AGREEMENT FOR MAINTENANCE OF STORM WATER DETENTION SYSTEM

This agreement is made on March 11, 2025, by 1575 E Hamlin Road, LLC, a Michigan limited liability company, whose address is 4015 4th Street, Detroit, MI 48201, ***("Owner")*** and the CITY OF ROCHESTER HILLS (the City), whose address is 1000 Rochester Hills Drive, Rochester Hills, MI 48309.

RECITALS:

WHEREAS, 1575 E Hamlin Road, LLC owns and occupies the property described in attached **Exhibit A**; and

WHEREAS, 1575 E Hamlin Road, LLC has proposed, and the City has approved, a storm water drainage and detention system (the system) for the property as described and depicted in the attached **Exhibit B**; and

WHEREAS, the parties will benefit from the proper use and maintenance of the System and desire to enter into this agreement to provide for the same.

THEREFORE, the parties agree:

1. **Use of the System:** Components of the System, including any and all water conveyance, detention and water quality treatment facilities and devices, storm sewer pipe, catch basins, manholes, and swales, shall be used solely for the purpose of detaining storm and surface water on the property until such time as: (i) The City may determine and advise 1575 E Hamlin Road , LLC, or 1575 E Hamlin Road, LLC successors, grantees or assigns, in writing that it is no longer necessary to use the detention system to detain storm or surface water; and (ii) An adequate alternative for draining storm and surface water has been provided which is acceptable to the City and which includes the granting of such easements to the City or third parties for the alternative drainage system as may be necessary.

2. **Maintenance:**

A. 1575 E Hamlin Road,LLC shall be responsible for the proper maintenance, repair and replacement of the System and any part thereof as detailed in the Maintenance Plan attached as **Exhibit C**.

B. Proper maintenance of the System shall include, but not limited to: (i) Removing accumulated sediment, trash and debris from the detention system and at inlet pipes; (ii) Maintaining storm sewer and structures; (iii) Controlling the effects of erosion; (iv) Inspection and cleaning of the water quality treatment device; (v) Inspection of inlet and outlet pipes for structural integrity; (vi) Inspection and cleaning of the storm sewer and catch basins upstream from the detention system; and (vii) Any other maintenance that is reasonable and necessary to facilitate and continue the proper operation and use of the System.

3. **Action by City:** In the event 1575 E Hamlin Road, LLC or 1575 E Hamlin Road, LLC successors, grantees, or assigns, neglects or fails at any time to properly maintain the System or any part thereof, the City may notify 1575 E Hamlin Road, LLC or 1575 E Hamlin Road, LLC successors, grantees or assigns, in writing, and the notice shall include a listing and description of maintenance deficiencies and a demand that they must be corrected within thirty (30) days. The notice shall further specify the date and place for a hearing to be held at least fourteen (14) days after the date of the notice before the City Council, or such other board or official to whom the City Council may delegate responsibility. At the hearing, the City Council (or other board or official) may endorse or modify the listing and description of deficiencies to be corrected and, for good cause, may extend the time within which the deficiencies must be corrected.

Thereafter, if the maintenance deficiencies are not corrected within the time allowed, the City may undertake and make the necessary corrections, and may maintain the System for a period not to exceed one (1) year. Such maintenance of the System by the City shall not be deemed a taking of the property, nor shall the City's actions be deemed to vest in the public any right to use the property. If the City determines maintenance of the system by the City should continue beyond one year, the City shall hold, and provide advance written notice of, a further hearing at which 1575 E Hamlin Road, LLC or 1575 E Hamlin Road, LLC successors, grantees or assigns, will not or cannot properly maintain the System, the City may continue to maintain the System for another year, and subject to a similar hearing and determination, in subsequent years.

In the event the City determines an emergency condition caused by or relating to the System threatens the public health, safety or general welfare, the City shall have the right to immediately and without notice enter the property and undertake appropriate corrective action.

4. **Charges:** The City shall charge to the current owner of the property the cost of maintenance or other corrective action undertaken by the City in accordance with this agreement, plus a ten percent (10%) administrative fee. If not timely paid, the City may assess the charges on the City□s tax roll, which charges shall be a lien on the real property and shall be collectable and enforceable in the same manner general property taxes are collected and enforced.

5. **Notice:** Any notices required under this agreement shall be sent by certified mail to the address for each party set forth below, or to such other addresses as such party may notify the other parties in writing:

To 1575 E Hamlin Road, LLC: 4015 4th Street
Detroit, MI 48201

To the City: Clerk
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

6. **Successors and Assigns:** This agreement shall bind and inure to the benefit of the parties and their respective successors, grantees and assigns. The rights, obligations and responsibilities hereunder shall run with the land and shall bind all current and future owners of the property.

7. **Recording of Agreement:** This agreement shall be recorded at the Oakland County Register of Deeds.

1575 E Hamlin Road, LLC

By: _____

Print or type name: Stephen Osborne

Title: Owner

CITY OF ROCHESTER HILLS

By: _____
Bryan K. Barnett, Mayor

STATE OF ~~MICHIGAN~~ IL
COUNTY OF ~~OAKLAND~~ Mchenry

This agreement was acknowledged before me on March 11th, 2025,

by Stephen Osborne, who is the Owner

of 1575 E Hamlin Road, LLC a Michigan limited liability company,

on behalf of the company.

OFFICIAL SEAL
KRISHNA PATEL
Notary Public - State of Illinois
My Commission Expires 3/30/2027

_____, notary public
My commission expires: 03/30/2027 County, ~~Michigan~~ Mchenry, IL

STATE OF MICHIGAN
COUNTY OF OAKLAND

This agreement was acknowledged before me on _____, 2025,

by Bryan K. Barnett, Mayor, of the City of Rochester Hills, on behalf of the City.

Drafted By:
Jessica Sutter, PE
Fenn & Associates, Inc.
14933 Commercial Drive
Shelby Twp., MI 48315

_____, notary public
_____ County, Michigan
My commission expires:

When Recorded Return to:
Clerks Dept.
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

Revised 121621

T. Dan Christ
Approved 3/19/25

EXHIBIT A
PARCEL DESCRIIPTION

T3N, R11E, SEC 24 PART OF SE 1/4 BEG AT PT DIST N 89°34'00" E 200 FT FROM S 1/4 COR, TH N 00°47'50" W 368.69 FT, TH N 89°34'00" E 273.55 FT, TH S 00°47'50" E 368.69 FT, TH S 89°34'00" W 273.55 FT TO BEG
2.32 A B359D

Approved
SB
City of Rochester Hills
03/25/2025

Fenn & Associates, Inc. Land Surveying and Civil Engineering
14933 Commercial Drive, Shelby Township, MI 48315
Phone: 586-254-9577 Fax: 586-254-9020 www.fennsurveying.com

ADDRESS: 1575 E. HAMLIN RD.
PART OF THE SE 1/4 OF SECTION 24, T3N, R11E, ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

PID: 15-24-401-006

CLIENT: CDK DEVELOPMENT

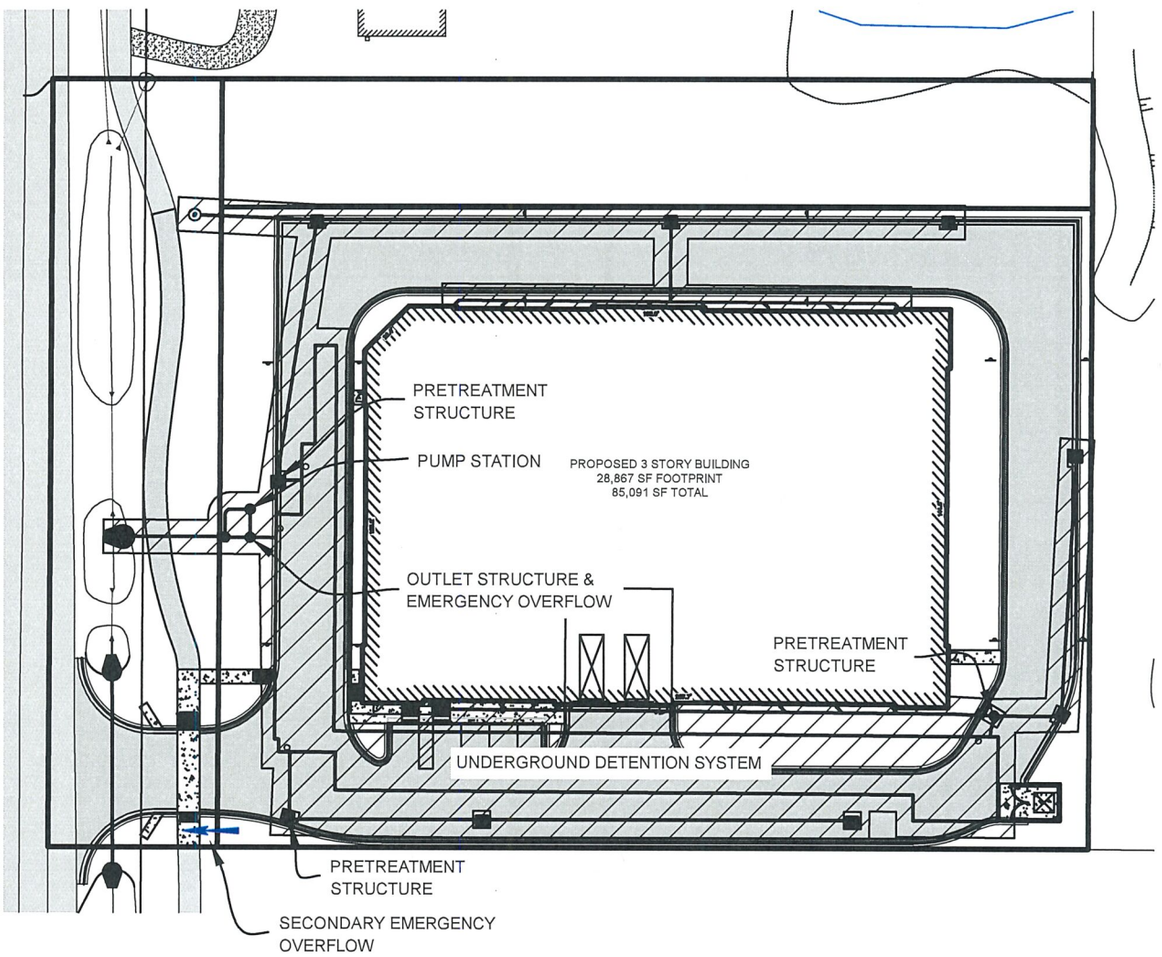
DATE 07/22/24
DRAWN JJS, PE
CHECK JSR, PE
SCALE N/A
SHEET SIZE 8.5 X 14

JOB NO. C22-049.10X

SHEET 1 OF 1

EXHIBIT B

STORMWATER SYSTEM DESCRIPTION & MAP



THE STORMWATER MANAGEMENT SYSTEM INCLUDES WITHOUT LIMITATION THE STORM SEWER PIPES, ROOF LEADS, SWALES, MANHOLES, CATCH BASINS, STORM WATER INLETS, PUMP STATION, OUTLET STRUCTURE, EMERGENCY OVERFLOWS, UNDERGROUND DETENTION SYSTEM, PRETREATMENT STRUCTURES, AND CLOSED CONDUITS AND WATERCOURSES THAT CONVEY FLOW FROM THE DETENTION SYSTEM TO THE EXISTING DITCH.

SCALE: 1" = 60'

0 30' 60' 120'

Approved ARS 041725

REVISED 4/2/25

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SHEET 1 OF 1

EXHIBIT C

TO AGREEMENT FOR STORM WATER SYSTEM MAINTENANCE

Operations Stormwater Drainage and Maintenance Plan

1575 E. Hamlin Road
Rochester Hills, MI

This long term maintenance operations and maintenance plan (O&M) shall use BMP's (Best Management Practices) to ensure that the stormwater management system performs and functions as designed. The stormwater management system is an effective way to enhance the water quality of the stormwater by effectively removing the sediment and pollutants from stormwater runoff. This will help ensure that we save our environment and help protect the valuable land and water resources. This O&M will outline the ownership/facility, underground detention system location, inspection and maintenance checklists, manufacturers O&M manuals. It will also outline the components of:

- System Inspections
- Removal of trash and litter debris from the site, including roadways/parking lot areas, service/dumpster areas and landscape beds
- Removal of dirt and sediment in swales, catch basins, water quality units, pump stations, overflow structures, restricted outlets, underground detention systems and sewer pipes
- Grass mowing and vegetated area maintenance

Ownership/Facility Manager Contact Information

1575 E Hamlin Road, LLC
Attention: Steve Osborn
4015 4th Street
Detroit, MI 48201

Stormwater Site Plan

The Developer has proposed as shown in "Exhibit B" of the Stormwater Maintenance Agreement plan, a details drawing showing the location of the storm water drainage and detention system comprised of underground storm water detention, water quality treatment devices, storm water pipe, catch basins, manholes, end sections, inlets, swales, pump station, restricted outlet and overflow structure, roof leads, and rip rap (the "System") for the Property as described and depicted in the Storm Water System Plan attached as "Exhibit B". Stormwater runoff is collected in the parking lot and yard catch basins and water is conveyed by a system of underground pipes to the storm water quality units. The storm water quality units provide treatment to the water by removing sediment,

pollutants, and floating debris. Regular maintenance of the system will help assure adequate performance. The structures and sewers shall also be observed during large rain events to ensure proper operation of the system.

Stormwater System Inspections and Maintenance – Structures

Attached is "Exhibit C" is an inspection and maintenance plan outline for stormwater management structures. The outline of the schedule will give the frequency and descriptions of areas to inspect and maintain in order to ensure the system is functioning as designed. This maintenance checklist shall be performed by personnel that is responsible for the maintenance of the system and may need to be certified for the entry of a confined space. The inspection shall be recorded and maintained by the owner for a minimum of ten (10) years and copies shall be provided to the City of Rochester Hills Engineering Department.

Trash and Litter

The inspection for trash and litter on the property shall be a regular routine. Proper disposal of items shall meet all State and Federal regulations. Parking lot sweeping shall also be performed to help provide a more overall attractive appearance to the outside of the building. Parking lot curb gutters shall also be maintained and kept free of dirt and sediment. A periodic inspection of landscape beds for debris shall be performed as needed. Plants, shrubs and trees shall also be inspected for healthy growth.

Stormwater System Management Maintenance - Underground Detention

Attached is the operation and maintenance manual for the underground stormwater system. This gives an introduction, operation, and maintenance of the overall system. Refer to the manual for overview of the maintenance requirements of the different components to the stormwater system. An inspection and maintenance plan is attached for areas to inspect, inspection timeline schedule, and corrective actions if needed.

Stormwater Pre-Treatment Devices (Contech Cascade Seperators)

Refer to the attached manufacturer's maintenance manual for all inspection and maintenance requirements for the pre-treatment structure. A record of inspections and maintenance shall be kept for a minimum of ten (10) years.

JL ARS
4/17/25

EXHIBIT C
INSPECTION AND MAINTENANCE PLAN

LONG-TERM MAINTENANCE PLAN AND SCHEDULE
TABLE 1 IDENTIFIES THE MAINTENANCE ACTIVITIES TO BE PERFORMED, ORGANIZED BY CATEGORY (MONITORING/INSPECTIONS, PREVENTATIVE MAINTENANCE, AND REMEDIAL ACTIONS). TABLE 1 ALSO IDENTIFIES SITE-SPECIFIC WORK NEEDED TO ENSURE THAT THE STORM WATER MANAGEMENT SYSTEM FUNCTIONS PROPERLY AS DESIGNED. THE FOLLOWING LIST SUPPLEMENTS TABLE 1 AND PROVIDES MORE INFORMATION ABOUT SITE SPECIFIC ACTIVITIES:

TABLE 1 STORM WATER MANAGEMENT SYSTEM LONG-TERM MAINTENANCE SCHEDULE

MAINTENANCE PLAN & SCHEDULE						
	SYSTEM COMPONENTS					
	STORM PRE-TREATMENT SYSTEM	CATCH BASIN SUMPS & PIPES	OUTLET CONTROL STRUCTURES AND PIPES	UNDERGROUND DETENTION SYSTEM	PAVEMENT AREAS	FREQUENCY
MONITORING / INSPECTION						
INSPECT FOR SEDIMENTATION ACCUMULATION	X	X	X	X	X	ANNUALLY
INSPECT FOR EROSION AND INTEGRITY OF THE SYSTEM	X	X	X	X	X	ANNUALLY
INSPECTION OF FLOATABLES & DEBRIS	X	X	X	X		ANNUALLY
INSPECT STORM WATER SYSTEM COMPONENTS DURING WET WEATHER & COMPARE TO TO AS-BUILT PLANS	X	X	X	X		ANNUALLY
KEEP ACCESS FOR MAINT. CLEAR/OPEN	X	X	X	X	X	ANNUALLY
PREVENTATIVE MAINTENANCE						
REMOVAL OF SEDIMENTATION ACCUMULATION	X	X	X	X	X	AS-NEEDED
CLEANING OF FLOATABLES & DEBRIS	X	X	X	X		AS-NEEDED
SWEEPING PAVED SURFACE					X	AS NEEDED
REMEDIAL ACTIONS						
STRUCTURAL MAINTENANCE/REPAIRS	X	X	X	X	X	AS NEEDED
MAKE ADJUSTMENTS OR REPLACEMENTS AS DETERMINED BY ANNUAL WET WEATHER INSPECTIONS	X	X	X	X		AS NEEDED
REPAIR/STABILIZE AREA OF EROSION		X			X	AS NEEDED

REVISED 4/2/25

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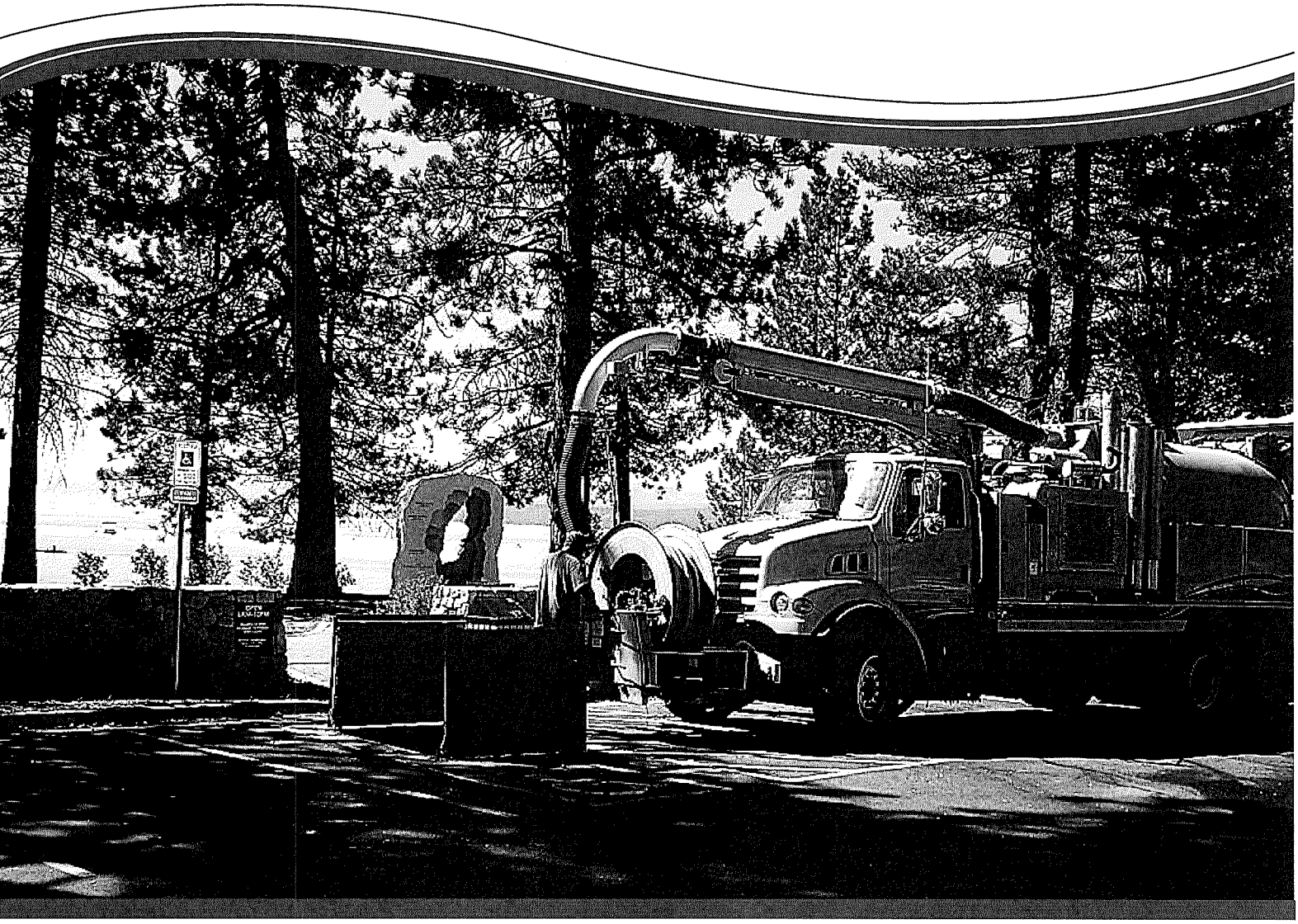
SHEET 1 OF 1

CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator® Inspection and Maintenance Guide



CASCADE
separator®

Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

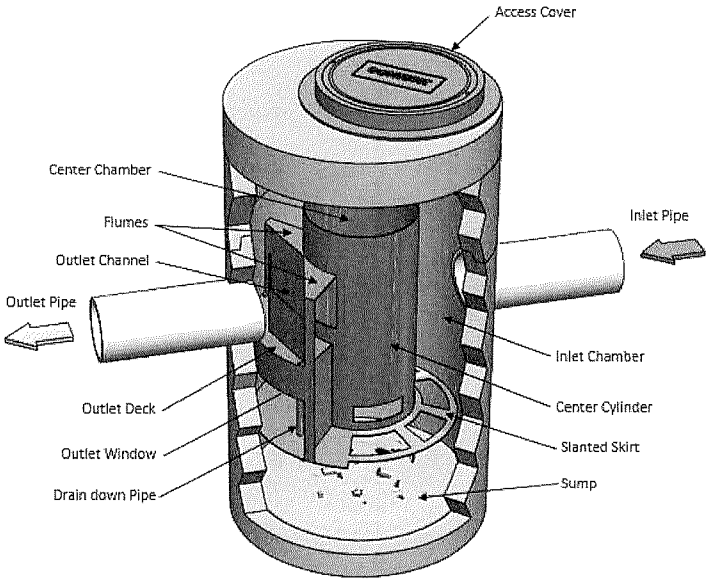
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.

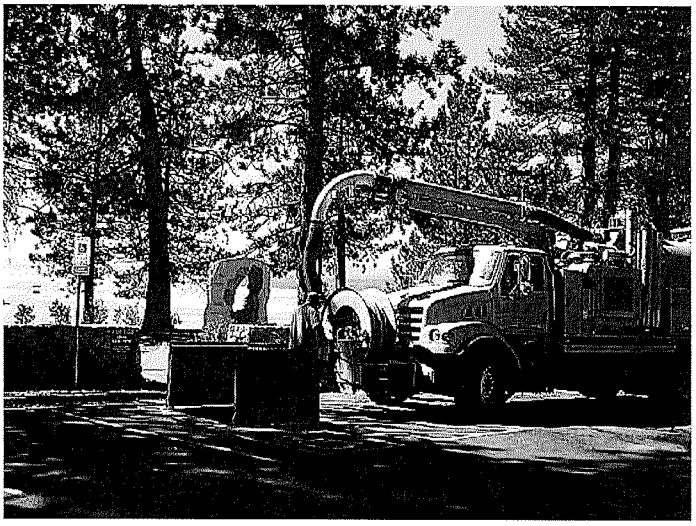


Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

CONTECH ENGINEERED SOLUTIONS
800-925-5240
www.ContechES.com

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

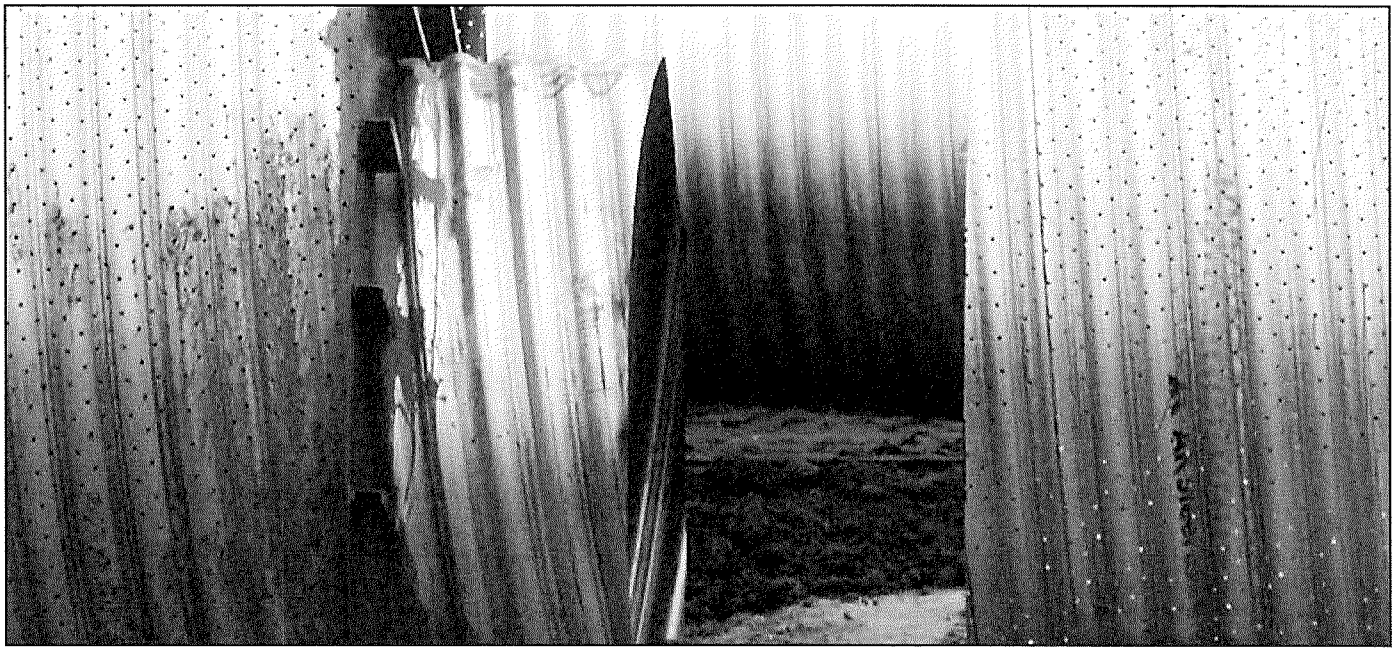
Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



CMP MAINTENANCE GUIDE 10/19 PDF

CONTECH®
CMP DETENTION SYSTEMS

CONTECH®
ENGINEERED SOLUTIONS

7 Maintenance

EN

7.1 Precautions

Before starting work, make sure that the safety instructions have been read and understood.

DANGER: Crush Hazard

Moving parts can entangle or crush. Always disconnect and lock out power before servicing to prevent unexpected startup. Failure to do so could result in death or serious injury.

WARNING: Crush Hazard

Make sure that the unit cannot roll or fall over and injure people or damage property.

WARNING: Biological Hazard

Infection risk. Rinse the unit thoroughly with clean water before working on it.

WARNING: Electrical Hazard

Risk of electrical shock or burn. A certified electrician must supervise all electrical work. Comply with all local codes and regulations.

WARNING: Electrical Hazard

There is a risk of electrical shock or explosion if the electrical connections are not correctly carried out, or if there is fault or damage on the product. Visually inspect equipment for damaged cables, cracked casings or other signs of damage. Make sure that electrical connections have been correctly made.

CAUTION: Electrical Hazard

Prevent cables from becoming sharply bent or damaged.

Make sure that you follow these requirements:

- Check the explosion risk before you weld or use electrical hand tools.
- Before starting work, make sure that the work area is well-ventilated.
- Do not open any vent or drain valves or remove any plugs while the system is pressurized. Make sure that the pump is isolated from the system and that pressure is relieved before you disassemble the pump, remove plugs, or disconnect piping.

Precautions for handling permanent magnet synchronous motors

WARNING: Magnetic Hazard

Magnetic fields can damage cardiac pacemaker and other medical implants. Stay clear of the permanent-magnet rotor, when disassembled from the motor.

WARNING: Electrical Hazard

The permanent-magnet motor generates voltage when the shaft rotates, even if power sources are disconnected. Never perform any electrical work if the shaft could rotate.

CAUTION: Crush Hazard

The rotor is a permanent magnet. Do not use tools which can be attracted to magnetic fields near the rotor, and do not allow the rotor to come near steel items.

Assembly and disassembly of permanent magnet synchronous motors must be performed by qualified personnel and according to relevant instructions.

Ground continuity verification

A ground (earth) continuity test must always be performed after service.

7.2 Inspect the work area before permit-required hot work

WARNING: Explosion/Fire Hazard

Before starting any permit-required hot work such as welding, gas cutting, grinding, or using electrical handtools, do the following: 1. Check the explosion risk. 2. Provide sufficient ventilation.

7.3 Requirements for maintenance

Stage	Requirement
Before reassembly	• All components must cool off • All parts, particularly O-ring grooves, must be thoroughly cleaned • All O-rings, gaskets, and seal washers must be changed • All springs, screws, and O-rings must be lubricated with grease
At reassembly	Existing index markings must be in line.
Before operation	• The reassembled drive unit must be insulation-tested • The reassembled product must always be test-run

7.4 Torque values

All screws and nuts must be lubricated to achieve correct tightening torque. Screws that are screwed into stainless steel must have the threads coated with applicable lubricants to prevent seizing.

If there is a question regarding the tightening torques, then contact a sales or authorized service representative.

Screws and nuts

Table 3: Stainless steel, A2 and A4, torque Nm (lbf·ft)

Property class	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30
50	1.0 (0.74)	2.0 (1.5)	3.0 (2.2)	8.0 (5.9)	15 (11)	27 (20)	65 (48)	127 (93.7)	220 (162)	434 (320)
70, 80	2.7 (2)	5.4 (4)	9.0 (6.6)	22 (16)	44 (32)	76 (56)	187 (138)	364 (268)	629 (464)	1240 (915)
100	4.1 (3)	8.1 (6)	14 (10)	34 (25)	66 (49)	115 (84.8)	248 (183)	481 (355)	—	—

Table 4: Steel, torque Nm (lbf·ft)

Property class	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30
8.8	2.9 (2.1)	5.7 (4.2)	9.8 (7.2)	24 (18)	47 (35)	81 (60)	194 (143)	385 (285)	665 (490)	1310 (966.2)
10.9	4.0 (2.9)	8.1 (6)	14 (10)	33 (24)	65 (48)	114 (84)	277 (204)	541 (399)	935 (689)	1840 (1357)
12.9	4.9 (3.6)	9.7 (7.2)	17 (13)	40 (30)	79 (58)	136 (100)	333 (245)	649 (480)	1120 (825.1)	2210 (1630)

Table 5: Brass, torque Nm (lbf·ft)

M5	M8	M10
2.7 (2.0)	11 (8.1)	22 (16.2)

Hexagon screws with countersunk heads

For hexagon socket head screws with countersunk head, maximum torque for all property classes must be 80% of the values for property class 8.8.

Round nuts with set screws

Table 6: Set screw, torque Nm (lbf·ft)

The torque values are only valid for the set screw, and not for the round nut.

M8	M10
18 (13)	35 (26)

7.5 Maintenance intervals

Type of maintenance	Purpose	Inspection interval
Initial inspection	A Xylem-authorized personnel checks the pump condition. From the results, the personnel recommends the intervals for the periodical inspection and overhaul for the installation.	Within the first year of operation.
Periodical inspection	The inspection prevents operational interruptions and machine breakdowns. The measures to increase performance and pump efficiency are decided for each application.	Up to 12,000 hours or three years, whichever comes first.
Overhaul	The overhaul lengthens the operating lifetime of the product. It includes the replacement of key components and the measures that are taken during an inspection.	Up to 24,000 hours or six years, whichever comes first.

NOTICE:

Shorter intervals may be required when the operating conditions are extreme, for example with very abrasive or corrosive applications or when the liquid temperatures exceed 40°C (104°F).

7.5.1 Inspection

The list is valid for initial inspection and periodical inspection.

Service item	Action
Cable	1. If the outer jacket is damaged, then replace the cable. 2. Check that the cables do not have any sharp bends and are not pinched.
Electrical connections	Check that the connections are properly secured.
Electrical cabinets	Check that they are clean and dry.
Impeller	1. Check the clearance. 2. If necessary, adjust.
Stator housing	Drain any liquid. For more information, see *Drain the liquid from the stator housing* on page 42.
Level regulators	Check the condition and functionality.
Lifting device	Check that the local safety regulations are followed.
Lifting handle	1. Check the screws. 2. Check the condition of the lifting handle and the chain. 3. If necessary, replace.
Oil	If necessary, fill with new oil. For more information, see *Change the oil* on page 43.
O-rings	1. Replace the O-rings of the oil plugs. 2. Replace the O-ring of the inspection plug. 3. Lubricate the new O-rings.
Overload protection and other protections	Check the correct settings.
Personnel safety devices	Check the guard rails, covers, and other protections.
Thermal contacts, for Ex-approved versions	Normally closed circuit; interval 0–1 ohm.
Voltage and amperage	Check the running values.
Corrosion	Check for corrosion and paint damages. If necessary, touch up. If applicable, install zinc anodes.
Zinc anodes	If applicable, replace the zinc anodes. Anodes are replaced when the anode mass is reduced to a selected fraction of its initial mass. The recommended interval for the selection fraction is 0.25–0.50 (25–50%).

7.5.2 Overhaul

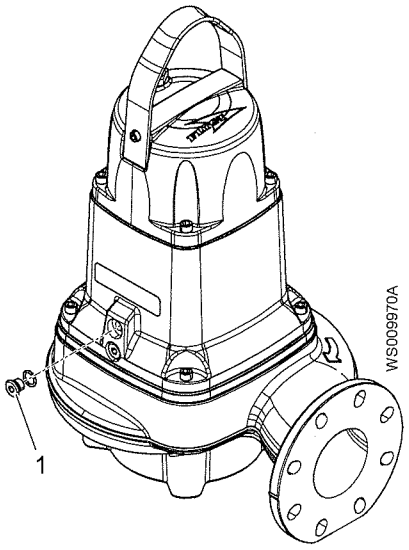
The basic repair kit includes O-rings, seals, and bearings.

For an overhaul, do the following in addition to the tasks listed under Inspection.

Service item	Action
Support and main bearing	Replace the bearings with new bearings.
Mechanical seal	Replace with new seal units.

7.6 Drain the liquid from the stator housing

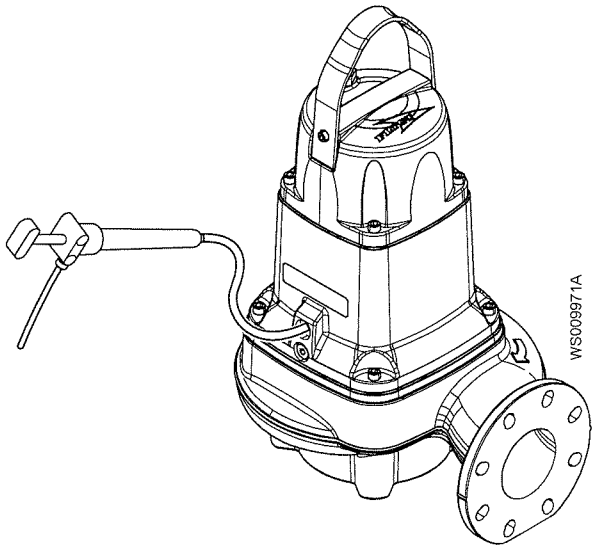
EN



Item	Label	Description
1	INSP	Inspection plug for inspection and drainage

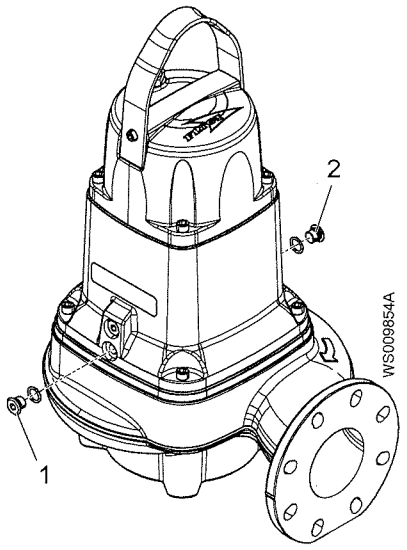
Figure 18: Inspection plug

1. Remove the inspection plug.
2. Pump out the liquid.



3. Replace the O-ring and install the inspection plug.
   Tightening torque: 22 Nm (16 lbf·ft)

7.7 Change the oil



Item	Label	Description
1	OIL OUT	Oil plug for the oil drainage
2	OIL IN	Oil plug for the oil refill

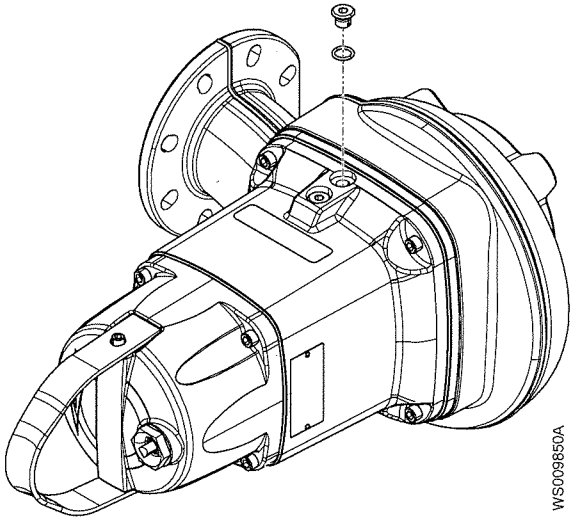
Figure 19: Oil plugs

Empty the oil

CAUTION: Compressed Gas Hazard

Air inside the chamber may cause parts or liquid to be propelled with force. Be careful when opening. Allow the chamber to de-pressurize before removal of the plug.

1. Put the pump in a horizontal position so that OIL OUT faces upwards and unscrew the oil plug.



2. Put a container under the pump and turn the pump.
   Remove the oil plug, OIL IN, to simplify the process.

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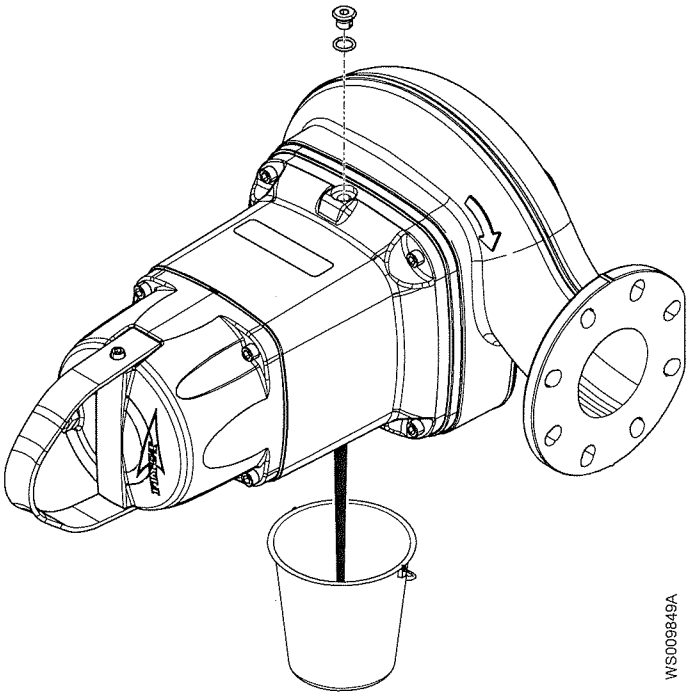
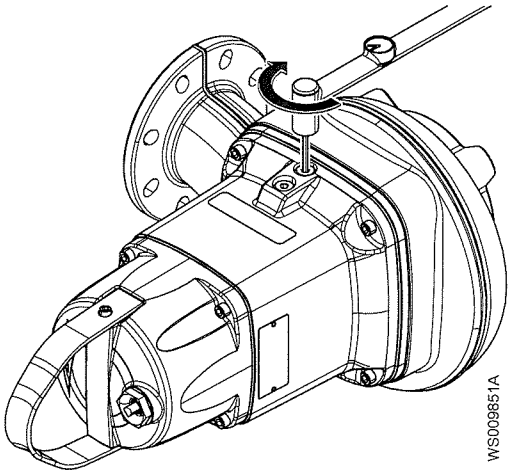


Fill with oil

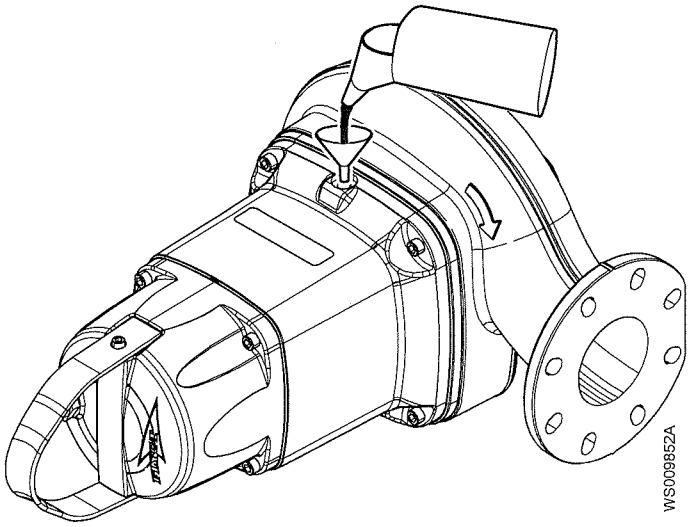
The oil must be a medical white oil of paraffin type that fulfills FDA Sec. 172.878 (a) requirements. The viscosity must be close to VG32. These oil types are applicable:

- Statoil MedicWay
- BP Enerpar M 004
- Shell Ondina 927
- Shell Ondina X430

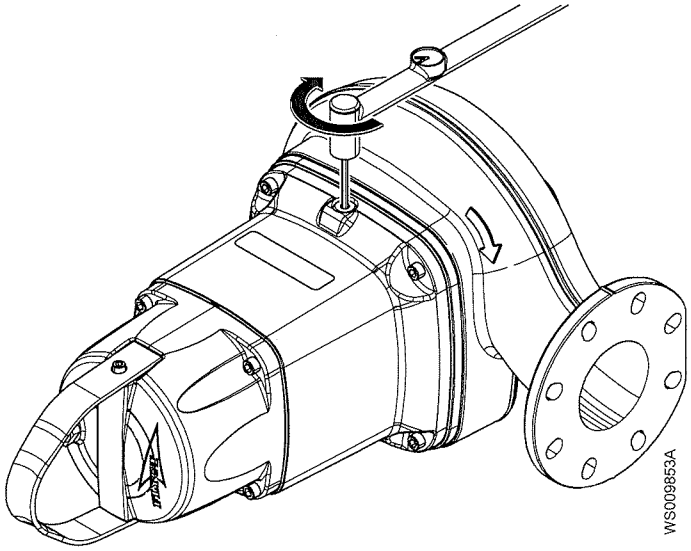
1. Replace the O-rings of the oil plugs.
2. Turn the pump so that OIL OUT faces upwards.
3. Refit and tighten the oil plug, OIL OUT.
   Tightening torque: 22 Nm (16 lbf·ft)



4. Turn the pump so that OIL IN faces upwards.
5. Fill with oil.
   Quantity: 1.0 L (1.1 quarts)



6. Refit and tighten the oil plug, OIL IN.
   Tightening torque: 22 Nm (16 lbf·ft)



7.8 Replace the impeller: P, S, T, Z installations

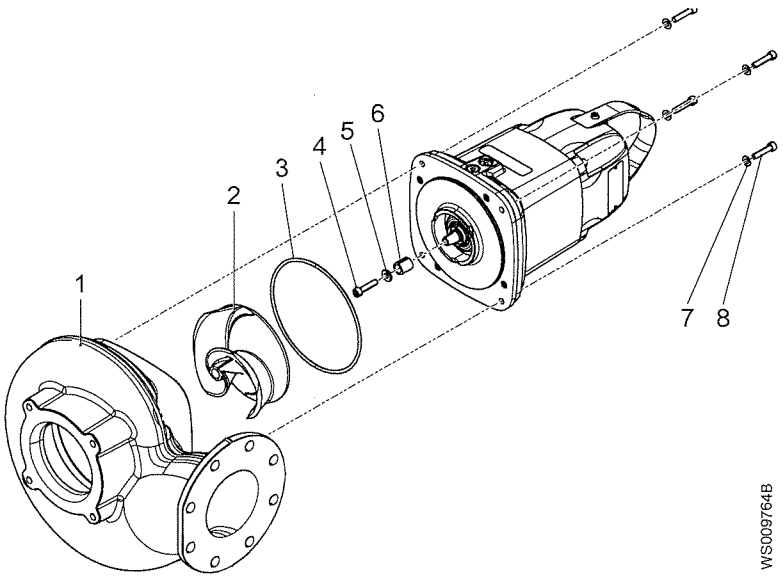
CAUTION: Cutting Hazard

Worn parts can have sharp edges. Wear protective clothing.

NOTICE:

When laying the pump on its side, do not allow the weight of the pump to rest on any portion of the impeller. The impeller must not be allowed to make contact with the concrete floor or other hard and rough surfaces.

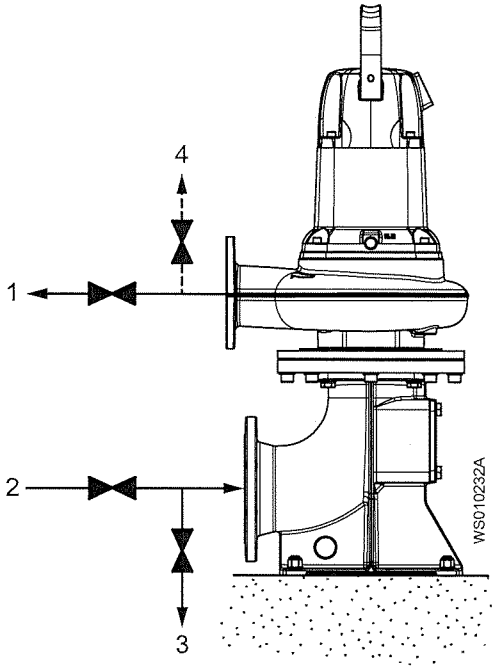
EN



1. Pump housing
2. Impeller
3. O-ring
4. Impeller screw
5. Washer
6. Clamping sleeve
7. Washers
   Washers are not used for all configurations.
8. Screws

7.8.1 Remove the pump from the installation: T, Z installations

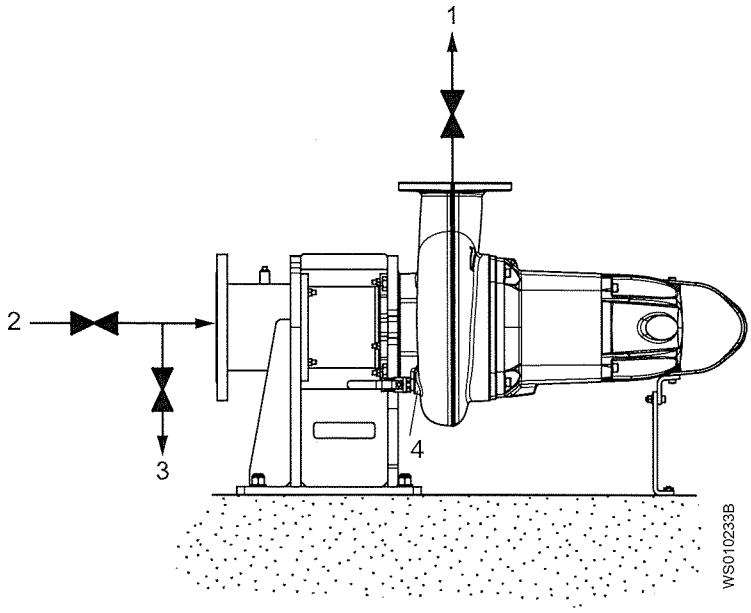
The pump must be removed from the installation before the impeller is replaced.



1. Discharge line
2. Suction line
3. Line to drain
4. Air vent

Figure 20: T installation

EN



1. Discharge line
2. Suction line
3. Line to drain
4. Drainage plug

Figure 21: Z installation

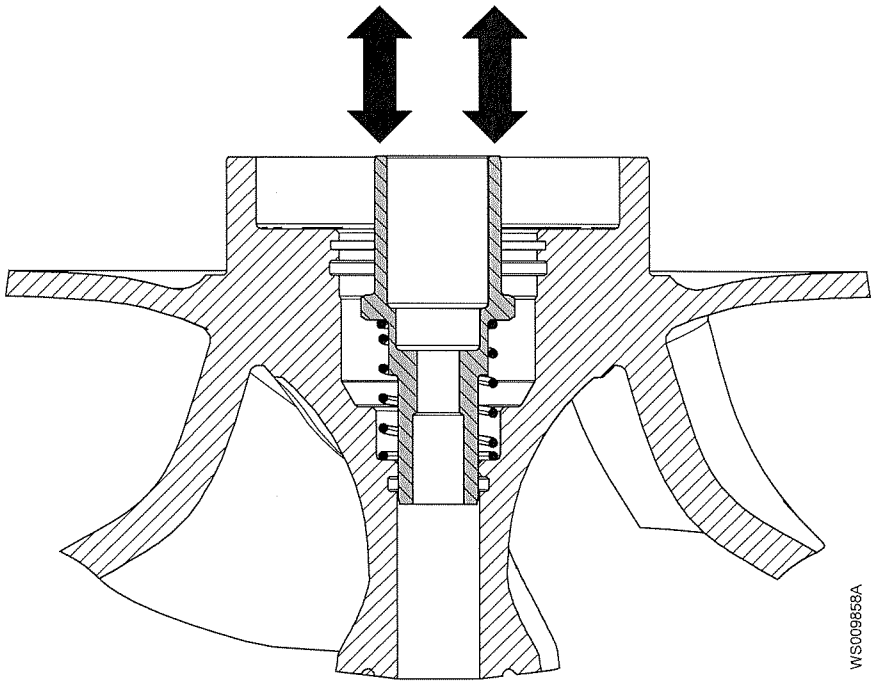
1. Close the suction and discharge valves.
2. Drain the pump.
3. Remove the pump from the installation.

7.8.2 Remove the impeller

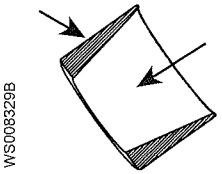
1. Put the pump in a horizontal position on the workbench.
2. Loosen the impeller screw until the impeller is free from the clamping sleeve.
   Prevent the impeller from rotating. Insert a rod through the pump housing outlet.
3. Put the pump in an upright position on the workbench.
4. Remove the screws between the drive unit and the pump housing.
5. Lift and remove the drive unit. Put the drive unit in a horizontal position on the workbench.
6. Remove the impeller.
   The impeller rests in the insert ring.
7. Remove the O-ring.
8. Remove the impeller screw, the washer, and the sleeve.

7.8.3 Install the impeller

1. Before installation of the impeller, push the sleeve to check that it moves freely up and down.
   When the sleeve is released, it must be fully pushed out again. If the sleeve does not move freely, or does not come fully out, then replace the impeller unit.



2. Prepare the shaft:
   a) Check that the end of the shaft is clean and free from burrs.
      Polish off any flaws with a fine emery cloth.
   b) Coat the inner conic and the outer cylindrical surfaces of the sleeve with a thin layer of grease.



The correct lubrication is grease for bearings, for example, Exxon Mobil Unirex N3, Mobil Mobilith SHC 220 or the equivalent.

NOTICE:

Surplus grease can cause the impeller to become loose. Remove surplus grease from conical and/or cylindrical surfaces of shafts and/or sleeves.

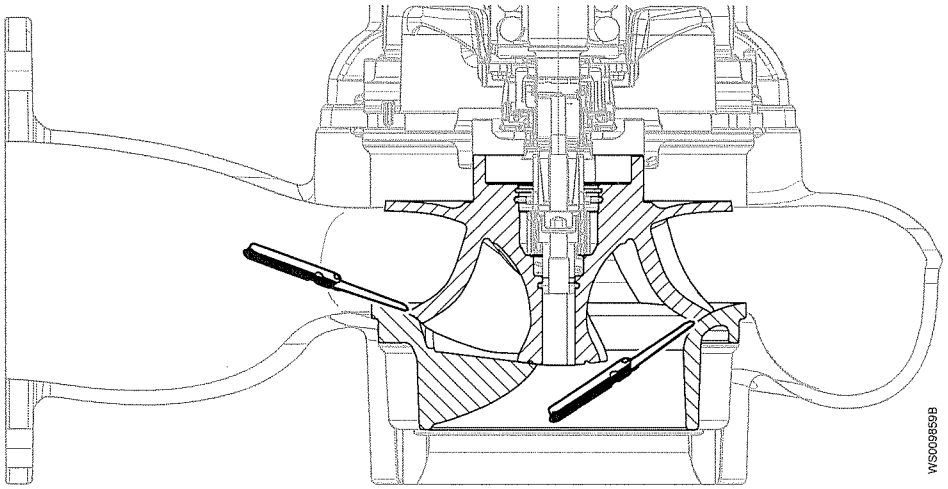
3. Lubricate the shaft and the impeller screw.
4. Install the clamping sleeve, washer, and impeller screw on the shaft. Do not tighten the screw.
5. Install the impeller on the shaft. Tighten the impeller screw by hand.
6. Put a new and lubricated O-ring on the motor assembly.
7. Put the pump housing in an upright position on the workbench.
8. Install the drive unit.
   a) Suspend the drive unit in the lifting handle.
   b) Lower the drive unit until it sits on top of the pump housing.
      Make sure that the motor cable gland is turned away from the pump outlet.
   c) Tighten the drive unit to the pump housing.
9. Suspend the pump in the lifting handle.
10. Adjust the impeller:

a) Put a rod through the outlet to lock the impeller in position.
b) Loosen the impeller screw until the impeller sits in the insert ring.
c) Tighten the impeller screw.
   Tightening torque: 44 Nm (33 lbf·ft)
d) Tighten the screw a further 1/8 turn (45°).
e) Check that the impeller can rotate freely.

EN

WARNING: Crush Hazard
Beware of the pinch point hazard between the rotating impeller and the guide pin.

f) Use an extended feeler gauge to make sure that the impeller clearance is 0.1–0.7 mm (0.004–0.028 in).



If the requirement is not fulfilled, then repeat the steps.

11. Install the pump.
    T installation: Bleed air through the air vent.

7.9 Replace the motor cable

Make sure that the electrical power has been disconnected and locked out. Make sure that any residual or transient voltage has discharged before proceeding.

1. Remove the motor cable from mains and the monitoring equipment.
2. Make sure that the new cable and the installation follow the requirements in *Electrical Installation* on page 24.

7.9.1 Remove the motor cable from the connection housing

1. Remove the connection housing. For more information, see *Remove the connection housing* on page 55.
   If only the motor cable is replaced, then do not drain the oil.
2. Loosen the cable entry.
3. Loosen the cable leads from the connection housing.
4. Loosen the terminals from the I/O unit.
5. If applicable, then loosen the ground (earth) pins and remove the lead-through unit.

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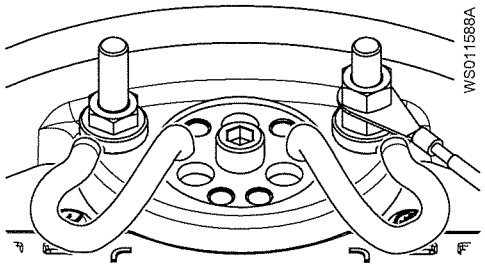


6. Remove the cable.

7.9.2 Install the motor cable in the connection housing

NOTICE:

Leakage into the electrical parts can cause damaged equipment or a blown fuse. Keep the end of the motor cable dry at all times.

At delivery from the factory, the motor cable is usually already connected to the pump.

NOTICE:

The control leads T3 and T4 must never be extended or broken up in sections. Spliced control leads can result in interference and signal loss.

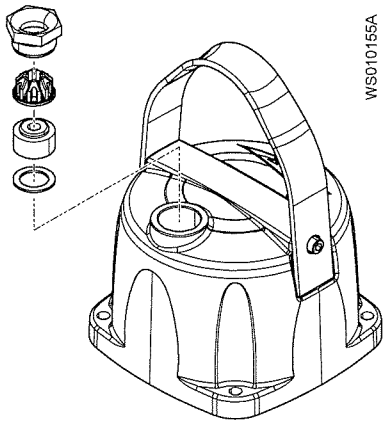


Figure 22: Iron

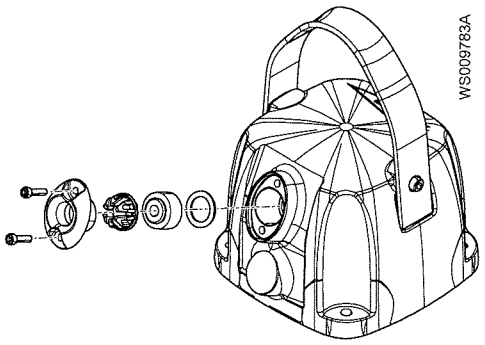
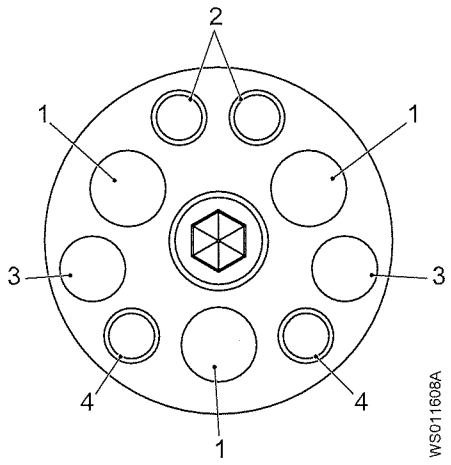


Figure 23: Aluminum

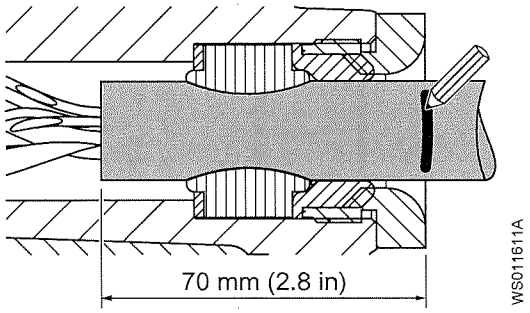
1. Loosen the cable entry.
2. Perform an insulation check.
   See *Perform an insulation check on the motor cable* on page 53.
3. If a lead-through unit is used, then make a marking 70 mm (2.8 in) in on the outer sheath of the cable. Use tape or a pen.
4. Pull the cable through the cable entry parts.
5. If the connection housing is of aluminum and a lead-through unit is used, then bundle up the free cable leads. Use electrical tape.
6. Pull the cable through the connection housing.
7. If a lead-through unit is used, then install it:
   a) Pull the cable leads through the threaded washer, the seal sleeve, and the second washer.



1. L1, L2, L3
2. T3, T4
3. Ground (earth) and screen
4. T1, T2

b) Pull the cable to the final position.

The marking must be aligned with the entrance of the cable entry.



c) Assemble and fasten the cable entry.

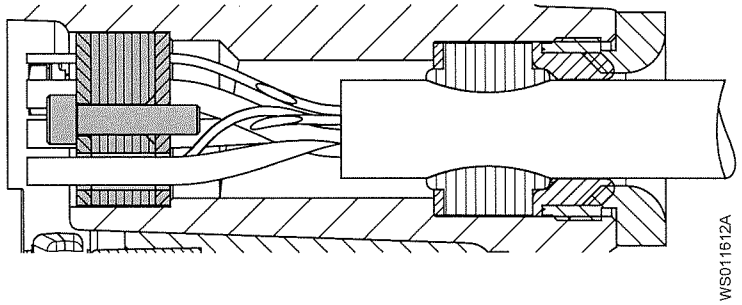
Make sure that the gland screw bottoms out when fastened.

d) Stretch the cable leads and push the lead-through unit in position in the connection housing.

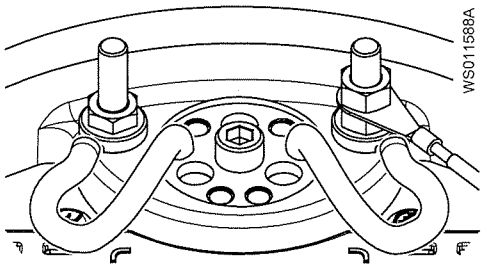
e) Lubricate, install, and tighten the screw.

The correct lubrication is grease, for example, Kluber ALTEMP Q NB 50 or the equivalent. The lubrication of stainless steel screws prevents them from galling.

Tightening torque: 9 Nm (6.6 lbf·ft)

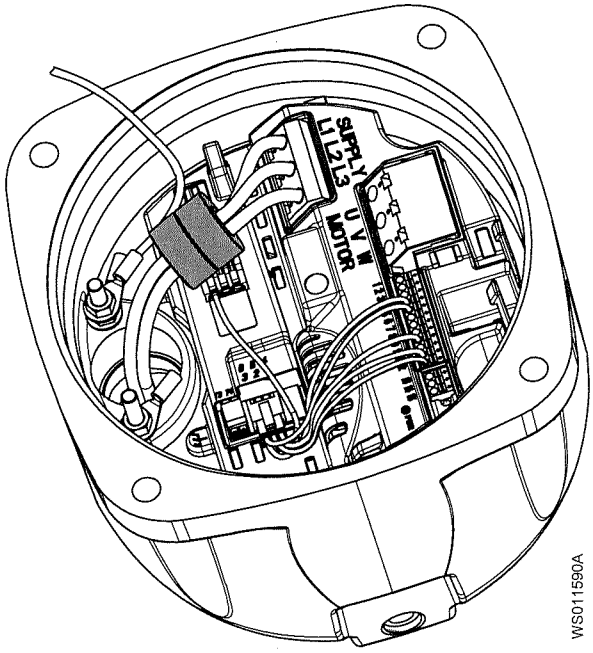


f) Connect the ground (earth) pins with the designated washers.



g) Twist the control leads in pairs, T1+T2 and T3+T4.

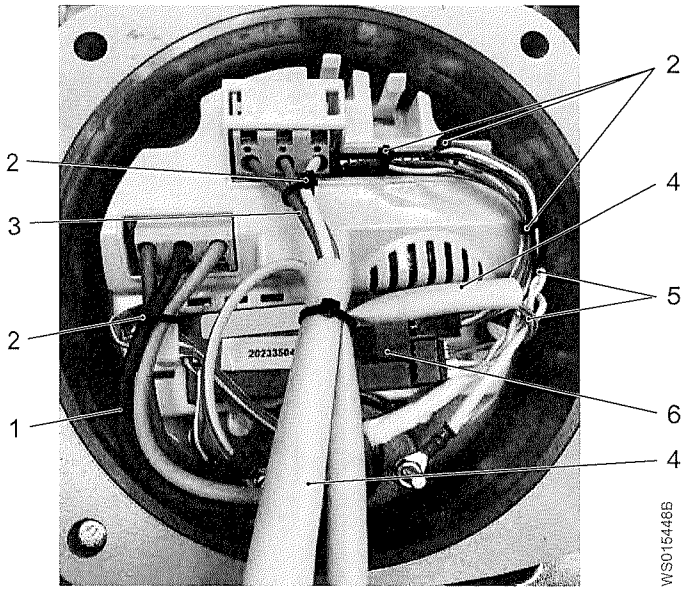
8. Install the toroid cores on the motor leads.



9. Connect the motor leads and the control leads.

   To decrease the risk for disturbance of the communication, separate the motor leads from the control leads. Use cable ties to secure the leads to the plastic lid.

   Tie the cable ties as close as possible to the terminals to prevent loose leads from getting in contact with the incorrect potential points. This applies to both the power leads and the control leads.



1. Motor leads
2. Cable ties
3. Stator leads
4. Isolating hose
5. Control leads
6. I/O unit

Make sure that the correct cable chart is used.

See *Cable charts* on page 31.

WARNING: Electrical Hazard

Risk of electrical shock. The ground (earth) lead must be sufficiently longer than the phase leads to make sure that the ground lead is the last to become disconnected if the cable is jerked loose.

10. Connect the uncovered screen of the motor cable to ground (earth).

    The impedance between the uncovered screen and the grounding point must be less than 5 milliohms.

    The uncovered screen can be attached to the mounting plate with clamps.

11. Assemble and fasten the cable entry.

    Make sure that the gland screw bottoms out when fastened.

If applicable, then install the connection housing. For more information, see *Install the connection housing* on page 56.

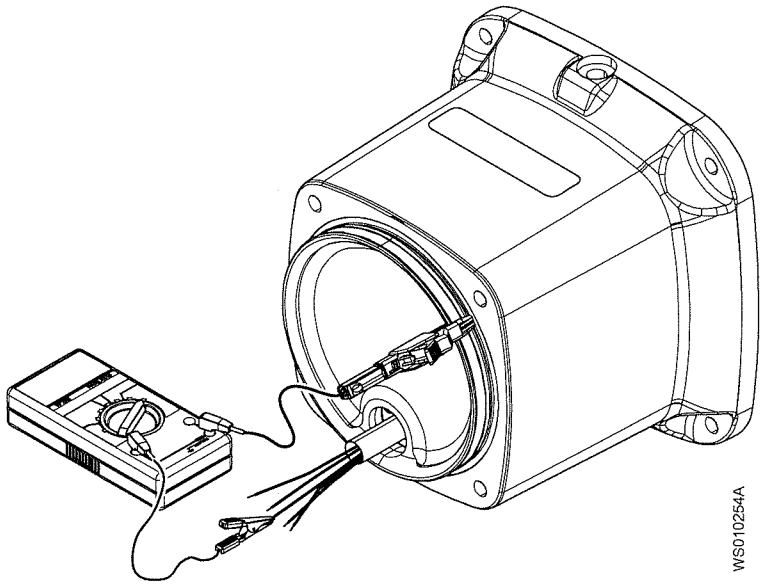
7.9.3 Perform an insulation check on the motor cable

Use an insulation and continuity tester maximum 1000 V.

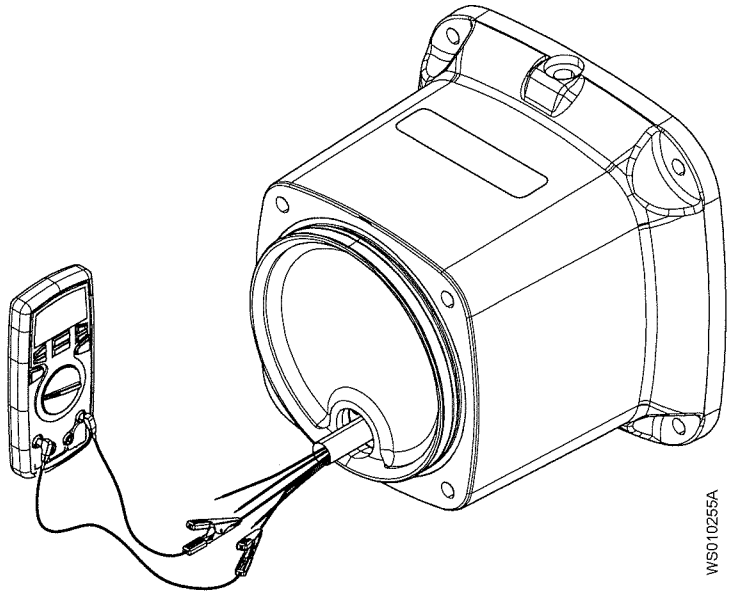
1. Make sure that the leads of the motor cable are disconnected and separated from each other in both ends.
2. Make sure that the resistance between the ground (earth) and phase lead is more than 5 megohms.
3. Conduct a phase-to-phase resistance check.

7.9.4 Test the stator

1. Make an insulation test between the grounded conductive parts and each phase lead. Make sure that the resistance is more than 5 megohms.



2. Measure that the winding resistance between all phase leads is approximately the same.

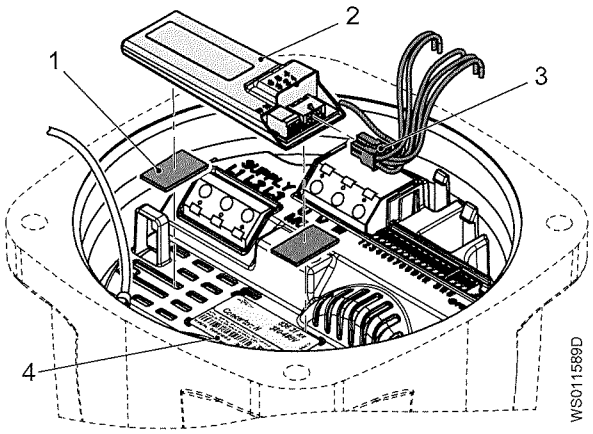


3. If needed, then replace the stator housing unit.

7.10 Replace the I/O unit and the cable unit

Remove the motor cable. For more information, see *Remove the motor cable from the connection housing* on page 49.

Generic illustration.



1. Double-sided tape
2. I/O unit
3. Cable unit
4. ICS serial number

1. Disconnect the cable unit from the I/O unit.
2. Disconnect and remove the cable unit.
3. Remove the I/O unit.

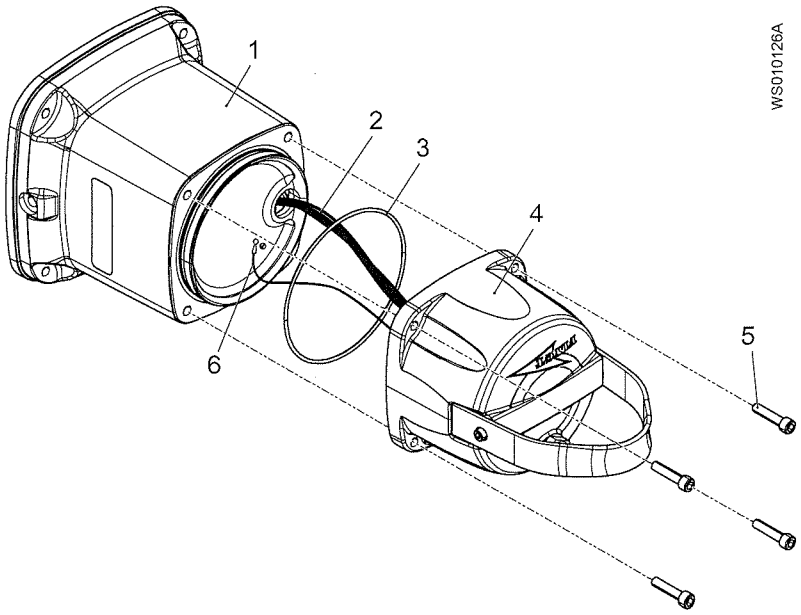
   Pry off the I/O unit, it is attached with double-sided tape.
4. Connect the new cable unit. For more information, see *Cable charts* on page 31.
5. Assemble the new I/O unit and the cable unit.
6. Attach the new I/O unit.

   Use double-sided tape.

   The double-sided tape must not cover the ICS serial number.

7.11 Remove the connection housing

Before the connection housing is removed, remove the impeller. See applicable steps in *Replace the impeller: P, S, T, Z installations* on page 45



1. Cooling jacket
2. Stator leads and leads for the leakage sensor
3. O-ring
4. Connection housing

5. Screws
6. Grounding cable

1. Make sure that the electrical power has been disconnected and locked out.
2. Make sure that any residual or transient voltage has discharged before proceeding.
   See *Time to zero energy state* on page 25.
3. Remove the screws between the connection housing and the cooling jacket.
4. Loosen the connection housing from the cooling jacket.

NOTICE:

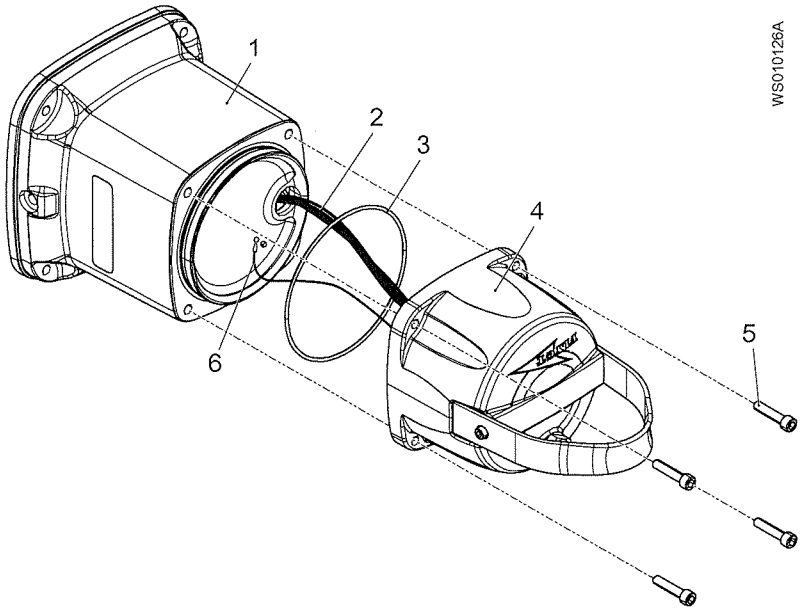
The parts are still connected through electrical leads.

5. Disconnect the stator leads and the leads for the leakage sensor from the connection housing.
6. Disconnect the motor cable leads and the control leads from the ICS.
7. Disconnect the grounding cable from the cooling jacket.
8. Remove the O-ring.

If necessary, then replace the motor cable. See *Replace the motor cable* on page 49.

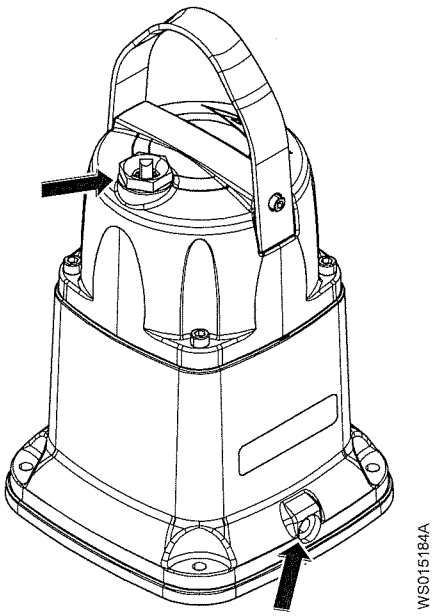
7.12 Install the connection housing

Make sure that the motor cable is in good condition and correctly installed. See *Electrical Installation* on page 24. If necessary, then replace the motor cable or perform an insulation check. See the applicable steps in *Replace the motor cable* on page 49.



1. Cooling jacket
2. Stator leads and leads for the leakage sensor
3. O-ring
4. Connection housing
5. Screws
6. Grounding cable

1. Put the connection housing on the workbench near the motor assembly.
   The motor cable must be in a 90 degrees angle from the oil plugs.



2. Put a new and lubricated O-ring on the cooling jacket.
3. Connect the grounding cable to the cooling jacket.
4. Connect the motor cable leads and the stator leads.
5. Connect all other leads according to the cable chart and markings on the terminals.
   See *Cable charts* on page 31.
6. Put the connection housing on to the motor assembly.
   Make sure that the leads are not pinched.
7. Tighten the screws to the correct torque value.

Install the impeller. See applicable steps in *Replace the impeller: P, S, T, Z installations* on page 45.

KENNEDY INDUSTRIES
INNOVATE
SOLVE
MONITOR
REPAIR

PUMP STATION MAINTENANCE REPORT

TECH 1: _____
TECH 2: _____
OSS/ISS: _____
DATE: _____
TIME: _____
SO#:

OWNER: _____
ADDRESS: _____
STATION: _____
CONTACT: _____
PHONE: _____
FULL INSPECTION ☐ ELECTRICAL CHECKS ☐

STATION INFORMATION:

NOTES:

ELECTRICAL CHECK POINTS

LEVEL CONTROLS N/A CLEANED & INSPECTED N/A ALARM @ INDICATOR LIGHTS N/A
TELEMETRY SENSAPHONE TELEMETRY CHECK N/A PHASE THREE PHASE
VFD PHASE CONVERSION N/A IN LINE STARTER N/A

VOLTS:
PUMP#1: L1L2_____ L2L3_____ L1L3_____ MEG CHECK_____ FLS CHECKED ☐
PUMP#2: L1L2_____ L2L3_____ L1L3_____ MEG CHECK_____ FLS CHECKED ☐
PUMP#3: L1L2_____ L2L3_____ L1L3_____ MEG CHECK_____ FLS CHECKED ☐
PUMP#4: L1L2_____ L2L3_____ L1L3_____ MEG CHECK_____ FLS CHECKED ☐

AMP: FLA _____ IF MEG CHECK > 20 COMPLETE OHM CHECK
PUMP#1: L1 _____ L2_____ L3_____ OHM CHECK _____
PUMP#2 L1_____ L2_____ L3_____ OHM CHECK_____
PUMP#3: L1 L2_____ L3_____ OHM CHECK_____
PUMP#4: L1_____ L2 _____ L3_____ OHM CHECK _____

NOTES:

HOURS	CURRENT	LAST	CHANGE
PUMP#1			
PUMP#2			
PUMP#3			
PUMP#4			

WET WELL CONDITION N/A DRY WELL SUMP PUMP OPERATION N/A

NOTES:

PUMP STATION
MAINTENANCE REPORT

MECHANICAL CHECK POINTS: ☐ ELECTRICAL CHECK ONLY, NO MECHANICAL CHECK POINTS NEEDED

LIFTING CHAIN ☐ PUMP HANDLE N/A DRAIN PUMP SEAL OIL N/A
PRESSURE CHECK SEAL CHAMBER N/A
STATOR FILLED N/A IF STATOR FILLED USE UNIVOLT
CHECK IMPELLER CLC N/A TYPE RADIAL
GRINDER N/A SPEC ☐ ADJUST TO OEM SPEC YES ☐ NO ☐
STARTING CLC ☐ FINISH CLC _____
IMPELLER CONDITION _____ WEAR RING ☐ OR WEAR PLATE ☐
WEAR RING CONDITION _____ PUMP CABLE CONDITION _____
IMPELLER BOLT ☐

MECHANICAL NOTES:

WERE SUPPLIES USED?:	YES ☐	NO ☐
WERE PARTS USED?:	YES ☐	NO ☐
CHECKED & UPDATED BOM?	YES ☐	NO ☐
WERE PICTURES TAKEN?	YES ☐	NO ☐
STATION LEFT IN AUTO ☐		

QTY	PART #	SUPPLIES/PARTS USED FROM STOCK/PURCHASED:	SOURCE:	COST: (IF PURCHASED)

AMOUNT OF NEW COOLANT SUPPLIED: _____ AMOUNT OF OLD COOLANT DISPOSED: _____

AMOUNT OF NEW OIL SUPPLIED: _____ AMOUNT OF OLD OIL DISPOSED: _____