

SNR: bearing expertise
to optimize maintenance



SNR - Industry



Maintenance Services



*Before choosing the tools,
choose the men*



Knowledge of bearings guarantees good maintenance

Influencing productivity, safety at work and the environment, maintenance has become of vital importance, especially concerning heavily loaded parts like bearings. Preventive maintenance depends above all on knowledge and experience. SNR Maintenance teams have gained this know-how through interventions in diverse industrial fields.

Their expertise, allied with an ability to listen to their customers, is their most effective tool.

SNR Services and products: a broad field of interventions

Our maintenance solutions are never oversize and adapted to each particular case. Our services range can take the form of specific interventions or longer-term contracts. Our products concern lubrication, the fitting/dismounting and the monitoring.



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Maintenance Services



Establishing the cause and origin of failure to improve performance

By monitoring the millions of SNR bearings available on the market, we have succeeded in developing extremely precise statistics regarding causes of failure. This compilation of data highlights a vital fact: in the event of premature failure, it is rare that the bearing itself is the cause. In 90% of cases, failure is caused by external elements that may be classified in 4 main families:

Inadequate lubrication (70%):

Incorrect or unsuitable lubrication significantly reduces bearing service life. Lubrication is frequently neglected due to lack of accessibility and the user's lack of knowledge concerning lubricants.

The choice of lubricant, the method, the quantity to be added and the frequency of addition should be carefully analyzed. SNR can specify the recommended lubricant, and markets a complete range of greases suited to each type of application, as well as an automatic lubrication system (*refer to the Lubrication chapter*).

Contamination (18%):

Frequently, bearings are used in extremely polluted environments that significantly reduce bearing service life.

To counter these problems, SNR has developed an extremely broad range of sealing systems and can advise which is most suited to your application.



Improper installation (10%):

The installation of a bearing is a key step that will effect the bearing's service life.

In fact, bearings that are incorrectly installed will become worn very quickly. The main causes are as follows:

- *improper installation procedures,*
- *contamination during installation,*
- *incorrect preparation of mating surfaces:
shafts and housings outside tolerance limits,
faulty lubricant access, misalignment.*

Damage may cause abnormal noise, in the short term it will cause fatigue of bearing surfaces.

SNR can either perform installation and removal operations, or provide you with tools and devices that will facilitate these operations and help ensure that they are correctly performed (*refer to the Installation & removal chapter, Services chapter*).

Fatigue (2%):

Bearings support loads and must at the same time rotate, conditions which cause fatigue of critical components. Fatigue, or spalling, of rolling elements and raceways is the normal mode of bearing failure, but can be accelerated by a number of faults.

By using our monitoring methods you will be able to identify the first signs of spalling and schedule suitable maintenance operations (*refer to the Monitoring & measurement chapter, Services chapter*).

Maintenance Services



*The maintenance department challenge:
To ensure production tool availability
when needed at optimised cost*

Currently operating in "Just In Time" mode, the industry is continuously compelled to reduce production costs while improving the quality of manufactured products. Hence, the quest to optimise the availability of production means and to decrease maintenance and repair costs has become crucial.

"Better safe than sorry" is a good summary of current maintenance philosophy which has had to evolve in order to meet these requirements. Increasingly, it is vital that the "maintenance policy" to be adopted is identified upstream, frequently with regard to machine constraints.

- **Curative or corrective maintenance: after failure**

This involves waiting for a failure to occur before determining the problem and carrying out repairs. This requires excessively large intervention teams in order to ensure fast reaction times, without allowing company control equipment availability. Failure usually generates significant production losses and repair costs.

- **Preventive: routine maintenance**

Routine maintenance, performed at regular intervals, engenders an increase in installation reliability but does not prevent failures.

It does not take wear of replaced parts into consideration and involves extraction and fitting that have a negative impact on service life and equipment reliability. It also means that machines are out of use for the duration of maintenance. Lastly, the large stocks of spares and labour needed to perform routine maintenance constitute as significant cost. According to some studies, 30% of amounts invested in preventive maintenance are wasted.

- **On-condition maintenance**

The aim of on-condition maintenance is to predict failures without dismounting machines or stopping production. It involves defining parameters which characterise the equipments state of health and periodically monitoring changes of said parameters in order to schedule corrective interventions at the optimum time.

The most commonly used techniques in the industry are vibration monitoring, tracking of operating parameters, analysis of lubricants and IR thermography.

On-condition maintenance offers many economic advantages:

- The incidence of unscheduled production shutdowns is decreased thus increasing equipment availability,
- Reduction of routine shutdowns for maintenance,
- The severity of repairs is limited thus entailing a reduction of intervention costs and an increase in intervention safety,
- Reduction of storage costs for spares procured according to actual requirements,
- Scheduling of maintenance interventions thus allowing improved organisation of the intervening parties and cost reductions,
- Intervention quality improved thanks to targeted actions,
- Employee motivation via valuation of maintenance tasks.

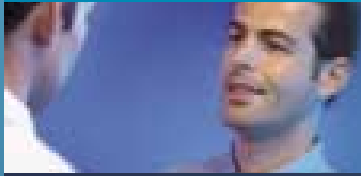
In order to efficiently meet these new maintenance expectations, SNR has developed a range of products and services that allow our clients to cope with all circumstances.

A photograph of two men in business attire (shirts and ties) looking at a tablet together. The man on the left is in the foreground, looking towards the right. The man on the right is in the background, looking at the tablet. The background is a soft, out-of-focus blue.

Services

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Services



Exclusive methods for deciphering the future of each bearing

An objective and global approach

Maintenance must take into account all the mechanical environment because the interactions between the bearing and other elements generate invaluable indices.

This global approach, defined thanks to experience of multiple applications, is nevertheless strongly linked to objective data which guarantees the neutrality of the diagnosis.

This is why SNR calls upon specialised partners, in particular 01dB Acoustics & Vibration. This collaboration enables us to propose many different modes of monitoring and in particular the vibratory analysis which is very effective in the field of rotating machines.

Proximity and flexibility for an adapted service

Via its worldwide network of distributors, SNR bases its "Maintenance Services" expertise on the same values as its manufacturer policy: flexibility, responsiveness and proximity. SNR focuses as much on its customers as it does on its bearings.

Monitoring and vibration expertise

Our shaft alignment and vibration expertise services will allow customers to define:

- monitoring methods and test/inspection means,
- test/inspection intervals,
- the organisation to be implemented,
- formal presentation of results and performance of technical/economic analyses.

Vibration Monitoring and Analysis: On-site services*



• Installation and start-up of portable (Off-line) vibration monitoring systems

- System installation,
- Monitoring database parameter setting: definition of control procedures, measurement points, monitoring parameters, thresholds, etc.,
- Analysis of measurements and zero state report.

• Installation, start-up and maintenance of continuous (On-line) vibration monitoring systems

- Installation of systems with, possibly, management of service providers for positioning of sensors, wiring and channel grouping units,
- System parameter setting: definition of control procedures, monitoring parameters, thresholds, etc.
- Preventive and corrective maintenance of all our systems in the context of guarantees and maintenance contracts.

• Periodic monitoring of your equipment

- Initialisation of monitoring,
- Data management,
- Periodic acquisition of data by the collector,
- Data analysis and provision of a monitoring report describing preventive and corrective actions to be performed.

* Works realized by our partner 01dB Acoustics & Vibration

Monitoring and vibration expertise



• Expert analyses and occasional interventions

There is a complete range of services available to allow monitoring of equipment from commissioning up until decommissioning and to ensure optimum availability.

- Acceptance testing of machines, ensuring compliance, settlement of discrepancies and disputes,
- Control procedures acknowledged and recognised by machine constructors and inspection organisations. They allow assessment of equipment quality with respect to standards in effect and design specification: critical speed, separation margin, susceptibility to imbalance, stability margin, etc.
- Occasional expert analysis of mechanical problems.
- Use of advanced analysis techniques to characterise machines in stationary and transient modes and to perform structure analyses. Control hardware and software fitted with efficient analysis tools such as: acyclism analysis for gear box, "ellipse" Bode analysis to establish critical speed, the "sliding statistics" to detect pulse phenomena, experimental modal analysis and calculation of modal distortion to resolve machine-structure coupling problems.
- Assistance with design, enhancing reliability of installations, reduction of nuisances, modelling, design. (Working with our partner Metravib RDS).
- On site Balancing of rotating machines (without removing the rotor).

Monitoring and vibration expertise

Vibration Monitoring and Analysis: remote services

From telephone services to complete responsibility for your conditional maintenance tools, our objective is to guarantee you optimum cost efficiency.

Data is transferred automatically by:

- Modem: exchanges between our On-line monitoring systems (Moviscan) and our remote monitoring centre,
- E- mail: measurements taken with our data collectors by you or, by a local service provider that we select together.

• Assistance with implementing our equipment and our software

Configuration of IT systems, undertaking and updating of firmware and software, database parameter setting.

• Off-line remote monitoring by data collector

- Initialisation of periodic monitoring program: database parameter setting,
- Periodic equipment trouble-shooting.

• On-line remote monitoring

Automatic continuous monitoring of your equipment performed by our Moviscan monitoring systems installed in a fixed station on your site. Alarm information is instantly transmitted to our remote monitoring centre for analysis.

Systems designed for severe environments and for monitoring equipment with specific operating modes: variable load and speed, cycle operation.

In the context of this service, we:

- Install and start-up of Moviscan,
- Set monitoring parameters,
- Perform periodic and on-alarm diagnosis,
- Perform system maintenance.

• Remote expert analyses

Diagnosis of your equipment, occasionally and on request.

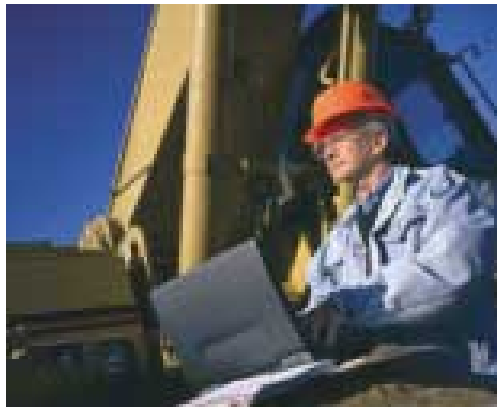
Access to your data by interacting with your application or by e-mail, using our software's export functions.



Services

Fitting - dismounting, shaft alignment

Fitting or dismounting of bearings



Bearing fitting or extraction is not an innocuous operation.

If you do not possess suitable means, or if you lack the time or availability, SNR is there to help you.

Especially trained by SNR with these operations, our teams are competent and professional. They are effective, responsive and available worldwide.

Our technicians will supervise these operations, or even perform the entire operation for you.

For specific cases, they will call on our specialised partners. These services guarantee impeccable fitting and ensure the durability of your installations.

These services are adapted to each type of application and each branch of industry: paper mill, iron and steel industry, quarry, cement factory, food and beverage, ski lifts, etc.

Shaft alignment

50% of rotating machine failures are caused by incorrect shaft alignment.

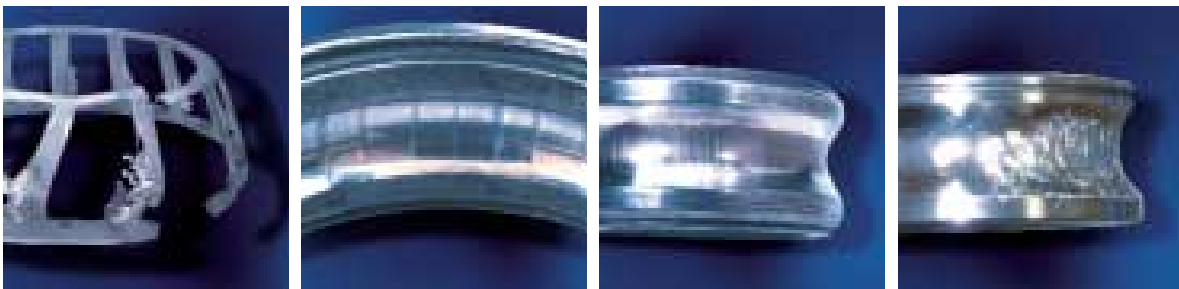
Misalignment entails stress loading and vibrations that give rise to premature deterioration of bearings, and also couplings, packings and sealings, etc. Abnormal stress loading associated with misalignment also entails increased energy consumption. Misalignment has a direct impact on maintenance costs and the availability of your production tool.

By entrusting your shaft alignment operations to the teams of SNR experts, you will guarantee the precision of alignment and will ensure the quality of your rotating machines elements.

Expertise and After-Sales Service

Even the best maintenance cannot totally eliminate failure.
A manufacturer must be able to perform precise analyses.

Bearing expert analysis: identifying the causes



- **A bearing is damaged or operating abnormally?**

It is vital to discover why in order to avoid reoccurrence of the failure after a short period. The same cause will inevitably produce the same effects. Our experts are available to examine the effective bearing and can travel to your site if necessary.

Upon conclusion of this expert analysis, you will be provided with a report explaining the causes of damage. This report will also include advice to prevent this type of problem in the future.

- **The procedure to be followed**

The bearing should be sent to us **without being cleaned**. An expert analysis must be requested using a special form available from your SNR contact or our distributor.

Please ensure that you provide with this form as much information as possible concerning equipment environment and operating conditions to allow us to analyse possible causes of failure as precisely as possible.

Maintenance tools: After-sales Service and guarantees



Our teams are available to assist you with any problems encountered when using our maintenance products. In the event of failure, replacement equipment will be rapidly shipped to you for the duration of the repair that will be made as quickly as possible.

All of our products are accompanied by a guarantee that varies depending on product type. Do not hesitate to contact your SNR contact or our distributor for more information.

The key to efficient maintenance

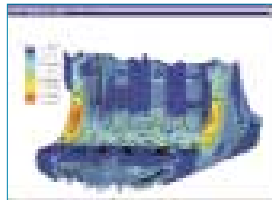


Even maintenance requires continuous maintenance: in other words, training is essential to ensure that your teams are able to act swiftly and with foresight within a technological universe in constant evolution.

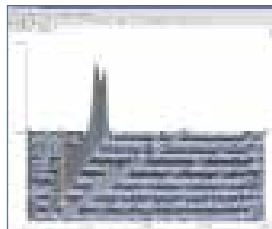
Training courses developed by SNR and its partners enable optimisation of maintenance techniques and tools in order to control all parameters that could affect a bearing.

• Extremely comprehensive content, customised services

SNR applies the same high quality standards to its training courses that it applies to its products. Approved by official organisations, course content is complete, thorough and continuously updated. The most recent maintenance methods are dealt with in detail. Training modules cover:



- Bearings and/or self aligning bearings: Initiation - Advanced courses.
- Fitting - extraction
- Lubrication
- Shaft alignment



- Vibration analysis
 - Rotating machines: Initiation - Advanced courses
 - Electrical engines
 - Turbomachines
 - Reduction gears
 - Structure analysis

• Objective: operational efficiency

These modules, of which there are different levels (I - II - III), include a routine assessment at the end of the course. Focused on real objectives, they make use of varied and complementary teaching techniques: lectures, group work, hands-on work, plant visits. Furthermore, upon completion of the training sessions, the content of the training course is available to your teams on CD-Rom and DVD, including demonstration films. An effective support medium that may be referred to at anytime.



Technical assistance and logistics

On a daily basis SNR technicians are attentive to your needs

Outside maintenance interventions, your teams may need precise technical information. Teams of engineers, technicians and SNR distributors are there to provide answers. Furthermore, SNR can provide you with documentation suited to your sector of activity.



SNR logistics: proximity and availability



Efficient maintenance must go hand in hand with responsive logistics in order to minimise production stoppages. SNR's extremely extensive distribution network guarantees rapid and emergency part availability and that parts will be delivered in immaculate condition, at a competitive cost.

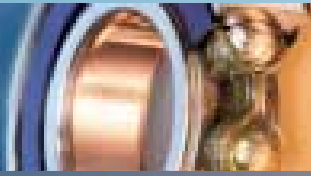
With its European Distribution Center, SNR ensures a 95% availability rate of the parts and a 98% service rate. That is to say, the error rate is 5 in 10000 delivered lines, a result seldom observed in industry.



Lubrication

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Lubrication



Life insurance for your bearings

Lubrication is taking integral part of the bearing

Lubrication is essential for correct operation of the bearing. In fact, 70 % of bearing failures originate from lubrication problems.

Lubrication's function is to insert an oil film between rolling elements and bearing races to avoid wear and seizing.

Besides, lubrication ensures protection against oxidation and external contamination.

A solution for each application

Bearing life is directly dependent on oil film efficiency, which is influenced by:

- lubricant nature, hence, its adhesion or retention capabilities with temperature, speed...*
- bearing load and speed.*

General purpose greases do not always meet the specific requirements of some applications. Bearings intended to operate in high load, speed and temperature conditions, or in the presence of water, humidity or vibrations, require carefully selected grease.

For more than 50 years, SNR has conducted research in this field, jointly with the largest lubricant manufacturers worldwide. Therefore, we have acquired extensive knowledge and experience in bearing lubricants.

SNR-LUB Greases



The SNR-LUB range is available in many packaging types and covers a large diversity of applications. Designed to meet your needs, it is your best asset in increasing your bearing service life. For this reason, careful, clean lubrication processes are strongly recommended. Any foreign body in the grease can cause premature bearing damage.

Physical and chemical characteristics of the greases

- NLGI grades (National Lubrication Grease Institute) correspond to a penetration value in the worked grease (according to test specification ASTM/D217).
- For bearings, the generally acknowledged consistency is grade 2 or 3.

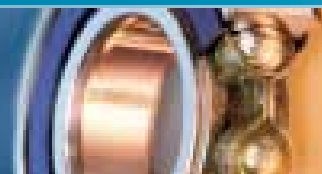
NLGI grades	Worked penetration	Consistency
0	385-355	Half-fluid
1	340-310	Very soft
2	295-265	Soft
3	250-220	Average
4	205-175	Half-hard

Basic oil viscosity: generally defined in cSt (mm²/s) at 40°C (100°F).

Density: on the order of 0.9ccm.

Drop point: temperature at which the 1st oil drop falls from a grease liquefied by heating of sample. For more details, write to your SNR technician.

Order of magnitude: 180°C / 250°C according to grease constituents. The max. operating temperature of the grease is always lower than drop point.

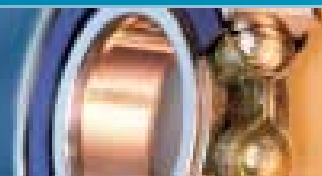


SNR-LUB Greases

RPM.Dm: RPM x mean diameter
 VG: Very good performance
 G: Good performance
 NR: Not recommended

Technical characteristics

	MS	EP	HT	GV+	VX	THT	AL1	FV <small>new</small>
Color	Amber	Amber	Light brown	Light yellow	Golden	White	Clear yellow	Dark brown
Composition	- Mineral oil - Lithium soap	- Mineral oil - Extreme pressure - Lithium soap	- Synthetic oil - Polyurea thickener	- Diester oil - Lithium soap	- Mineral paraffinic oil - Lithium soap	- Perfluorated thickening fluid - PTFE	- Mineral paraffinic oil - Complex aluminum soap	- Mineral oil - Lithium + calcium
Basic oil viscosity (SUS)	105	105	150	15	310	390	200	950
Consistency, NLGI Grade	2	2	2	2	2	2	2	2
Operating temperature, (°C / °F)	-30 +120 -20 +250	-30 +110 -20 +230	-30 +150 -20 +300	-50 +120 -75 +250	-20 +130 -5 +270	-20 +220 -5 +430 -20 +250 -5 +480	-30 +120 -20 +250	-5 +140 +25 +285
Moderate loads P < C / 5	G	VG	G	G	G	VG	G	G
High loads P > C / 5	NR	VG	NR	NR	VG	VG NR	G	VG
Low speed RPM x Dm < 100,000	G	G	NR	NR	VG	VG	G	VG
High speed RPM x Dm > 100,000	G	G	G	VG	NR	G G	G	NR
Humidity, Presence of water	VG	VG	G	VG	G	G	G	G
Oscillations, Low amplitude	G	G	VG	G	VG	VG	G	G
Vibrations at idle	NR	NR	NR	VG	NR	NR	NR	NR
Adhesion	G	G	VG	G	VG	VG	G	VG
Low torque	G	G	G	VG	NR	NR	G	NR
Quietness	G	G	G	VG	NR	NR	NR	NR
Corrosion protection	VG	VG	G	VG	G	G	G	G
Resistance to chemical agents	NR	NR	NR	NR	NR	VG	NR	NR
Pumpability	VG	VG	VG	VG	VG	VG	VG	G
Packaging	- Tube 230g - Cartridge 400g - Can 1kg - Bucket 5kg - Barrel 23kg, 50kg	- Cartridge 400g - Can 1kg - Bucket 5kg - Barrel 23kg, 50kg and 190kg	- Cartridge 400g - Can 1kg	- Tube 90g - Can 1kg	- Cartridge 400g - Can 1kg - Barrel 50kg	- Tube 50g (25 ml)	- Cartridge 400g - Can 1kg	- Cartridge 400g - Can 1kg
Remarks	-	-	Grease life depends on operating temperature	Pay attention to: - quantity - hold - eighboring active parts - grease retention	-	-	Conforms to US Food and Drug Administration Recommendations, Class H1	-



SNR-LUB Greases

Choosing an SNR grease according to your applications

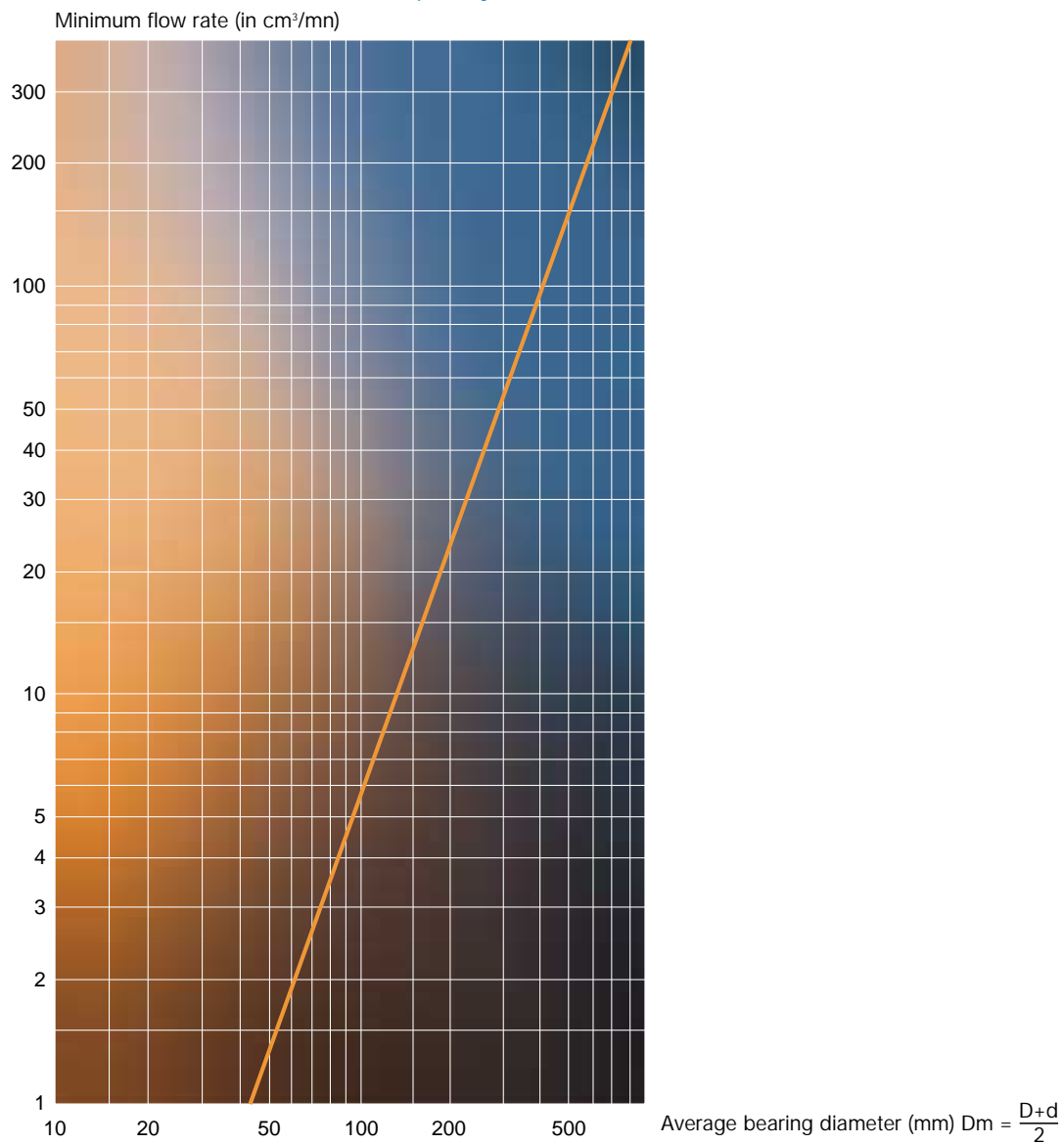
Main criteria	Operating limits		Typical applications	General recommendations	SNR-LUB recommendation
	Temperature, °C/°F	Speed			
General purpose	-30 to +120 / -20 to +250 -	< bearing's limiting speed	- Farming machines - General mechanics - Handling devices - Electrical tooling	- Mineral oil - Traditional soap (lithium, calcium...) - Consistency: generally grade 2, for large size bearings, or particular operating modes - Performance reduction above 80°C / 175°F in continuous mode; some applications may require another choice	● MS
High loads	-30 to +110 / -20 to +230	< 2/3 bearing's limiting speed	- Automotive - Iron & Steel - Civil works equipment	- Similar to multi-purpose greases but with extreme pressure additives	● EP
High temperature	-30 to +130 / -20 to +270	< 2/3 bearing's limiting speed	- Electrical motors, class E	- Traditional soap with high viscosity mineral base oil or synthetic oil	● HT
	-20 to +150 / -5 to +300	-	- Electrical motors, class F - Alternators		
	-20 to +180 / -5 to +350	≤ 1/3 bearing's limiting speed	- Oven & furnace equipment - Electrical motors, class H - Couplers	- Entirely synthetic greases - Greases with silicone base oil feature poor performance under load	● THT
	-20 to +250 / -5 to +480	< 1/5 bearing's limiting speed	- Oven equipment - Furnace tubs	- Synthetic products, in solid or paste form - Hardly mixable products	Consult SNR
Low temperature	Down to -50 / Down to -75	≤ 2/3 bearing's limiting speed	- Aerospace - Special engines	- Very low viscosity base oil Pay attention to grease retention, if temperature exceeds 80°C / 175°F	● GV+
High speed	-20 to +120 / -5 to +250	≤ 4/3 bearing's limiting speed	- Machine-tool spindles - Wood-working machines - Textile spindles	- Very low viscosity oil	
Humidity	-30 to +120 / -20 to +250	≤ 2/3 bearing's limiting speed	- Washing machines	- Traditional grease, with large amount of anti-corrosion additives	● MS ● EP
Centrifugal forces Vibrations Rotating outer ring	-20 to +130 / -5 to +270	≤ 2/3 bearing's limiting speed	- Alternators - Civil works equipment - Idle pulleys	- Strong adhesion grease (grade 2 consistency)	● VX
Food compatibility	-30 to +120 / -20 to +250	≤ 2/3 bearing's limiting speed	- Agri-food industry	- Food compatible grease	● AL1
High load and low speed	-5 to +140 / +20 to +285	-	- Heavy industry: steel-works: paper mills, quarries	- Suitable for very low speed operation, under very high loads	● FV <small>new</small>

Lubrication

SNR-LUB Greases

Grease titration and regreasing

- **Oil lubrication** (minimum oil quantity)



- **Grease lubrication** (Grease titration)

Excess grease can cause overheating.

The grease must occupy 20 to 30% of the free volume inside the bearing.

Necessary grease weight calculation formula: $G = 0,005 D.B$

G = gram (or cm³) , D = bearing outer diameter in mm , B = bearing width in mm

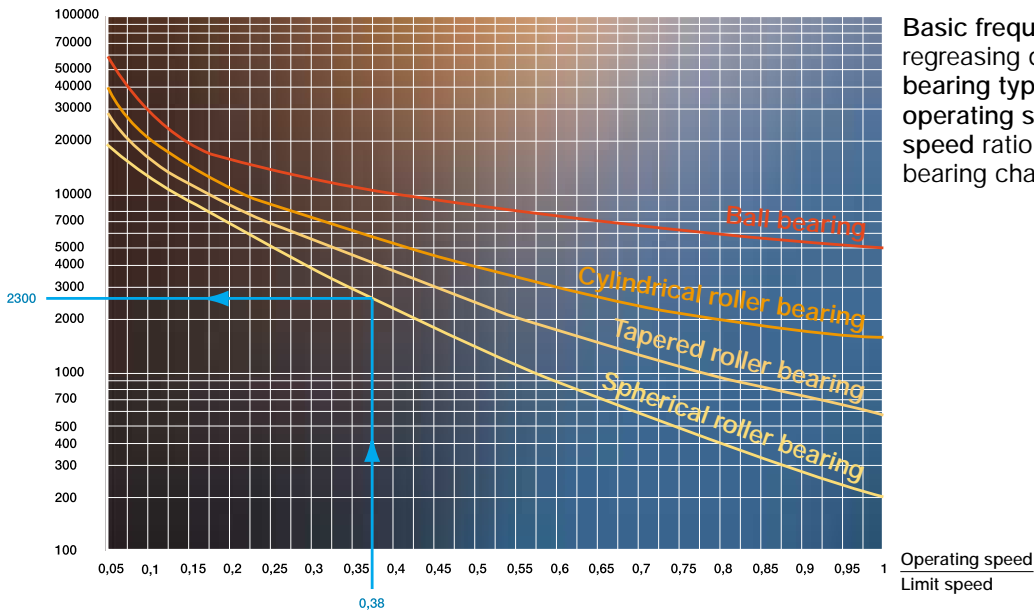
Exceptions:

- The grease quantity can be increased by 20% for bearings fitted with a grease drain port,
- Bearings turning at very low speed will tolerate maximum filling.

SNR-LUB Greases

• Regreasing frequency

Basic frequency (in hours)



Basic frequency (Fb) of regreasing depends on bearing type and on operating speed vs. limit speed ratio indicated in the bearing characteristics.

This basic frequency must be corrected by the factors according to the particular environmental conditions of the mechanism (dust, humidity, shocks, vibrations, vertical shaft, operating temperature...) as per the relation: $F_c = F_b \times T_e \times T_a \times T_t$

	Environment	Application	Temperature		
Conditions	- Dust - Humidity - Condensation	- With shocks - Vibrations - Vertical shaft	Level	For standard grease	For high temperature grease
Factors	T_e	T_a		T_t	T_t
Average	0.7 to 0.9	0.7 to 0.9	75°C	0.7 to 0.9	-
High	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 high	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, lubricated with standard grease, turning at 1,500 RPM, in a dusty environment, at 90°C, except other application requirements:

22212 = Spherical roller bearing
 S limit = 3,900RPM
 S operating = 1,500RPM

$\frac{S \text{ operating}}{S \text{ limit}} = \frac{1,500}{3,900} = 0,38$ ----> Basic frequency
 $F_b = 2,300H$

Factors
 $T_e = 0.5$ ----> dust
 $T_a = 0.9$ ----> normal
 $T_t = 0.3$ ----> 90°C

Corrected frequency (F_c) = $F_b \times T_e \times T_a \times T_t = 2,300 \times 0.5 \times 0.9 \times 0.3 = 310$ hours

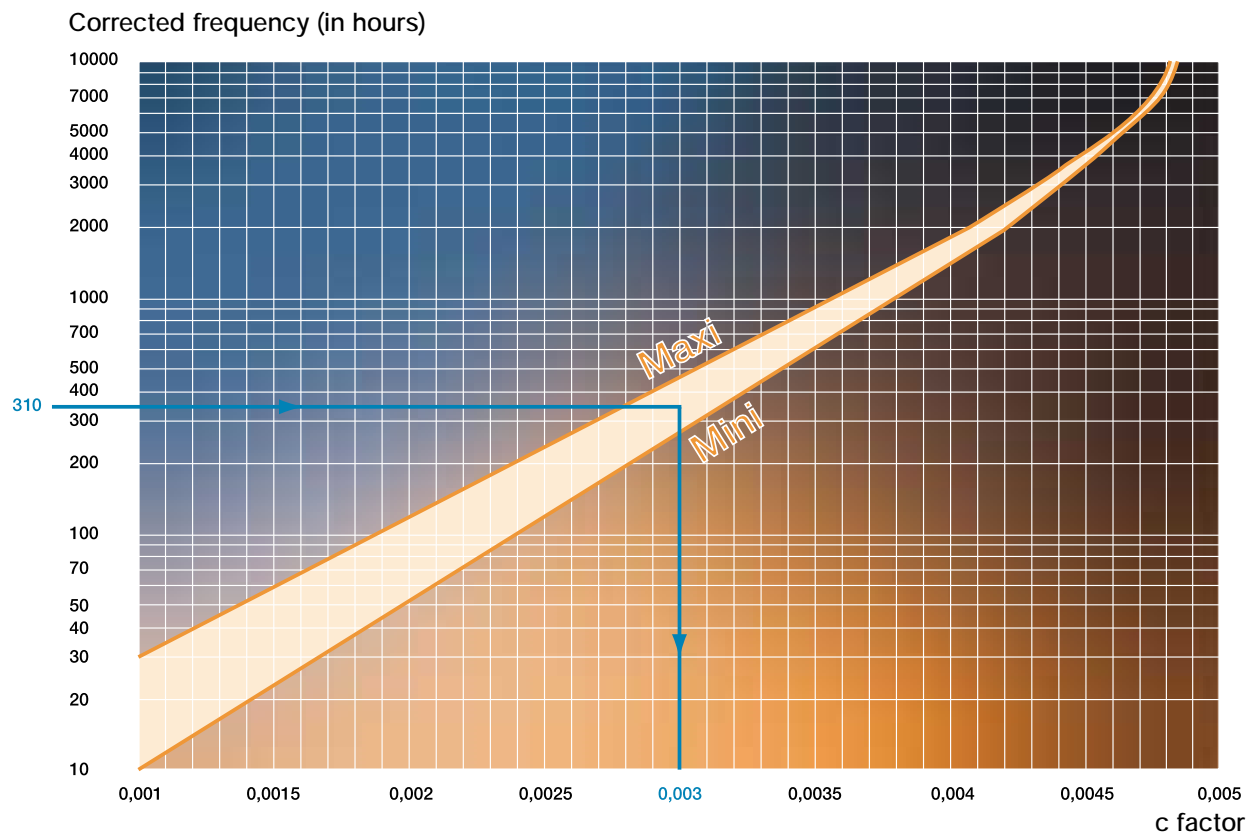
Lubrication

SNR-LUB Greases

- Grease amount to be added

This corrected frequency allows the calculation of the amount of grease to be added, depending on:

- bearing width B,
- outer diameter D,
- c factor as read on the curve below, according to the relation $P = D \times B \times c$.



Example: for bearing 22212
(spherical roller bearing)

P = grease weight
D = 110mm
B = 28mm
c = 0.003

$P = D \times B \times c = 110 \times 28 \times 0.003 = 9$ grams
Therefore, 9 grams will be added every 310 operating hours

All these calculations can be realized thanks to our CD Rom I-cat

Fitting compound



The fitting compound was especially designed for contact corrosion-critical applications.

By its unique composition, it is both a lubricating and a fitting compound.

Applications

- Installation and removal (bearings, wheels, flanges, etc.),
- Lubrication (smooth bearings, threaded spindles, splined shafts, adjustment nuts and bolts, rubber lip rings, etc.) for stick-slip reduction.

Technical characteristics

- Contact corrosion reduction, permitting easier removal,
- Extended shaft and bearing housing life,
- Composition: lithium soap, synthetic oil, solid organic lubricants,
- Enhanced corrosion protection,
- Operating temperature: -45°C to + 150°C,
- NLGI grade: 1 (basic oil viscosity at 40°C = 380 cSt),
- Water and washout resistant.

For lubrication of your bearings, SNR generally recommends the use of various types of grease from the SNR-LUB range. (See Choosing an SNR grease according to your applications p. 20-21).

Lubrication

Grease gun for bearings



When you carry out maintenance on your equipment, frequently access to the bearings is difficult and often in dusty, dirty environments.

The grease gun is designed to facilitate regreasing and allows you to cleanly inject the right grease quantity.

The grease gun and its specific accessories are designed to facilitate the operations of greasing and re-greasing of your bearings and to inject the good quantities of grease with cleanliness and precision.

Technical characteristics

- Material: heavy steel plate,
- Weight: 2-1/2 pounds with steep section and clip,
- 150mm steep section in steel,
- "Hydraulic" type steel clip, 3 jaws, with flat (10 x 100 threads),

Content	Flow rate	Operating pressure	Maximum pressure
500cm ³	0.80cm ³	180bar	360bar

Suitable for 400g cartridges, bulk grease, with bleed and filling valve. The SNR grease gun is compatible with standard grease cartridges, notably SNR-LUB grease cartridges.

- Greasing accessories supplied with the gun: di-chromated, zinc-plated steel union (M10 x 100 threads), two plastic nozzles (standard threads).

Advantages

• Durable

- Entirely made of steel, it ensures long service life (resistance to shocks and intensive use).

• Practical use

- The pump can be actuated with one hand; you can turn the bearing with your free hand,
- Knurled body, permitting excellent grip,
- Accepts cartridges or bulk grease.

• Greasing precision

- Thanks to a specially designed SNR union, you can fit a special profile greasing nozzle onto the SNR grease gun. This nozzle will allow you to inject the grease at the right point,
- Reduced, controlled grease flow rate.

• Cleanliness

- Closed circuit, from grease cartridge to greasing nozzle,
- Clean for the environment and the user.

SNR automatic lubricator

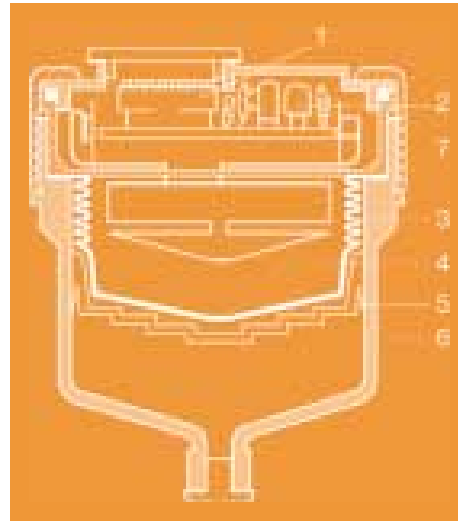


Any under-lubricated bearing is subject to irreversible premature failure.

The automatic lubricator allows constant, regular lubrication of your bearings. Easy to integrate into various types of applications (mechanical and motor industries, steel-works, paper mills, etc.), it enables you to optimize the lubrication function without the need to modify to your equipment.

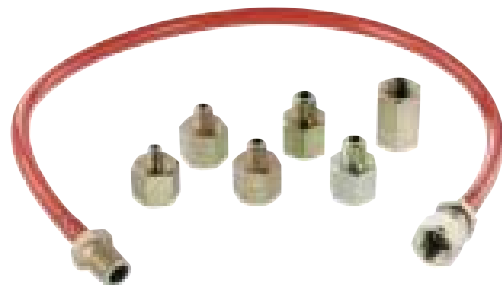
Technical characteristics

- Grease reservoir content: 125 cm³ (6),
- Reservoir closed by piston (5), expressed by diaphragm (3),
- Chamber sealed (4) closed by a membrane: the chamber contains the electro-chemical cell which generates the propellant gas,
- Upper part (7): monitoring cell (1) and control cell (2), comprised of an electrical system with indicator light and 6 switches,
- Cell power supply: 2 alkaline batteries, LR6 type, of 1.5 Volt each,
- Operating time selection (1, 2, 3, 6 months, 1 year) according to the flow rate selected via the switches,
- Switch set to "on": an indicator light blinks, indicating device in service.



Available installation accessories:

- Hoses: RGF 1000 N 01
- RDF unions - female / female
1/4 inch, gas-type, cylindrical
- RDM unions – male / female
6 x 100, taper
8 x 100, taper
8 x 125, taper
10 x 100, taper
10 x 150, taper

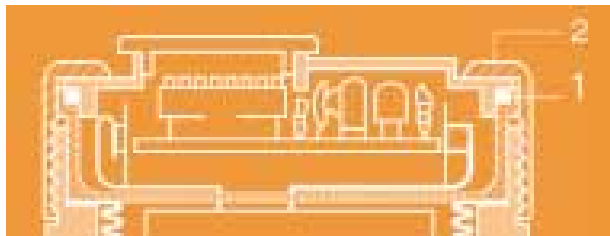


Lubrication

SNR automatic lubricator

Composition of the various elements

- **Lubricator body**, injection-molded, transparent to show the remaining grease level. Fitted with 1/4 inch male threads.
- **Diaphragm** features suitably shaped bottom section intended to ensure correct axial pressure on the grease contained in the reservoir. The body and diaphragm materials (polyamide 11 and polypropylene) comply with the FDA list (US Food & Drug Administration), hence compatible for food applications.



- **Upper chamber**: clear PVC, housing electrodes, the extensible membrane, batteries and electrical system. After adding a cover sealed with O-ring (1) the chamber is centered in the body and secured with polyamide ring nut (2) .

- **Electrolyte** (14 to 15 grams of salt water solution), retained by an organic substrate held between two carbon fiber electrodes.
- **Electrodes**: fed through the bottom section of the upper compartment via sealed (bonded) ports. They extend into US-welded stainless steel contacts.
- **Electrical system**. The various elements: diode, transistors, resistors, condensers, and the switching unit are tin-welded on a PCB. This electrical unit and the two batteries are clipped onto the corresponding stainless steel contacts. To ensure continuous contact for the entire lubricator service life, the various elements are pressed by leaf-springs.
- **Diaphragm**, made of thermoplastic material ensuring both the mechanical strength of plastic and the elasticity of elastomeric materials, it is US-welded on the bottom section of the upper compartment. Therefore, the electro-chemical cell is housed in a fully sealed enclosure. During final assembly, the sealed joint is pressed between the tank and the upper compartment by the flanged nut, ensuring a leak-proof connection.



- **Protections**. Access to the switching unit is closed by a cap fitted with an O-ring, ensuring a perfect seal, even when submersed. A grease flow port is sealed by a plug.

- **Propellant gas**. The inert gas in the SNR lubricator guarantees absolute safety. Comprised of 90% nitrogen, it is harmless both to the operator and the environment. Explosion-proof, flameproof, it allows the SNR lubricator to meet industrial safety standards, notably the non-combustable standards.

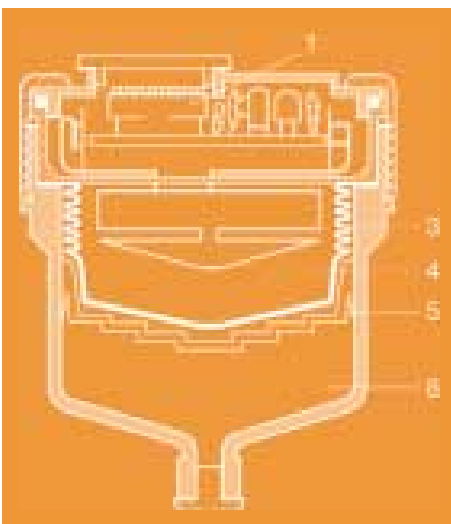
SNR automatic lubricator

Advantages

- Easily installed, reliable greasing system,
- Clear container with graduated label for permanent grease level monitoring,
- Regular flow rate,
- Large volume, compact size (diameter: 80mm, height: 130mm, weight: 14ounces),
- Perfectly tight connection between lubricator and greased component (no risk of contamination, clean for the environment and the user),
- Harmless to the environment. The gas generated in the SNR lubricator's sealed chamber (nitrogen) is explosion-proof and flame-proof (INERIS and CECHAR certifications),
- Operational up to 55°C / 130°F max. temperature, in high altitude, in water and in all positions,
- Extensive range of accessories (unions, hoses, etc.),
- Can be shut down then restarted,
- Programmable during operation,
- Allows limited maintenance in hazardous environments.

Operating principles

- Setting of the selected switch(es) (1) closes the corresponding electronic circuit and allows variable current (according to the desired flow rate).
- The electro chemical cell releases an inert gas, essentially comprised of nitrogen (90%).
- This gas fills chamber (4) and, via diaphragm (3), pushes piston (5) which, in turn, ejects lubricant (8) contained in the reservoir.



Lubrication

SNR automatic lubricator

Available types of grease

- SNR-LUB EP
- SNR-LUB HT
- SNR-LUB VX
- SNR-LUB AL1, meeting 21 CFR 178 357 requirements of the FDA (US Food and Drug Administration), classified H1 as per USDA recommendations (United States Department of Agriculture).

Please contact us for other types of greases or for empty lubricators, to be filled by the user.

Flow rate adjustment parameters

Shaft diameter	Manual greasing frequency (1 pump strike = 1cm ³)	Daily quantity	Automatic lubricator replacement frequency
100 to 120mm	4 pumps, daily	3 to 4cm ³	1 month
80 to 100mm	2 pumps, daily	2cm ³	2 months
65 to 80mm	8 to 10 pumps, weekly	1.5cm ³	3 months
50 to 65mm	8 to 10 pumps every 15 days	0.7cm ³	6 months
< 50mm	8 to 10 pump strikes, monthly	0.3cm ³	12 months

Values given for normal conditions. For more details, contact your SNR technician.



Installation & removal

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withdrawal sleeves p. 37
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Removal
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Installation & removal



Two crucial points in the life of the bearing

An intervention fraught with consequences

Bearing installation is an essential process which will determine the bearing's service life and ensure correct operation of your equipment.

In fact, incorrectly installed bearings will undergo rapid damage and affect your production facilities.

As a general rule for installation or removal, the bearing must be press-fitted on the turning element (the shaft or the bearing housing, depending on which one is turning).

Nothing must "contaminate" the rolling elements

Cleanliness must also be a permanent concern. Any foreign body infiltration, either during installation, removal or storage, will cause rapid damage to the bearing.

Precautionary steps must also be taken when installing sealing elements. It is mandatory to lubricate the seal mating surfaces when fitting. A grease bead applied at the seal lip and at shaft feedthrough will help to improve the efficiency of the seal and limit the risks of damage.

INSTALLATION PRINCIPLES:

- *Check the bearing part number versus the drawings, specifications, procedures.*
- *Check that the dimensions and geometry of the mating surfaces and bearing journal positions correspond to the SNR drawings and specifications.*
- *Prepare all necessary equipment, parts, tools before beginning the installation process. Check their cleanliness.*
- *Carefully clean and check all parts and components in the bearing environment.*
- *Remove the bearing from its packing at the last moment, in a perfectly clean work zone.*
- *Never wash the bearing, unless otherwise specified. In fact, the bearing is protected against oxidation by a thin film of oil, compatible with all the lubricants used.*
- *Carry out bearing installation in accordance with the chosen method.*
- *Lubricate with special bearing grease, according to the instructions.*
- *After fitting and before final start-up, operate equipment without external loads applied and check correct operation in order to detect possible anomalies (noise, vibrations, overheating, abnormal axial or radial play, ...).*

Installation kit



Bearing installation is a critical operation, requiring suitable tools.

For correct fitting, force must always be applied to the bearing ring being fitted, on the shaft, or in the bearing housing, depending on the installation type.

The SNR installation tools will allow you to maintain the quality of the bearing races, seals and cages, by preventing damage due to the use of improperly sized fittings.

Applications

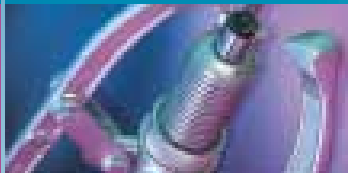
- Bearing installation (bore diameter of 10-55 mm),
- Spacer ring installation,
- Pulley installation,
- Seal installation.

Technical characteristics

The kit includes:

- **3 impact tubes**, well adapted for hand operation,
 - **1 set of 33 impact rings**, very hard wearing, covering an extensive range of dimensions,
 - **1 special hammer**, anti-bounce, shot-loaded, to ensure maximum impact.
-
- A practical kit, easily transportable.

Cold installation



Installation kit

Tube P/Ns	Rings P/Ns	Matching bearing series and symbols								
		60 - 62 63 - 64	12 - 22 13 - 23	72 B 73 B	32 33	222-213 223	NU - NJ N	302 322	313 323	
A 100199	10 - 26	6000	129							
	10 - 30	6200	1200 2200	-	3200	-	-	-	-	
	10 - 35	6300	1300							
	12 - 28	6001								
	12 - 32	6201	1201 2201	-	3201	-	-	-	-	
	12 - 37	6301	1301 2301							
	15 - 32	6002								
	15 - 35	6202	1202 2202	7202 B	3202					
	15 - 42	6302	1302 2302		3302	-	-	30302	-	
B 100299	17 - 35	6003								
	17 - 40	6203	1203 2203	7203 B	3203			30203		
	17 - 47	6303	1303 2303	7303 B	3303	-	-	30303	-	
	20 - 42	6004								
	20 - 47	6204	1204 2204	7204 B	3204		204			
	20 - 52	6304 6403	1304 2304	7304 B	3304	21304	304	30304	32304	
	25 - 47	6005								
	25 - 52	6205	1205 2205	7205 B	3205	22205	205	30205		
	25 - 62	6305 6404	1305 2305	7305 B	3305	21305	305	30305	31305 32305	
C 100399	30 - 55	6006								
	30 - 62	6206	1206 2206	7206 B	3206	22206	206	30206 32206		
	30 - 72	6306 6405	1306 2306	7306 B	3306	21306	306 405	30306	31306 32306	
	35 - 62	6007								
	35 - 72	6207	1207 2207	7207 B	3207	22207	207	30207 32207		
	35 - 80	6307 6406	1307 2307	7307 B	3307	21307	307 406	30307	31307 32307	
	40 - 68	6008								
	40 - 80	6208	1208 2208	7208 B	3208	22208	208	30208 32208		
	40 - 90	6308 6407	1308 2308	7308 B	3308	21308 22308	308 407	30308	31308 32308	
For bearing installation into a housing (without shaft)	45 - 75	6009								
	45 - 85	6209	1209 2209	7209 B	3209	22209	209	30209 32209		
	45 - 100	6309 6408	1309 2309	7309 B	3309	21309 22309	309 408	30309	31309 32309	
	50 - 80	6010								
	50 - 90	6210	1210 2210	7210 B	3210	22210	210	30210 32210		
	50 - 110	6310 6409	1310 2310	7310 B	3310	21310 22310	310 409	30310	31310 32310	
	C 100399	50 - 90	6011 6012	-	-	-	-	-	-	-
		45 - 100	6013 6211	1211 2211	7211 B	3211	22211	211	-	-
		50 - 110	6014	1212	7212 B	3212	22212	212		
6015			1213	7213 B	3213	22213	213	-	-	
6212			2212	7311 B	3311	21311	311			
6213			2213			22311	410			
6311			1311							
6410	2311									

Spanner wrenches



Solid, safe and simple to use, the 5 dimensions of SNR spanner wrenches available from the catalog can replace three times as many fixed conventional wrench models.

They facilitate tightening and removal operations for standard and precision nuts, while reducing the number of part numbers to be controlled and stored.

Technical characteristics

- Size range: 15 to 180mm,
- Two types of wrenches available:
 - Castellated wrench, to tighten nuts with straight lots (or castellated nuts)
 - Pin wrench to tighten drilled nuts (e.g. precision nuts).
Pins are heat-treated to 40 HRC Rockwell hardness.
- 5 sizes of castellated wrenches and/or pin wrenches in catalog:
 - 15 - 35 mm
 - 35 - 50 mm
 - 50 - 80 mm
 - 80 - 120 mm
 - 120 - 180 mm
- The hinge joint, incorporates a spring-washer that ensures smooth, reliable operation. Damage to the nut and the shaft is avoided.

Cold installation



Spanner wrenches

SNR precision nuts and slot wrench / pin wrench arrangement										
	Wrench 15-35mm		Wrench 35-50mm		Wrench 50-80mm		Wrench 80-120mm		Wrench 120-180mm	
	Slot	Pin	Slot	Pin	Slot	Pin	Slot	Pin	Slot	Pin
B and TB type nuts	B 20/1	TB 20/1	B 25	TB 25	B 35	TB 35	B 60	TB 60	B 90	TB 90
	B 20/1,5	TB 20/1,5	B 30	TB 30	B 40	TB 40	B 65	TB 65	B 95	TB 95
	-	-	-	-	B 45	TB 45	B 70	TB 70	B 100	TB 100
	-	-	-	-	B 50	TB 50	B 75	TB 75	-	-
	-	-	-	-	B 55	TB 55	B 80	TB 80	-	-
	-	-	-	-	B 60	TB 60	B 85	TB 85	-	-
BP and TBP type nuts	-	-	BP 20/1	TBP 20/1	BP 30	TBP 30	BP 55	TBP 55	BP 75	TBP 75
	-	-	BP 20/1,5	TBP 20/1,5	BP 35	TBP 35	BP 60	TBP 60	BP 80	TBP 80
	-	-	BP 25	TBP 25	BP 40	TBP 40	BP 65	TBP 65	BP 85	TBP 85
	-	-	-	-	BP 45	TBP 45	BP 70	TBP 70	BP 90	TBP 90
	-	-	-	-	BP 50	TBP 50	-	-	BP 95	TBP 95
	-	-	-	-	-	-	-	-	BP 100	TBP 100
BR and TBR type nuts	-	-	BR 25	TBR 25	BR 35	TBR 35	BR 60	TBR 60	BR 90	TBR 90
	-	-	BR 30	TBR 30	BR 40	TBR 40	BR 65	TBR 65	BR 95	TBR 95
	-	-	-	-	BR 45	TBR 45	BR 70	TBR 70	BR 100	TBR 100
	-	-	-	-	BR 50	TBR 50	BR 75	TBR 75	-	-
	-	-	-	-	BR 55	TBR 55	BR 80	TBR 80	-	-
	-	-	-	-	BR 60	TBR 60	BR 85	TBR 85	-	-
BPR and TBPR type nuts	-	-	BPR 20/1	TBPR 20/1	BPR 30	TBPR 30	BPR 55	TBPR 55	BPR 75	TBPR 75
	-	-	BPR 20/1,5	TBPR 20/1,5	BPR 35	TBPR 35	BPR 60	TBPR 60	BPR 80	TBPR 80
	-	-	BPR 25	TBPR 25	BPR 40	TBPR 40	BPR 65	TBPR 65	BPR 85	TBPR 85
	-	-	-	-	BPR 45	TBPR 45	BPR 70	TBPR 70	BPR 90	TBPR 90
	-	-	-	-	BPR 50	TBPR 50	-	-	BPR 95	TBPR 95
	-	-	-	-	-	-	-	-	BPR 100	TBPR 100

KM lock nut and slot wrench arrangement				
Wrench 15-35mm	Wrench 35-50mm	Wrench 50-80mm	Wrench 80-120mm	Wrench 120-180mm
KM 0	KM 5	KM 7	KM 12	KM 18
KM 1	KM 6	KM 8	KM 13	KM 19
KM 2	-	KM 9	KM 14	KM 20
KM 3	-	KM 10	KM 15	KM 21
KM 4	-	KM 11	KM 16	KM 22
-	-	KM 12	KM 17	KM 23
-	-	-	KM 18	KML 24
-	-	-	-	KM 24
-	-	-	-	KM 25
-	-	-	-	KML 26
-	-	-	-	KM 26
-	-	-	-	KM 27
-	-	-	-	KML 28
-	-	-	-	KM 28
-	-	-	-	KML 30

Adapter and withdrawal sleeves, hydraulic sleeve



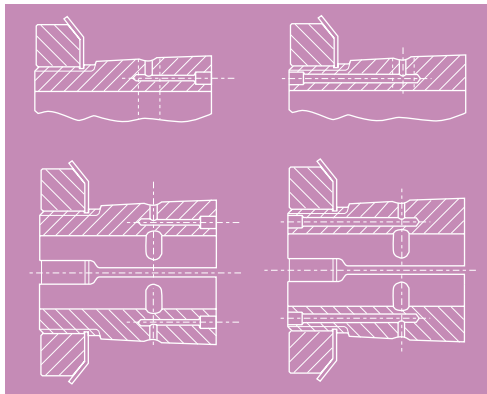
Adapter sleeves produce an interference fit between bearing and rotating shaft by pressing the bearing onto the sleeve. Withdrawal sleeves allow easy removal by simply screwing in the extraction nut (pushing the sleeve into the bearing bore). To facilitate large-size bearing installation and removal, SNR has also developed a range of hydraulic sleeves.

Applications

- **Average size bearings:**

- Sleeves permit tight fitting of taper bore bearings onto cylindrical shafts allowing larger shaft diameter tolerances. Bearing bore taper is generally 1/12. It is 1/30 for spherical roller bearings of Series 240.. and 241...
- Tolerances on shafts receiving sleeves:
 - Diameter tolerances: ISO quality 9 minimum.
 - Shape tolerances: ISO quality 5 minimum.

- **Large size bearings:**

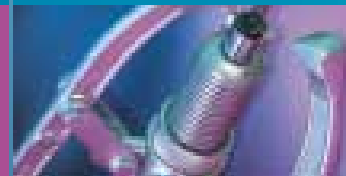


The SNR product range now includes hydraulic sleeves with distribution channels and slots permitting pressurized oil injection between bearing and sleeve, and between sleeve and shaft.

Oil reduces friction and avoids damage to the contact surfaces.

While considerably reducing bearing installation/removal times, this method also reduces equipment downtime.

Cold installation



Adapter and withdrawal sleeves, hydraulic sleeve

Range of installation/withdrawal sleeves, nuts, washers, taper bore bearings (suffix K) and associated wrenches

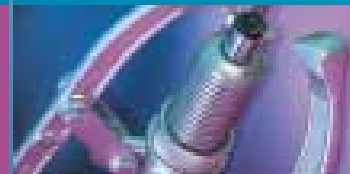
BRG: Taper bore bearing (suffix K)
 WRE: Corresponding spanner wrench (see description, p. 35-36)
 S: Sleeve
 N: Nut
 W: Washer

Shaft	BRG	WRE	S				N				W				BRG																
			S	N	W	BRG	S	N	W	BRG	S	N	W	BRG	S	N	W	BRG													
17	20	15/35	H204	KM4	MB4		H304	KM4	MB4		2204																				
20	25	35/50	H205	KM5	MB5	1205	H305	KM5	MB5	1305	2205	21305	22205	H2305	KM5		MB5	2305													
25	30	35/50	H206	KM6	MB6	1206	H306	KM6	MB6	1306	2206	21306	22206	H2306	KM6		MB6	2306													
30	35	50/80	H207	KM7	MB7	1207	H307	KM7	MB7	1307	2207	21307	22207	H2307	KM7		MB7	2307													
35	40	50/80	H208	KM8	MB8	1208	H308	KM8	MB8	1308	2208	21308	22208	H2308	KM8		MB8	2308	22308												
40	45	50/80	H209	KM9	MB9	1209	H309	KM9	MB9	1309	2209	21309	22209	H2309	KM9		MB9	2309	22309												
45	50	50/80	H210	KM10	MB10	1210	H310	KM10	MB10	1310	2210	21310	22210	H2310	KM10		MB10	2310	22310												
50	55	50/80	H211	KM11	MB11	1211	H311	KM11	MB11	1311	2211	21311	22211	H2311	KM11		MB11	2311	22311												
55	60	50/80	H212	KM12	MB12	1212	H312	KM12	MB12	1312	2212	21312	22212	H2312	KM12		MB12	2312	22312												
60	65	80/120	H213	KM13	MB13	1213	H313	KM13	MB13		2213	21313	22213	H2313	KM13		MB13	2313	22313												
60	70	80/120	H214	KM14	MB14	1214	H314	KM14	MB14		21314	22214	H2314	KM14		MB14	22314														
65	75	80/120	H215	KM15	MB15	1215	H315	KM15	MB15	1315	2215	21315	22215	H2315	KM15		MB15	2315	22315												
70	80	80/120	H216	KM16	MB16	1216	H316	KM16	MB16		2216	21316	22216	H2316	KM16		MB16	22316													
75	85	80/120	H217	KM17	MB17	1217	H317	KM17	MB17	1317		21317	22217	H2317	KM17		MB17	22317													
80	90	120/180	H218	KM18	MB18	1218	H318	KM18	MB18		2218	21318	22218	H2318	KM18		MB18	2318	22318												
85	95	120/180	H219	KM19	MB19	1219	H319	KM19	MB19			22219	H2319	KM19		MB19	22319														
90	100	120/180	H220	KM20	MB20	1220	H320	KM20	MB20	1320	2220		22220	H2320	KM20		MB20	22320	23220	H3120	KM20	MB20	23120								
100	110	120/180	H222	KM22	MB22	1222	H322	KM22	MB22			22222	23022	H2322	KM22		MB22	22322	23222	H3122	KM22	MB22	23122								
110	120	120/180												H2324	KM24		MB24	22324	23224	H3024	KML24	MBL24	23024	H3124	KM24	MB24	22224	23124			
115	130	120/180												H2326	KM26		MB26	22326	23226	H3026	KML26	MBL26	23026	H3126	KM26	MB26	22226	23126			
125	140	120/180												H2328	KM28		MB28	22328	23228	H3028	KML28	MBL28	23028	H3128	KM28	MB28	22228	23128			
135	150	120/180												H2330	KM30		MB30	22330	23230	H3030	KML30	MBL30	23030	H3130	KM30	MB30	22230	23130			
140	160													H2332	KM32		MB32	22332	23232	H3032	KML32	MBL32	23032	H3132	KM32	MB32	22232	23132			
150	170													H2334	KM34		MB34	22334	23234	H3034	KML34	MBL34	23034	H3134	KM34	MB34	22234	23134			
160	180													H2336	KM36		MB36	22336	23236	H3036	KML36	MBL36	23036	H3136	KM36	MB36	22236	23136			
170	190													H2338	KM38		MB38	22338	23238	H3038	KML38	MBL38	23038	H3138	KM38	MB38	22238	23138			
180	200													H2340	KM40		MB40	22340	23240	H3040	KML40	MBL40	23040	H3140	KM40	MB40	22240	23140			
200	220													H2344H	HM44T		MB44	22344	23244	H3044H	HM3044	MS3044	23044	H3144	HM44T	MB44	22244	23144			
220	240													H2348H	HM48T		MB48	22348	23248	H3048H	HM3048	MS3048	23048	H3148H	HM48T	MB48	23148				
240	260													H2352H	HM52T		MB52		23252	H3052H	HM3052	MS3052	23052	H3152H	HM52T	MB52	23152				
260	280													H2356H	HM56T		MB56	22356	23256	H3056H	HM3056	MS3056	23056	H3156H	HM56T	MB56	23156				
280	300																			H3060H	HM3060	MS3060	23060	H3160H	HM3160	MS3160	23160	H3260H	HM3160	MS3160	23260
300	320																			H3064H	HM3064	MS3064	23064	H3164H	HM3164	MS3164	23164				
320	340																			H3068H	HM3068	MS3068	23068	H3168H	HM3168	MS3168	23168				
340	360																			H3072H	HM3072	MS3072	23072	H3172H	HM3172	MS3172	23172				
360	380																			H3076H	HM3076	MS3076	23076								
380	400																			H3080H	HM3080	MS3080	23080								

INSTALLATION



Cold installation



Adapter and withdrawal sleeves, hydraulic sleeve

BRG: Taper bore bearing (suffix K)
 WRE: Corresponding spanner wrench (see description, p. 35-36)
 S: Sleeve
 N: Nut
 W: Washer

REMOVAL	Shaft	BRG	WRE	S	N	BRG		S	N	BRG		S	N	BRG		S	N	BRG		S	N	BRG		S	N	BRG						
	35	40	50/80	AH308	KM9	21308	22208			AH2308	KM9	22308																				
	40	45	50/80	AH309	KM10	21309	22209			AH2309	KM10	22309																				
	45	50	50/80	AHX310	KM11	21310	22210			AHX2310	KM11	22310																				
	50	55	50/80	AHX311	KM12	21311	22211			AHX2311	KM12	22311																				
	55	60	50/80	AHX312	KM13	21312	22212			AHX2312	KM13	22312																				
	60	65	80/120	AH313G	KM14	21313	22213			AH2313G	KM14	22313																				
	65	70	80/120	AH314G	KM15	21314	22214			AHX2314G	KM15	22314																				
	70	75	80/120	AH315	KM17	21315	22215			AHX2315G	KM16	22315																				
	75	80	80/120	AH316	KM18	21316	22216			AHX2316	KM18	22316																				
	80	85	80/120	AHX317	KM19	21317	22217			AHX2317	KM19	22317																				
	85	90	120/180	AHX318	KM20	21318	22218			AHX2318	KM20	22318											AHX3218	KM20	23218							
	90	95	120/180	AHX319	KM21		22219			AHX2319	KM21	22319																				
	95	100	120/180	AHX320	KM22		22220			AHX2320	KM22	22320			AHX3120	KM22	23120						AHX3220	KM22	23220							
	105	110	120/180							AHX2322G	KM24	22322			AHX3122	KM22	22222	23122					AHX3222G	KM24	23222		AH24122	KM23				
	115	120	120/180							AHX2324G	KM26	22324	AHX3024	KM26	23024	AHX3124	KM24	22224	23124				AHX3224G	KM26	23224	AH24024	KM25	24024	AH24124	KM26	24124	
	125	130	120/180							AHX2326G	KM28	22326	AHX3026	KM28	23026	AHX3126	KM26	22226	23126				AHX3226G	KM28	23226	AH24026	KM27	24026	AH24126	KM28	24126	
	135	140	120/180							AHX2328G	KM30	22328	AHX3028	KM30	23028	AHX3128	KM28	22228	23128				AHX3228G	KM30	23228	AH24028	KM29	24028	AH24128	KM30	24128	
	145	150	120/180							AHX2330G	KM32	22330	AHX3030	KM32	23030	AHX3130G	KM30	22230	23130				AHX3230G	KM32	23230	AH24030	KM31	24030	AH24130	KM32	24130	
	150	160								AH2332G	KM34	22332	AH3032	KM34	23032	AH3132G	KM32	22232	23132				AH3232G	KM34	23232	AH24032	KM34	24032	AH24132	KM34	24132	
	160	170								AH2334G	KM36	22334	AH3034	KM36	23034	AH3134G	KM34	22234	23134				AH3234G	KM36	23234	AH24034	KM36		AH24134	KM36	24134	
	170	180				AH2236G	KM38	22236		AH2336G	KM38	22336	AH3036	KM38	23036	AH3136G	KM36	23136				AH3236G	KM38	23236	AH24036	KM38	24036	AH24136	KM38			
	180	190				AH2238G	KM40	22238		AH2338G	KM40	22338	AH3038G	KM40	23038	AH3138G	KM38	23138				AH3238G	KM40	23238	AH24038	KM40	24038	AH24138	KM40	24138		
	190	200				AH2240	HM44T	22240		AH2340	HM48T	22340	AH3040G	HM42T	23040	AH3140	KM40	23140				AH3240	HM44T	23240	AH24040	HM42T		AH24140	HM42T	24140		
	200	220				AOH2244	HM48T	22244		AOH2344	HM52T	22344	23244	AOH3044G	HM46T	23044	AOH3144	HM48T	23144					AOH24044	HM46T	24044	AOH24144	HM46T	24144			
	220	240								AOH2348	HM56T		23248	AOH3048	HM52T	23048	AOH3148	HM52T	23148					AOH24048	HM50T	24048	AOH24148	HM52T	24148			
	240	260								AOH2352G	HM3160		23252	AOH3052	HM56T	23052	AOH3152G	HM56T	23152					AOH24052G	HM56T		AOH24152	HM56T	24152			
	260	280								AOH2356G	HM3164		23256	AOH3056	HM3060	23056	AOH3156G	HM3160	23156					AOH24056G	HM3160		AOH24156	HM3160				
	280	300												AOH3060	HM3064	23060	AOH3160G	HM3164	23160				AOH3260G	HM3164	23260	AOH24060G	HM3164	24060	AOH24160	HM3164		
	300	320												AOH3064G	HM3068	23064	AOH3164G	HM3168	23164									AOH24164	HM3168			
	320	340												AOH3068G	HM3072	23068	AOH3168G	HM3172	23168									AOH24168	HM3172			
	340	360												AOH3072G	HM3076	23072	AOH3172	HM3176	23172									AOH24172	HM3176			
	360	380												AOH3076G	HM3080	23076																
	380	400												AOH3080G	HM3084	23080																

Cold installation



Standard and precision nuts



For bearing installation with sleeves, SNR proposes a full range of lock-nuts and lockwashers covering the market's needs.

Standard nuts and lockwashers

See table on pages 38 to 41.

Applications

For precision nuts:

- Installing high precision or standard angular contact ball bearings,
- Installing tapered bearings,
- Installing combined needle bearings.

Applications:

- To establish and maintain preload of a set of bearings.
- Cases of high precision bearing installation requiring the use of accessories to maintain the precision level of the assembly.
- To establish and maintain the axial position of a set of bearings, even if not preloaded, and more particularly in the case of high axial load applications.

Technical characteristics

For precision nuts:

- Self-locking nut.
- The threads and the flat face of the nut (abutting the bearing) are machined concurrently. Therefore, high run-out precision is obtained: 0.005mm tolerance.
- Metric threads are used (as per ISO R/724 standard) with 5H tolerance (as per ISO 965/1 standard).



Standard and precision nuts

Precision nut range

• Nuts type B and TB

Threads	P/N		Weight	Dimensions				Locking screw	Nuts		
	D2	–		–	D1	L1	D3		M	Mbl	Far
–	–	–	kg	mm	mm	mm	mm	N.m	kN	N.m	N.m
M20 x 1	B 20/1	TB 20/1	0,04	32	10	28	M5	4-5	140	18	39
M20 x 1,5	B 20/1,5	TB 20/1,5	0,04	32	10	28	M5	4-5	126	18	39
M25 x 1,5	B 25	TB 25	0,06	38	12	33	M5	4-5	198	25	56
M30 x 1,5	B 30	TB 30	0,08	45	12	40	M5	4-5	240	32	63
M35 x 1,5	B 35	TB 35	0,11	52	12	47	M5	4-5	263	40	72
M40 x 1,5	B 40	TB 40	0,15	58	14	52	M6	8-10	290	55	97
M45 x 1,5	B 45	TB 45	0,18	65	14	59	M6	8-10	322	65	115
M50 x 1,5	B 50	TB 50	0,20	70	14	64	M6	8-10	351	85	132
M55 x 2	B 55	TB 55	0,25	75	16	68	M8	16-18	378	95	148
M60 x 2	B 60	TB 60	0,27	80	16	73	M8	16-18	405	100	186
M65 x 2	B 65	TB 65	0,28	85	16	78	M8	16-18	431	120	196
M70 x 2	B 70	TB 70	0,38	92	18	85	M8	16-18	468	130	228
M75 x 2	B 75	TB 75	0,42	98	18	90	M8	16-18	497	150	255
M80 x 2	B 80	TB 80	0,49	105	18	95	M8	16-18	527	160	291
M85 x 2	B 85	TB 85	0,52	110	18	100	M8	16-18	558	190	315
M90 x 2	B 90	TB 90	0,75	120	20	110	M8	16-18	603	200	369
M95 x 2	B 95	TB 95	0,78	125	20	115	M8	16-18	637	220	391
M100 x 2	B 100	TB 100	0,82	130	20	120	M8	16-18	688	250	432

Far: Breaking axial load / Ma: Tightening couple / Md: Unlocking couple corresponding to the Ma indicated

Mbl: Max tightening couple recommended for screws / D1: Outer diameter / D3: Support face diameter / L1: Width

• Nuts type BP and TBP

Threads	P/N		Weight	Dimensions				Locking screw	Nuts		
	D2	–		–	D1	L1	D3		M	Mbl	Far
–	–	–	kg	mm	mm	mm	mm	N.m	kN	N.m	N.m
M20 x 1	BP 20/1	TBP 20/1	0,12	38	20	28	M5	4-5	255	18	39
M20 x 1,5	BP 20/1,5	TBP 20/1,5	0,12	38	20	28	M5	4-5	225	18	39
M25 x 1,5	BP 25	TBP 25	0,17	45	20	33	M6	8-10	405	25	56
M30 x 1,5	BP 30	TBP 30	0,24	52	22	40	M6	8-10	491	32	63
M35 x 1,5	BP 35	TBP 35	0,28	58	22	47	M6	8-10	560	40	72
M40 x 1,5	BP 40	TBP 40	0,29	62	22	52	M8	16-18	585	55	97
M45 x 1,5	BP 45	TBP 45	0,37	68	24	59	M8	16-18	641	65	115
M50 x 1,5	BP 50	TBP 50	0,46	75	25	64	M8	16-18	706	85	132
M55 x 2	BP 55	TBP 55	0,92	88	32	68	M8	16-18	940	95	148
M60 x 2	BP 60	TBP 60	1,14	98	32	73	M8	16-18	1 070	100	186
M65 x 2	BP 65	TBP 65	1,29	105	32	78	M8	16-18	1 155	120	196
M70 x 2	BP 70	TBP 70	1,49	110	35	85	M8	16-18	1 230	130	228
M75 x 2	BP 75	TBP 75	2,25	125	38	90	M10	30-32	1 300	150	255
M80 x 2	BP 80	TBP 80	2,97	140	38	95	M10	30-32	1 420	160	291
M85 x 2	BP 85	TBP 85	3,44	150	38	100	M10	30-32	1 510	190	315
M90 x 2	BP 90	TBP 90	3,59	155	38	110	M10	30-32	1 596	200	369
M95 x 2	BP 95	TBP 95	3,73	160	38	115	M10	30-32	1 656	220	391
M100 x 2	BP 100	TBP 100	3,70	160	40	120	M10	30-32	1 780	250	432

Far: Breaking axial load / Ma: Tightening couple / Md: Unlocking couple corresponding to the Ma indicated

Mbl: Max tightening couple recommended for screws / D1: Outer diameter / D3: Support face diameter / L1: Width

Cold installation



Standard and precision nuts

• Nuts type BR and TBR

Threads	P/N		Weight	Dimensions				Locking screw	Nuts		
	D2			D1	L1	D3	M		Mbl	Far	Ma
-	-	-	kg	mm	mm	mm	mm	N.m	kN	N.m	N.m
M25 x 1,5	BR 25	TBR 25	0,06	38	12	33	M5	3-4	198	25	85
M30 x 1,5	BR 30	TBR 30	0,08	45	12	40	M5	3-4	240	32	96
M35 x 1,5	BR 35	TBR 35	0,11	52	12	47	M5	3-4	263	40	107
M40 x 1,5	BR 40	TBR 40	0,15	58	14	52	M6	6-8	290	55	127
M45 x 1,5	BR 45	TBR 45	0,18	65	14	59	M6	6-8	322	65	149
M50 x 1,5	BR 50	TBR 50	0,20	70	14	64	M6	6-8	351	85	180
M55 x 2	BR 55	TBR 55	0,25	75	16	68	M8	12-14	378	95	206
M60 x 2	BR 60	TBR 60	0,27	80	16	73	M8	12-14	405	100	255
M65 x 2	BR 65	TBR 65	0,28	85	16	78	M8	12-14	431	120	277
M70 x 2	BR 70	TBR 70	0,38	92	18	85	M8	12-14	468	130	304
M75 x 2	BR 75	TBR 75	0,42	98	18	90	M8	12-14	497	150	357
M80 x 2	BR 80	TBR 80	0,49	105	18	95	M8	12-14	527	160	396
M85 x 2	BR 85	TBR 85	0,52	110	18	100	M8	12-14	558	190	444
M90 x 2	BR 90	TBR 90	0,75	120	20	110	M8	12-14	603	200	501
M95 x 2	BR 95	TBR 95	0,78	125	20	115	M8	12-14	637	220	550
M100 x 2	BR 100	TBR 100	0,82	130	20	120	M8	12-14	688	250	603

Far: Breaking axial load / Ma: Tightening couple / Md: Unlocking couple corresponding to the Ma indicated
Mbl: Max tightening couple recommended for screws / D1: Outer diameter / D3: Support face diameter / L1: Widht

• Nuts type BPR and TBPR

Threads	P/N		Weight	Dimensions				Locking screw	Nuts		
	D2			D1	L1	D3	M		Mbl	Far	Ma
-	-	-	kg	mm	mm	mm	mm	N.m	kN	N.m	N.m
M20 x 1	BPR 20/1	TBPR 20/1	0,12	38	20	28	M5	3-4	255	18	56
M20 x 1,5	BPR 20/1,5	TBPR 20/1,5	0,12	38	20	28	M5	3-4	225	18	56
M25 x 1,5	BPR 25	TBPR 25	0,17	45	20	33	M6	6-8	405	25	85
M30 x 1,5	BPR 30	TBPR 30	0,24	52	22	40	M6	6-8	491	32	96
M35 x 1,5	BPR 35	TBPR 35	0,28	58	22	47	M6	6-8	560	40	107
M40 x 1,5	BPR 40	TBPR 40	0,29	62	22	52	M8	12-14	585	55	127
M45 x 1,5	BPR 45	TBPR 45	0,37	68	24	59	M8	12-14	641	65	149
M50 x 1,5	BPR 50	TBPR 50	0,46	75	25	64	M8	12-14	706	85	180
M55 x 2	BPR 55	TBPR 55	0,92	88	32	68	M8	12-14	940	95	206
M60 x 2	BPR 60	TBPR 60	1,14	98	32	73	M8	12-14	1 070	100	255
M65 x 2	BPR 65	TBPR 65	1,29	105	32	78	M8	12-14	1 155	120	277
M70 x 2	BPR 70	TBPR 70	1,49	110	35	85	M8	12-14	1 230	130	304
M75 x 2	BPR 75	TBPR 75	2,25	125	38	90	M10	24-26	1 300	150	357
M80 x 2	BPR 80	TBPR 80	2,97	140	38	95	M10	24-26	1 420	160	396
M85 x 2	BPR 85	TBPR 85	3,44	150	38	100	M10	24-26	1 510	190	444
M90 x 2	BPR 90	TBPR 90	3,59	155	38	110	M10	24-26	1 596	200	501
M95 x 2	BPR 95	TBPR 95	3,73	160	38	115	M10	24-26	1 656	220	550
M100 x 2	BPR 100	TBPR 100	3,70	160	40	120	M10	24-26	1 780	250	603

Far: Breaking axial load / Ma: Tightening couple / Md: Unlocking couple corresponding to the Ma indicated
Mbl: Max tightening couple recommended for screws / D1: Outer diameter / D3: Support face diameter / L1: Widht

Induction heaters



Heat assisted installation consists of thermally expanding the bearing by raising the temperature, then sliding it onto the shaft without the need to apply force.

Contrary to oil bath, heating table or oven devices, the SNR induction heaters are safer and ensure a more exact procedure.

Heating temperature depending on bearing bore

- Temperature should not exceed 130°C / 265°F in order to prevent altering of the characteristics of the steel or damage to the internal bearing components. Inner ring expansion (by temperature rise), facilitates bearing installation onto the shaft.
- Temperature must be adjusted according to dimensions, amount of interference fit and bearing journal material.
- Generally, the following temperature values can be applied:

Bore diameter	Heating temperature (max.)
Up to 100mm	90°C / 195°F
From 100 to 150mm	120°C / 250°F
Above 150mm	130°C / 265°F

Heat assisted installation



Induction heaters

Advantages

• Easy to use

- Fewer handling operations, thanks to the pivot arm.
- Operator's safety: only the part to be heated undergoes high temperatures (easier handling, reduced risk of personal injury).
- Cleanliness: no oil, no waste, lower pollution of the bearings or components.
- Operating mode choice option: temperature mode / time mode.
- Automatic demagnetizing on completion of the cycle (less than 2A/cm loss).
- Bearings can be heated even when fitted with seals and greased.
- °C / °F switching.
- Easy maintenance.

• Heating control and safety

- Temperature control by integrated probe. The initial qualities of the bearing are maintained (no risk of exceeding the displayed temperature or eliminating the bearing radial internal clearance, etc).
- No risk of part overheating. By default, the device selects a temperature of 110°C / 230°F. However, you can manually select any temperatures from 50 to 240°C / 120 to 460°F.
- Magnetic probe insulation protecting the operator from burning his or her fingers.
- Compliance with EEC standards.

• Efficiency

- Turbo-boost: "Turbo-boost" technology is integrated in the SNR heaters. In horizontal position (resting on the polyamide base), the part is heated twice as rapidly (not recommended for low internal clearance bearings such as J20).
- Rapidity: It is no longer necessary to heat the same part several times to maintain the desired temperature. As soon as the part temperature drops 5°C / 9°F, heating restarts automatically and will repeat 5 times in sequence. This function is triggered automatically.

• Cost savings

- High efficiency, with a power factor of 0.8.
- Fast bearing heating, hence lower power consumption and extended device life.

Example:

Standard heater

Operating condition:

400 Volts, 30A, 0.23 power factor.

This delivers the following power:

$$P_{rms} = U \times i \times \cos \phi, \text{ i.e. } P_{rms} = 400 \times 30 \times 0.23 = 2.76\text{kVA}$$

Therefore, it draws 12 kVA and only delivers 2.76kVA.

SNR heater

Operating condition:

400 Volts, 30A, 0.8 power factor.

This delivers the following power:

$$P_{rms} = U \times i \times \cos \phi, \text{ i.e. } P_{rms} = 400 \times 30 \times 0.8 = 9.6\text{kVA}$$

Therefore, it draws 12kVA and delivers 9.6kVA.

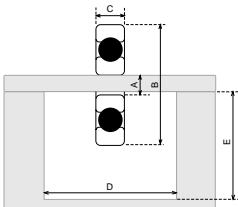


Induction heaters

Fast Therm 20



Technical information	
Voltage	110V - 230V / 110S - 230S
Frequency	50 - 60Hz
Power (kVA) / Maximum current	3.6 / 16A
Weight	17kg / 37lbs
Probe	Magnetic, insulated
Temperature mode	Max. 240°C / 460°F
Temperature hold	Yes
Time mode	No
Demagnetizing	Automatic
Pivot arm	No
Error signal / Display type	Yes / Digital
Distance between support points: height	100mm
Distance between support points: width	120mm
Device dimensions	345 x 200 x 240mm
Weight of the part to be heated	20kg / 45lbs.
Max. diameter of the part to be heated	280mm
Min. bore of the part to be heated	20mm



A = Minimum bearing bore
 B = Maximum bearing diameter
 C = Maximum bearing width
 D = Distance between support points (width)
 E = Distance between support points (height)

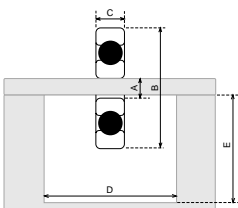
Dimensions of the bars and other components						
Bars	A	B	C	Max. weight	Max. outer diameter with raiser 40 x 50 x 75mm	Max. width with raiser 40 x 50 x 75mm
14 x 14 x 200*	20mm	215mm	120mm	10kg	365mm	120mm
25 x 25 x 200*	35mm	225mm	120mm	15kg	375mm	120mm
40 x 40 x 200*	60mm	280mm	100mm	20kg	280mm	175mm (**)

(*): These bars are included in standard delivery with heaters. (**) : Bearing in horizontal position on white base
 The Fast Therm 20 device is delivered in a durable transport case

Fast Therm 35



Technical information	
Voltage	110V - 230V / 110S - 230S
Frequency	50 - 60Hz
Power (kVA) / Maximum current	3.6 / 16A
Weight	31kg / 68lbs.
Probe	Magnetic, insulated
Temperature mode	Max. 240°C / 460°F
Temperature hold	Yes
Time mode	Max. 99.59min
Demagnetizing	Automatic
Pivot arm	Yes
Error signal / Display type	Yes / Digital
Distance between support points: height	160mm
Distance between support points: width	180mm
Device dimensions	420 x 260 x 360mm
Weight of the part to be heated	35kg / 77lbs.
Max. diameter of the part to be heated	410mm
Min. bore of the part to be heated	20mm



A = Minimum bearing bore
 B = Maximum bearing diameter
 C = Maximum bearing width
 D = Distance between support points (width)
 E = Distance between support points (height)

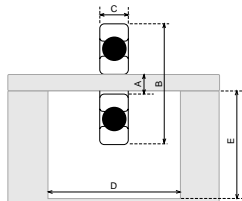
Dimensions of the bars and other components						
Bars	A	B	C	Max. weight	Max. outer diameter with raiser 50 x 50 x 120mm	Max. width with raiser 50 x 50 x 120mm
14 x 14 x 280	20mm	345mm	180mm	10kg	585mm	180mm
25 x 25 x 280	35mm	355mm	180mm	15kg	595mm	180mm
40 x 40 x 280	60mm	360mm	180mm	25kg	600mm	180mm
50 x 50 x 280	70mm	410mm	180mm	35kg	440mm	280mm (**)

(**): Bearing in horizontal position on white base

Heat assisted installation

Induction heaters

Fast Therm 150



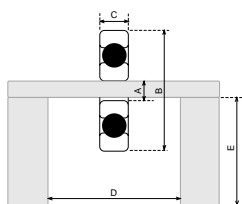
A = Minimum bearing bore
 B = Maximum bearing diameter
 C = Maximum bearing width
 D = Distance between support points (width)
 E = Distance between support points (height)

Dimensions of the bars and other components						
Bars	A	B	C	Max. weight	Max. outer diameter with raiser 70 x 70 x 150mm	Max. width with raiser 70 x 70 x 150mm
20 x 20 x 350	30mm	460mm	210mm	15kg	760mm	210mm
30 x 30 x 350	45mm	475mm	210mm	20kg	775mm	210mm
40 x 40 x 350	55mm	485mm	210mm	25kg	785mm	210mm
50 x 50 x 350	70mm	500mm	210mm	35kg	800mm	210mm
60 x 60 x 350	85mm	515mm	210mm	60kg	815mm	210mm
70 x 70 x 350	100mm	490mm	215mm	150kg*	490mm	365mm

(*): Only in horizontal position

Technical information	
Voltage	400V - 480V / 400S - 480S
Frequency	50 - 60Hz
Power (kVA) / Maximum current	12.8 / 32A
Weight	51kg / 111lbs.
Probe	Magnetic, insulated
Temperature mode	Max. 240°C / 460°F
Temperature hold	Yes
Time mode	Max. 99.59min
Demagnetizing	Automatic
Pivot arm	Yes
Error signal / Display type	Yes / Digital
Distance between support points: height	215mm
Distance between support points: width	210mm
Device dimensions	505 x 260 x 440mm
Weight of the part to be heated	150kg / 330lbs.
Max. diameter of the part to be heated	490mm
Min. bore of the part to be heated	30mm

Fast Therm 300



A = Minimum bearing bore
 B = Maximum bearing diameter
 C = Maximum bearing width
 D = Distance between support points (width)
 E = Distance between support points (height)

Dimensions of the bars and other components of the device						
Bars	A	B	C	Max. weight	Max. outer diameter with raiser 80 x 80 x 150mm	Max. width with raiser 80 x 80 x 150mm
20 x 20 x 490	30mm	620mm	330mm	15kg	760mm	330mm
30 x 30 x 490	45mm	630mm	330mm	20kg	775mm	330mm
40 x 40 x 490	55mm	640mm	330mm	25kg	785mm	330mm
50 x 50 x 490	70mm	650mm	330mm	35kg	800mm	330mm
60 x 60 x 490	85mm	660mm	330mm	60kg	815mm	330mm
70 x 70 x 490	100mm	670mm	330mm	80kg	490mm	330mm
80 x 80 x 490	115mm	740mm	300mm	300kg*	740mm	450mm

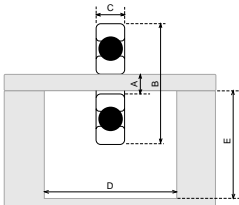
(*): Only in horizontal position

Technical information	
Voltage	400V - 480V / 400S - 480S
Frequency	50 - 60 Hz
Power (kVA) / Maximum current	25.2 / 63A
Weight	91kg / 200lbs.
Probe	Magnetic, insulated
Temperature mode	Max. 240°C / 460°F
Temperature hold	Yes
Time mode	Max. 99.59min
Demagnetizing	Automatic
Pivot arm	Yes
Error signal / Display type	Yes / Digital
Distance between support points: height	300mm
Distance between support points: width	330mm
Device dimensions	Transportable: 700 x 500 x 980 Fixed: 700 x 500 x 580
Weight of the part to be heated	300kg / 660 lbs.
Max. diameter of the part to be heated	740mm
Min. bore of the part to be heated	30mm



Induction heaters

Fast Therm 600



- A = Minimum bearing bore
- B = Maximum bearing diameter
- C = Maximum bearing width
- D = Distance between support points (width)
- E = Distance between support points (height)

Technical information	
Voltage	400V - 480V / 400S - 480S
Frequency	50 - 60Hz
Power (kVA) / Maximum current	25.2 / 63A
Weight	350kg / 770lbs.
Probe	Magnetic, insulated
Temperature mode	Max. 240°C / 460°F
Temperature hold	Yes
Time mode	Max. 99.59min
Demagnetizing	Automatic
Pivot arm	No
Error signal / Display type	Yes / Digital
Distance between support points: height	390mm
Distance between support points: width	410mm
Device dimensions	700 x 1,000 x 1,100mm
Weight of the part to be heated	600kg / 1320 lbs.
Max. diameter of the part to be heated	900mm
Min. bore of the part to be heated	45mm

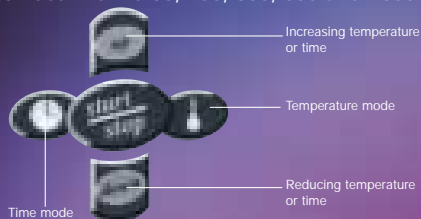
Dimensions of the bars and other components				
Bars	A	B	C	Max. weight
30 x 30 x 700	45mm	830mm	420mm	600kg
40 x 40 x 700	55mm	840mm	420mm	600kg
50 x 50 x 700	70mm	850mm	420mm	600kg
60 x 60 x 700	85mm	860mm	420mm	600kg
70 x 70 x 700	100mm	870mm	420mm	600kg
80 x 80 x 700	115mm	880mm	420mm	600kg
90 x 90 x 700	130mm	890mm	420mm	600kg
100 x 100 x 700	145mm	900mm	420mm	600kg

Fast Therm 1000



Technical information	
Voltage	400V - 480V / 400S - 480S
Frequency	50 - 60Hz
Power (kVA) / Maximum current	40 / 100A
Weight	800kg / 1760lbs.
Probe	Magnetic, insulated
Temperature mode	Max. 240°C / 460°F
Temperature hold	Yes
Time mode	Max. 99.59min
Demagnetising	Automatic
Pivot arm	No
Error signal / Display type	Yes / Digital
Distance between support points: height	500mm
Distance between support points: width	520mm
Device dimensions	600 x 1500 x 1,300mm
Weight of the part to be heated	1000 kg / 2,200 lbs.
Max. diameter of the part to be heated	1,150mm
Min. bore of the part to be heated	100mm

Control interface, common to Fast Therm 35, 150, 300, 600 and 1000



Dimensions of the bars and other components				
Bars	A	B	C	Max. weight
70 x 70 x 850	100mm	1070mm	500mm	1000kg
80 x 80 x 850	115mm	1080mm	500mm	1000kg
100 x 100 x 850	145mm	1100mm	500mm	1000kg
150 x 150 x 850	215mm	1150mm	500mm	1000kg

Heat assisted installation



Heat-insulating gloves



Designed to resist oil and heat, the SNR heat-insulating gloves are perfectly suitable for handling oily, hot bearings.

Technical characteristics

- Made of KEVLAR®: the gloves include several fabric plies (ultra strong fibers).
- Tested and certified for EN 388 mechanical and EN 407 thermal risks, they meet extremely strict requirements:
 - Mechanical protection, EN 388: 244X
 - Thermal protection, EN 407: 4341XX

NORMS EN 388

Descriptive	Norms
Abrasion	2
Cutting	4
Tearing	4
Piercing	X

NORMS EN 407

Descriptive	Norms
Flammability	4
Contact heat	3
Convective heat	4
Radiant heat	1
S. Welded metal	X
P. Welded metal	X

Norms: from 1 (satisfactory) to 4 (optimum), X, non tested

Advantages

- Resistance to temperatures up to 350°C / 660°F,
- Easy wear: provides comfort in all your maintenance tasks,
- Very high resistance to cuts, tears and abrasion,
- Non flammable: very high contact heat and convection heat protection (indices 3 and 4),
- Non-melting, lint-free,
- Size: 10.5,
- High protection: arm + hand (glove length: 35cm / 14 inches),
- Long time resistance to high temperature.



Hydraulic extractor



Above a given bearing size, the use of a mechanical extractor for bearing removal is no longer suitable. SNR proposes a 10-metric ton hydraulic extractor. Therefore, with its integrated hydraulic pump, bearing removal is made much easier.

Applications

- Removal of bearing assemblies (pulleys, gear bearings, etc.) or of tight-fitted inner rings,
- Removal of bearings either by the bore or by the outer diameter, by reversing the jaws.

Technical characteristics

- Extractor, with a set of 2 or 3 interchangeable jaws,
- Heat-treated to provide heavy duty mechanical strength,
- Jaw extractor, offering 182mm range. Piston stroke: 55mm,
- Extraction force: 10 metric tons,
- Maximum jaw opening: 55 to 280mm (suitable for bearings and other parts of 55-280mm outer diameter),
- Light weight.

Removal



Hydraulic extractor

Advantages

- Very simple to use, due to the integral hydraulic pump: can be handled by one single operator,
- Durable pump,
- No energy losses,
- Removal safety: extractor equipped with EC standardized cover, to avoid any injury,
- Easily convertible between a 2- or 3-jaw extractor,
- Delivered in a rigid transport case (no risk of damage, easy transport),
- The extractor does not turn during bearing removal (an important feature, as a manual extractor requires a considerable torque in order to pull the bearing out).



The spindle of the mechanical extractor must turn, requiring the operator to apply a very high torque to pull out the part.



With the SNR hydraulic extractor, the operator only needs to actuate a pump. High power is obtained very simply.

Operating tips

- Always position the protection cover over the jaws when using the extractor.
- Take care not to damage the shaft or the bearing housing during the operation.



Monitoring & measurement

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Monitoring & measurement



With SNR, place your bearings under close control

Follow the cycle of life of each bearing

However perfect its geometry, and however effective the steel from which it is made, each bearing has a service life limit. Optimisation of service life requires identification of bearings state indicators and regular monitoring of any indicator changes during operation. This allows identification of damage and scheduling of corrective maintenance operations at the optimum time.

Analyse of the external causes

SNR has developed an entire range of measuring and monitoring devices to precisely analyse the environmental constraints affecting the proper operation of your installations and notably your bearings.

We also propose a range of products and services designed for vibration monitoring of rotating machines provided by our partner, 01 dB Acoustics & Vibration, a recognised expert in this area, to identify all your equipment trouble spots and remedy these one by one.

Measurements may be taken continuously for implementation of an on-condition maintenance programme, or occasionally, to perform expert analysis.

Continuous monitoring devices (On-line)



For most machines, vibration measurements are used firstly to fulfil a safety function, the objective being to shut down the machine to ensure the safety of property and people as soon as it features operating conditions impugning its integrity.

Furthermore, the aim of the maintenance function is to predict shutdowns and maintenance operations and to establish the origin of defects in order to correct these or prevent their occurrence.

Data acquisition is performed using portable devices (off-line) or using automatic on-line measurement systems, installed permanently on equipment, coupled to predictive maintenance software.

Continuous vibration analysis (On-line)*

- **VIBALERT**

- Mechanical "Switch" providing a simple and economic solution to protect your machines.

- **TRANSMITTER, 4-20 mA**

Range of vibration transmitters, 4-20mA, enabling monitoring of machines from a programmable PLC.

- Solutions suited to roller bearings and fluid bearings.
- ATEX certified versions available for the explosive zone.

- **MOVI2**

Single channel (VIXAL, ISO 2954) or 2 channels (ROXOR, bearing defect factor) monitoring modules).

- Protection: IP55.
- Adjustment on site: thresholds, measurement scale.
- Danger, alarm relay.
- 4-20mA and 0-10V output.

* Works realized by our partner 01dB Acoustics & Vibration

Monitoring & measurement

Continuous monitoring devices (On-line)



• **MoviDin**

Range of 2-channel monitoring modules to ensure protection of rotating machines.

- Compatible accelerometers, proximity probes and temperature probes.
- Displays levels.
- Assembly on a DIN rail.
- Adjustment on site: thresholds, measurement scale, frequency range.
- Integrity, danger & alarm relays.
- 4-20 mA outputs.

• **MOVISYS**

Multi-channel real time and/or sequential monitoring system, based on proximity probes, accelerometers, temperature probes, etc.

- 19" format industrial rack, 6U, modular (52 sensors in real time monitoring / several hundred sensors in sequential monitoring).
- Complies with the main specifications of the standards API 670 and 678, ISO 2954 and 7919.
- Automatic On-line diagnosis with Divadiag.

• **MOVISCAN**

Remote diagnosis and machine protection system combining 3 functions:

- Close sequential monitoring, automatic storage of measurements, diagnosis performed on site/ remotely,
- SCANBOX multiplexing units minimising wiring and installation costs,
- Synchronous analysis and acquisition on condition authorising monitoring of complex machines or machines with variable operating modes. Modem link and serial line to allow communication with process and maintenance.

Connection of several MOVISCAN to a diagnostic station (Divadiag) installed on site or remotely.

Sensors

A large range of industrial sensors suited to the most severe environments (oil splashing, high temperature, explosive atmosphere):

- the ASH accelerometer series with integrated electronics,
- high temperature velocimeters,
- proximity sensors for journal bearing measurements.

Periodic monitoring devices (Off Line)



Through the technical proficiency and skills of our partner, 01dB Acoustics & Vibration, we are able to meet your equipment needs and also remedy any problems you may encounter with monitoring, implementation and evolution of your conditional maintenance policy.

We offer you a whole array of devices to perform periodic monitoring of your machines. Through these analyses, performed occasionally to carry out expert analysis, you could identify a large number of phenomena that cause machine malfunctions and thus remedy said.

• MULTIVIB

- Control of bearings and vibrations for vibration measurements (ISO compliant),
- Control of machine temperature and rotation speed,
- Measurement of bearing state (defect factor method®).

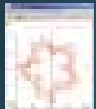
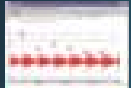
• MOVIPACK

Multifunction device, ultra compact, manageable, light and ergonomic, 2 channels + trigger input; it allows the vibration control and analysis in an industrial environment.

- FFT analyser, data collector, balancer, signal recorder, order analyser,
- Laser sighted pyrometer (°C) and tachometer (RPM),
- Complete set of tools to detect and analyse defects of rolling bearing machines (Defect factor, Kurtosis, Envelope) and journal bearing machines (orbit, cascade, Bode, etc.),
- Automatic identification of contact free measurement point,
- Communication by USB, RS232 and Internet (e-Route module),
- Intrinsically safe version: ATEX certified EEX ia IIC T4.

Software

Numerous software packages are available to meet your occasional or continuous monitoring needs. In a few clicks, you can enter all the data from your measurements, analyse stationary or transient signals, troubleshoot your installation failures and thus implement suitable solutions.



• Off-line / On-line conditional maintenance

e-Diag offers solutions for periodic or continuous monitoring, conditional maintenance and diagnosis of rotating machines: management of Vibration/Oil/Process/Thermography data, automatic identification of monitoring parameters defined through post electronic processing of data, advanced graphic analysis tools, single station, network or Web version.

• Expertise tools

vib-Graph is a software package designed to measure vibrations of rotating machines equipped with powerful tools to analyse all types of stationary or transient signals.

Monitoring & measurement

Laser-targeting thermometer



To optimize the service life of your bearings and reduce your maintenance costs, it is essential to periodically record the operating condition of your machines and bearings.

SNR proposes an efficient measuring instrument: **LASERTEMP**.

This laser-targeting thermometer is a high-quality pocket instrument. Very simple to use, it allows you to measure the temperature of rolling element bearings, plain bearings and other components.

Applications

- Rolling element bearings, plain bearings and lubrication system for functional monitoring.
- Bearings and other heated parts in mechanical assemblies.
- Surface temperature of gearboxes, gear cases, bearings of small and large engines.
- Industrial equipment: paper rolls, metal strip during rolling or in motion, tires in rotation, etc.
- Live components (electrical or electronic items) or any untouchable items (sterile parts, freshly painted areas, etc.).

Technical characteristics

- Precise, non-contact infrared measurement (laser aiming of the measurement area): straight forward temperature data acquisition even for dynamic processes: no influence on the object to be measured. (Caution: the red dot does not indicate the measured surface).
- Wrench-to-target ratio of 3/1. (Recommendation: hold LASERTEMP 3 to 10 ft. from the object to be measured. The further away the surface to be measured, the larger the target area surface measured.)
- Emissivity adjustment 0.20 to 1.00.
- °C / °F switching.
- Measured temperature "HOLD" function. Adjustable audio alarm when a given threshold is exceeded.
- Storage case, low battery signal.

Temperature range	-50°C to +400°C / - 60°F to + 750°F
Resolution	0.5°C (-50°C to +400°C) / 1°F (- 60°F to +750°F)
Precision (*) +/- 1 Digit	+/- 2 % mean value (+100.1°C to 400°C / + 212.1 to + 750°F) +/-2°C (-50°C to 100°C) / +/- 4°F (- 6 °F to + 212°F)
Ambient °C / °F (**)	0°C to +50°C / 32°F to +120°F
Storage °C / °F (***)	-40°C to +70°C / - 40°F to +160°F
Power supply	2 AAA batteries (LR03, 1.5 Volt micro-battery)
Battery service life	20 hours
Dimensions	184 x 43.4 x 19mm
Weight	80g / 2.8 ounces

(*) : Precision of +/-2°C (4°F); over a measuring range of -50 to 100°C (- 60 to +210°F), if a measurement is made at 60°C (140°F), your device may display a value between 58 and 62°C (136 and 144°F).

Digit : The electronic circuitry of digital display measuring instruments features an uncertainty of 1 digit (the digit corresponds to the last displayed figure on screen). Therefore, reusing the previous example, the thermometer can display a value between 57.9 and 62.1°C (135.9 and 144.1°F).

(**) : The ambient temperature corresponds to the device's operating temperature.

(***) : The storage temperature corresponds to the temperature that the device can sustain when switched off, without undergoing any technical damage.

Laser-targeting thermometer

Measured material emissivity

In order to obtain a precise measurement and avoid any evaluation error, it is mandatory to check the emissivity of the LASERTEMP instrument adjustment based on the table below (capacity of a material to emit infrared radiation; factor between 0 and 1).

METALS		
Material	Type/ Structure / Element	Emissivity
Aluminium	Not oxidized	0.02 < x > 0.06
	Oxydized	0.11 < x > 0.19
	Severely oxydized	0.20 < x > 0.31
	Fine polished	0.09
Chromium	Not polished	0.18
	Chromium	0.08 < x > 0.26
Iron	Polished chromium	0.06
	Oxydized	0.74 < x > 0.84
	Not oxidized	0.05
	Thin rust layer	0.70
Cast iron	Rust	0.65
	Oxidized	0.64 < x > 0.78
	Not oxidized	0.21
Copper	Severely oxidized	0.95
	Copper oxide	0.77 < x > 0.87
	Black oxidized	0.78
	Corroded	0.09
	Polished	0.03
	Rolled	0.64
Alloy	Rought	0.74
	Molten	0.15
	Ni 20, Cr 24, FE 55, oxidized	0.90
	Ni-60, Cr-12, Fe-28, oxidized	0.89
Magnesium	Ni-80, Cr-20, oxidized	0.87
	Magnesium	0.07 < x > 0.13
Brass	73 % Cu, 27 % Zn, polished	0.03
	62 % Cu, 37 % Zn, polished	0.03
	Matted	0.07
	Burnished	0.40
Nickel	Oxidized	0.61
	Not oxidized	0.04
	Polished	0.05
	Oxidized	0.31 < x > 0.46
Forged iron	Not oxidized	0.05 < x > 0.12
	Galvanized	0.04
	Dull	0.94
Steel	Smooth	0.35
	Polished	0.28
	Cold rolled	0.75 < x > 0.85
	Polished table	0.00 < x > 0.14
	Soft steel, unalloyed, polished	0.10 < x > 0.12
Stainless steel	Not oxidized	0.08
	Oxidized	0.80
	Type 301, polished	0.27
	Type 316, polished	0.28
Zinc	Type 321, polished	0.18 < x > 0.49
	Usual commercial purity (99.1 %)	0.05
	Galvanized	0.28
NON METALLIC	Polished	0.02 < x > 0.11
	Aluminum paint	0.27 < x > 0.67
	10 % Al	0.52
	26 % Al	0.30
	Blue, Cu 203	0.94
	Black, Cu 0	0.96
	Green, Cu 203	0.92
	Red, Fe 203	0.91
	White, Al 203	0.94
	Rubber	Hard
Oil paint	Soft, gray	0.86
	All colors	0.92 < x > 0.96
	Black, glossy	0.90
	Camouflage	0.85
	White	0.94

NOTE – The LASERTEMP emissivity adjustment ranges from 0.20 to 1.00. For objects featuring an emissivity degree of less than 0.20, use an adhesive tape of fixed emissivity (0.93) or compare with contact measurement. Do not carry out measurement on glossy or reflective surfaces.

Monitoring & measurement

Calibrated feeler gauges



In a moving mechanical system, it is necessary to maintain a functional clearance permitting free rotation, as well as compensation for thermal expansion differences between shaft and housing.

The SNR feeler gauges allow you to better evaluate bearing fit.

Applications

- Internal radial clearance measurement in spherical and cylindrical roller bearings.

Technical characteristics

- Set of 18 gauges, round tip,
- Two gauge lengths available:
 - 90mm length x 10mm width,
 - 150mm length x 10mm width.
- Hardened steel gauges,
- Calibrated to 1/100th, they ensure high precision measurement,
- Each set of gauges is protected by a steel frame and a plastic case.

Blade length (mm)	Blade thickness (mm)		
90	0.04	0.10	0.50
	0.05	0.15	0.60
	0.06	0.20	0.70
	0.07	0.25	0.80
	0.08	0.30	0.90
	0.09	0.40	1.00
150	0.04	0.10	0.50
	0.05	0.15	0.60
	0.06	0.20	0.70
	0.07	0.25	0.80
	0.08	0.30	0.90
	0.09	0.40	1.00

Also available in inch.

Calibrated feeler gauges

Verification of clearance reduction

- Spherical roller bearings with tapered bore

Bearing bore (mm)		After fitting					
		C0 (J0)		C3 (J30)		C4 (J40)	
>	≤	Gauge to use (mm)		Gauge to use (mm)		Gauge to use (mm)	
		yes	no	yes	no	yes	no
30	40	0,02	0,03	0,03	0,04	0,04	0,05
40	50	0,02	0,03	0,03	0,05	0,05	0,07
50	65	0,03	0,05	0,04	0,06	0,06	0,08
65	80	0,03	0,05	0,04	0,06	0,07	0,09
80	100	0,04	0,06	0,05	0,07	0,08	0,11
100	120	0,05	0,07	0,07	0,09	0,10	0,13
120	140	0,06	0,09	0,08	0,11	0,11	0,14
140	160	0,06	0,10	0,09	0,13	0,13	0,17
160	180	0,06	0,10	0,10	0,15	0,15	0,20
180	200	0,07	0,12	0,10	0,15	0,16	0,22
200	225	0,08	0,13	0,12	0,17	0,18	0,24
225	250	0,09	0,14	0,13	0,19	0,20	0,27
250	280	0,10	0,16	0,14	0,21	0,22	0,29
280	315	0,11	0,17	0,15	0,22	0,24	0,32
315	355	0,12	0,19	0,17	0,25	0,26	0,34
355	400	0,13	0,20	0,19	0,27	0,29	0,37
400	450	0,13	0,20	0,20	0,28	0,31	0,40
450	500	0,16	0,24	0,23	0,31	0,35	0,44
500	600	0,17	0,26	0,25	0,34	0,36	0,46

Europe

FRANCE

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	Poligono Industrial	Fax. 91 673 65 48
	28820 Coslada	

*EUROPE	Subsidiaries excepted	Fax. 04 78 66 68 21
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	1053 Buenos-Aires	Fax. (54) 11-4 372-0088

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	Ain Sebaâ Casablanca	Fax. (212) 22 66 51 66
	B.P 15873 Casa-Principal	



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