pump.

6.3.2 PI Packing Option

The PI Packing Option pump shares reassembly steps 1 through 11, and 19 to 36, with the PI Mechanical Seal Option pump. Please follow the aforementioned steps from the PI Mechanical Seal Option pump reassembly procedure found in SECTION 6.3.1 - PI Mechanical Seal Option when reassembling the PI Packing Option pump.

Intermediate steps to reassemble the PI Packing Option pump, steps 13 to 18 for the driven side are the following:

13. Insert two strips of packing in the packing chamber rolled to the sleeve.

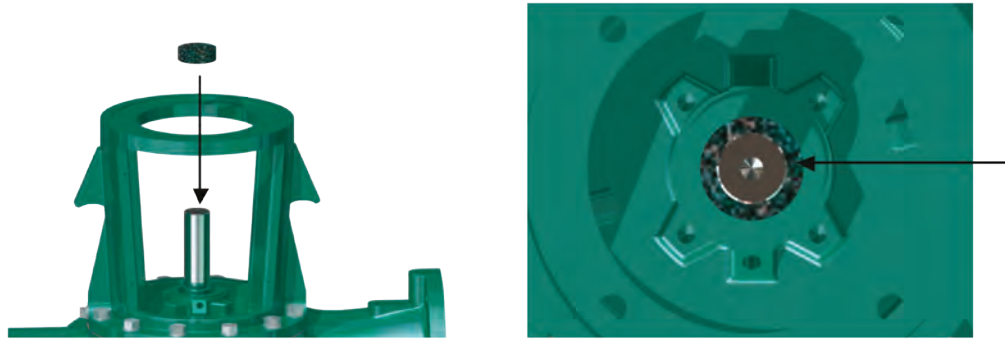


Figure 6.37 Inserting two strips of packing in the packing chamber rolled to the sleeve.

ATTENTION

The joining faces of each strip must not be aligned to ensure a proper assembly and function.

14. Assemble and insert the lantern ring into the shaft until it touches the packing.

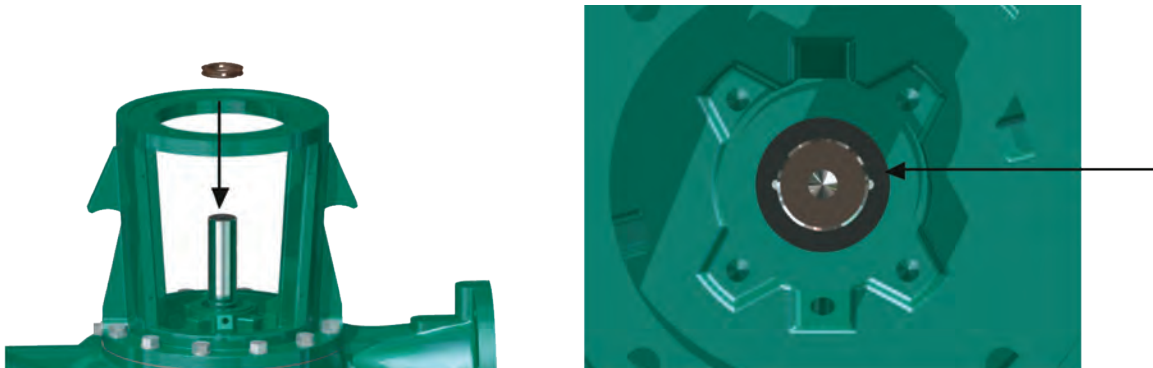


Figure 6.38 Assembling and inserting the lantern ring into the shaft until it touches the packing.

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15. Place two strips of packing in the packing chamber. Make sure the packing is touching the lantern ring.

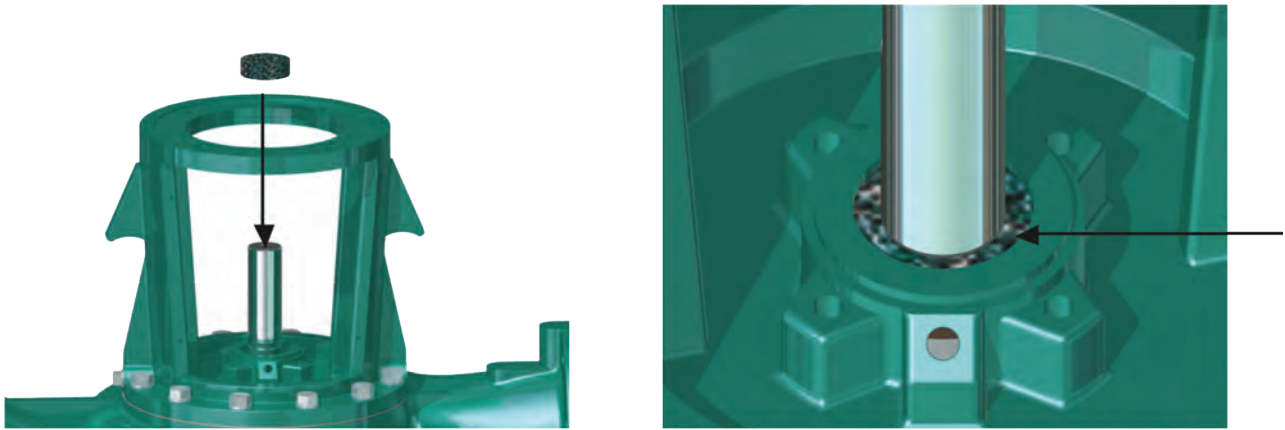


Figure 6.39 Placing two strips of packing in the packing chamber.

ATTENTION

The joining faces of each strip must not be aligned to ensure a proper assembly and function.

16. Insert the two corresponding studs into the adapter. The studs must be screwed until they stop.

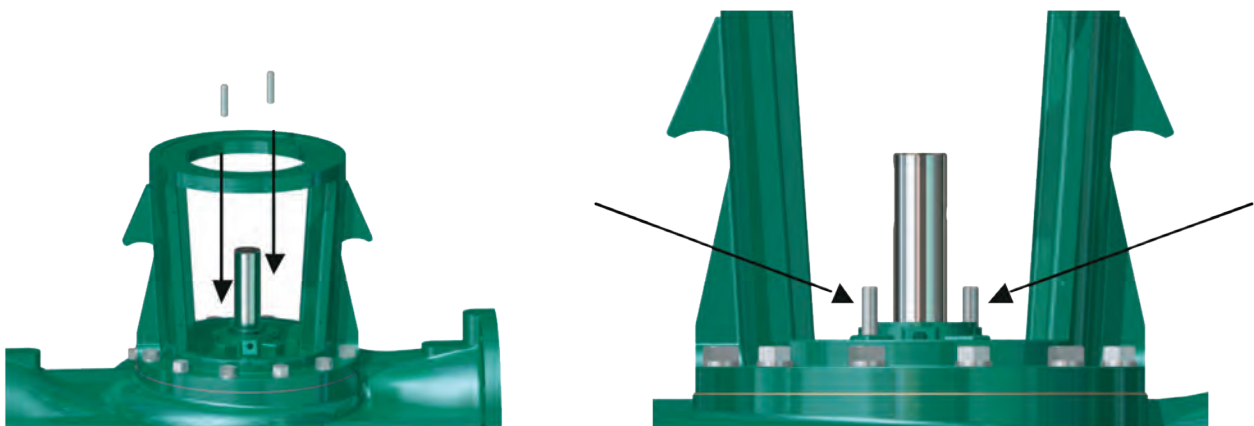


Figure 6.40 Inserting the two corresponding studs into the adapter.

17. Assemble and insert the packing gland onto the shaft.

a) Assemble the two equal pieces of the packing gland.



Figure 6.41 Assembling the two equal pieces of the packing gland.

b) Insert two screw bolts into the split packing gland. The head of both bolts should be in the same side.



Figure 6.42 Inserting two screw bolts into the split packing gland.

c) Place the two corresponding nuts into the screw bolts.

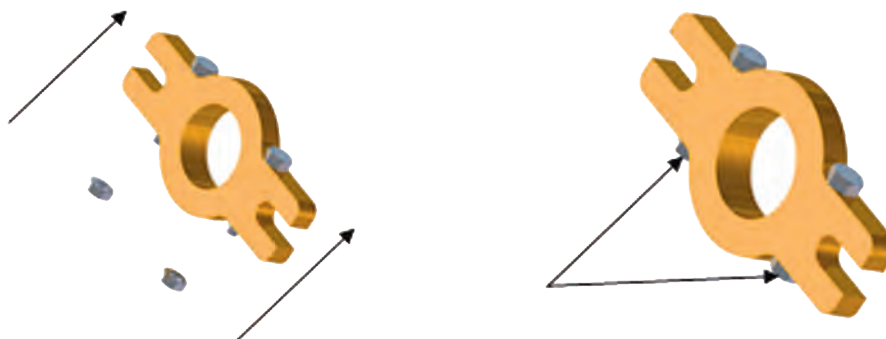


Figure 6.43 Placing the two corresponding nuts into the screw bolts.

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- d) Insert the packing gland onto the shaft. Make sure that the studs and the packing gland match with each other.

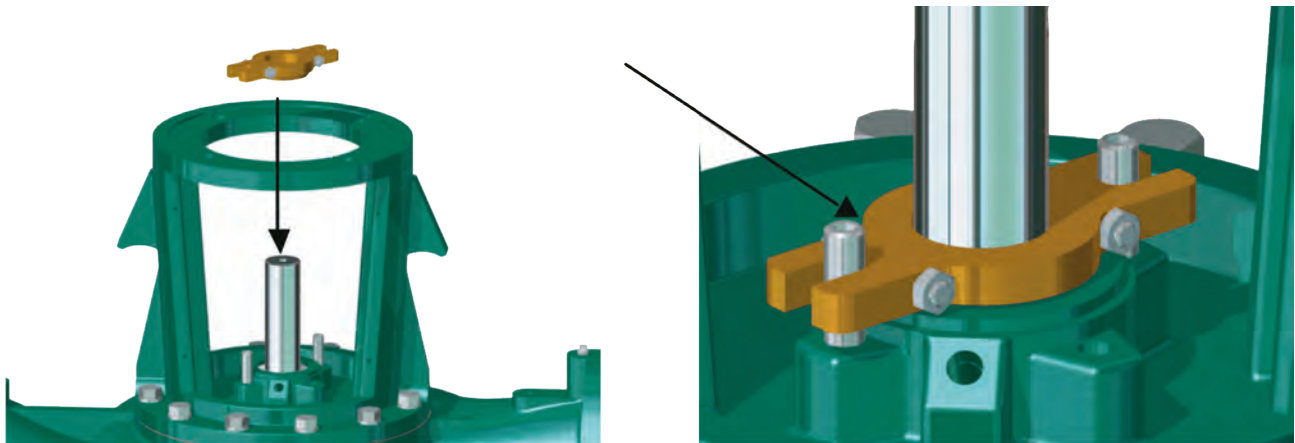


Figure 6.44 Inserting the packing gland into the shaft.

18. Place the corresponding nuts in their position.

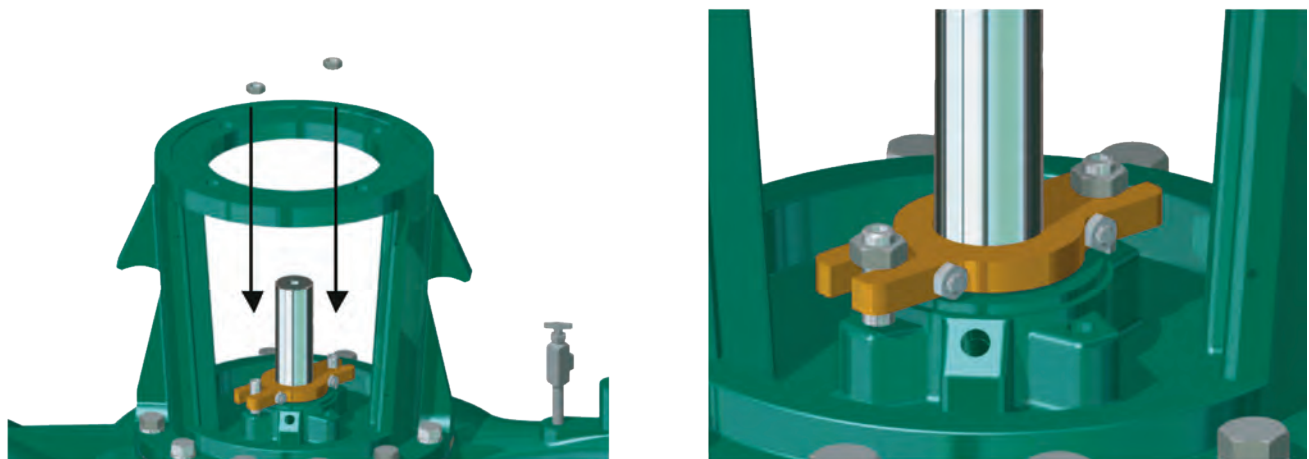


Figure 6.45 Placing the corresponding nuts in their position.

ATTENTION

The nuts must be screwed by hand, not using a wrench. This for the proper function of the packing seal.

After finishing these steps, refer to SECTION 6.3.1 PI Mechanical Seal Option, STEP 19.

7. SECTION SEVEN - SPARE PARTS

The recommended quantity of spare parts to meet regular conditions of constant operation over a period of two years are given in the list below:

Spare parts	Number of identical pumps (including reserve pumps)						
	2	3	4	5	6 and 7	8 and 9	10 and more
	Quantity of spare parts						
Impeller	1	1	1	2	2	3	30%
Shaft with key	1	1	1	2	2	3	30%
O-rings (one of each size)	2	3	6	8	8	10	150%
Repair kit for mechanical seal	1	1	2	2	2	3	30%

The spare parts should be available from the time of first operation.

Spare parts taken out and used must be replaced as soon as possible.

Please give the following details when ordering:

- Order No. of the pump
- Type of pump and size
- Identity number from the list of spare parts
- Part number from the sectional drawing
- Quantity

Material Storage of spare parts

- Store the spare parts in their original packaging.
- Store in a dry place, preferably at a constant temperature.
- Check the spare parts and the state of the packaging every 6 months for signs of corrosion.
- Repair any damage or sign of corrosion with anticorrosive agents.

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8. SECTION EIGHT - PARTS INFORMATION

Pump PI			
Item	Description	Item	Description
101	Pump Casing	909	Setscrew
211	Pump Shaft	912	Drain Plug
230	Impeller	913	Plug
400	Casing Gasket	914	Socket head Cap Screw (Coupling)
471	Seal Cover	400.01	Mechanical Seal Gasket (Top)
472	Rotating Seal Face	400.02	Mechanical Seal Gasket (Bottom)
475	Stationary Seal Face	900.01	Hexagonal Head Cap Screw (Case)
540	Bushing	900.02	Hexagonal Head Cap Screw (Gland)
594	Motor Adapter	900.03	Hexagonal Head Cap Screw (Motor)
681	Coupling Guard	900.04	Hexagonal Head Cap Screw (Shaft)
703	Sealing Tubing	931.01	Lockwasher (Case)
710	Seal Pipe	931.02	Lockwasher (Gland)
740	Flex Hose	931.03	Lockwasher (Shaft)
741	Vent Valve	940.01	Key (Coupling)
819	Motor (Driver) Shaft	940.02	Key (Impeller)
861	Split Coupling	940.03	Key (Motor)

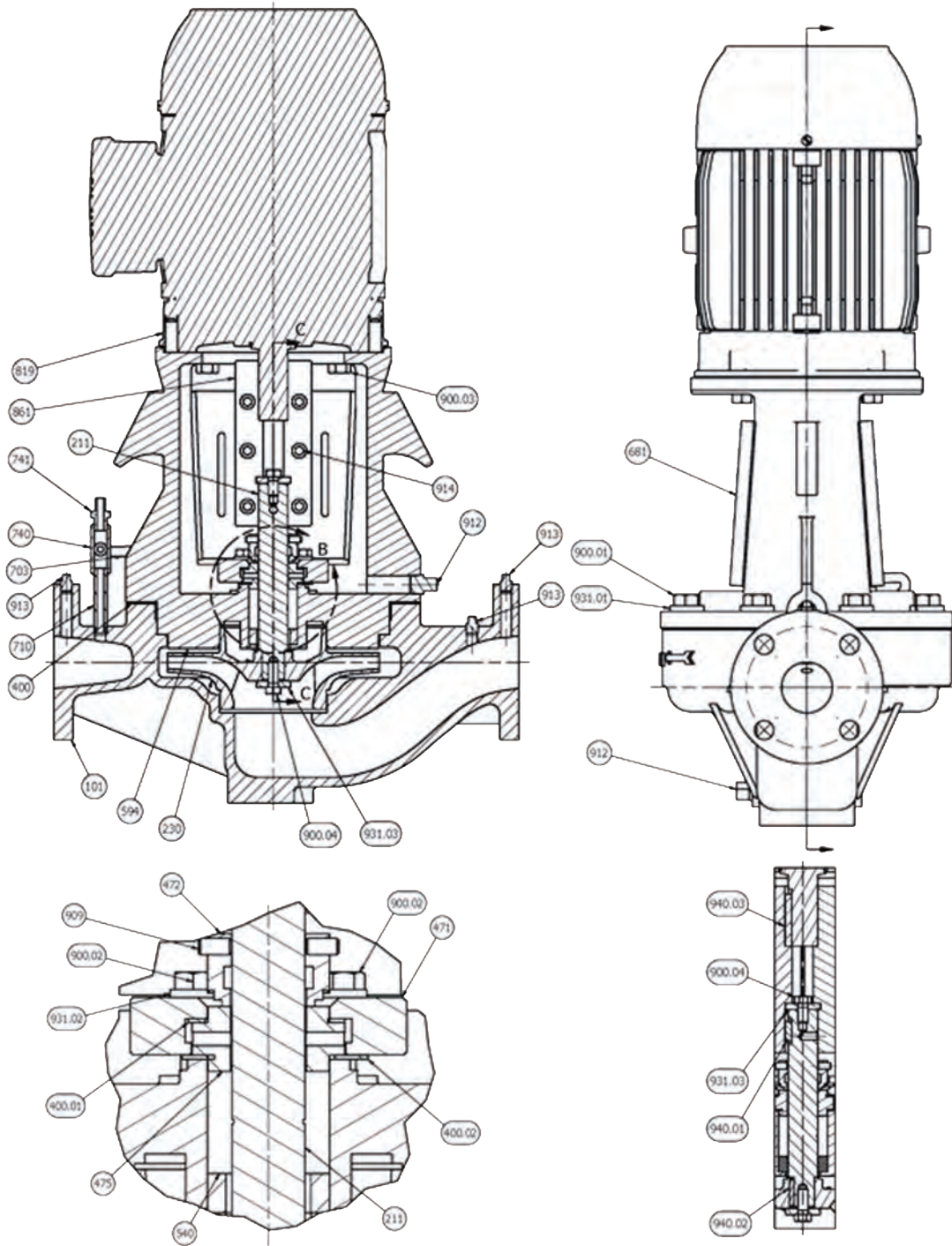


Figure 8.1 Sectional Drawing

PI Operation Manual

9. SECTION NINE - TROUBLESHOOTING CHART

TROUBLE	PROBABLE CAUSES	SUGGESTED SOLUTION
<p>PUMP DOES NOT DELIVER LIQUID</p>	<ul style="list-style-type: none"> a. Inner pump parts are worn. b. Density or viscosity of pumped fluid is not same as designed. c. The motor voltage is incorrect. d. Motor runs only in two phase mode. e. Pump not primed. f. Speed too low. g. Feed pipe or impeller plugged. h. Clogged suction. i. Damaged impeller. j. Wrong rotation. k. Pump or piping are not properly vented. l. Formation of air pockets in the piping. m. The counter pressure of the system is greater than the design point of the pump. n. NPSHa too low. 	<ul style="list-style-type: none"> a. Change worn parts. b. Consult a WDM Pumps dealer. c. Apply correct voltage to the motor. d. Check the cables, connections and fuses. e. Prime pump. f. Check driver input. g. Clean pipe and impeller. h. Clean out suction line. i. Replace impeller. j. Check driver rotation. k. Vent or top up. l. Install vent valve or lay piping elsewhere. m. Open discharge valve as wide as necessary to reach the operating point. n. Check the fluid level in the feed container. Open suction valve completely. Lay suction pipe elsewhere as friction losses are too great. Check for a possible filter in the feed pipe.

TROUBLE	PROBABLE CAUSES	SUGGESTED SOLUTION
<p style="text-align: center;">CAPACITY OR DISCHARGE PRESSURE LOW</p>	<ul style="list-style-type: none"> a. Air leaks into suction. b. Speed too low. c. Clogged suction. d. Clogged impeller. e. Damaged impeller. f. Wrong rotation. g. Feed pipe or impeller plugged. h. Formation of air pockets in the piping. i. Inner pump parts are worn. j. Density or viscosity of pumped fluid is not same as designed. k. The motor voltage is incorrect. l. Motor connected only in two-phase mode. m. NPSHa too low. 	<ul style="list-style-type: none"> a. Check suction line for leaks. b. Check driver and its power source. c. Clean out suction line. d. Clean impeller. e. Replace impeller. f. Check motor (driver) rotation. g. Clean pipe and impeller. h. Install vent valve or lay piping elsewhere. i. Change worn parts. j. Consult a WDM Pumps dealer. k. Apply correct voltage to the motor. l. Check the cables, connections and fuses. m. Check the fluid level in the feed container. Open suction valve completely. Lay suction pipe elsewhere as friction losses are too great. Check for a possible filter in the feed pipe.
<p style="text-align: center;">DRIVER OVERLOAD</p>	<ul style="list-style-type: none"> a. Density or viscosity of pumped fluid is not same as designed. b. Speed too high. c. Pump is under tension. d. The motor voltage is incorrect. e. Motor connected only in two-phase mode. f. System head lower than rating. 	<ul style="list-style-type: none"> a. Consult a WDM Pumps dealer. b. Decrease driver speed. c. Check the piping for tension free connections. d. Apply correct voltage to the motor. e. Check the cables, connections and fuses. f. Check suction and discharge pressure.

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Continuing a tradition of more than 50 years, WDM Pumps manufactures quality electric and engine driven pumps for diverse commercial and industrial applications. Our continued growth is based on a commitment to high standards for efficient product design, production, sales, and customer support.

Our customers rely on our world-class team of experienced WDM Pumps engineers, technicians, and product application specialists.

WDM offers pump products and related equipment for a wide variety of industries, including industrial, agricultural, and construction. The WDM Pumps product line includes self priming, flexible coupled, close coupled, diesel and gasoline driven centrifugal pumps, in addition to submersible solids handling products.

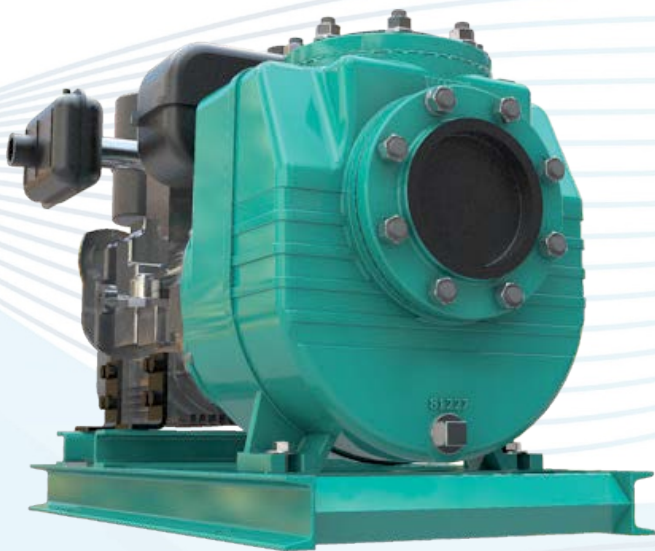
WDM Pumps plants are strategically located throughout the Americas in the United States, Colombia, Mexico, Panama, Argentina, and Guatemala.



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Self-Priming Pumps



Operation Manual

WDM Water Systems

1. Introduction.

This manual contains instructions for the installation and operation of your Self-Priming pump. Read these recommendations carefully before use. Keep this manual for future reference.

Congratulations! You have purchased a product developed with the latest technology from WDM Pumps, Inc. (referred to as “WDM”).

WDM designs and manufactures our products with the highest quality components. Our experience as a manufacturer and our special care and dedication in production result in products that meet the highest standards.

The information contained in this manual is important for the installation, operation and maintenance of your WDM Self-Priming pump. Read all instructions carefully before installing and using the product. Keep this manual for future reference.

Our products are factory tested to ensure proper operation. Inspect carefully and make sure there are no missing or damaged pieces from shipping. If, upon delivery, parts are damaged or missing, make a claim to the shipping company as soon as possible.

The design of this product, as well as the materials and processes used in its manufacture provide for proper operation. However product performance and lifespan depend on appropriate application, installation, periodic inspection and general preventive maintenance.



WARNING.

WDM is not responsible for any damage or accidents that occur when the instructions given in this manual have not been followed.

The warranty is only valid when using WDM original spare parts. Failure to follow these guidelines in installing and starting your pump will void your warranty.

2. Safety Recommendations.

- WDM pumps are designed to operate safely when used and maintained according to this manual.
- Rotating parts of the pumps are dangerous and can cause injury. Operators and maintenance personnel should be aware of and follow safety recommendations.
- The pumps are considered heavy equipment. Handle them with care.
- To reduce the risk of electrical shock, all wiring of pumps, motors, overload protection and control panels must be in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Requirements will vary depending on usage and location. Improper grounding will void the warranty.
- To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Cable should be inspected frequently.
- Never handle connected power cords with wet hands.
- If any product is to be returned, it must be cleaned, sanitized, or decontaminated as necessary according to any applicable laws and regulations prior to shipment, to protect employees from exposure to health hazards.
- Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other

reproductive harm. Leaded copper alloys should not be used in potable water applications. If this pump is for use in a potable water application, contact manufacturer to determine suitability.

- Loose fitting clothing can easily be caught by the impeller or other moving parts, therefore do not wear loose fitting clothing when doing maintenance or service work on the pump. Always wear appropriate protective equipment, including gloves, safety glasses or shoes, when installing, servicing or repairing the pump or piping.
- Keep clear of suction and discharge openings.
- Disconnect power before inserting fingers in pump.
- Do not operate pump without safety devices in place. Make sure lifting handles are securely fastened each time before lifting.
- Replace all safety features and devices that may have been removed during service or repair.
- During installation, secure the pump so it cannot tip over, fall or slide from its operating position.
- Do not allow pump to exceed manufacturer's recommendation for maximum performance, as doing so could cause the motor to overheat.
- Operating the pump while the discharge valve is closed will cause premature bearing and seal failure on any pump. Heat buildup inside end-suction and self-priming pumps may generate steam, resulting in dangerous pressures. WDM recommends that a high temperature switch or pressure relief valve be installed on the pump body.
- Pumps build up heat and pressure during operation. Allow sufficient time for pumps to cool before handling or servicing.
- Never pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them. Doing so will void the warranty.

Pump coupled to combustion engines.

- Make sure combustion engines have adequate ventilation. Never operate combustion engines in an enclosed area where fumes can collect.
- Do not refuel the tank while the engine is running. Shut off engine and wait until it cools.

3. General Information.

Receiving.

Pumps should be inspected upon receipt. Make note of damage or missing parts, if any, and immediately file a claim with the shipping company. During inspection, if the manual is removed, do not lose or misplace it.

Storage.

While our pumps are designed to work efficiently after a short period of storage, best results occur when the pump is kept, as assembled in the factory, in a storage facility that has a dry atmosphere and constant temperature. Short term storage should not exceed 6 months.

If planning to store the pump for more than 6 months, but less than 24 months, the pump should be stored inside an enclosure that is temperature controlled between 40°F - 120°F (4°C - 50°C). The enclosure should provide protection from all elements.

Prior to storage, if high humidity is expected during storage, all exposed areas with paint should be inspected and repainted with a water base, air dry enamel paint. Then all surfaces should be sprayed with rust-inhibiting oil. The pump should be kept in its original storage container. Before starting the pump up, the impeller should be rotated by hand to see if seal and impeller rotate freely.

4. Installation.

Location.

The pump should always be as close as possible to the liquid supply and in no case should the pump be more than 25 feet above the surface of the liquid supply. The pump should always be as level as possible. (See Fig. 1).

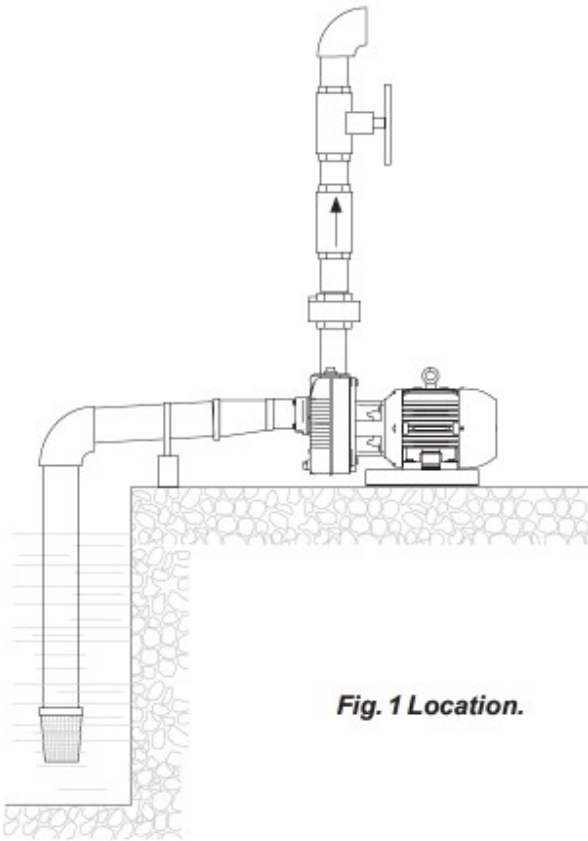
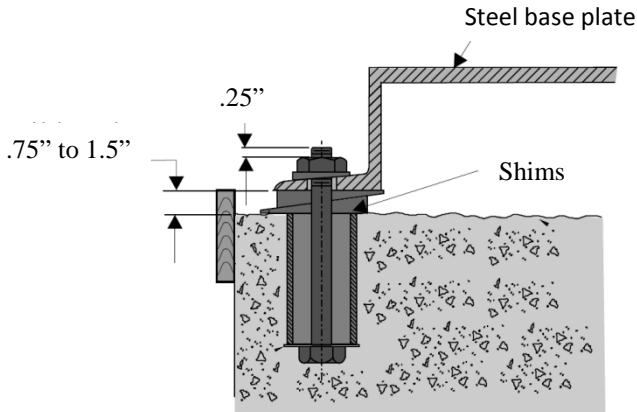


Fig. 1 Location.

Pump Foundation.



Rotation.

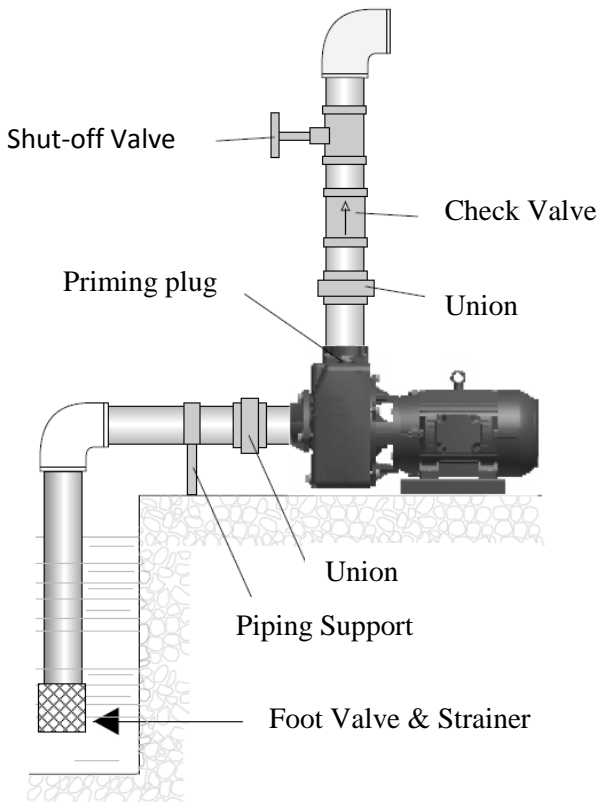
Check the direction of the rotation of the pump to be sure that it agrees with direction indicated on the rotation plate. If the direction of the rotation is incorrect, consult the following instructions. For a 3 phase, exchange any two incoming wire leads. For a 1 phase, follow the connection name plate on the motor. All pump units should rotate clockwise when viewing from the motor end of the pump. Securely install the pump on a firm footing to make sure the pump will not move due to vibration.

Suction System.

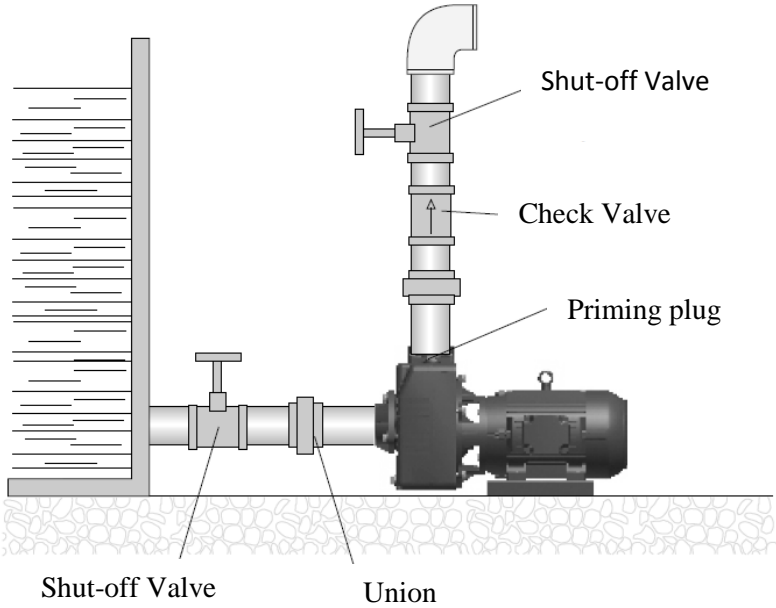
Use a suction line that is the same size as the pump port. Using a suction line smaller than the pump port size can cause internal damage to the pump. Horizontal suction lines should slope up to the pump to prevent trapped air pockets. Support the weight of the suction line by installing an adjustable stand, pipe clamp or a floor flange.

The suction line must not have holes. The slightest air leak in the suction line can prevent the pump from priming. To insure an air tight joint, use pipe thread compound in all threaded connections in the suction line. . Suction flanges should also be pulled up tight to prevent air leaks.

Negative Suction

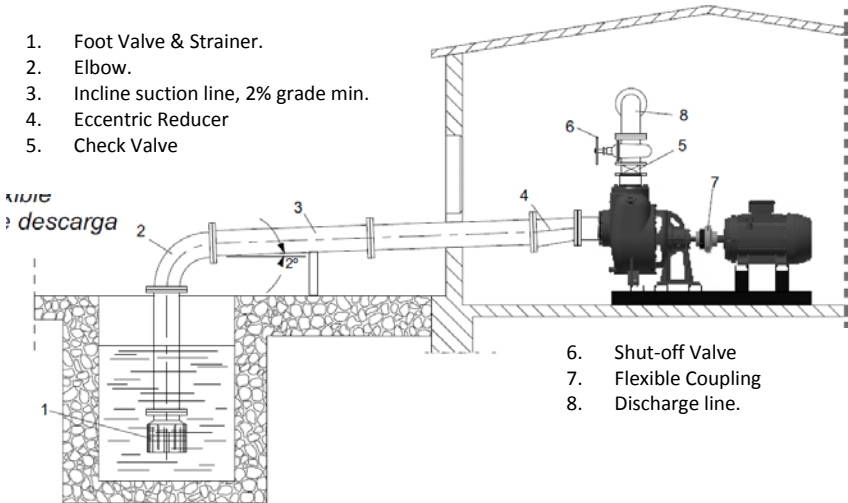


Positive Suction

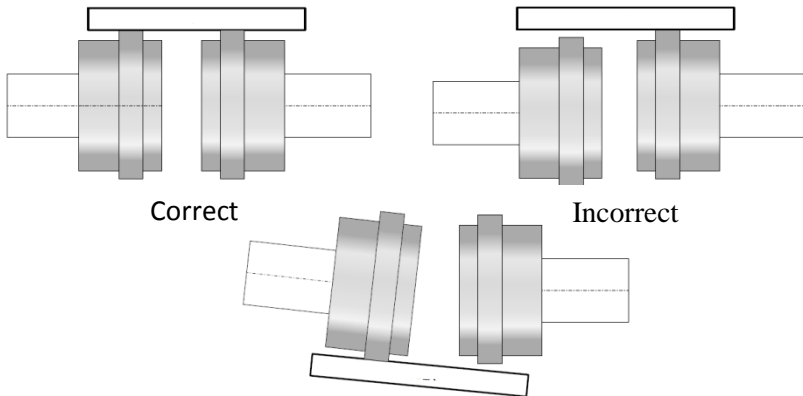


Frame Mounted Units

1. Foot Valve & Strainer.
2. Elbow.
3. Incline suction line, 2% grade min.
4. Eccentric Reducer
5. Check Valve



Verify the correct alignment between the motor and the pump shafts. The pump was accurately aligned with the motor at factory, but you should always verify and realign if required during final installation. Failure to do it might cause pump malfunction and void the manufacturer warranty.



CAUTION.

Always operate this pump with a strainer on the end of the suction line to prevent sticks, stones, rags and other foreign matter from being drawn into the impeller. Clean the strainer regularly to prevent clogging and insure full flow.

Discharge System.

Connect the discharge hose or pipe to the side outlet on the discharge tee, or to the discharge elbow.



ATTENTION.

WDM does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned in this operation manual.

Electric motor & connections.

Read the motor manufacturer's instructions, or consult the connection diagram located either on the motor name plate or inside the cover on the conduit box. The wiring of the motor and control panel, overload protection and grounding should be in accordance with State, Province, Local and National Electrical Code (NEC) or Canadian Electrical Code (CEC). Be sure the following criteria are met:

1. AC power is within $\pm 10\%$ of rated voltage with rated frequency. (See motor name plate for rating).
OR
2. AC power is within $\pm 5\%$ of rated frequency with rated voltage. OR
3. A combined variation in voltage and frequency of $\pm 10\%$ (sum of absolute values) of rated values, provided the frequency variation does not exceed $\pm 5\%$ of rated frequency.

Pump Lubrication.

The pump requires no lubrication. The impeller and seal are the only moving parts of the pump. These parts are water lubricated and need no attention.



CAUTION.

Do not operate pump without liquid in pump body as operating dry will result in damage to the seal.

5. Operation.

Priming.

Remove the priming plug, located in the top of the discharge tee or in

top of pump body, and fill the pump body completely with liquid. Liquid should be as free of solids as possible. In freezing weather, the pump should be primed with warm water whenever possible, to prevent damage that might be caused by ice forming inside the pump.

Starting.

After completing this procedure, the pump is now ready for operation. Start the pump by applying power to motor as outlined in the motor instructions.

Shutdown.

Operation may be discontinued by disconnecting electric power. When the pump has been operating in freezing weather or in liquid that contains a considerable amount of solids, it is advisable to drain the pump body by removing the drain plug and flushing the solids out of the pump body.

Replace the drain plug.

Restart.

Any time the pump is restarted, but especially when the pump has been drained, check to make sure the pump is refilled back to the level required for self-priming. The pump is self-priming only when the body is full of liquid

6. Pump service and repair.

Check valve service.

To clean out or repair a check valve, disconnect the suction piping, then remove cap screws and suction flange.



ATTENTION.

Do not pry the flange off, but rather bump it off with a block of wood and a hammer. Pull off the gasket together with the weights, round head screw and lockwasher. All parts should be examined and parts showing wear or damage should be replaced. When replacing the gasket and weight assembly onto the pump body, make sure that the hinge section of the gasket is at the top and that the large weight is on the pump side of gasket.

Body, volute and impeller service.

To clean out or repair the body, volute or impeller, disconnect suction and discharge piping.

Remove the hex nuts and lockwashers and pull the body from the intermediate coupling. This will expose the O-ring, impeller, impeller locking screw, volute and volute gasket. Examine all parts for wear and tear and replace as necessary.

If the impeller needs to be replaced, pull volute from intermediate coupling, remove set screw or cap screws and washers, and unscrew the impeller from the motor shaft. As the impeller is screwed onto the shaft with right hand thread, break loose by placing a block of wood against a vane and striking it with a hammer. When reassembling, be sure to use the required number of shims to result in an impeller-to-volute clearance of not more than .021”.

Shaft seal service.

When examining or replacing the shaft seal, remove the body and impeller, impeller shims and rotating member of shaft seal from motor shaft. This exposes all components of the shaft seal so they can be examined. When any part shows wear and tear or damage, the entire shaft seal assembly should be replaced. If a stationary member needs replacing, pry the used stationary member from the

intermediate coupling.



CAUTION.

All seal parts should be handled with extreme care. Do not scratch or mar lapped faces.

Lightly oil the ring and press the replacement stationary member over motor shaft and into intermediate coupling.

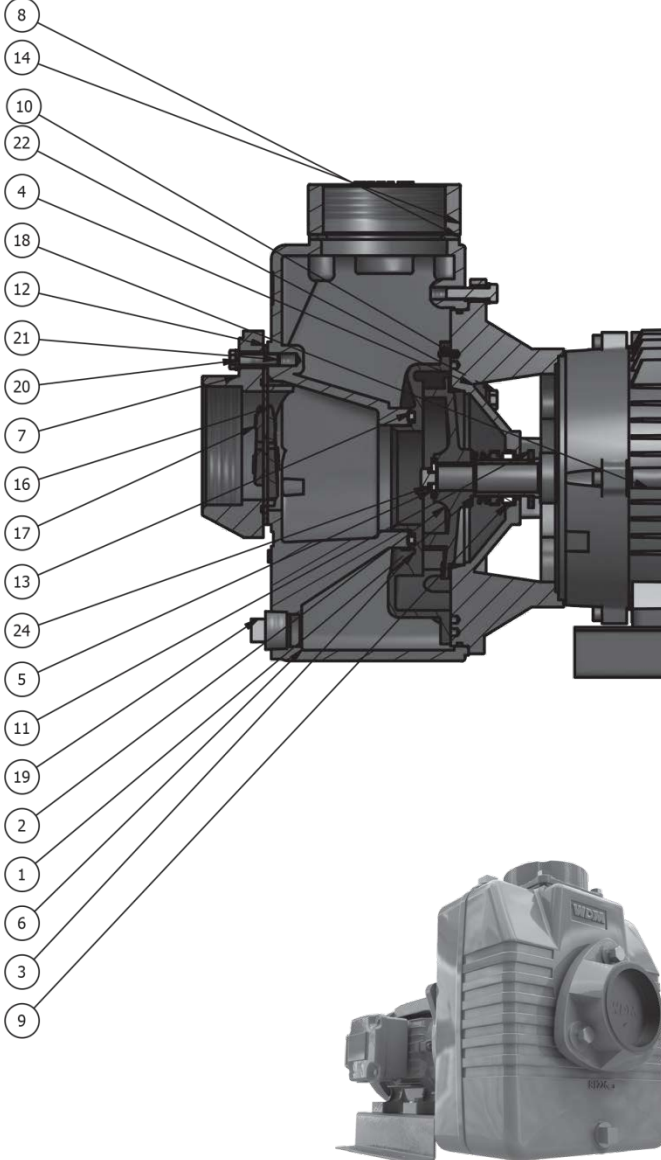
The motor shaft and inner surface of bellows of rotating member should be lightly oiled. With the lapped surface facing the intermediate coupling, slide the rotating member onto the shaft until the lapped faces of the rotating member and stationary member are together. Then reassemble the remainder of the pump.

Motor service.

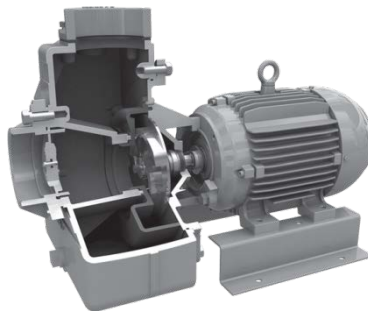
To remove or replace the motor, disassemble the pump. Remove the cap screws and lockwashers to remove the motor, and base. To remove the motor from the base, remove the cap screws on hex nuts.

7. Sectional.

AE Series.



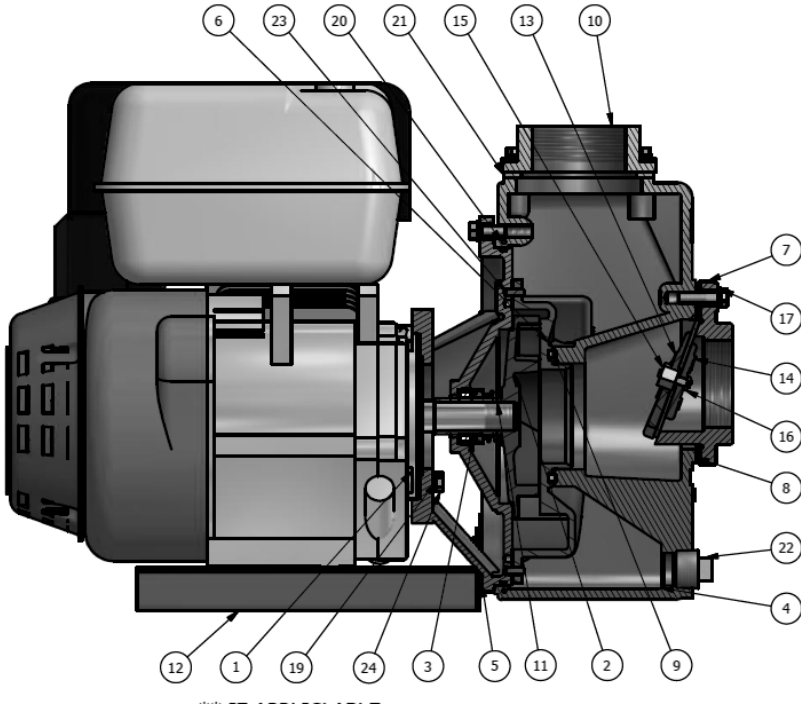
Item	Description
1	Shaft Sleeve
2	Impeller
3	Volute
4	Motor Bracket
5	Washer
6	Casing
7	Suction
8	Discharge Gasket / O ring
9	Mechanical Seal
10	Volute Pin
11	Slinger
12	Check Valve Gasket
13	Volute Gasket
14	Discharge
15	Base brackets
16	Big Weight
17	Small Weight
18	Motor
19	Square Head Plug
20	Heavy Helical Spring Lock Washers (Inch Series)
21	Hex Cap Screw
22	Hex Bolt - UNC (Regular Thread - Inch)
23	Hex Cap Screw
24	Hex Bolt - UNC (Regular Thread - Inch)



Self-Priming Pumps.



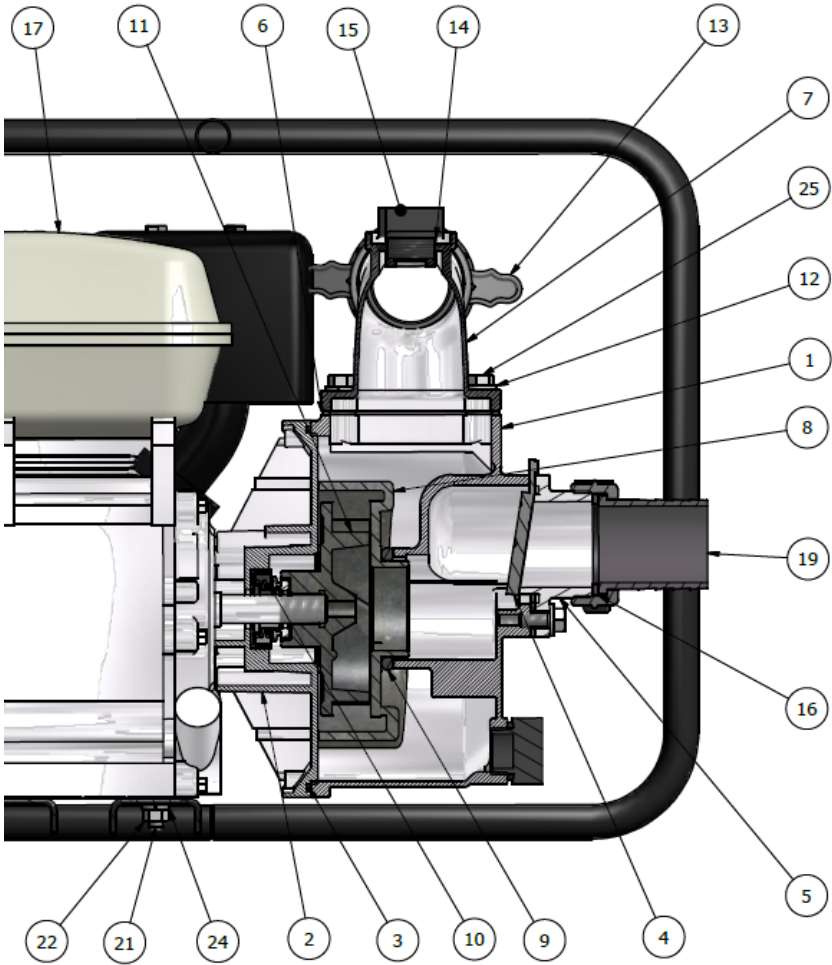
AG/AD Series.



Item	Description
1	Engine
2	Impeller
3	Shaft Seal
4	Casing
5	Engine Bracket
6	Volute
7	Suction
8	Suction Gasket
9	Volute Gasket
10	Discharge
11	Shaft Sleeve
12	Base Brackets
13	Big Weight
14	Small Weight
15	Hex Nut
16	Round Screw
17	Lock Washer
18	Hex Bolt
19	Lock Washer
20	O-ring
21	Discharge Gasket
22	Drain Plug
23	Volute Pin
24	Cap Screw



AAG/AAD



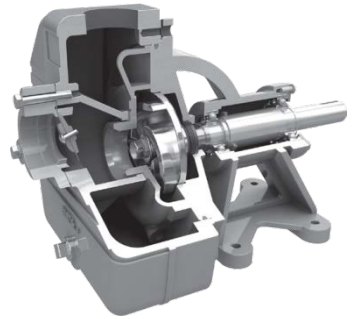
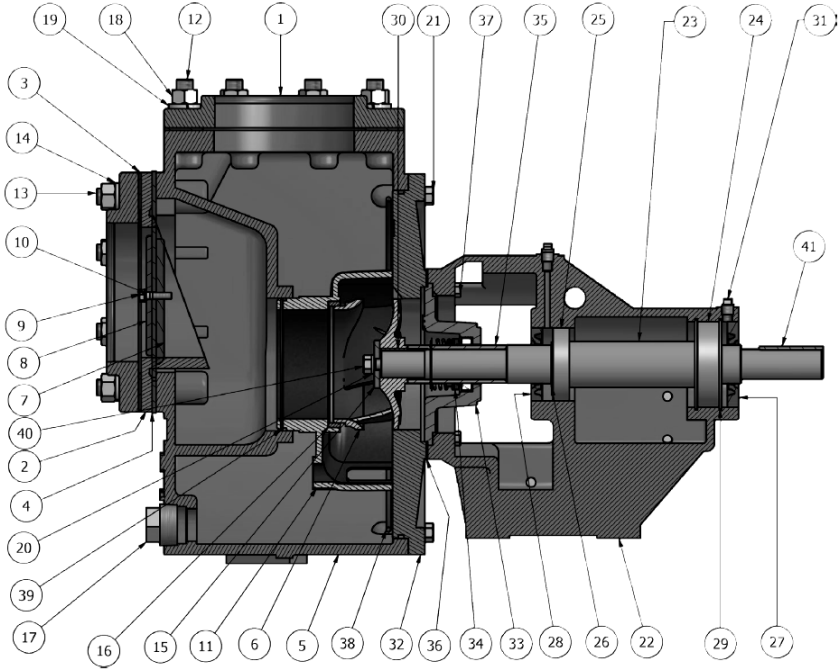
Item	Description
1	Casing
2	Engine Bracket
3	O-ring
4	Gasket
5	Suction
6	Discharge Gasket
7	Discharge
8	Volute
9	Volute Gasket
10	Mechanical Seal
11	Impeller
12	Lock Washer
13	Plastic Coupling
14	O-ring
15	Plastic Plug
16	Gasket
17	Engine
18	Hex Socket Head Cap Screw
19	Suction Fitting
20	Metal Frame
21	Hex Bolt
22	Hex Nut
23	Washer
24	Lock Washer
25	Hex Bolt



Self-Priming Pumps.



AU Series.



Item	Description
1	Discharge
2	Suction

3	Suction Gasket
4	Gasket
5	Casing
6	Impeller
7	Big Weight
8	Small Weight
9	Hex Bolt
10	Lock Washer
11	Volute
12	Discharge Studs
13	Suction Studs
14	Lock Washer
15	Impeller Lock Washer
16	Volute Gasket
17	Drain Plug
18	Hex Nut
19	Discharge Lock Washer
20	Impeller Lock Washer
21	Hex Bolt
22	Bearing Frame
23	Shaft
24/25	Bearing
26/29	Snap Ring
27/28	Lip Seal
30/41	Key
31	Grease Plug
32	Backplate
33	Seal Housing
34	Mechanical Seal
35	Shaft Sleeve
36	Backplate Gasket
37	Cap Screw
38/39	O -Ring
40	Impeller Bolt

8. Troubleshooting.

Symptom	Possible cause(s)	Possible solution(s)
Little or no discharge and unit will not prime.	1. Casing not filled with water.	1. Fill pump casing. Using a foot valve will extend pump life and facilitate immediate priming.
	2. Total head too high.	2. Shorten suction head.
	3. Suction head higher than pump designed for.	3. Lower suction head, install foot-valve and prime.
	4. Impeller partially or completely plugged.	4. Disassemble pump and clean out impeller.
	5. Hole or leak in suction line.	5. Repair or replace suction line.
	6. Foot-valve too small.	6. Match foot-valve to piping or install one size larger foot-valve.
	7. Impeller damaged.	7. Disassemble pump and replace impeller.
	8. Foot-valve or suction line not submerged deep enough in water; pulling air.	8. Submerge lower in water.
	9. Insufficient inlet pressure or suction head.	9. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	10. Suction piping too small	10. Increase pipe size to pump inlet size or larger.
	11. Casing gasket leaking	11. Replace.
	12. Suction or discharge line valves closed.	12. Open.
	13. Piping is fouled or damaged.	13. Clean or replace.
	14. Clogged strainer or foot valve.	14. Clean or replace.
Loss of suction after satisfactory operation.	1. Air leak in suction line.	1. Repair or replace suction line.
	2. When unit was last turned off, water siphoned out of pump casing.	2. Refill (reprime) pump casing before restarting.
	3. Suction head higher than pump designed for.	3. Lower suction head; install foot-valve and primer.

	4. Insufficient inlet pressure or suction head.	4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	5. Clogged foot-valve, strainer, or pump.	5. Unclog, clear or replace as necessary.
Pump overloads driver.	1. Total head lower than pump rating, unit delivering too much water.	1. Increase back pressure on pump by turning gate valve on discharge line to partially closed position that will not overload motor
	2. Specific gravity and viscosity of liquid being pumped different than the pump rating	2. Consult factory.
Pump vibrates and/ or makes excessive noise.	1. Mounting plate or foundation not rigid enough.	1. Reinforce.
	2. Foreign material in pump causing unbalance.	2. Disassemble pump and remove foreign material..
	3. Impeller bent.	3. Replace impeller
	4. Cavitation present	4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line.
	5. Piping not supported to relieve any strain on pump assembly.	5. Make necessary adjustments.
Pump runs but no fluid.	1. Faulty suction piping (air leak)	1. Replace faulty suction piping
	2. Pump located too far from fluid source	2. Reposition.
	3. Gate valve closed.	3. Open
	4. Clogged strainer	4. Clean or replace
	6. Discharge height too great	6. Lower the height
	7. Fouled impeller.	7. Clean or replace.
Pump leaks at shaft	8. Faulty mechanical seal	8. Replace
	1. Worn mechanical seal.	1. Replace
	2. Replacement seal not installed properly.	2. Follow Maintenance instructions carefully

9. Warranty.

WDM guarantees its Self-Priming Pumps for a period of 12 months from the date of delivery, against defects in material and workmanship, as indicated in its general conditions of sale.

Failure to follow the suggestions and recommendations in this manual, as well as improper product use or handling will completely invalidate the warranty.

The warranty excludes wear and tear, misuse, repair, or replacement of the defective part by the user or unskilled personnel without specific permission of WDM Pumps.

Operation Manual.



Notes:

Self-Priming Pumps.



Notes:



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