



**Application Note 51645**  
**(Revision -, 1/2023)**  
Original Instructions

## **Re-greasing Procedure for GSxE Rotary Control Valve**



### General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



### Revisions

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### Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.



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Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

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## Warnings and Notices

### Important Definitions



This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER** - Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
- **WARNING** - Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
- **CAUTION** - Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
- **NOTICE** - Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT** - Designates an operating tip or maintenance suggestion.

#### **WARNING**

**Overspeed /  
Overtemperature /  
Overpressure**

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

#### **WARNING**

**Personal Protective  
Equipment**

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

#### **WARNING**

**Start-up**

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

## Electrostatic Discharge Awareness

### NOTICE

#### Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual **82715**, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
  - Do not touch any part of the PCB except the edges.
  - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
  - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. After removing the old PCB from the control cabinet, immediately place it in the antistatic protective bag.

### IMPORTANT

External wiring connections for reverse-acting controls are identical to those for direct-acting controls.

### Regulatory Compliance

These products are subject to safety regulatory certifications. See product manuals 26689 and 35017 for additional details. The service center performing the work on the products must not alter the construction such that the certifications are invalidated.

In particular, O-rings on the LERA gearbox are part of ingress protection for Zone 2 protection.

### ⚠ WARNING

#### Explosion Hazard

Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

Substitution of components may impair suitability for Class I, Division 2 or Zone 2 applications.

## Re-greasing Procedure for GSxE Rotary Control Valve

The only maintenance required for the GSxE Rotary Control Valve is:

- Lubricate the actuator gears and bearings and inspect the overboard vent drain every 12 months, in accordance with the descriptions below.
- The valve must be overhauled every 3 years.

No field maintenance or repair is possible.



Lift or handle the valve only by using the lifting eyes.



Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the GSxE Rotary Control Valve.



The surface of this product can become hot or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.



Do not disassemble the GSxE Rotary Control Valve due to dangerous forces contained in the springs. All disassembly shall be performed only by Woodward or an Authorized Service Center.

### NOTICE

Use only Woodward-approved grease to lubricate the gear train and bearings in this actuator. Use of any other grease will reduce performance and reliability and will void the product warranty. Woodward lubrication kits are available as part number 8923-3303.

### NOTICE

DO NOT adjust the hydraulic damper setting from the factory-optimized level. Adjustment by unqualified operators may damage the valve and actuator components, affecting valve performance.

## GSxE Lubrication Procedure

### Lubricating the Gear Box Assembly



#### CAUTION

To prevent injury, wear protective gloves and safety glasses in accordance with the MSDS for the specific lubricant.

1. Clean the outside of the actuator to ensure that no debris gets inside the actuator during the lubrication process. Any debris in the bearings will reduce actuator life.
2. Remove each of the 6 grease port plugs (remove only one at a time all the way through this procedure and repeat for the remaining plugs until all 6 are done) with a 3/16 inch hex wrench (Figure 4-1).
3. Set the plug aside and keep clean, ensuring that the inside plug surface is not scratched or marred.
4. Attach the thread connector of the grease syringe to the threaded bearing grease port. The fitting should be fully seated (Figure 4-1).
5. Inject the entire Woodward-approved grease kit 8923-3303 into each of the six bearing grease ports.
6. Remove the grease syringe from the bearing port and install the bearing port plug. Torque to (4.3 to 4.7) N·m / (38 to 42) lb-in.

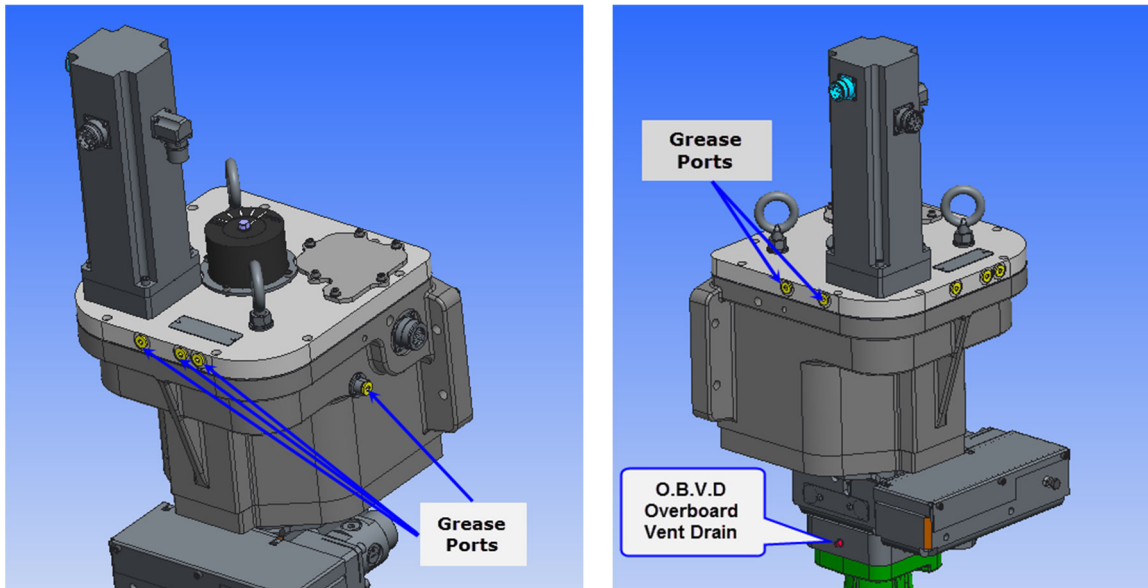


Figure 4-1. Grease Ports



#### WARNING

To prevent possible serious personal injury or damage to equipment, be sure all electric power and gas pressure have been removed from the valve and actuator before beginning any maintenance.

**MATERIAL SAFETY DATA SHEET****1. Product and Company Identification**

Material name	UNIFLOR 8951
Version #	08
Revision date	January-29-2013
CAS #	Mixture
Product Code	UNIFLOR 8951
Product use	Lubricating Grease
Manufacturer information	Nye Lubricants, Inc. 12 Howland Road Fairhaven, MA 02719 US 508-996-6721 CHEMTREC 1-800-424-9300

**2. Hazards Identification**

Emergency overview	Thermal decomposition will generate hydrogen fluoride, which is corrosive and can cause burns on contact with skin and other tissue. Inhalation of fumes generated during thermal decomposition may cause polymer fume fever. Prolonged and/or repeated skin contact may result in mild irritation or redness. Contact with eyes may cause irritation. Health injuries are not known or expected under normal use.
OSHA regulatory status	This product is considered not hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Skin contact. Eye contact.
Eyes	Contact with eyes may cause irritation.
Skin	Prolonged and/or repeated skin contact may result in mild irritation or redness.
Inhalation	Health injuries are not known or expected under normal use.
Ingestion	Health injuries are not known or expected under normal use.
Target organs	Eyes, Skin.

**3. Composition / Information on Ingredients**

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

**4. First Aid Measures**

First aid procedures	
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.
Skin contact	Wash off with soap and water. Get medical attention if symptoms occur. Wash clothing separately before reuse.
Inhalation	If symptoms develop, remove affected person from source of exposure into fresh air. Get immediate medical attention.
Ingestion	If ingestion of a large amount does occur, seek medical attention. Do not induce vomiting without medical advice. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth to a victim who is unconscious or is having convulsions.
General advice	If you feel unwell, seek medical advice (show the label where possible).

**5. Fire Fighting Measures**

Flammable properties	Not flammable by OSHA criteria. Not combustible by OSHA criteria.
Extinguishing media	
Suitable extinguishing media	Water Fog. Use methods for the surrounding fire. Product does not burn.
Unsuitable extinguishing media	Water. Do not use water jet as an extinguisher, as this will spread the fire.

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<b>Protection of firefighters</b>	
<b>Protective equipment and precautions for firefighters</b>	Wear suitable protective equipment.
<b>Fire fighting equipment/instructions</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Move containers from fire area if you can do it without risk. Move containers from fire area if you can do so without risk.
<b>Hazardous combustion products</b>	Hydrogen fluoride. Carbonyl fluoride.

## 6. Accidental Release Measures

<b>Personal precautions</b>	Keep unnecessary personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep people away from and upwind of spill/leak. Observe precautions from other sections.
<b>Environmental precautions</b>	Prevent further leakage or spillage if safe to do so. Prevent entry into waterways, sewers, basements or confined areas.
<b>Methods for containment</b>	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.
<b>Methods for cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Soak up with inert absorbent material. Absorb in vermiculite, dry sand or earth and place into containers. Clean contaminated surface thoroughly. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills in original containers for re-use. For waste disposal, see section 13 of the MSDS. Clean up spills immediately, observing precautions in Protective Equipment section. Sweep up and shovel into suitable containers for disposal.</p>

## 7. Handling and Storage

<b>Handling</b>	Do NOT pressurize, cut, heat, or weld containers. Empty product containers may contain product residue. Avoid prolonged or repeated skin contact with this material. Avoid breathing gas/vapors/mist/fumes. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Do not handle or store near an open flame, heat or other sources of ignition. Do not take internally. Do not taste or swallow. Avoid contact with eyes. Wash thoroughly after handling. Handle and open container with care.
<b>Storage</b>	Keep away from heat and sources of ignition. Store in cool place. Store in a closed container away from incompatible materials. Use care in handling/storage.

## 8. Exposure Controls / Personal Protection

<b>Engineering controls</b>	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
<b>Personal protective equipment</b>	
<b>Eye / face protection</b>	Wear safety glasses; chemical goggles (if splashing is possible).
<b>Skin protection</b>	Wear suitable protective clothing. Wear nitrile, neoprene, PVC or viton gloves.
<b>Respiratory protection</b>	No personal respiratory protective equipment normally required. An air purifying respirator with an organic vapor cartridge may be used under certain circumstances where airborne concentrations are expected to exceed exposure limits, or if irritation or symptoms are experienced. Respiratory protection must be provided in accordance with 29 CFR 1910.134.
<b>General hygiene considerations</b>	When using, do not eat, drink or smoke. Handle in accordance with good industrial hygiene and safety practice. Wash hands thoroughly after handling. Launder contaminated clothing before reuse.

## 9. Physical & Chemical Properties

<b>Appearance</b>	Not available.
<b>Form</b>	Liquid, Liquid
<b>Color</b>	White
<b>Odor</b>	Slight
<b>Flash point</b>	Not available.

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**Other data**

Kinematic viscosity	18 cSt
Shelf life	4 years

**10. Chemical Stability & Reactivity Information**

<b>Chemical stability</b>	Material is stable under normal conditions. Stable.
<b>Conditions to avoid</b>	Heat, flames and sparks. Avoid temperatures exceeding the flash point.
<b>Incompatible materials</b>	Strong acids, alkalies and oxidizing agents. Alkaline metals. Alkaline earth metals. Powdered metals. Halogenated compounds.
<b>Hazardous decomposition products</b>	Hydrogen fluoride. Carbonyl fluoride.

**11. Toxicological Information**

<b>Local effects</b>	Inhalation of decomposition products may cause polymer fume fever, a temporary flu-like illness accompanied by fever, chills, and sometimes cough. Refer to Hazards Identification Section for additional information.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA. This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC and NTP.
<b>Further information</b>	This product has no known adverse effect on human health.

**12. Ecological Information**

<b>Ecotoxicity</b>	This material is not expected to be harmful to aquatic life.
<b>Persistence and degradability</b>	Not available.

**13. Disposal Considerations**

<b>Disposal instructions</b>	Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose in accordance with all applicable regulations.
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal.

**14. Transport Information****DOT**

Not regulated as dangerous goods.

**15. Regulatory Information**

<b>US federal regulations</b>	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
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CERCLA/SARA Hazardous Substances - Not applicable.

**Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2))**

Not regulated

**DEA Essential Chemical Code Number**

Not regulated

**Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))**

Not regulated

**DEA Exempt Chemical Mixtures Code Number**

Not regulated

**CERCLA (Superfund) reportable quantity**

None

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**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
 Immediate Hazard - No  
 Delayed Hazard - No  
 Fire Hazard - No  
 Pressure Hazard - No  
 Reactivity Hazard - No

**Section 302 extremely hazardous substance**  
 No

**Section 311 hazardous chemical**  
 No

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

**State regulations**  
 This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

**16. Other Information**

**Further information**  
 HMIS® is a registered trade and service mark of the NPCA.

**HMIS® ratings**  
 Health: 0  
 Flammability: 0  
 Physical hazard: 0

**NFPA ratings**  
 Health: 3  
 Flammability: 0  
 Instability: 0

**Disclaimer**  
 The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release. Nye Lubricants, Inc. makes no warranty with respect thereto and disclaims all liability with respect thereon. The information in the sheet was written based on the best knowledge and experience currently available.

**Issue date**  
 January-29-2013

**This data sheet contains changes from the previous version in section(s):**  
 Product and Company Identification: Product and Company Identification

Material name: UNIFLOR 8951

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## Revision History

### Revision –

- New Application Note

We appreciate your comments about the content of our publications.

Send comments to: [industrial.support@woodward.com](mailto:industrial.support@woodward.com)

Please reference publication **51645**.



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