Brand of **NTN Group**

LUBRICATION

Experts & Tools, at the service of our customers

Because each customer's bearing maintenance and lubrication requirements are unique, Experts & Tools offers you solutions that take account of your application, the issues at stake and your available resources.

Each application requires its own specific expertise. Maintaining a wind turbine is different from maintaining a press or a crusher. With almost a century of theoretical and practical experience in industrial applications, NTN Europe can provide you with the expertise and tools you need.

With almost 25,000 employees worldwide, NTN Group develops and improves maintenance methods and tools daily.

Our aim is to provide you with products and services that are easy for your operators to use. In the design of our tools and in our approach to service, we aim to increase your efficiency.

From reducing the duration of your maintenance and servicing operations to optimising the longevity of your bearings, our offers bring you real benefits as well as safety and long service life.

This catalogue covers our entire range of greases, lubricators and centralised lubrication systems, including associated services. A specific catalogue is available for our maintenance tools.

LUB'SOLUTIONS, let us solve your lubrication problems.

Bearings, mechanical components and industrial processes require reliable, appropriate lubrication if they are to operate at optimum efficiency over the long term. In addition to its quality bearings, Experts & Tools also provides you with the expertise and products you need to control this fundamental part.

The LUB'SOLUTIONS product range includes lubricants specifically selected for the various applications, as well as all the resources needed to reliably distribute the right volume required by each mechanical component.

But above all, **LUB'SOLUTIONS has experts** on hand to help you implement solutions tailored to your environment. From advice on defining your needs to the implementation of lubrication systems for your application, including customised solutions, our technicians are on hand to solve your problems.

LUB'SOLUTIONS is the spirit of Experts & Tools. It's a desire that drives an organisation of experts who are available and determined to provide you with a personalised response to ensure that your bearings and machines operate in optimum conditions.

> "Experts & Tools, bring you a complete solution of tools and services for your bearings"

Experts & Tools

CONTENT

1 Lubricants

What the experts say

Only appropriate lubrication can guarantee the optimal operation of bearings and the related mechanical assembly.

55% of premature bearing failure is caused by inappropriate lubrication.

Inadequate lubrication will substantially shorten the service life of the bearing. Bearing lubrication is often neglected due to the difficulty of accessing bearings and the operator's lack of lubricant knowledge.

Selecting the right lubricant, the right lubrication method, the precise quantity required for the bearing and the frequency of monitoring the lubrication are all critical points.

1.1 Good lubrication: principles and benefits

- ✔ By interposing a film of lubricant (known as an oil film) between the rolling bodies and the raceway, it prevents wear and seizure of the elements in contact.
- ✔ It also protects parts from corrosion
- ✔ It provides a seal against liquids and external pollution, and evacuates impurities created by the movement of parts
- ✔ It reduces friction, and therefore limits the power consumed by the machine, thus saving energy
- ✔ In the case of oil circulation, it evacuates calories and thus contributes to the thermal balance of the machine.
- ✔ Bearing life is directly related to the efficiency of the oil film, which depends:
  - the nature of the lubricant and therefore its ability to withstand temperature, vibration, etc.
  - load and bearing speed.

General purpose greases do not always meet the specific requirements of certain applications. Bearings that must operate under conditions of load, speed, temperature, water, humidity or vibration require the use of a carefully selected grease.

1.2 Choosing the type of lubrication

	OIL LUBRICATION	GREASE LUBRICATION
BENEFITS	• Good bearing penetration • Good chemicopysical stability • Cooling • Easy lubricant control: condition and levels	• Clean mechanism • Easier to seal • Protective barrier • Simple assembly • Easy to handle • Reduction or elimination of top-up lubrication • Possibility of using pre-greased bearings
DISADVANTAGES	• Tightness required for assembly • In case of prolonged standstill, poor protection against oxidation and humidity • Delayed start-up when autonomous start-up prior to rotation is required	• Higher coefficient of friction than oil • Lower heat dissipation • Replacement (if necessary) requires the bearing to be dismantled and washed. • No possibility of checking grease levels, so need for reliable grease retention or periodic greasing to compensate for leaks, pollution or ageing.

1.3 Bearing grease

A grease is a product with a semi-fluid to solid consistency, obtained by dispersing a thickening agent (soap) in a lubricating liquid (mineral or synthetic oil).

Additives can be included to provide specific properties. The increasing use of grease-lubricated bearings, combined with the development of the concept of lifetime lubrication, means that the grease is an integral component of the bearing. The life of the bearing and its behaviour in various environments are largely determined by the properties of the grease used.

Chemicophysical characteristics

Consistency:

- NLGI (National Lubrication Grease Institute) grades correspond to a penetration value in the grease being worked (according to ASTM/D217 test specification).
- For bearings, the consistency generally used is grade 2.

NLGI GRADES	WORKED PENETRATION	CONSISTENCY
0 1	385 - 355 340 - 310	Semi-fluid Very soft
2 3	295 - 265 250 - 220	Soft Normal
4	205 - 175	Film

Base oil viscosity: generally defined in cSt (mm^2/s) at 40°C.

Density: around 0.9.

Drop point: temperature at which the first liquefied drop falls when a sample is heated.

Order of magnitude: 180°C/260°C depending on the grease constituents. The maximum temperature at which the grease can be used is always well below the dropping point.

Functional characteristics

The working conditions imposed on the lubricant (rolling, kneading) require special greases for bearings which cannot be selected solely based on their chemicophysical characteristics. The NTN Europe Research & Test Centre conducts continuous approval tests on bearings, enabling us to recommend the grease best suited to the application.

For over 50 years, NTN Europe has been conducting research in this field with the world's leading lubricant manufacturers. As a result, we have knowledge and practical experience of most lubricants applicable to bearings.

The homologation specifications cover the following basic criteria:

- Ball bearing endurance
- Roller bearing endurance
- Water resistance
- High and low temperature resistance
- Adhesion (centrifugation)
- Vibration resistance (false Brinell effect)
- High-speed performance

Other criteria can be added depending on the final results required by the customer. Selecting a type of grease will represent the best compromise based on the specifications for the application.

1.4 SNR lubricants offer

The choice of grease is based on knowledge of the operating conditions, which must be defined as precisely as possible: temperature, speed, load, environment, vibrations, constraints specific to the application. If you have any doubts or questions, select the grease to be used in liaison with your NTN Europe contact. The table on pages 12 & 13 supplies an initial orientation.

Universal Multi-purpose

Grease for general usage, in industry or for automobiles.
Standard applications: Agricultural equipment, washing machines, handling equipment, general mechanical devices, low-power electric motors, car wheel bearings, small tools, etc.
Benefits: Good properties in the presence of water, excellent protection against wear and corrosion.
Temperature range: from -25°C to +140°C

HEAVY DUTY High Load

Top quality grease for very high-pressure applications, suitable for many applications, intended for arduous applications in heavy industry: metallurgy, construction, transport, etc.
Standard applications: Conveyors, lifting devices, truck wheel hubs, high-power electric motors, water pumps, presses, etc.
Benefits: Excellent performance under heavy loads, including high speeds, good properties in the presence of water, excellent protection against wear and corrosion.
Temperature range: from -25°C to +140°C

VIB Vibrations & Shocks

This grease is an ideal lubricant for parts subjected to extensive vibrations or impact. Recommended for quarries, cement plants, public works and agricultural operations, high-load applications in humid environments, paper plants, boring, etc.
Standard applications: Shafts in scoops, crushers, grinders, vibrating scalpers, washing machines, industrial fans, etc.
Benefits: Excellent resistance to impact, vibrations and heavy loads, excellent resistance to water guaranteeing long-term lubrication.
Temperature range: from -20°C to +140°C

HIGH TEMP MP High temperature

This grease is the ideal solution for long-term lubrication at low and high temperatures up to +180°C
Standard applications: Electric motors, dryers, oven conveyors, generators, pumps, textile machines, paper converting machines..
Benefits: Extreme pressure polyurea multi-purpose grease that offers excellent protection against wear and corrosion. Quiet, it is perfect for the lubrication of electric motor bearings.
Temperature range: from -40°C to +180°C

FOOD AL Food Sure

Multi-purpose grease for the food and pharmaceutical industries. Complies with NSF-H1* recommendations*.

Standard applications: Straight, bevel and worm gearing, main bearings, pivots, articulations as well as for the lubrication of lifting, drive and transmission chains even at low temperatures.

Benefits: Wide range of service temperatures, good protection against corrosion, good resistance to washing with hot and cold water, and many disinfectant solutions and detergents.

Temperature range: from -25°C to +120°C * NSF: National Sanitation Foundation /H1: Occasional contact with food.

FOOD CHAIN OIL

Food-grade oil for chains designed for the food-processing and pharmaceutical industry. Complying with NSF-H1* recommendations.

Standard applications: Straight, bevel and worm gearing, main bearings, pivots, articulations as well as for the lubrication of lifting, drive and transmission chains even at low temperatures.

Benefits: Wide range of operating temperatures, remains very stable over time and resists oxidation, good protection against wear and corrosion as well as a resistance to seizing. Neutral in relation to sealants and paints.

Temperature range: -30°C to +120°C * NSF: National Sanitation Foundation/H1: occasional contact with food

CHAIN OIL

Synthetic oils for high-temperature chains.

Standard applications: Textile and plastic injection machines: in levelling equipment, stenter frames, multi-layer systems, festoon dryers, festoon steamers and coating units. For all types of stenter chains lubricated with oil (roller chains, clips with ball bearings, sliding with guide bar) and chain/ chain shaft articulations.

Benefits: Excellent lubrication, even with the presence of high temperatures and loads, excellent spreading properties, ensuring the rapid formation of a film of lubrication, excellent resistance to loads and wear, good adhesion therefore no spray, little formation of residue thanks to 100% synthetic components.

Temperature range: from -20°C to +250°C

* NSF: National Sanitation Foundation / H1: occasional contact with food.

ULTRA HIGH TEMP
Extreme High Temperature

This grease is for long-term lubrication for any type of bearing subjected to extreme temperatures. Registered H1: can be used in food-processing industries.

Standard applications: Textile drying machines, corrugated board production units, the plastic industry, rolling tail pipes, copy machines, furnace equipment, kiln cars, electric motors operating at extreme temperatures, etc.

Benefits: For very high service temperatures up to +260°C, good ability to absorb pressure, excellent resistance to aggressive agents, compatible with most plastics and seals.

Temperature range: from -30°C to +260°C

HIGH SPEED + Spindles

Low-temperature grease for very high speeds.

Standard applications: Textile machine spindles, spindles in power-operated tools running at high speeds (milling shafts, lathes, grinders, drills, etc.)

Benefits: Reduced running-in time for spindle bearings, excellent resistance to water (protects against the premature failure of bearings and reduces maintenance costs), reduced bearing temperature due to low friction torque (extended bearing service life), synthetic oil + low-viscosity ester ensuring a wide range of service temperatures and excellent cold temperature resistance.

Temperature range: from -45°C to +120°C


NTN
SNR

1.5 Technical characteristics of SNR lubricants

LUBRICANTS: DESIGNATION	UNIVERSAL	UNIVERSAL +	HEAVY DUTY	HEAVY DUTY +
NLGI consistency grade	2	2	2	2
Base oil	Mineral	Mineral	Mineral	Mineral
Thickener / type of soap	Lithium	Lithium / calcium	Lithium with EP additives	Lithium with EP additives
Colour	Amber	Light brown	Amber	Blonde
Base oil viscosity (cSt) - at 40°C	115	150	115	150
- at 100°C	11	11.5	11	15
Service temperature range (C°)	From -25 to +140	From -30 to +130	From -25 to +140	From -30 to +150
Drop point (°C) DIN ISO 2176	> 190	> 190	> 190	> 190
Suitable for medium loads P< C/5	+		++	
Suitable for high loads P > C/5	-		++	
Suitable for low speeds N.Dm < 100 000	+		+	
Suitable for high speeds N.Dm > 100 000	+		+	
Properties in humid environments, in the presence of water	++		++	
Suitable for low-amplitude oscillations	+		+	
Suitability for vibration when shutdown	-		-	
Adhesion	+		+	
Low torque	+		+	
Low noise levels	+		+	
Anti-corrosion protection	++		++	
Resistance to chemical agents	-		-	
Pumpability	++		++	
Sizes available	400 g cartridge 1 Kg can 5 Kg bucket 15 & 50 Kg drums	BOOSTER READY grease nipples DRIVE SMART	400 g cartridge 1 Kg can 5 Kg bucket 15, 50 & 190 Kg drums	BOOSTER READY grease nipples DRIVE SMART
Remarks	Previous name: MS		Previous name: EP	

N.Dm: rpm X average bearing diameter (mm)
++ = excellent performance
+ = good performance

- = not recommended
/ = not applicable

VIB	HIGH TEMP MP	FOOD AL / FOOD	FOOD CHAIN OIL	CHAIN OIL	ULTRA HIGH TEMP	HIGH SPEED +
2	2	2	/	/	2	2
Semi-synthetic	Synthetic	Paraffinic mineral / PAO	Ester + PAO	Ester + PAO	Perfluorinated polyether synthetics	Ester + SHC
Lithium / calcium	Polyurée	Complex aluminium	/	/	PTFE	Lithium / calcium
Blonde	Pale Yellow	Light yellow / Amber	Colourless	Pale green	White	Light brown
360	80	248 / 195	220	320 (*)	460	25
25	12	24 / 22	26	28 (*)	40	5,8
From -20 to +140	From -40 to +180	From -25 to +120 / -30 to +120	From -30 to +120	From -20 to +250	From -30 to +260	From -45 to +120
> 190	> 260	> 200 / > 220	**Pour point <-30**	**Pour point <25**	Not measurable (*)	> 180
+	+	+	/	/	++	+
++	+	+	/	/	++ (**)	-
++	+	+	/	/	++	-
-	+	+	/	/	+	++
++	++	+	/	/	+	++
++	++	+	/	/	++	+
-	-	-	/	/	-	++
++	++	+	/	/	++	+
-	+	+	/	/	-	++
-	++	-	/	/	-	++
+	+	+	/	/	+	++
-	-	-	/	/	++	-
++	++	++	/	/	++	++
400g cartridge 1 Kg can 50Kg drum BOOSTER grease gun	400 g cartridge 1 Kg can BOOSTER grease nipples	Food AL: 400 g cartridge 1 Kg tin Food: Grease nipples BOOSTER	READY BOOSTER READY DRIVE SMART	BOOSTER READY DRIVE SMART grease nipples	800 g cartridge	1 Kg can
Previous name: VX	Previous name: HIGH TEMP	Meets NSF requirements as an H1 product FOOD AL Halal certified	Meets NSF requirements as an H1 product	* Base oil viscosity at 20°C = 1200 cSt	* According to the standard DIN 2176, the dropping point of this grease cannot be decided, i.e., it does not melt ** If T°< 220°C. Meets NSF H1 requirements.	Beware • quantity • to keep grease

1.6 Choice of SNR grease depending on your applications

PREVAILING OPERATION	OPERATING LIMITS		EXAMPLES OF APPLICATIONS
	TEMPERATURE °C	SPEED	
General use	UNIVERSAL -25 to +140 UNIVERSAL + -30 to +130	< maximum bearing speed	**Industry and automobile:** Agricultural equipment, general mechanical devices, handling equipment, electrical tools, car wheel bearings, etc.
Highs loads	HEAVY DUTY -25 to +140 HEAVY DUTY + -30 to +150	< 2/ 3 maximum bearing speed	**Arduous applications in heavy industry:** Iron and steel, construction, transport, conveyors, lifting devices, high-power electric motors, water pumps, presses, truck wheel hubs, etc.
High temperature	From -40 to +180	< 2/ 3 maximum bearing speed	**Multi-purpose applications, high speeds, low/high temperatures** Automotive, steel, paper, bearings for electric motors, pumps, dryers, furnace conveyors, generators, and many other high temperature applications.
	From -30 to +260	< 2/ 3 maximum bearing speed	**Intensive applications at extreme temperatures** Corrugated board production, the plastic industry, textile drying machines, rolling tail pipes, copy machines. Electric motors operating at very high temperatures, furnace equipment, kiln cars, etc. Registered H1: can be used in food-processing industries.
Low temperature	Down to -45	< 2/ 3 maximum bearing speed	Aviation, special devices.
High speed	From -20 to +120	< 4/ 3 maximum bearing speed	Machine tool spindles, textile machine spindles, miniature electric motors.
Humidity	From -30 to +140	< 2/ 3 maximum bearing speed	Washing machines.
High amplitude vibrations or shocks **Centrifugation Rotating outer ring**	From -20 to +130	< 2/ 3 maximum bearing speed	For quarries, cement plants, public works and agricultural operations, high-load applications in humid environments, paper plants, drilling and boring. Shafts in scoops, crushers, grinders, vibrating scalpers, washing machines, industrial fans, etc
Food usage	From -25 to +120	< 2/ 3 maximum bearing speed	**Applications where accidental contact with food is technically possible:** Bottling machines, dairy equipment, industrial baking, pasta manufacturing, confectionery, slaughterhouses, etc.
Food Chain oil	From -30 to +120	/	**Applications in the food and pharmaceutical industry:** Straight, bevel and worm gearing, main bearings, pivots, articulations as well as for the lubrication of lifting, drive and transmission
Chain oil at high temperatures	From -25 to +250	/	**Applications in the textile and plastics industries with all types of oil-lubricated chains:** Levelling machines, stenter frames, multi-layer systems, festoon steamers, dryers, coating units.

STANDARD RECOMMENDATIONS	RECOMMENDATIONS Experts & Tools
Mineral oil. Traditional soap (lithium, calcium, etc.). Consistency generally grades 2 for large bearings or bearings with special operating characteristics. Performance decreases at continuous temperatures above 90°C.	**UNIVERSAL** or **UNIVERSAL +**
Like general purpose greases with extreme pressure additives.	**HEAVY DUTY** or **HEAVY DUTY +**
Multi-purpose synthetic polyurea grease for high speeds, low and high temperatures, containing no substances harmful to human health or the environment.	**HIGH TEMP MP**
Completely synthetic grease. The grease is not miscible with mineral and synthetic based products of different types. The proper operational efficiency of this product can only be achieved when the components to be lubricated are thoroughly clean and free from other grease. H1 registrations: occasional contact with food.	**ULTRA HIGH TEMP**
Very low viscosity base oil. Important: the grease becomes fluid if temperature >80°C.	**HIGH SPEED +**
Very low viscosity oil.	
Highly doped traditional grease with anti-corrosion additive.	**UNIVERSAL** or **HEAVY DUTY** (normal or +)
Grade 2 consistency grease with strong adhesion.	**VIB**
Meets NSF requirements as an H1 product. Halal-certified grease (FOOD AL) * NSF: National Sanitation Foundation / H1: Occasional contact with food.	**FOOD AL** or **FOOD**
Meets NSF requirements as an H1 product. *NSF: National Sanitation Foundation /H1: Occasional contact with food.	**FOOD CHAIN OIL**
Oil with good adhesion and good flow (spreading) properties.	**CHAIN OIL**

Miscibility of fats

As a rule, it is not advisable to mix two lubricating greases.

When mixing greases (e.g., changing the grease in a lubrication system), make sure that the two greases are miscible, i.e. that their base oils and thickeners are compatible.

OIL	MINERALS	PAO POLY ALPHA-OLEFIN	ESTER	PAG POLY GLYCOL	POLYPHENYL ETHER	SILICONE (METHYL)	SILICONE (PHENYL)	FLUORINATED
MINERALS	M							
PAO POLY ALPHA-OLEFIN	M	M						
ESTER	M	M	M					
PAG POLY GLYCOL	NM	NM	M	M				
POLYPHENYL ETHER	M	M	M	NM	M			
SILICONE (METHYL)	NM	NM	NM	NM	NM	M		
SILICONE (PHENYL)	M	M	M	NM	M	M	M	
FLUORINATED	NM	NM	NM	NM	NM	NM	NM	M

THICKENER	CALCIUM ANHYDROUS SOAP	CALCIUM COMPLEX SOAP	LITHIUM SOAP	COMPLEX LITHIUM SOAP	LITHIUM / CALCIUM SOAP	COMPLEX ALUMINIUM SOAP	BENTONE SILICA GEL	POLYUREA	FLUORINATED
CALCIUM ANHYDROUS SOAP	M								
CALCIUM COMPLEX SOAP	NM	M							
LITHIUM SOAP	M	NM	M						
COMPLEX LITHIUM SOAP	M	M	M	M					
LITHIUM / CALCIUM SOAP	M	NM	M	M	M				
COMPLEX ALUMINIUM SOAP	M	NM	NM	NM	NM	M			
BENTONE SILICA GEL	M	NM	NM	NM	NM	NM	M		
POLYUREA	M	M	M	M	NM	M	NM	M	
FLUORINATED	NM	NM	NM	NM	NM	NM	NM	NM	M

M = Miscible mixture - NM = Non-miscible mixture.

2 Lubrication systems

▶ Manual

Grease gun

For easy, one-handed lubrication.

Applications:

Agricultural equipment, washing machines, handling equipment, general mechanics, low-power electric motors, automotive wheel bearings, small tools, etc.

*Option

Benefits:

- **Practical**
  The pump can be used with one hand. Its knurled body makes it easy to grip.
  It can hold cartridges or bulk grease directly.
- **Robust**
  Designed for industrial use, it develops a maximum pressure of 345 bar. Its high-quality, impact-resistant steel guarantees long-lasting use.
- **Precise and clean application**
  A grease nozzle developed by NTN Europe can be screwed onto the grease gun. It allows the grease to be injected cleanly and precisely into the bearing. Reduced, controlled grease flow: 0.5 cm3 /stroke.

Product name:

LUB GREASE GUN SET
Cap (optional): LUB GREASE GUN/ACC SET

▶ Monopoint

Automatic lubricators ensure continuous, reliable, clean and extremely precise lubrication of your bearings:

- They provide the application with a constant, controlled supply of quality fat, 24 hours a day, 7 days a week.
  - Less friction = energy savings
- They make an active contribution to extending bearing life.
  - Improve the availability of industrial equipment
- They eliminate the risk of over- or under-greasing.
- They reduce the risk of contamination.
- They ensure correct lubrication with the right grease.
  - Reduce the number of premature failures
- They allow you to space out machine interventions.
  - -Reduce the risk of accidents, particularly in dangerous or hard-to-reach areas

What the experts think

Reduce your maintenance times and operating costs while improving safety for your personnel and machines. The automatic lubricator can be used to ensure the constant and regular lubrication of your bearings. The lubricator is easy to integrate into various applications (mechanical and automobile industries, steelworks, paper plants, etc.), and can be used to optimise lubrication without any need to modify your installations.

Combine the right grease and lubricant for each of your applications

	UNIVERSAL +	HEAVY DUTY +	VIB	HIGH TEMP MP	FOOD	FOOD CHAIN OIL	CHAIN OIL
DESCRIPTION							
	For general use,for industry	Extreme pressure quality, multi-service, for intensive applications	Parts subject to high levels of vibration or shock for heavy-duty applications in damp environments	Ideal for long-term lubrication at high temperatures up to +180°C	Multi-purpose for the food and pharmaceutical industries Complies with recommendations NSF-H1	Edible chain oil for the food and pharmaceutical industries. Follows NSF-H1 recommendations	Synthetic oil for high-temperature chains
APPLICATIONS							
	Agricultural equipment, handling equipment, general mechanics, low-power electric motors..	Heavy industries: steel, construction, transport, conveyors, lifting equipment, water pumps, etc.	Quarries, cement works, public works and wetlands: paper mills, drilling, crushers, vibrating screens, etc.	Textile machinery, processing paper, hot fan, dryers, heat pump, etc. water, electric motors..	Bottling, dairy, industrial pastry-making, pasta-making, confectionery, abattoirs..	Spur, bevel and worm gears, bearings, pivots, joints, as well as for lubricating lifting, drive and transport chains.at low temperatures	Textile and material processing machinery plastics: for all types of chain, oil-lubricated oars
TECHNICAL DATA							
Soap	Lithium Calcium	Lithium	Lithium Calcium	Polyurea	Aluminium complex	•	•
Oil	Mineral	Mineral	Semi-synthetic	Synthetic	Paraffinic mineral	Ester + PAO	Ester + PAO
Operating temperature	-30°C/+130°C	-30°C/+150°C	-20°C/+140°C	-40°C/+180°C	-30°C/+120°C	-30°C/ +120°C	-20°C/+250°C
Viscosity at 40°C	150 cSt	150 cSt	360 cSt	80 cSt	195 cSt	220 cSt	320 cSt
AVAILABLE OFFER							
READY Booster	•	•	•	•	•	•	•
SMART Booster	•	•	•	•	•	•	•
DRIVE Booster	•	•	•	•	•	•	•

READY BOOSTER

- 60 cm^3 and 125 cm^3
- Low-cost
- Robust
- Ergonomic: excellent grease level visibility
- Can be used in explosive areas

SMART BOOSTER

- + capacity: 125 cm^3
- Precise, ergonomic
- Adjustable discharge (in months) using an LCD
- Constant flow, regardless of ambient temperature
- Recyclable: re-usable control unit
- Suitable for explosive areas

DRIVE BOOSTER

- Polyvalent
- 4 sizes: 60 cm^3, 120 cm^3, 250 cm^3 and 500 cm^3
- Multi-purpose
- Precise
- Powerful: suitable for remote lubrication
- Rechargeable

2.1 READY Booster 60 & 125

Ideal for humid environments, exposed to corrosion or where maximum hygiene is needed, such as in the food industry.

READY BOOSTER: the flexible business model.

2.1.1 Description

Available in 2 sizes (60cc and 125cc), the **READY BOOSTER** is suitable for a wide variety of applications, and in particular aggressive environments that can lead to corrosion of electronic systems, or industrial sectors that demand cleanliness and hygiene.

The fat is distributed by an electrochemical reaction.

The duration of grease distribution can be adjusted from 1 to 12 months via a selector switch.

2.1.2 Applications

Designed for single-point lubrication of bearings, plain bearings, open gears, chains, ball screws, linear guides, etc.

Its resistance to corrosion is highly prized in the food industry.

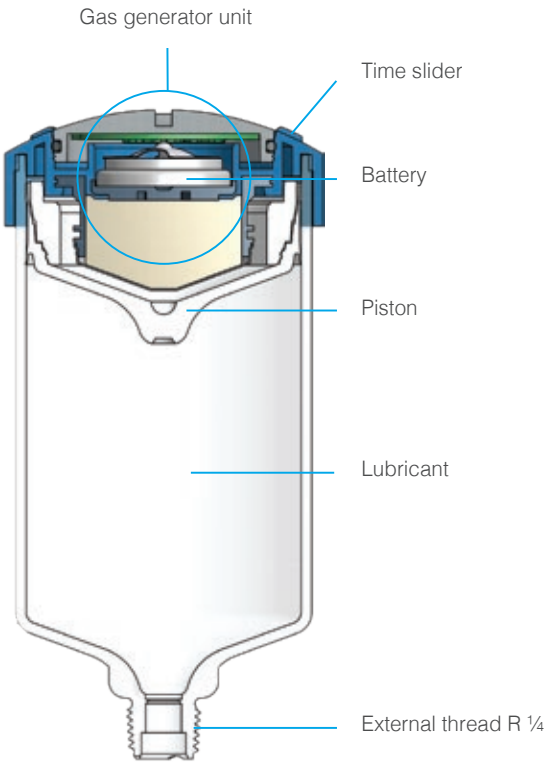
2.1.3 Features and benefits

• Compact design (with optional flange)	• Easy to install, even in confined spaces
• Certification **II 1G Ex ia IIC T6 II 1D Ex iaD 20 T85°C I M1 Ex ia I DEKRA 13 ATEX 0078 X**	• Suitable for use in hazardous areas
• Transparent tank in high-density polyamide	• Allows visual control of grease levels
• Waterproof and dustproof: IP 68	• Corrosion and vibration resistant • Works in any position
• Integrated flow control valve for oil version	• Easy to install

2.1.4 Technical data

Drive: gas by electrochemical reaction
Capacity: 60 cm^3 or 125 cm^3
Maximum pressure: 5 bar
Distribution period: 1 to 12 months
Immediate start: 1 day
Operating temperature: -20°C to +60°C

Available with SNR high-performance greases specially developed for bearings and with special synthetic oils for chains. Contact us for other types of lubricant.



2.1.5 Commercial references

COMMERCIAL REFERENCE	PRODUCT	LUBRICANT
LUBER READY 60 UNIVERSAL +	READY BOOSTER 60	UNIVERSAL + grease (general use)
LUBER READY UNIVERSAL +	READY BOOSTER 125	
LUBER READY 60 HEAVY DUTY +	READY BOOSTER 60	HEAVY DUTY + grease (Heavy duty)
LUBER READY HEAVY DUTY +	READY BOOSTER 125	
LUBER READY 60 HIGH TEMP MP	READY BOOSTER 60	HIGH TEMP MP grease
LUBER READY HIGH TEMP MP	READY BOOSTER 125	
LUBER READY 60 VIB	READY BOOSTER 60	VIB grease (Vibration and shock)
LUBER READY VIB	READY BOOSTER 125	
LUBER READY 60 FOOD	READY BOOSTER 60	FOOD grease (food compatible)
LUBER READY FOOD	READY BOOSTER 125	
LUBER READY 60 FOOD CHAIN OIL	READY BOOSTER 60	FOOD CHAIN OIL
LUBER READY FOOD CHAIN OIL	READY BOOSTER 125	FOOD CHAIN OIL
LUBER READY 60 CHAIN OIL	READY BOOSTER 60	CHAIN OIL (High performance chain oil)
LUBER READY CHAIN OIL	READY BOOSTER 125	

2.2 SMART Booster 125

High-performance, cost-effective lubrication solution, ideal for applications subject to temperature variations.

SMART BOOSTER: the temperature-independent business model.

2.2.1 Description

SMART BOOSTER, the first electrochemical automatic lubricator, equipped with a reusable control unit that adjusts the flow rate according to the ambient temperature.

You can be sure of continuously supplying the volume of lubricant required for your application, whatever the temperature. This intelligent grease gun is equipped with a temperature sensor that adjusts the level of pressure needed to dispense the right amount of grease set at start-up.

The dispensing time is easily adjusted to the nearest month (from 1 to 12 months) by simply pressing the control unit. The control unit can be reused several times, with only the 125 cm3 grease cartridge needing to be replaced.

2.2.2 Applications

Designed for single-point lubrication of bearings, plain bearings, open gears, chains, ball screws, linear guides, etc. It is perfectly suited to environments subject to wide variations in temperature (e.g. fans under roofs) or requiring intrinsic safety (e.g. petrochemical industry).

2.2.3 Features and benefits

• Adjustable from 1 to 12 months via a touch control unit, with on/off function, reusable.	• Flexible, precise and versatile, it reduces operating costs while improving the lubrication of rotating parts.
• Integrated temperature compensation with wide operating temperature range.	• High reliability: temperature-independent, controlled grease flow over the entire dispensing time. • Universal use.
• Compact design with reinforced flange.	• Robust, easy to install even in confined spaces.
• Certification **I M1 Ex ia I Ma** **II 2G Ex ia IIC T4 Gb** **II 2D Ex ia IIIC T 135°C Db** **ZELM I0 ATEX 0434X**	• Suitable for use in hazardous areas.
• IP65 protection.	• Can be used in a wide range of dusty, damp environments.
• Transparent tank in high-density polyamide.	• Allows visual control of grease level. • Works in any position.
• Integrated flow control valve for the oil version.	• Easy to install.

2.2.4 Technical data

Drive: gas generator cells with electronic temperature compensation.

Capacity: 125 cm^3

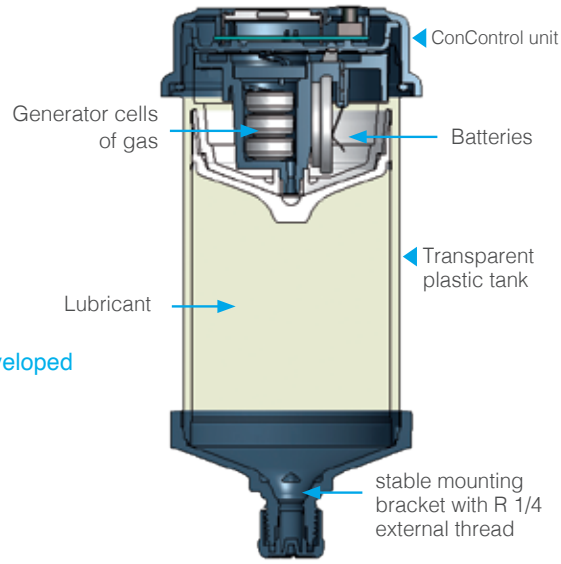
Maximum pressure: 6 bar

Distribution period: 1 to 12 months

Immediate start: 1 day

Operating temperature: -20°C to +60°C

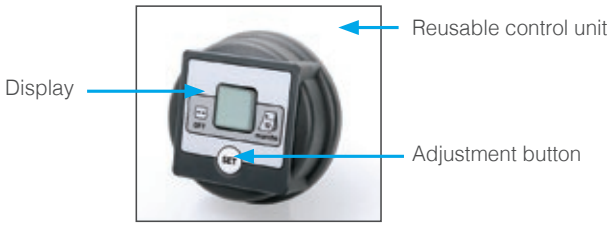
Available with SNR high-performance greases specially developed for bearings and with special synthetic oils for chains.
Contact us for other types of lubricant.



2.2.5 Commercial references

LUBER SMART 125 (grease name) :
Complete kit (control unit + lubricant tank with gas cells and batteries + protective cover).

LUBER SMART REFILL (grease name) :): Lubricant tank with gas cells and batteries + protective cover).



Selecting the dispensing time

Transport protection and dust and dirt cover

COMMERCIAL REFERENCE	PRODUCT	LUBRICANT
LUBER SMART 125 UNIVERSAL+	Complete SMART BOOSTER	UNIVERSAL + grease (general use)
LUBER SMART REFILL 125 UNIVERSAL+	Refill	
LUBER SMART 125 HEAVY DUTY+	Complete SMART BOOSTER	HEAVY DUTY + grease (Heavy duty)
LUBER SMART REFILL 125 HEAVY DUTY+	Refill	
LUBER SMART 125 HIGH TEMP MP	Complete SMART BOOSTER	HIGH TEMP MP grease
LUBER SMART REFILL 125 HIGH TEMP MP	Refill	
LUBER SMART 125 VIB	Complete SMART BOOSTER	VIB grease (Vibration and shock)
LUBER SMART REFILL 125 VIB	Refill	
LUBER SMART 125 FOOD	Complete SMART BOOSTER	FOOD grease (food compatible)
LUBER SMART REFILL 125 FOOD	Refill	
LUBER SMART 125 CHAIN OIL	Complete SMART BOOSTER	CHAIN OIL (High performance chain oil)
LUBER SMART REFILL 125 CHAIN OIL	Refill	

2.3 DRIVE Booster 60, 120, 250 & 500

A high-performance, environmentally friendly, easy-to-use lubrication solution for applications requiring very precise dosing, either in contact with or at a distance from the point to be lubricated.

DRIVE BOOSTER: the best single-point lubricator to simplify your maintenance and optimise your productivity!

The ideal solution for reducing the risk of accidents in hazardous areas that are difficult to access or subject to high ambient temperatures or severe vibration.

2.3.1 Description

DRIVE BOOSTER, automatic electromechanical lubricator for extremely precise lubrication, independent of temperature, with high reliability in service. This grease gun is the ideal solution for reducing the risk of accidents in hazardous areas that are difficult to access or subject to high ambient temperatures or severe vibration. Available in **4 sizes: 60, 120, 250 and 500 cm³**, it meets the needs of most lubrication applications.

Its electromechanically driven control head features:

- A single button linked to the LCD screen for easy setting of the grease nipple discharge time (1 to 24 months*) and activation of the «purge» function.
- 4 LEDs scattered around the control head for clear indication of device status.
- Constant, reliable thrust pressure of 7.5 bar throughout the dispensing operation, enabling the lubrication point to be located up to 5 metres away**.
- A reusable head, helping to protect the environment.

2.3.2 Applications

Designed for single-point lubrication of bearings, plain bearings, open gears, chains, ball screws, linear guides, etc. Independent of ambient temperature and pressure, it is suitable for a wide range of applications and operating conditions. It can be installed up to 5 metres from the lubrication point.

2.3.3 Features and benefits

• Driven by a powerful, robust electric motor. • Easily adjustable with LCD display.	• 7.5 bar pressure (distribution up to 5 metres). • Independent of temperature and pressure. • High reliability: constant grease flow throughout the dispensing cycle.
• Reusable	• Ecological
• Transparent, high-density polyamide tank with reinforced flange.	• Visualisation of fat levels
• Equipped with indicator lights.	• Indicates operating status and enables rapid remote control.
• Compact design.	• Easy to install, even in confined spaces.
• Grease nipple kit with accessories included.	• The set of fittings supplied allows the device to be fitted to 95% of applications.
• Recharge consisting of a lubricant tank and a battery pack. • Adjustable from 1 to 24* months via a touch-sensitive control unit with reusable on/off function and purge function.	• Functional guarantee. • Flexible and precise, it reduces operating costs. • The purge function can be used to clear a blockage.

* Discharge time varies according to cartridge size.
** Maximum distance depends on several factors. Please ask your NTN Europe contact for more information.

2.3.4 Technical data

Drive: electromechanical, reusable

Power supply: battery pack

Capacity : 60cm^3, 120 cm^3, 250 cm^3 or 500cm^3

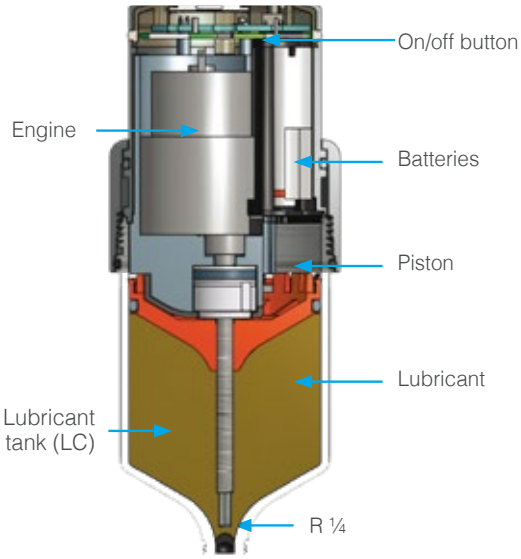
Maximum pressure: 7.5 bar

Duration of distribution::
1 to 26 weeks for all cartridge sizes
1 to 24 months for 60 cm cartridges3
1 to 12 months for 120 & 250 cm cartridges3
Up to 6 months for 500 cm cartridges3

Immediate start

Operating temperature: -20°C to +60°C

Available with SNR high-performance greases specially developed for bearings. Consult us for other types of lubricant.



LCD display with adjustment button (1 to 24 months) + purge function

Protective cap

2.3.5 Commercial references

LUBER DRIVE KIT (capacity, grease name): Complete grease gun kit including: Engine + 60, 120, 250 or 500 cm^3 lubricant tank + battery pack.

LUBER DRIVE REFILL (capacity, grease name): Refill including: 60, 120, 250 or 500 cm^3 lubricant tank + battery pack. The commercial reference is the same for all lubricants: UNIVERSAL+, HEAVY DUTY+, HIGH TEMP MP, VIB, FOOD, CHAIN OIL, FOOD CHAIN OIL.

EXAMPLE OF A COMMERCIAL REFERENCE	PRODUCT	LUBRICANT
LUBER DRIVE KIT 120 UNIVERSAL +	DRIVE BOOSTER 120 complete kit	UNIVERSAL + grease (general use)
LUBER DRIVE KIT 250 HEAVY DUTY +	DRIVE BOOSTER 250 complete kit	HEAVY DUTY + grease (Heavy duty)
LUBER DRIVE REFILL 60 HIGH TEMP MP	Refill 60	HIGH TEMP MP grease
LUBER DRIVE REFILL 500 VIB	Refill 500	VIB grease (Vibration and impact)

To order:

- **A complete 250 cm DRIVE BOOSTER kit3 with HIGH TEMP MP grease**
  > Ref.: LUBER DRIVE KIT 250 HIGH TEMP MP
- **A 120 cm refill3 with HEAVY DUTY + grease**
  > Ref. number: LUBER DRIVE REFILL 120 HEAVY DUTY+

Consult the E-Shop».

www.eshop.ntn-europe.com

2.4 Installation guide for SNR single-point lubricators

What the expert think

Only use hoses with an internal diameter of at least 6 mm.
Avoid unnecessarily long hoses.

Choice of installation method:

Remote installation or not?

In many cases, it is safer to install remote lubrication systems because of the risks involved in accessing machines in operation.

Bearing mounting example


Example of remote mounting

2.4.1 Mounting kits for SNR DRIVE BOOSTER, robust and reliable turnkey solutions

Advantages of DRIVE ASSEMBLY KITS:

Safety at work

- Remote mounting reduces the risk of accidents by up to 90
- Remote mounting reduces time spent in hard-to-reach hazardous areas

Costs

- The best economic solution with a cost advantage over retail purchasing
- All parts from a single supplier ➜ less administrative burden

Reliability

- The robustness of each accessory ensures a long service life

2.4.2 DRIVE Standard Duty mounting kit

Standard Duty mounting kits are designed for use in environments with normal environmental conditions. The kits contain the necessary fixing materials and an M10x1 and G1/8 reducer for each lubrication point.

Fixing with

1 point with 65 mm mounting bracket and 3 m hose with internal diameter of 9.5 mm.

Reference SNR:
LUBER SDKIT 1P BC

2-point with 65 mm mounting bracket and 5 m hose with 9.5 mm internal diameter.

Reference SNR:
LUBER SDKIT 2P BC

bracket Fixing for protective grille

1 point for protective grille with 3 m of 9.5 mm ID hose.

Reference SNR:
LUBER SDKIT 1P CH

2 points for protective grille with 5 m hose 9.5 mm internal diameter.

Reference SNR:
LUBER SDKIT 2P CH

2.4.3 DRIVE mounting kit heavy Duty

DRIVE Heavy Duty mounting kits are designed for use in environments with harsh environmental conditions. The kits contain the necessary fixing materials as well as a DRIVE Heavy Duty protective cover, a drain connection with manual valve and an M10x1 and G1/8 reducer for each lubrication point.

Fixing with

1 point with 65 mm mounting bracket and 3 m of 9.5 mm ID hose.

Reference SNR:
LUBER HDKIT 1P BC

2-point with 65 mm mounting bracket and 5 m hose with 9.5 mm internal diameter.

Reference SNR:
LUBER HDKIT 2P BC

bracket Fixing for protective grille

1 point for protective grille with 3 m of 9.5 mm ID hose.

Reference SNR:
LUBER HDKIT 1P CH

2 points for protective grille with 5 m hose 9.5 mm internal diameter.

Reference SNR:
LUBER HDKIT 2P CH

2.4.4 Accessories for preparing the lubrication point.

When installing a remote mounting with a single-point lubricator for the first time, it is essential to pre-fill the hose to the lubrication point.

The pre-filling adaptor kit is made up of several components that can be used to fit different pipe diameters.

Designation	Reference
R1/4 conical grease nipple	1
Flat grease nipple G1/4	2
Extension 45 mm G1/4 male x G1/4 female	3
Sleeve G1/4 female	4
G1/4 male hose connector for Øi 9.5mm push lock hose	5
G1/4 male hose connector for Øi 8mm straight hose	6
G1/4 male hose connector for Øi 6mm straight hose	7

1 2 3 4 5 6 7

Example below of installation for different pipe diameters

G1/4

Ø 6 mm

Ø 8 mm

Ø 9,5 mm

2.5 Accessories for the Booster range

Choose the right accessory from the SNR range.

Mounting brackets:

		
DESCRIPTION	Plastic fastening clip DRIVE / SMART / READY	Bracket + insert
REFERENCE SALES	LUBER UNIVERSAL CLIP	LUBER BRACKET

Flexible connection:

	
DESCRIPTION	1 Female connector on Booster side + 1 Flexible tube (Nylon, length 1 m, O.D./O.D.: 8 / 6 mm) + 1 G1/4 male fitting
REFERENCE SALES	LUBER HOSE & CONNECTORS 1 M

Elbows:

		
DESCRIPTION	Connection angle 45° G1/4 - G1/4	90° connection angle G1/4 - G1/4
REFERENCE SALES	LUBER ANGLE 45 G1/4	LUBER ANGLE 90 G1/4

Fittings / Reducers:

						
DESCRIPTION	Reducer G1/4 - G1/8	Reducer G1/4 - M6	Reducer G1/4 - M8 x1	Reducer G1/4-M8 x1,25	Reducer G1/4 - M10 x1	Reducer G1/4-M10 x1,50
REFERENCE SALES	LUBER REDUCER G1/4 - G1/8	LUBER REDUCER G1/4 - M6	LUBER REDUCER G1/4 - M8 x1	LUBER REDUCER G1/4 - M8	LUBER REDUCER G1/4 - M10 x1	LUBER REDUCER G1/4 - M10

Extension leads

		
DESCRIPTION	Extension R1/40 x G1/4 - 30 mm	Extension R1/40 x G1/4 - 75 mm
REFERENCE SALES	LUBER EXTENSION G1/4 30 mm	LUBER EXTENSION G1/4 75 mm

Brushes:

				
DESCRIPTION	Brush diam. 20 G1/4	Brush 40X30 mm G1/4	Brush 60X30 mm G1/4	Brush 100X30 mm G1/4
REFERENCE SALES	LUBER OIL BRUSH diam. 20 -G1/4	LUBER OIL BRUSH 40 x 30 -G1/4	LUBER OIL BRUSH 60 x 30 -G1/4	LUBER OIL BRUSH 100 x 30 -G1/4

Accessories Drive

			
DESCRIPTION	G1/4 reinforcing subbase (copper / plastic)	Protective cap 120 cm^3	Protective cap 250 cm^3
REFERENCE SALES	LUBER PROTECTION BASE	LUBER PROTECTION COVER 120	LUBER PROTECTION COVER 250

Ready accessories:

		Extreme environment accessory kit	
			
DESCRIPTION	Reinforcement subbase (G1/4 - G1/4) (copper / plastic)	Reinforcement base (G1/4 - G1/4) (aluminium)	Protective metal cap
REFERENCE SALES	LUBER READY PROTECTION BASE	LUBER READY SUPPORT FLANGE	LUBER READY PROTECTION CAP

* These accessories are sold separately.

2.6 POLIPUMP, centralised lubrication easy to use and cost-effective.

A cost-effective, high-performance multi-point lubrication solution that's easy to use, allowing you to lubricate from 1 to 35 points.

Plugged in and connected, your lubrication unit is ready to use. Just follow the 4 steps described below:

1. **Decide the number of points you need to lubricate,** choose your pumping elements and connect them
2. **Connect the pump** to your electricity network
3. **Filling the tank** with the grease of your choice
4. **Program your lubrication cycles:** your POLIIPUMP is ready for use

2.6.1 Profits

A profitable choice
Treat yourself to a multi-point lubrication system that will increase the availability of your equipment while reducing your maintenance costs.

A cost-effective, high-performance solution
Lubricate from 1 to 35 points with the grease of your choice up to 20 metres*.

Ecological and easy to install.
No technical skills are required to install your lubrication unit. Ready to use and environmentally friendly, you can easily recharge your pump and reduce waste.

2.6.2 Applications

This lubrication solution has been designed to lubricate from 1 to 35 points for a wide variety of applications. It is mainly found in two distinct sectors:

- **Industry**

The polipump can be used to lubricate bearings, plain bearings, open gears, chains, ball screws, linear guides, etc. It's self-contained, so you can lubricate up to 35 points over up to 20 metres*. No need to refill with specific greases, you can easily fill your reservoir with the grease of your choice.

- **Vehicles and chassis (agricultural machinery, construction equipment, lorries)**

A special version of the polipump has been designed for applications on vehicles such as agricultural machinery, construction and public works machinery, trucks, etc. This pump can lubricate up to 35 points while complying with the electrical constraints specific to these vehicles.

* Distance subject to conditions: please contact us.

• Robust electric motor	• Independent of temperature and pressure
• Simplified grease distribution circuit	• No special technical skills required for installation.
• Easy programming	• High reliability: constant grease flow throughout the dispensing period
• Compact pump	• Allows easy integration into your equipment
• Transparent tank	• Visualisation of fat levels.
• Works with grease grade NLGI 00 to 2 (For silicone-based grease, please contact us)	• Use your own grease, no special refills required
• Optional "flash" tank filling kit	• A solution for filling your tank very quickly
• 6 pumping elements available for sale with different flow rates	• Allows you to be as close as possible to your lubrication needs
• Collection of accessories available for sale, including fittings and pre-filled tubes	• Our range of fittings covers most of your applications

2.6.3 Technical data

Power supply: 12VDC or 24VDC

2 types of pump : NRUN for vehicles and IND for industry

Capacity : 2-litre tank

Maximum pressure: 80 bar

Operating temperature: -10°C to + 60°C

Grade of grease used: NLGI 00 to NLGI 2

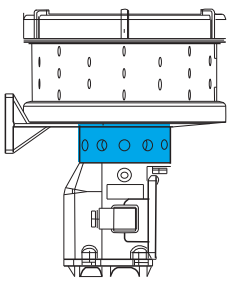
Programming: from 1 cycle/min to 12 cycles/day (2 cycles/min: for hose filling only)

6 types of pumping elements:
0.02, 0.03, 0.04, 0.08, 0.10 and 0.13 cc

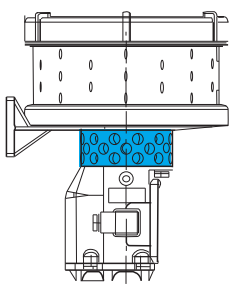
Pump available in two versions: 12 or 35 outlets

The most important questions to be asked

- **How many points do I have to lubricate?**
- **What is the maximum distance between the two furthest points?**
- **What type of supply?**
- **What amount of grease is required for each point to be lubricated?**



12 outputs



35 outputs

2.6.4 POLIPUMP solution selection guide

Choose the pump and accessories you need for your installation from the list below.

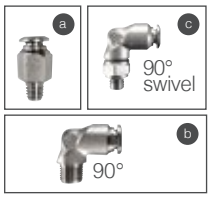
1. Pump selection

		DESIGNATION	Numbers of outlet	Sap code	Quantity
POLIPUMP standard Can be used for the applications industrial	12 VDC	POLIPUMP-2KG-12 PUM-12VDC-IND._0888270	12	308492	
		POLIPUMP-2KG-35 PUM-12VDC-IND._0888272	35	308500	
	24 VDC	POLIPUMP-2KG-12 PUM-24VDC-IND._0888273	12	308494	1*
		POLIPUMP-2KG-35 PUM-24VDC-IND._0888275	35	308502	
POLIPUMP NRUN For construction and agricultural machinery, lorries, etc.	12 VDC	POLIPUMP-2KG-12 PUM-12VDC-NRUN_0888276	12	308493	
		POLIPUMP-2KG-35 PUM-12VDC-NRUN_0888278	35	308501	
	24 VDC	POLIPUMP-2KG-12 PUM-24VDC-NRUN_0888279	12	308495	
		POLIPUMP-2KG-35 PUM-24VDC-NRUN_0888281	35	308503	

2. Selecting pumping éléments

DESIGNATION	Color	Sap code	Quantity
pUMPING UNIT 0.02cc - RED_0888451	RED	308508	6*
PUMPING UNIT 0.03cc - GREEN_0888452	GREEN	308509	4*
PUMPING UNIT 0.04cc - YELLOW_0888453	YELLOW	308510	
PUMPING UNIT 0.08cc - BLUE_0888454	BLUE	308511	
PUMPING UNIT 0.10cc - GREY_0888455	GREY	308512	
PUMPING UNIT 0.13cc - BLACK_0888456	BLACK	308513	

3. Selecting fittings and hoses



	DESIGNATION	Sap code	Quantity
Connectors	PUSH-IN- M6X1 D4_3084579 ⓐ (65 bar max.)	311555	10*
	PUSH-IN-90 M6X1 D4_3084613 ⓑ (65 bar max.)	311558	
	PUSH-IN-GIR.90 M8X1 TUBO4_3084731 ⓒ (150 bar max.)	311560	
	CONN-ELBOW PUSH-IN M10X1 D4_3084654 ⓑ (65 bar max.)	311561	
	SWIVEL CONN-STRAIGHT 90-Ø4-1/8_3084638 ⓒ (65 bar max.)	311562	
	STRAIGHTPUSH-IN-CONN 1/8 D4_3084577 ⓐ (65 bar max.)	311557	
Hose without grease	TUBE-NYLON 6 4X2 BLACK-25M_5717258 (65 bar max.)	310717	
Hose with grease	TUBE-NYLON6 4X2 BLACK-25M GREASE_5717259 (65 bar max.)	310718	2*

4. Filling and grease kit

DESIGNATION	Sap code	Quantity
KIT CARTRIDGE GREASE FILLING_0888038	308475	1*
FITTING 90° M22 x 1,5 - M/F - 3077222 (for kit cartridge)	370658	
Lub Universal grease	230415	
Lub Heavy duty grease	230422	
Lub High Temp MP grease	467254	
Lub VIB grease	230421	
Lub Food AL grease	297465	1*
Lub Ultra High temp grease	248672	

5. Tank riser

DESIGNATION	Sap code	Quantity
Lubso tank segment_888116	326966	1*

*Example of application

Industry: food

Application: packaging machine

Ambient temperature: 25°C

Grease used: FOOD AL

Number of points to be lubricated:

- 4 bearings 22210 in increments: 5 g(cc)/week
- 6 22206 bearings in housings: 3.4 g(cc)/week

Power supply: 24 VDC

More information:

- connection to point M6X1
- distance: 1 bearing 22210 and 22206 at 10 m and the other points at 3 m
- filling the pump with the appropriate syringe (cartridge kit + 1 cartridge)

> Parts to order

Pump:
Polipump 24 VDC 12 PUM

Pumping element:

a) 5 g(cc)/week = 0.03cc with 24cy/day** setting

b) 3 g(cc)/week = 0.02cc with 24cy/day** setting

Fitting: 10 M6X1 fittings

Hose: 2 x 25 m pre-filled hoses

**Result obtained using the calculation table available on our website.

2.6.5 Accessories for POLIPUMP

Choose the right accessory from the SNR range.

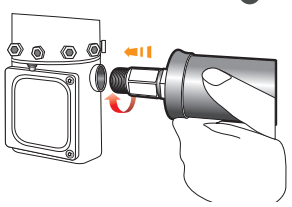
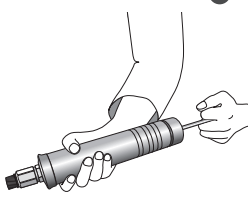
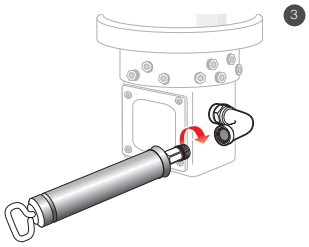
Connections / Reducers:

			
DESCRIPTION	Straight push-in fitting M6X1	90° push-in elbow M6X1	M8X1 90° rotary push-in fitting
COMMERCIAL REFERENCE	PUSH-IN – M6x1 D4 3084579	PUSH-IN –90 M6x1 D4_3084613	PUSH-IN –GIR.90 M8x1 TUBO4_3084731
			
DESCRIPTION	90° push-in elbow M10X1	1/8" 90° rotary push-in fitting	1/8" straight push-in fitting
COMMERCIAL REFERENCE	CONN-ELBOW PUSH-IN M10x1 D4_3084654	SWIVEL CONN-STRAIGHT 90-Ø4-1/8_3084638	STRAIGHTPUSH-IN-CONN 1/8 D4_3084577

Hoses:

		
DESCRIPTION	Grease-free 4X2 nylon hose	Nylon hose pre-filled with grease NLGI00
COMMERCIAL REFERENCE	TUBE-NYLON 6 4X2 BLACK-25M_571258	TUBE-NYLON 6 4X2 BLACK-25M GREASE_571259

fill grease kit and FITTING 90° M22 x 1.5:

			
DESCRIPTION	Quick-fill kit for the polipump tank		Fitting 90° M22 x 1.5 for use with quick-fill kit
COMMERCIAL REFERENCE	KIT CARTRIDGE GREASE FILLING_0888038		Fitting 90° M22 x 1,5 - M/F - 3077222

3 Lubrication theory and methodology

3.1 LUB' SOLUTIONS services

- Need help defining your industrial lubrication requirements for your application?
- Would you like to design and build the lubrication system best suited to your machine?
- Do you need an installer to install or change a system?
- Are you experiencing problems with your industrial lubrication system?

The LUB'SOLUTIONS offer from Experts & Tools is first a team of engineers and technicians available to support you in your various projects and tasks.

Please contact Experts & Tools (tel.: 04 5065 3000, website: www.ntn-europe.com) or via your NTN Europe distributor or sales contact.

3.1.1 Advice on defining your needs

Our engineers can help you choose the lubrication technology best suited to your application and its environment and design the most efficient system for your machine. What's more, working with Experts & Tools when designing a machine brings an important additional benefit. Simultaneous dimensioning of the bearings and their lubrication system ensures superior reliability and optimum operation of your industrial installation at optimised cost.

Equipping old machines designed without centralised lubrication, or existing but obsolete systems, is a task where we can assist you. The LUB'SOLUTIONS experts will decide the closest equivalent or the most suitable for your equipment.

3.1.2 Design and production of customised systems

Based on your specifications, Experts & Tools' designers will provide you with a tailor-made technical and commercial offer, accompanied by a technical file (schematic diagram, list of components).

Once it has been approved by you, Experts & Tools will then manufacture your customised lubrication unit.

3.1.3 Installation of customer lubrication systems

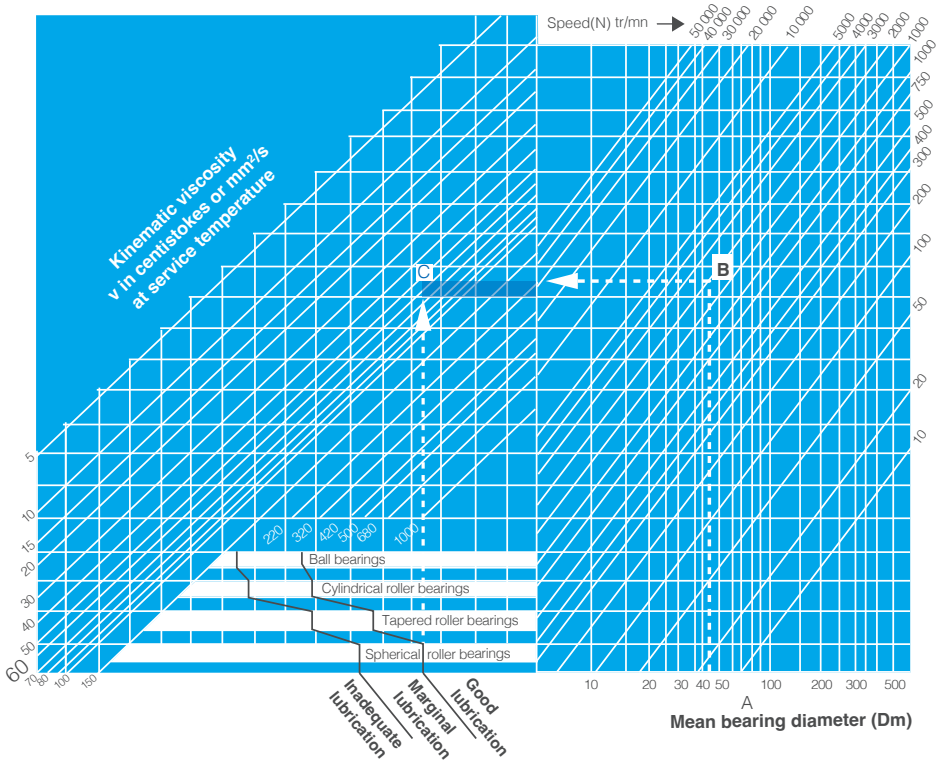
Our technicians are available to install the industrial lubrication equipment designed for you on your machine at your site.

3.1.4 After-sales service

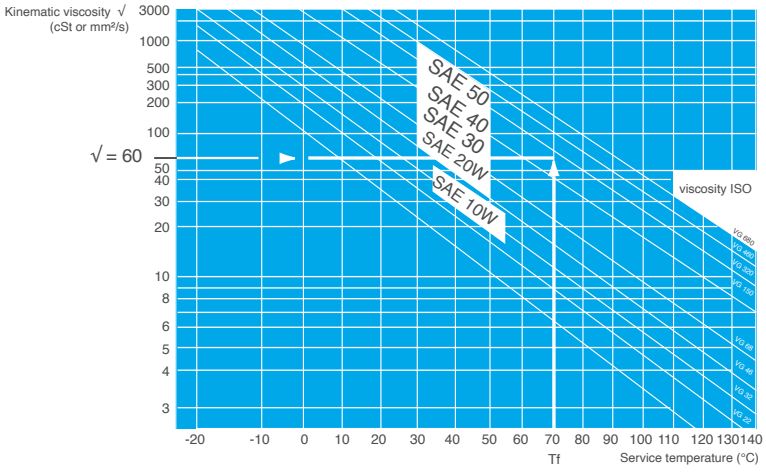
Even outside the warranty period, Experts & Tools also provides servicing and maintenance for industrial lubrication systems. We also offer this service for plants that are not of our own design.

3.2 Tools for calculating bearing lubrication requirements

Choice of lubricant viscosity (oil or grease)



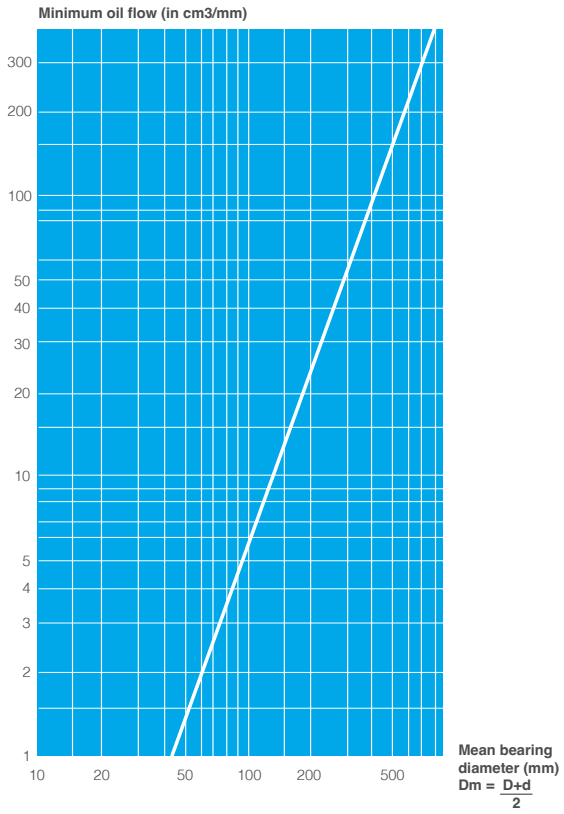
- Determine the average diameter of the bearing (A)= (Bore + outside diameter)/2
- Find point B on the graph, which intersects with the line showing the speed of rotation of the bearing.
- Identify point C, the intersection of the horizontal line from B and the vertical line from the effective lubrication limit, depending on the type of bearing.
- Determine the value of the oblique line passing through C (60, in this case)



- Next, calculate the viscosity of the lubricant to be selected, considering the operating temperature of the bearing. On the vertical scale, plot the value of the calculated base viscosity. Identify the intersection between this value and the operating temperature of the bearing. The viscosity required is the value of the oblique line passing through this intersection. (Approximately SAE 50 or VG 300 in this case).

Lubricant dosage and relubrication

▸ Lubrification à l'huile (Quantity minimale)



▸ Grease lubrication (dosing)

Excess grease can cause overheating. The grease should occupy approximately 30% of the free volume inside the bearing.

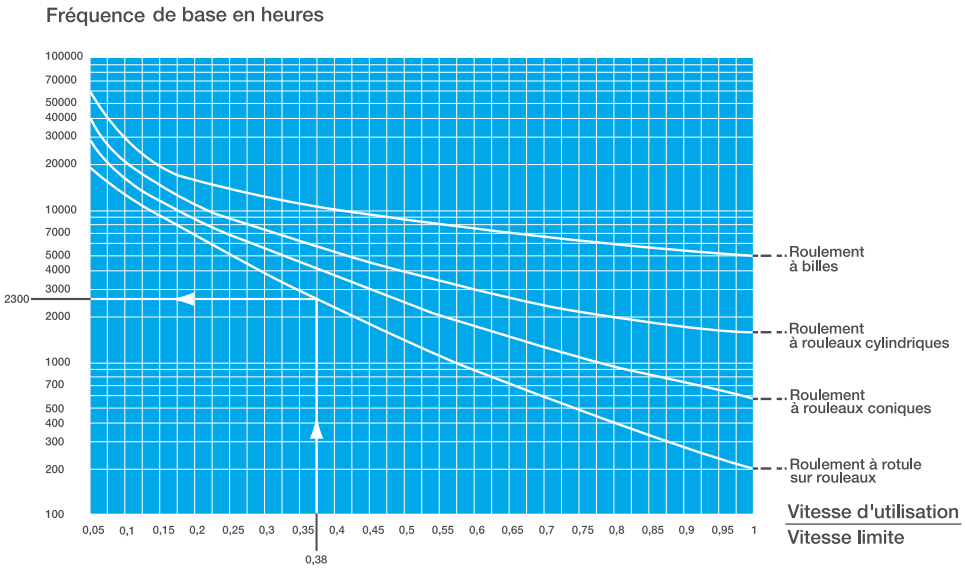
Formula to calculate the weight of grease required: V = K x W

V: Complete free volume for open bearings (approx.), cm³
K: Internal free volume factor (see K in the table below)
W: Bearing mass, kg

Bearing typ [1]			Cage type	Volume factor free internal K
Deep groove ball bearing [2]			Pressed cage	61
Angular contact ball bearing			Pressed cage	54
			Machined cage	33
			Molded resin cage	33
Cylindrical roller bearing	NU Type [3]		Pressed cage	50
			Machined cage	36
	N Type [5]		Pressed cage	55
			Machined cage	37
	ULTAGE Series (EA Type) E Type	NU Type [4]	Machined cage	33
			Molded resin cage	33
		N Type [4]	Machined cage	34
			Molded resin cage	35
Tapered roller bearing			Pressed cage	46
Spherical roller bearing	Type C		Pressed cage	35
	Type B Type 213		Machined cage	28
	ULTAGE Series	Type EA	Pressed cage	33
		Type EM	Machined cage	31

[1] Does not apply to types not included in the catalogue. [2] Does not apply to 1600 series [3] Does not apply to NU4 series [4] Applies only to G1 machined cages. [5] Does not apply to N4 series.

▸ Frequency of relubrification



The basic frequency (Fb) of relubrication depends on the type of bearing and the ratio of operating speed to the speed limit given in the bearing specifications.

This basic frequency must be corrected by the coefficients below according to the environmental conditions of the mechanism (dust, humidity, shocks, vibration, vertical axis, operating temperature, etc.) according to the relationship: Fc=Fb x Te x Ta x Tt

	Environment	Applications	Temperature		
Conditions	Poussière Humidité Condensation	Avec chocs Vibrations Axe Vertical	Niveau	Pour graisse standard	Pour graisse haute température
Coefficients	Te	Ta		Tt	Tt
Average	0,7 to 0,9	0,7 to 0,9	75°C	0,7 to 0,9	-
Strong	0,4 to 0,7	0,4 to 0,7	75°C to 85 °C	0,4 to 0,7	0,7 to 0,9
Very strong	0,1 to 0,4	0,1 to 0,4	85°C to 125 °C	0,1 to 0,4	0,4 to 0,7
	-	-	130°C to 170 °C	-	0,1 to 0,4

Example: a 22212EA bearing, greased with standard grease, running at 1500 rpm in a dusty environment, at 90°C with no other application constraints:

22212 = Spherical roller bearing

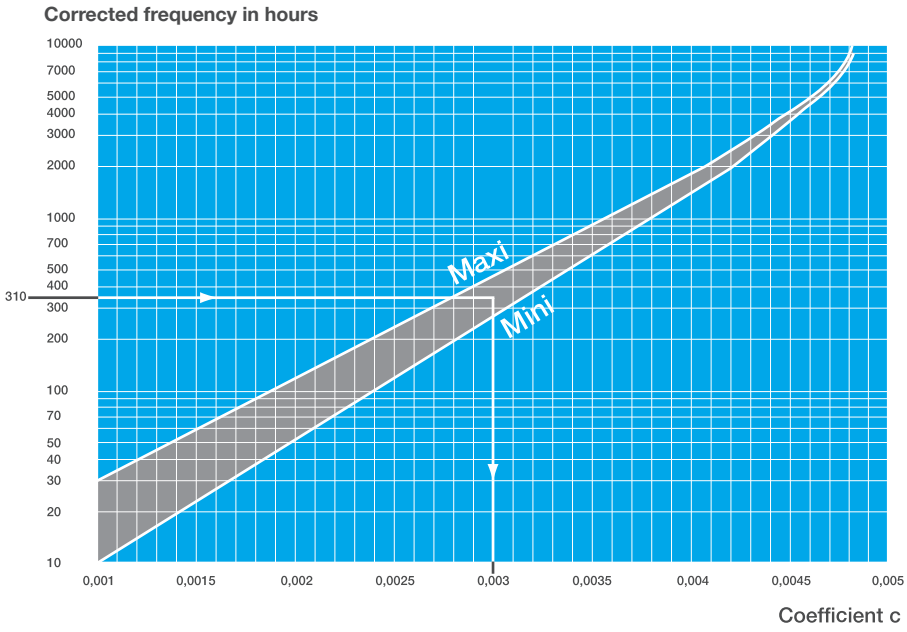
V limit = 3900 rpm

V use = 1500 rpm

$$\frac{\textbf{V operating = 1500 tr/mn}}{\textbf{V speed = 3900 tr/mn}} = \frac{1500}{390} = 0{,}38 \dashrightarrow \textbf{Basic frequency Fb = 2300 H}$$

Te = 0,5 ⇢ dust
Ta = 0,9 ⇢ normal
Tt = 0,3 ⇢ 90°C

▸ Weight of grease to be replaced



This corrected frequency can be used to determine the weight of grease to be added, depending on:

- bearing width B,
- outer diameter D,
- coefficient c taken from the graph below based on the formula **P = D x B x c**

Example:

For bearing 22 121 (spherical roller bearing).

P = weight of the grease

Add approximately 9 grams every 310 hours of operation.

As a first approximation, we can consider the following values:

Shaft diameter	Manual greasing frequency (1 pump stroke = 0,5 cm^3)	Quantity per day	Frequency of automatic grease nipple replacement
100 to 120 mm	8 strokes a day	3 to 4 cm^3	1 month
80 to 100 mm	4 strokes a day	2 cm^3	2 months
65 to 80 mm	16 to 20 pump strokes per week	1,5 cm^3	3 months
50 to 65 mm	16 to 20 pump strokes every 15 days	0,7 cm^3	6 months
< 50 mm	16 to 20 pump strokes per month	0,3 cm^3	12 months

4 Technical product data

4.1 Grease gun

Reference: LUB GREASE GUN SET

Technical specifications:

- Grease gun suitable for 400 g cartridges, bulk grease, with bleed and fill valve. Compatible with standard grease cartridges, including SNR LUB grease cartridges.
- Material: strong sheet steel
- Weight: 1,130 g with hose and nozzle
- 150 mm rigid steel tube
- Hydraulic» type steel end cap, 3 jaws, with flat (10x100 thread)

Capacity	Flow	Service pressure	Maximum pressure
500 cm^3	0,50 cm^3	180 bar	345 bar

- Lubrication accessories supplied with the gun: a bichromate zinc-plated steel extension (M10x100 thread)
- Option: two plastic nozzles with standard threads

4.2 Booster automatic single-point lubricators

LUBER READY capacity, name of lubricant)

Capacity		60 cm^3 or 125 cm^3
Distribution time		Adjustable from 1 to 12 months
Ambient temperature range		-20°C to +60°C
Maximum operating pressure		5 bar
Drive		Electrochemical reaction
Maximum permissible distance between grease nipple and point to be lubricated		Oil 1000 mm and minimum inner tube diameter 6 mm Grease 500 mm and minimum inner tube diameter 10 mm*.
Intrinsic safety certification		I M1 Ex ia I II 1G Ex ia IIC T6 II 1D Ex iaD 20 T 85°C
Recommended storage temperature		20°C
Maximum storage time and expiry dates		Max. 2 years (storage + use) ** (storage + use)
Weight (with lubricant)	**READY BOOSTER 60** **READY BOOSTER 125**	Approx. 145 g Approx. 260 g

*The maximum length of the lubricant line depends on the ambient temperature, the type of grease and the back pressure generated by the application.

▸ Draining time for READY 125 at 20°C

Ø	1 month	3 months	6 months	9 months	12 months
-20°C	2	5	10	13	15
0°C	1,3	3,8	7,2	11	13
+20°C	1	3	6	9	12
+40°C	0,8	2,5	5,2	7,5	10
+60°C	0,6	2	4	-	-

Data based on laboratory tests without back pressure and using grade 2 grease.
Possible residue at a temperature > 40°C or a draining period > 6 months.

▸ Flow rate setting at 20°C (grease)

Setting / month		1	2	3	4	5	6	7	8	9…	…12
Lubricant / day (cm^3)	60cc	2,0	1,0	0,7	0,5	0,4	0,3	0,3	0,3	0,2	0,2
	125cc	4,2	2,1	1,4	1,0	0,8	0,7	0,6	0,5	0,5	0,4
Lubricant / week (cm^3)	60cc	14,0	7,0	4,7	3,5	2,8	2,3	2,0	1,8	1,6	1,6
	125cc	29,2	14,6	9,7	7,3	5,8	4,9	4,2	3,6	3,2	2,6
Lubricant / month (cm^3)	60cc	60	30	20	15	12	10	8,5	7,5	6,6	5
	125cc	125	62,5	41,6	31,2	25	20,8	17,8	15,6	13,8	10,4
Pump strokes / week	60cc	9-11	5	3	2-3	2	1-2	<1,5	<1,5	1	<1
	125cc	60	29 - 30	19 - 20	14 - 15	11 - 12	9 - 10	8 - 9	7 - 8	6 - 7	5 - 6

1 pump stroke of the dispensing grease gun: 0.5 cm^3/piston stroke.

LUBER SMART 125 (name of grease)

Complete kit (control unit + lubricant tank with gas cells and batteries + plastic cover).

LUBER SMART REFILL 125 (grease name)

Lubricant tank with gas cells and batteries + plastic cover.

Capacity	125 cm^3
Distribution time	Flexible from 1 to 12 months (adjustable to the nearest month)
Ambient temperature range	-20°C to +60°C
Maximum operating pressure	6 bar
Drive	Gas generator cell with electronic temperature compensation
Maximum permissible distance between grease nipple and point to be lubricated	Oil 1000 mm and minimum inner tube diameter 6 mm Grease 1000 mm and minimum inner tube diameter 10 mm*.
Intrinsic safety certification	I M1 Ex ia I Ma II 2G Ex ia IIC T4 Gb II 2D Ex ia IIIC T135°C Db
Protection class	IP 65
Recommended storage temperature	20°C
Maximum storage time and expiry dates	Max. 2 years (storage + use)** (storage + use)
Weight (with lubricant)	Approx. 280 g (including 40 g electronic unit)

* The maximum length of the lubricant line depends on the ambient temperature, the type of grease and the back pressure generated by the application.

** The electronic control unit is reusable and is not affected.

▸ Flow rate setting

Setting / month	1	2	3	4	5	6	7	8	9…	…12
Lubricant / day (cm^3)	4	2	1,4	1,1	0,9	0,7	0,6	0,5	0,5	0,4
	29	14,5	10,1	7,6	6,1	5,1	4,3	3,8	3,4	2,7
Lubricant / week (cm^3)	8 to 9	4 to 5	2 to 3	2 to 3	2	1 to 2	1	1	1	< 1
	60 to 62	30 to 32	20 to 21	15 to 16	12 to 13	10 to 11	8 to 9	7 to 8	6 to 7	5 to 6
Pump strokes/ day	4	2	1,4	1,1	0,9	0,7	0,6	0,5	0,5	0,4
	29	14,5	10,1	7,6	6,1	5,1	4,3	3,8	3,4	2,7
Pump strokes / week	8 to 9	4 to 5	2 to 3	2 to 3	2	1 to 2	1	1	1	< 1
	60 to 62	30 to 32	20 to 21	15 to 16	12 to 13	10 to 11	8 to 9	7 to 8	6 to 7	5 to 6

1 pump stroke (grease gun) dispensing: 0.5 cm3/piston stroke.

LUBER DRIVE KIT (capacity, name of lubricant)

Complete kit (engine + lubricant tank 60, 120, 250 or 500 cm3 + battery pack).

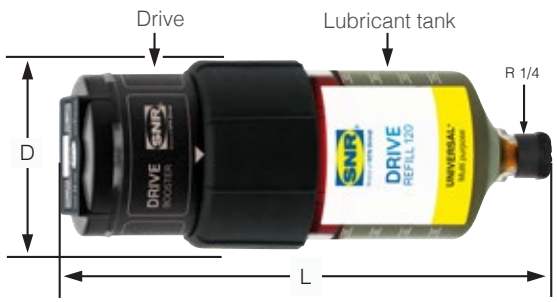
LUBER DRIVE REFILL (capacity, name of lubricant)

Lubricant tank 60, 120, 250 or 500 cm3 + battery pack.

Capacity		60 cm^3, 120 cm^3, 250 cm^3 or 500 cm^3
Distribution time		1 to 26 weeks for all cartridge sizes 1 to 24 months for 60 cm^3 cartridges 1 to 12 months for 120 & 250 cm^3 cartridges Up to 6 months for 500 cm3 cartridges
Ambient temperature range		-20°C to +60°C
Maximum operating pressure		7,5 bar
Drive		Electromechanical
Maximum permissible distance between grease nipple and point to be lubricated		Oil 5 metres and internal diameter 9.5 mm* Grease 5 metres and internal diameter 9.5 mm*
Status indicators (LEDs)		In good working order, in operation, empty, faulty
Recommended storage temperature		20°C
Maximum storage time and expiry dates		2 years (storage + use) **
Battery pack		3 x 1,5 V AA (Alcaline)
Weight (with lubricant)	**DRIVE BOOSTER 60** **DRIVE BOOSTER 120** **DRIVE BOOSTER 250** **DRIVE BOOSTER 500**	Approximately 542 g Approx. 612 g Approx. 774 g Approx. 1105 g

* The maximum length of the lubricant line depends on the ambient temperature, the type of grease and the back pressure generated by the application.
** The electronic control unit is reusable and is not affected.

Type	Volume (cm^3)	Diameter D (mm)	Total length L (mm)
REFILL 60	60	75	155
REFILL 120	120	75	178
REFILL 250	250	75	228
REFILL 500	500	75	324



DRIVE BOOSTER

▸ Weekly flow rate setting

		1	2	3	4	5	6	7	8	9	10	11	12
DRIVE 60 60 cm³	cm³ / 24 h	8,57	4,29	2,86	2,14	1,71	1,43	1,22	1,07	0,95	0,86	0,78	0,71
	cm³ / 100 h	35,7	17,9	11,9	8,93	7,14	5,95	5,10	4,46	3,97	3,57	3,25	2,98
	Pause time	0:21	0:42	1:03	1:24	1:45	2:06	2:27	2:48	3:09	3:30	3:51	4:12
DRIVE 120 120 cm³	cm³ / 24 h	17,1	8,57	5,71	4,29	3,43	2,86	2,45	2,14	1,90	1,71	1,56	1,43
	cm³ / 100 h	71,4	35,7	23,8	17,9	14,3	11,9	10,2	8,93	7,94	7,14	6,49	5,95
	Pause time	0:21	0:42	1:03	1:24	1:45	2:06	2:27	2:48	3:09	3:30	3:51	4:12
DRIVE 250 250 cm³	cm³ / 24 h	35,7	17,9	11,9	8,93	7,14	5,95	5,10	4,46	3,97	3,57	3,25	2,98
	cm³ / 100 h	148,8	74,4	49,6	37,2	29,8	24,8	21,3	18,6	16,5	14,9	13,5	12,4
	Pause time	0:20	0:40	1:00	1:20	1:40	2:00	2:21	2:41	3:01	3:21	3:41	4:01
DRIVE 500 500 cm³	cm³ / 24 h	71,4	35,7	23,8	17,9	14,3	11,9	10,2	8,93	7,94	7,14	6,49	5,95
	cm³ / 100 h	297,6	148,8	99,2	74,4	59,5	49,6	42,5	37,2	33,1	29,8	27,1	24,8
	Pause time	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00

		13	14	15	16	17	18	19	20	21	22	23	24	25	26
DRIVE 60 60 cm³	cm³ / 24 h	0,66	0,61	0,57	0,54	0,50	0,48	0,45	0,43	0,41	0,39	0,37	0,36	0,34	0,33
	cm³ / 100 h	2,75	2,55	2,38	2,23	2,10	1,98	1,88	1,79	1,70	1,62	1,55	1,49	1,43	1,37
	Pause time	4:33	4:54	5:15	5:36	5:57	6:18	6:39	7:00	7:21	7:42	8:03	8:24	8:45	9:06
DRIVE 120 120 cm³	cm³ / 24 h	1,32	1,22	1,14	1,07	1,01	0,95	0,90	0,86	0,82	0,78	0,75	0,71	0,69	0,66
	cm³ / 100 h	5,49	5,10	4,76	4,46	4,20	3,97	3,76	3,57	3,40	3,25	3,11	2,98	2,86	2,75
	Pause time	4:33	4:54	5:15	5:36	5:57	6:18	6:39	7:00	7:21	7:42	8:03	8:24	8:45	9:06
DRIVE 250 250 cm³	cm³ / 24 h	2,75	2,55	2,38	2,23	2,10	1,98	1,88	1,79	1,70	1,62	1,55	1,49	1,43	1,37
	cm³ / 100 h	11,5	10,6	9,92	9,30	8,75	8,27	7,83	7,44	7,09	6,76	6,47	6,20	5,95	5,72
	Pause time	4:22	4:42	5:02	5:22	5:42	6:02	6:23	6:43	7:03	7:23	7:43	8:03	8:24	8:44
DRIVE 500 500 cm³	cm³ / 24 h	5,49	5,10	4,76	4,46	4,20	3,97	3,76	3,57	3,40	3,25	3,11	2,98	2,86	2,75
	cm³ / 100 h	22,9	21,3	19,8	18,6	17,5	16,5	15,7	14,9	14,2	13,5	12,9	12,4	11,9	11,5
	Pause time	2:11	2:21	2:31	2:41	2:51	3:01	3:11	3:21	3:31	3:41	3:51	4:01	4:12	4:22

▸ Setting the flow rate per month

		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24
DRIVE 60 60 cm³	cm³ / 24 h	1,97	0,99	0,66	0,49	0,39	0,33	0,28	0,25	0,22	0.20	0,18	0,16	0,13	0,11	0,09	0,08
	cm³ / 100 h	8,22	4,11	2,74	2,06	1,64	1,37	1,17	1,03	0,91	0,82	0,75	0,69	0,55	0,46	0,39	0,34
	Pause time	1:31	3:02	4:33	6:04	7:36	9:07	10:38	12:09	13:40	15:12	16:43	18:14	22:48	27:21	31:55	36:28
DRIVE 120 120 cm³	cm³ / 24 h	3,95	1,97	1,32	0,99	0,79	0,66	0,56	0,49	0,44	0,39	0,36	0,33				
	cm³ / 100 h	16,45	8,22	5,48	4,11	3,29	2,74	2,35	2,06	1,83	1,64	1,50	1,37				
	Pause time	1:31	3:02	4:33	6:04	7:36	9:07	10:38	12:09	13:40	15:12	16:43	18:14				
DRIVE 250 250 cm³	cm³ / 24 h	8,22	4,11	2,74	2,06	1,64	1,37	1,17	1,03	0,91	0,82	0,75	0,69				
	cm³ / 100 h	34,27	17,13	11,42	8,57	6,85	5,71	4,90	4,28	3,81	3,43	3,12	2,86				
	Pause time	1:27	2:55	4:22	5:50	7:17	8:45	10:12	11:40	13:07	14:35	16:03	17:30				
DRIVE 500 500 cm³	cm³ / 24 h	16,45	8,22	5,48	4,11	3,29	2,74										
	cm³ / 100 h	68,53	34,27	22,84	17,13	13,71	11,42										
	Pause time	0:43	2:57	2:11	2:55	3:38	4:22										

4.3 Polipump

POLIPUMP-2KG-(12-35) PUM-(12-24) VDC-(IND-NRUN)

An electric pump with an integrated reservoir, POLIPUMP is designed for use with pumping units.

The IND model is designed for industrial applications.

The NRUN model is designed for industrial vehicles (trucks, construction and agricultural machinery).

CARACTÉRISTIQUES TECHNIQUES

Pumping system	Single-acting pumping elements with cam activation	
Drive assembly	DC motor with gearbox	
Power supply	12 VDC	24 VDC
Electronic motor overload protection threshold	0,6 A	
Net weight	3,4 kg (2,2 lb)	
Number of outputs/max/versions	12 – 35	
Connection of pumping elements	Instant for Ø 4 (5/32 inch)	
Nominal output per pumping element	0,02 cm^3/stroke – **RED** (1 encoche) 0,03 cm^3/stroke – **GREEN** (2 notches) 0,04 cm^3/stroke – **YELLOW** (3 notches) 0,08 cm^3/stroke – **BLUE** (4 notches) 0,10 cm^3/stroke – **GREY** (5 notches) 0,13 cm^3/stroke – **BLACK** (6 notches)	
Max. discharge pressure	80 bar	
Tank capacity	2 L (0,53 gallons)	
Compatible grease (except silicone grease)	NLGI00 to NLGI2	
Operating temperature	-10°C to +60°C (+14°F to +140°F)	
Storage temperature	-20°C to +80°C (-4°F to + 176°F)	
Noise level	< 70 dB (A)	
Minimum level indication	Hall effect sensor	
CONTROL PANEL CHARACTERISTICS		
Power supply	12 VDC – 24 VDC	
Operating temperature	-10°C to +60°C (+14°F to +140°F)	
Storage temperature	-20°C to +80°C (-4°F to + 176°F)	
Features	• Motor overload protection • Input power protection • Remote alarm signal • End-of-cycle control sensor	
Level of protection	IP 65	
Relay alarm contact	NC (open during alarm) – Imax 5 A - Vmax 250 V – Pmax 60 W	

INSTALLATION OF PUMPING ELEMENTS AND PLUGS

Pumping elements are not supplied with the pump and must be ordered separately and installed before use, depending on the number of points to be lubricated. Each pumping element is colour coded to match the delivery volume and should simply be screwed into the outlet port. All unused ports must be sealed with plugs (supplied).

▸ Positioning of pumping elements

Select a location for the first pumping element and then distribute the other elements in the outlet header ports according to the instructions in the table below and in the diagram (fig.1).

No. of outputs used	Position of pumping elements	No. of outputs used	Position of pumping elements	No. of outputs used	Position of pumping elements
Row 1		Row 2		Row 3	
1	1	13	13	25	25
2	1-7	14	13-19	26	25-31
3	1-5-9	15	13-17-21	27	25-29-33
4	1-4-7-10	16	13-16-19-22	28	25-28-31-34
5	1-2-4-7-10	17	13-14-16-19-22	29	25-26-28-31-34
6	1-3-5-7-9-11	18	13-15-17-19-21-23	30	25-27-29-31-33-35
7	1-2-4-5-7-9-11	19	13-14-16-17-19-21-23	31	25-26-28-29-31-33-35
8	1-2-4-5-7-8-10-11	20	13-14-16-17-19-20-22-23	32	25-26-28-29-31-32-34-35
9	1-2-3-5-6-7-9-10-11	21	13-14-15-17-18-19-21-22-23	33	25-26-27-29-30-31-33-34-35
10	1-2-3-4-5-6-7-9-10-11	22	13-14-15-16-17-18-19-21-22-23	34	25-26-27-28-29-30-31-33-34-35
11	1-2-3-4-5-6-7-8-9-10-11	23	13-14-15-16-17-18-19-20-21-22-23	35	25-26-27-28-29-30-31-32-33-34-35
12	1-2-3-4-5-6-7-8-9-10-11-12	24	13-14-15-16-17-18-19-20-21-22-23-24		

Tighten the pumping elements (12 mm wrench) and plugs (6 mm Allen key) applying a torque of 10 Nm.

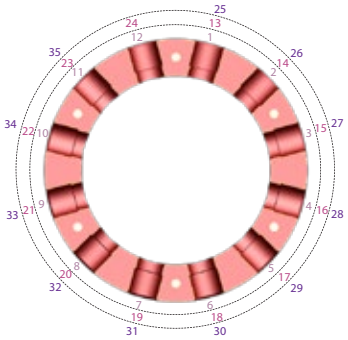
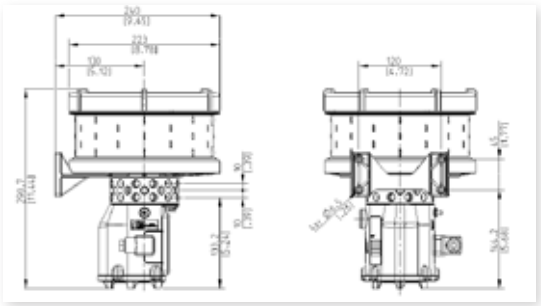


Fig.1: Positioning of pumping elements according to the number of outlets used.

Electrical connection diagram

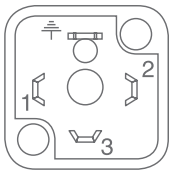
▸ Dimensions



NRUN: model designed for industrial vehicles. The connection with general activation (NRUN) allows the use of the pump with the machine in closed-loop control. The pump operates only if the activation signal is present, otherwise it remains in standby mode; the external activation signal is a standard +5V logical signal.

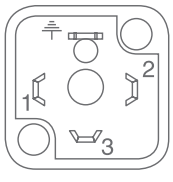
12 VDC-IND

1 = 12VDC +
2 = ALARM NO out
3 = ALARM COM out
⏚ = 12VDC –



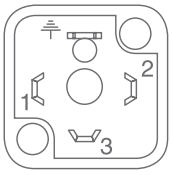
24 VDC-IND

1 = 24VDC +
2 = ALARM NO out
3 = ALARM COM out
⏚ = 24VDC –



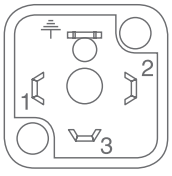
12 VDC-NRUN

1 = 12VDC +
2 = NRun in
3 = ALARM out
⏚ = 12VDC –



24 VDC-NRUN

1 = 24VDC +
2 = NRun in
3 = ALARM out
⏚ = 24VDC –



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