

# CENTRALIZED LUBRICATION SYSTEMS



**ADVANCED FLUID  
MANAGEMENT SOLUTIONS**

**GENERAL  
CATALOG No.  
854**



**15**



**20**



**25**



**30**









**ADVANCED FLUID  
MANAGEMENT SOLUTIONS**



DESIGN IS AN

*Art*

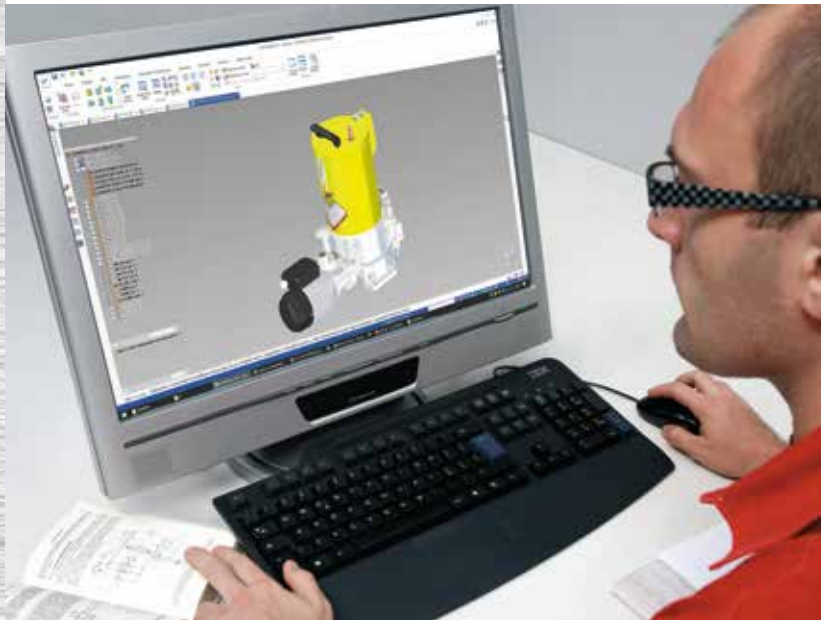




## Study, research and design

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The real strength of a firm starts with the ability of its study and research departments to always find the most suitable solutions to address market demands.



## Testing and inspections

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A sophisticated test room enables careful testing of the quality of new products before they are put on the market.



## Assembly lines

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Dedicated equipment specially designed to facilitate assembly operations, at the same time allowing an effective and automatic control of quality.





## Storage of Components

Our vertical stores enable quick and careful preparation of the components and spare parts intended for assembly and sale.



**Technology**  
**Efficiency**  
**Reliability**



## Technical Assistance

RAASM has the most complete range of products for lubrication and the dispensing of fluids. The aim is to always respond fully to the questions of our customers and meet all their needs.

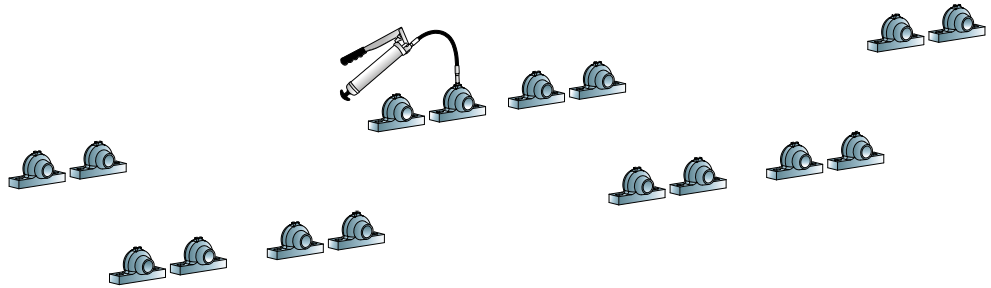


# Lubrication

The parts in relative, rotary or linear motion, making up any industrial machine, are producers of friction. The purpose of lubrication is to reduce the friction and consequently the wear of moving parts, significantly decreasing the generation of heat, improving the performance of the machine, and increasing its service life. Lubrication of the moving parts can be obtained by procedures that differ in methodologies, for effectiveness and efficiency.

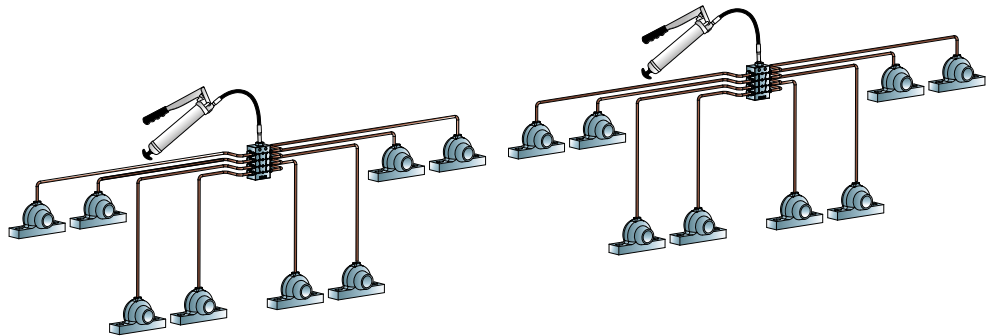
## Manual lubrication

The operator in charge is the only one responsible for the proper lubrication of the moving parts. He decides the quantity of lubricant to be dispensed and the intervals at which the operation is carried out, physically reaching each single lubrication point. Manual lubrication, therefore, depends solely on the operator's diligence and experience. Also, in case of hard-to-reach places the operator is put in uncomfortable or hazardous conditions.



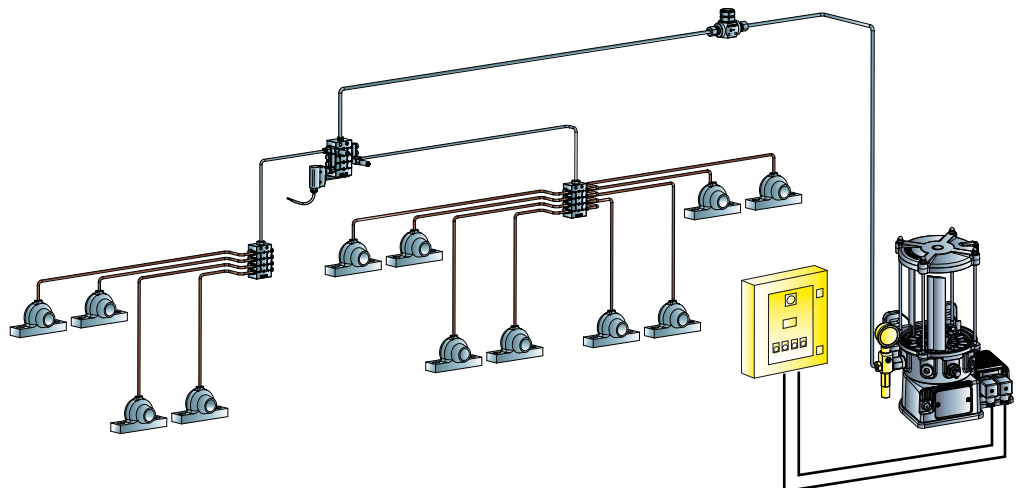
## Manual centralized lubrication

Compared to the method indicated in the preceding paragraph, with manual centralized lubrication all the machine lubrication points are grouped by means of appropriate piping, thus facilitating the task of the operator, who must intervene on a small number of points, reducing operation times and dosing the quantity of lubricant with greater precision, avoiding uncomfortable or hazardous conditions.



## Automated centralized lubrication

In addition to grouping all the lubrication points in a single point as described above, the operator is completely replaced by a pumping unit and specific control equipment. The main features of this method of lubrication are: correct dosing of lubricant for each single point, the possibility of monitoring the entire system by means of special equipment, programming of dosing through work time/cycles (lubrication) and pauses depending on machine requirements, and monitoring of minimum and maximum oil tank levels.



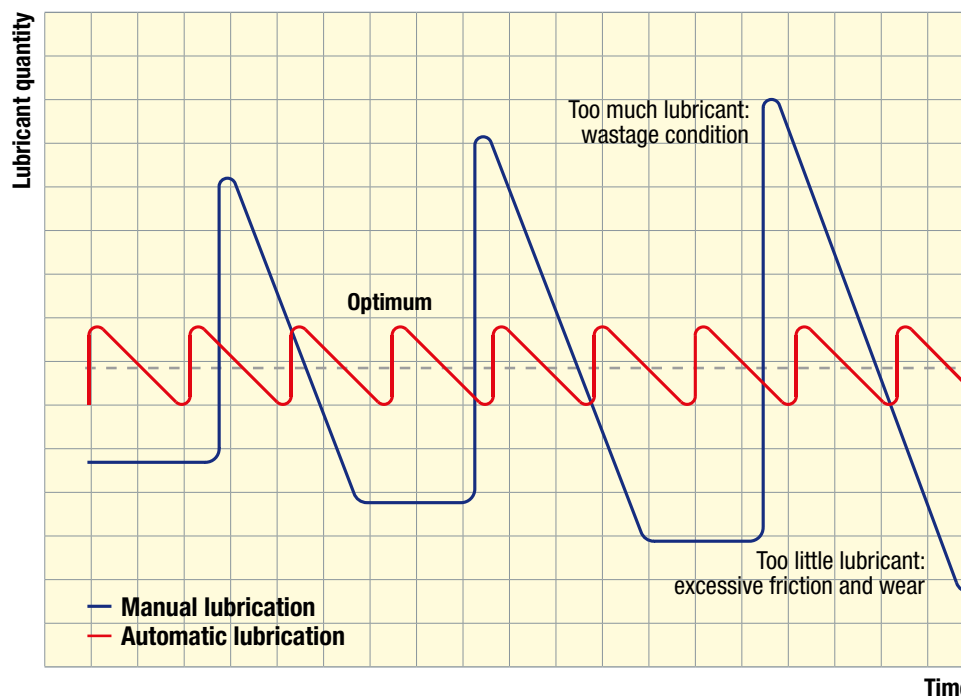


# Automated centralized lubrication

The centralized lubrication systems are designed for the automatic lubrication of moving parts that generate friction. These systems considerably reduce maintenance costs for the machinery on which they are installed, eliminating machine downtimes for lubrication and extending the life of the lubricated components. The automated systems also allow all the points requiring lubrication to be reached; even those not easily reached by an operator.

**For example, to better understand the concept, imagine being in your garden and having to water all the flowers and plants. You can choose to do this entirely by hand, using the classic watering can (manual lubrication) or make use of a manually-operated irrigation system (manual centralized lubrication) or add a system that times the delivery of water (automated centralized lubrication).**

Given below is a graph comparing the various lubrication conditions, following the methods previously described.



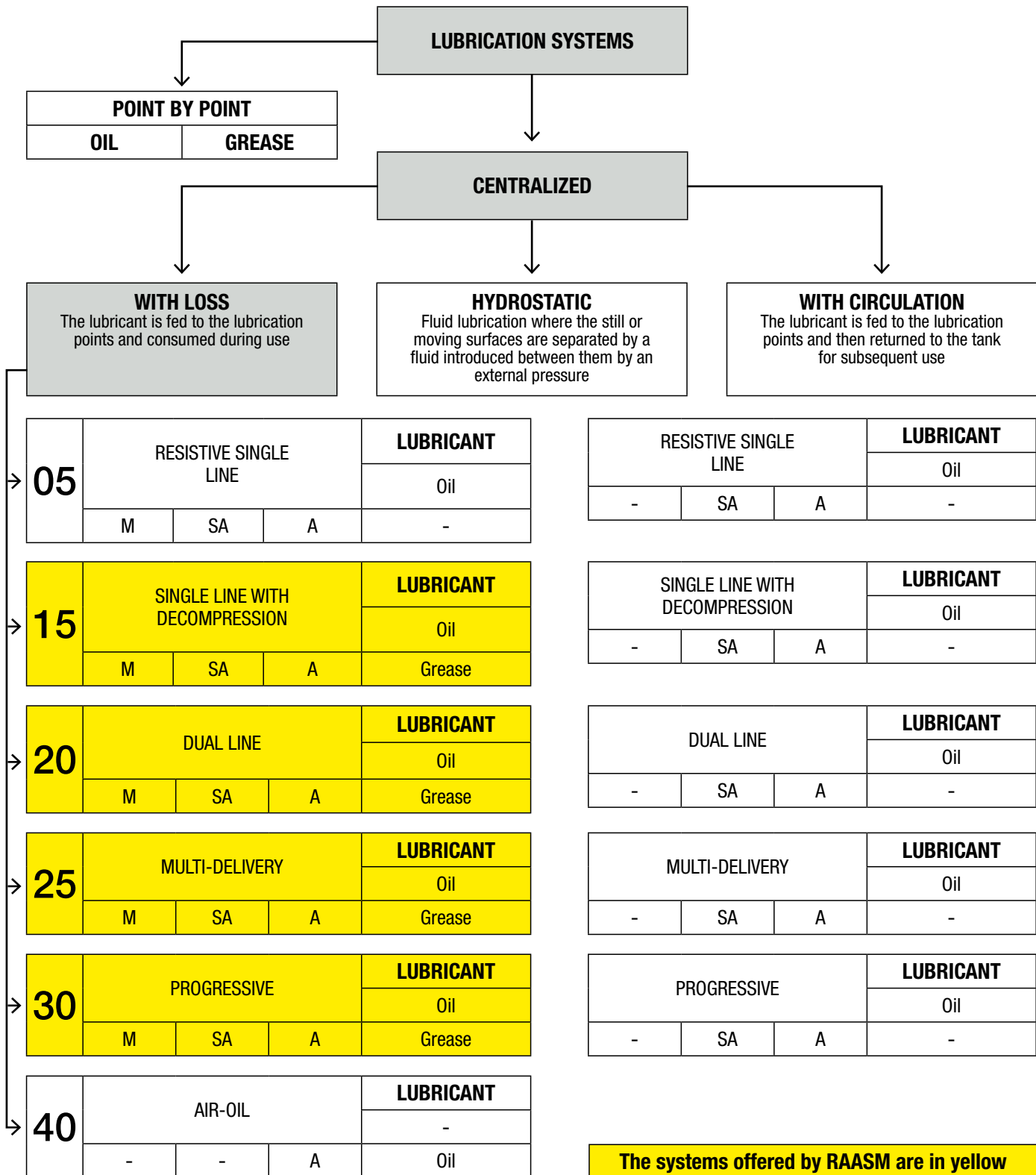
## ADVANTAGES

Automated centralized lubrication offers various advantages compared to manual lubrication:

- Improves the efficiency of the machine, increasing its productivity
- Lengthens the average service life of machinery
- Avoids costly downtimes for insufficient or no lubrication, thus also reducing the costs of repair and spare parts
- Correct dosing avoids unnecessary waste of lubricant, minimising costs and reducing the risk of environmental impact
- Allows hard to access areas to be reached, thereby avoiding potentially dangerous situations for the operator
- Allows the programming of dosing times according to the specific machine requirements, controlling the functionality of the entire system through special control equipment
- Allows the right quantity of lubricant to be adjusted point by point, even in phases after installation
- Facilitates the implementation of the system through the use of additional modular components, thus responding to the changing needs of the end-customer.

# Industrial machinery Lubrication systems

(Reference to international standard ISO 5170)



## LEGEND

<b>M</b>	MANUAL	<b>SA</b>	SEMI-AUTOMATIC	<b>A</b>	AUTOMATIC
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# Automated centralized lubrication: Components

## Pumping unit

It consists of lubricant tank and a pump which can be electric, air-operated or hydraulic.



## Volumetric distributors

Hydraulically operated devices, directly connected to the user points, arranged to dispense a predetermined and adjustable quantity of lubricant.



## CONTROL EQUIPMENT

The set of devices (PLC, pressure switches, sensors and level gauges) for programming, monitoring and ensuring proper functioning of the lubrication system.



## FEED LINES

They connect the pumping unit to the volumetric distributors (primary line) and from them to the individual users (secondary line). It consists of rigid pipe in steel, copper or flexible tubing in thermoplastic material, depending on the pressures developed.

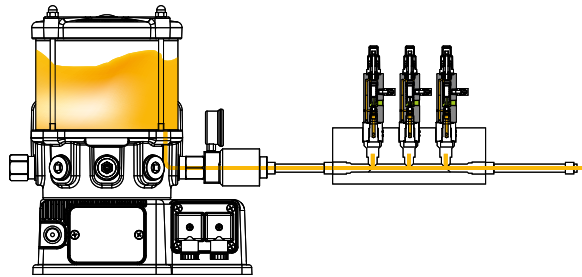


# RAASM centralized

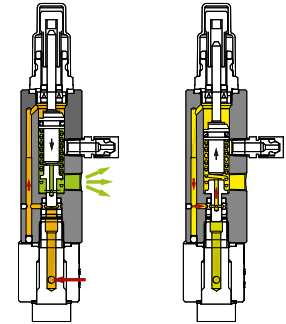
## Single line with decompression 15

It consists of an independent pumping unit which, through a main line, delivers the lubricant (oil or grease) in a predetermined quantity to direct response volumetric dosers (injectors). These volumetric dosing units operate in two phases: in the first phase the pressurization of the system (580-4350 psi) allows dispensing of the loaded lubricant. Whereas doser loading (decompression) occurs in the second phase, when the system is not under pressure. Each injector can be adjusted to deliver predetermined quantities of lubricant.

### ■ Pumping unit



### ■ Volumetric doser (injector)

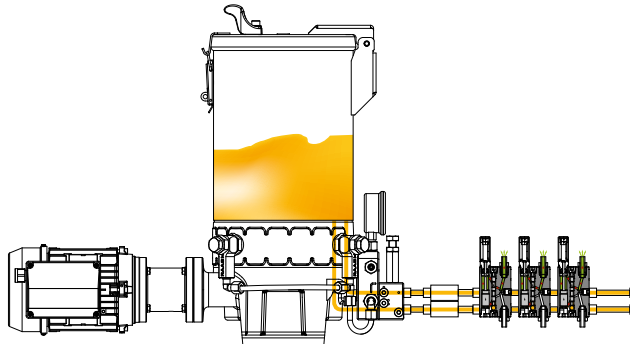


<b>Power supply</b>	24 V DC - 230/400 V AC - 50 Hz - 275/480 V AC - 60 Hz - pneumatic
<b>Lubrication session management</b>	By cycles
<b>Controls</b>	One for each critical user
<b>Type of installation</b>	On fixed/movable machinery
<b>Length of system</b>	Medium/long
<b>System architecture</b>	Parallel
<b>Maximum pressure</b>	4350 psi
<b>Delivery</b>	Medium/high
<b>Functionality</b>	There are no machine stops/interruption if an injector sticks

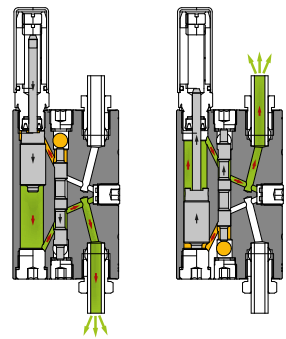
\* **On request:** available different voltages depending on the standard of the various countries of the world.

## Dual line - system 20

### ■ Pumping unit



### ■ Volumetric doser



It is thus defined because lubricant dispensing occurs through two separate lines that are fed alternately by the pumping unit. In turn the two lines feed volumetric distributors connected to them, specially adjustable to dispense predefined quantities of lubricant.

<b>Power supply</b>	230/400 V AC - 50 Hz - 275/480 V AC - 60 Hz - pneumatic
<b>Lubrication session management</b>	by cycles
<b>Controls</b>	One for each critical user
<b>Type of installation</b>	On fixed
<b>Length of system</b>	long
<b>System architecture</b>	Parallel
<b>Maximum pressure</b>	5800 psi
<b>Delivery</b>	Medium/high
<b>Functionality</b>	There are no machine stops/interruption if an injector sticks

\* **On request:** available different voltages depending on the standard of the various countries of the world.

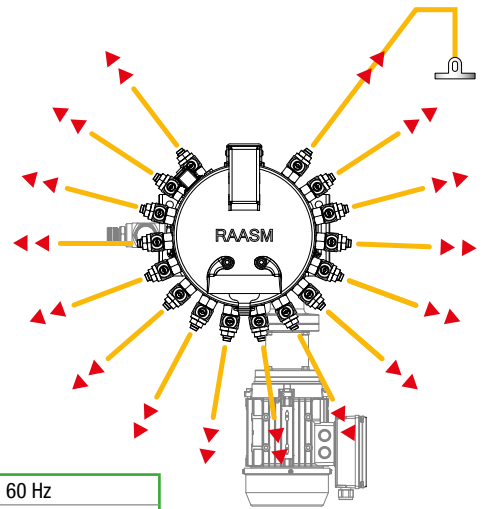
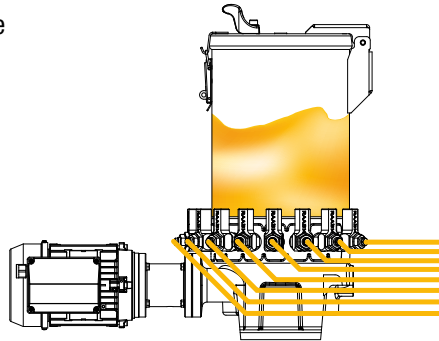


# Lubrication systems

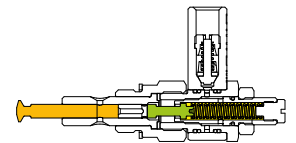
## Multi-delivery - system 25

It consists of a central pumping station allowing the lubrication of a high number of users (up to 16) with oil or grease in predetermined quantities. The pumping unit consists of an electric pump fitted radially with a number of pumping elements which, through the movement of a cam, push the lubricant in succession to the various deliveries, connected to the pipes.

### ■ Pumping unit



### ■ Pumping element



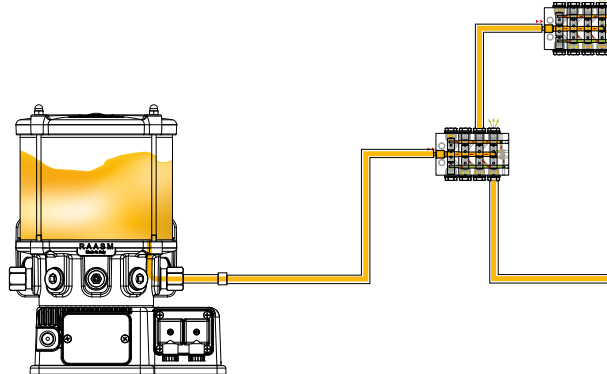
<b>Power supply</b>	230/400 V AC - 50 Hz - 275/480 V AC - 60 Hz
<b>Lubrication session management</b>	Timed
<b>Controls</b>	System maximum pressure
<b>Type of installation</b>	On fixed machinery
<b>Length of system</b>	Medium/short
<b>System architecture</b>	Single pumping element (separate outlets)
<b>Maximum pressure</b>	5800 psi
<b>Delivery</b>	Medium
<b>Functionality</b>	There are no machine stops/interruption if a pumping element jams

\* **On request:** available different voltages depending on the standard of the various countries of the world.

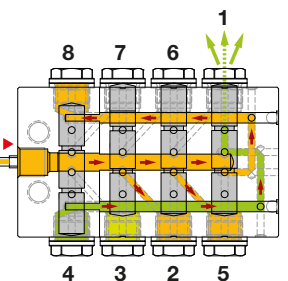
## Progressive - system 30

It consists of an independent pumping unit that feeds the volumetric distributors equipped with several outlets. The dispensing of lubricant, in a predetermined quantity, occurs through a progressive sequence and not simultaneously as in the previous systems.

### ■ Pumping unit



### ■ Volumetric doser (progressive)



<b>Power supply</b>	12/24 V DC - 230/400 V AC - 50 Hz - 275/480 V AC - 60 Hz - pneumatic
<b>Lubrication session management</b>	Timed/cycle
<b>Controls</b>	A single control is sufficient to check operation of the complete system
<b>Type of installation</b>	On fixed/movable machinery
<b>Length of system</b>	Medium/short
<b>System architecture</b>	In series
<b>Maximum pressure</b>	3625 psi
<b>Delivery</b>	Medium/low
<b>Functionality</b>	each dispenser is placed in series with all the others, therefore the malfunction of one causes blocking of all the others

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## SYSTEM 15







# SYSTEM 15 SINGLE LINE

The single-line decompression lubrication system consists of an independent pump assembly, which distributes the lubricant (oil or grease) to direct-response distributors (injectors) through a main line.

The operation of the system occurs through two phases:

1 - Injector loading (the system is not under pressure)

2 - Lubricant dispensing (the system is under pressure)

Each injector can be adjusted to dispense different quantities of lubricant.

The pump assembly is equipped with a device (discharge valve) which enables rapid decompression of the system immediately after the action of the injectors. The system pressure and the configuration of the injectors in parallel enable the feeding of even very large centralized systems and with a high number of users. Through control of the pressure, verification of operation for each cycle is possible. Lubricating oils and greases up to NLGI 2 can be used.

The pumps feeding these systems can be:

- air-operated pumps for standard drums
- air-operated pumps with 2.6 gal reservoir
- electric pumps C15 S (radial piston – max. 4)
- electric pumps C15B18 (radial piston – max. 4)

Management and control of the system occurs through the application of modern electrical equipment (PLC, level sensors, microswitches, pressure switches).



## Examples of application sectors

- |                           |                                |
|---------------------------|--------------------------------|
| ■ Bucket wheel excavators | ■ Agriculture                  |
| ■ Cement works            | ■ Conveyor belts               |
| ■ Forestry                | ■ Mining trucks                |
| ■ Quarries                | ■ Excavators with front loader |
| ■ Shiploaders             | ■ Tracked cranes               |

## Advantages

- Longer life of lubricated components
- Reduced lubricant consumption and operating costs
- Programmed and precise dosing of the lubricant at each point to be lubricated
- System easily extended without the need to be redesigned
- System suitable for particularly demanding environments
- System easy to create (pump plus number of users)
- Injector delivery adjustable directly at installation or after
- There are no lubrication stops/interruptions if an injector sticks
- Injectors with visual control of operation
- Pumping unit offering easy maintenance and very safe operation, working with oil or grease

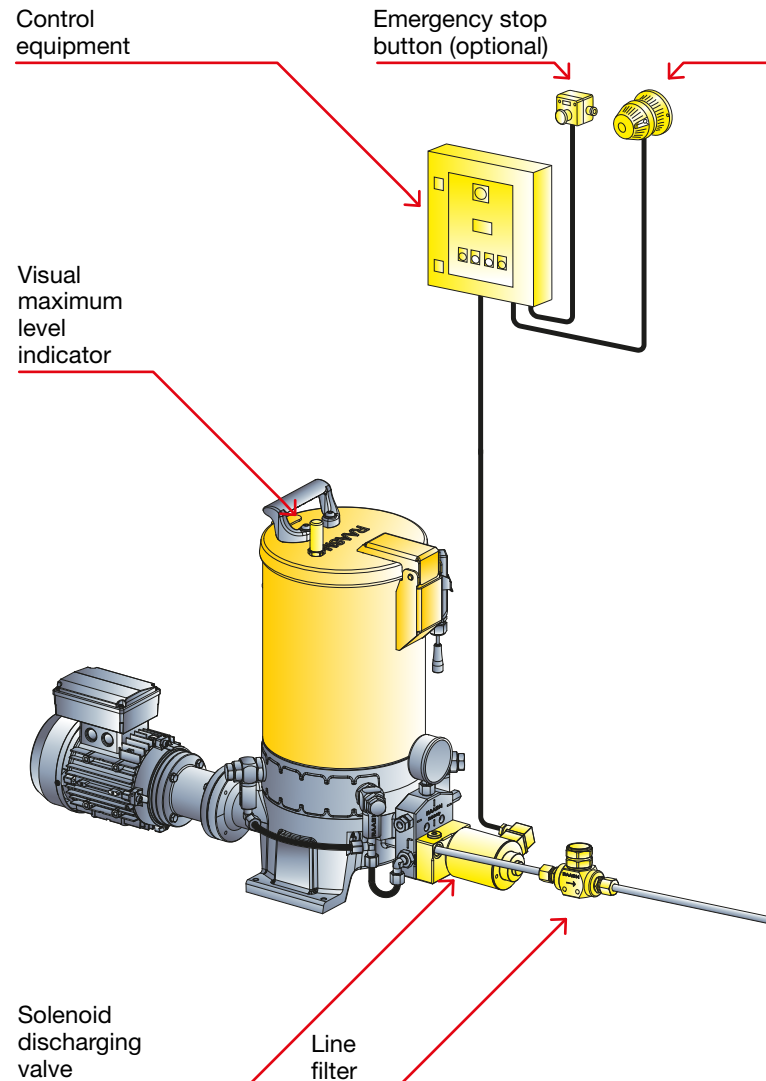
Control equipment

Emergency stop button (optional)

Visual maximum level indicator

Solenoid discharging valve

Line filter

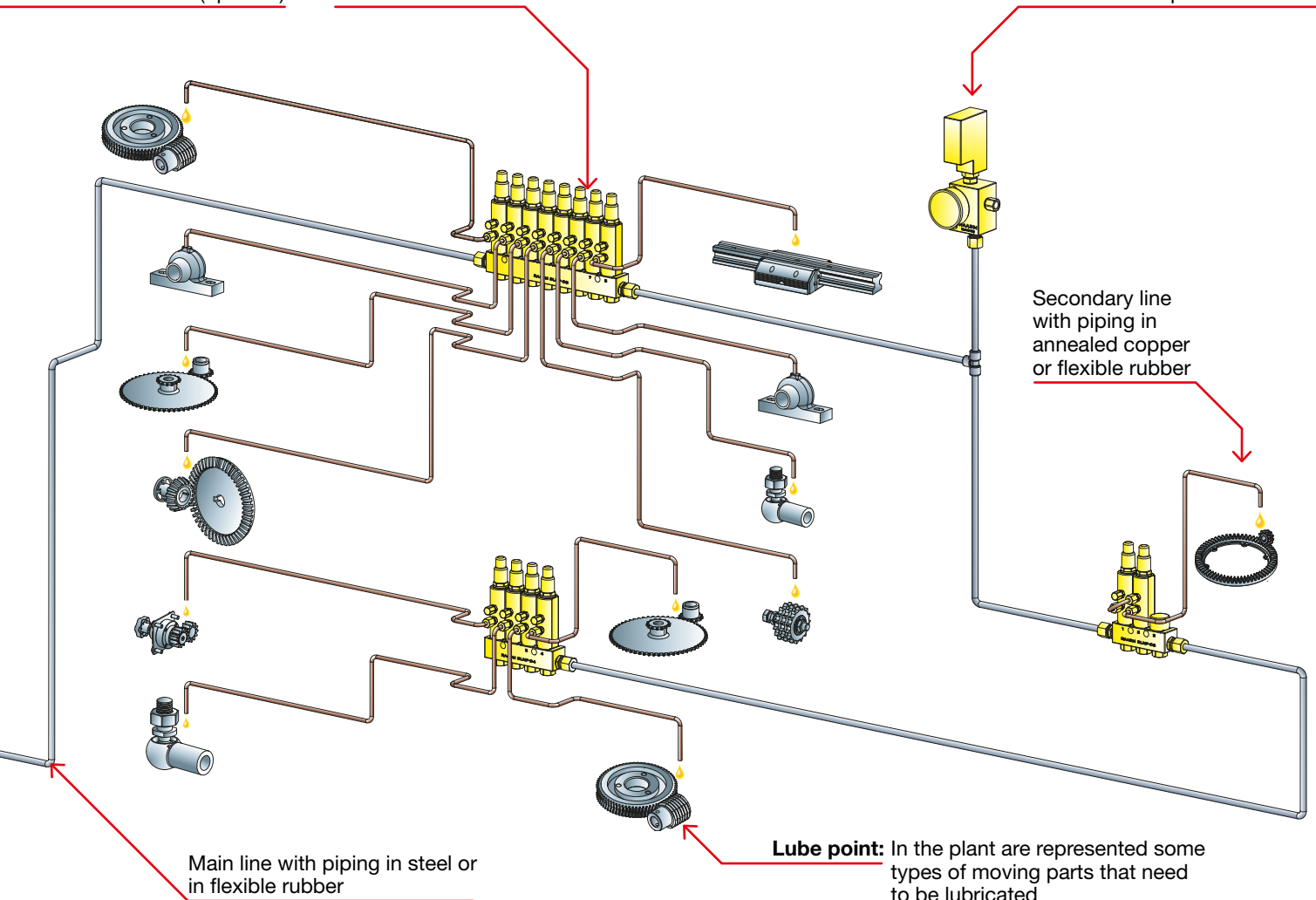




Acoustic and flashing alarm (optional)

Volumetric distributor SLHP-D

Line end pressure switch



Main line with piping in steel or in flexible rubber

**Lube point:** In the plant are represented some types of moving parts that need to be lubricated







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## SYSTEM 20





# SYSTEM 20 DUAL LINE

The centralized dual-line lubrication systems are normally used in large plants and machines: steel mills, cement works, mines, overhead cranes, shipyard cranes and presses.

The systems are sized in order to be able to reach rather high pressures from 2900 to 5800 psi. In such systems the length of the piping can easily exceed 230 ft.

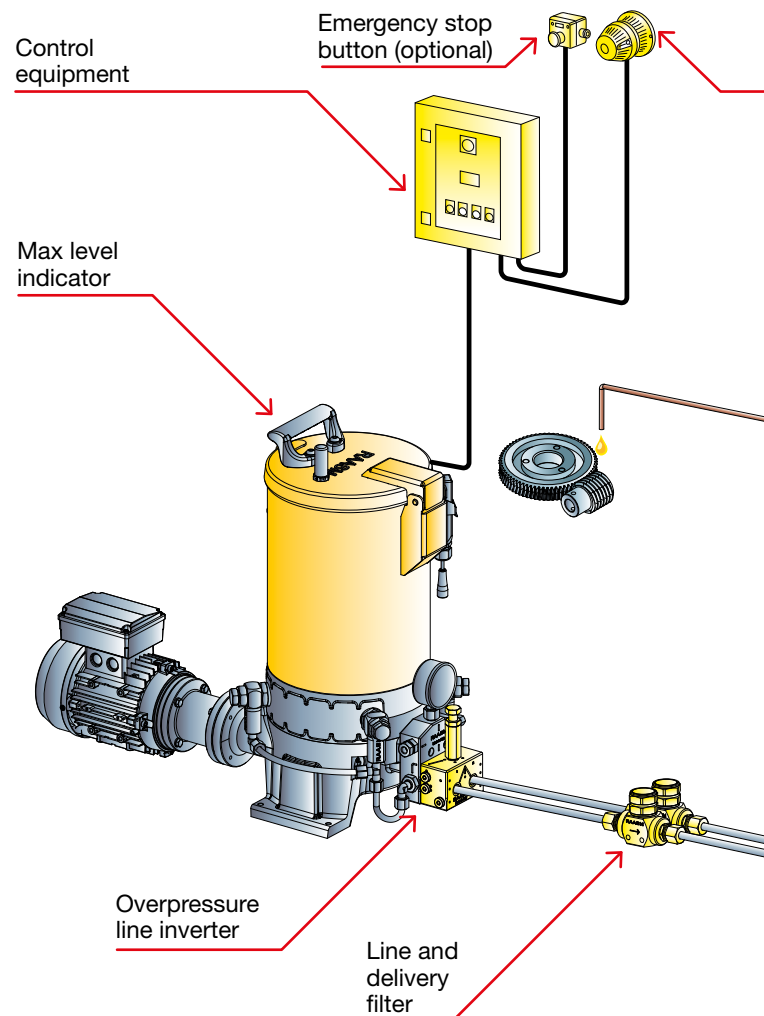


## Examples of application sectors

- Bucket wheel excavators
- Cement works
- Forestry
- Quarries
- Shiploaders
- Agriculture
- Conveyor belts
- Mining trucks
- Excavators with front loader
- Tracked cranes

## Advantages

- Supplies an exact quantity of lubricant from the pumping unit to all the grease points located even at great distances
- The dosing and measuring devices (called volumetric distributors) are managed through two main lines, therefore the lubricant is always under the control of the system at the same time
- The system can be easily extended through the addition of one or more volumetric distributors
- This high pressure system allows the use of particularly narrow pipes, enabling a reduction in the quantity and the deterioration of the residual grease inside the piping, while also reducing installation costs
- Visual check of each volumetric distributor or by means of an appropriate sensor
- If a volumetric distributor does not work, all the other outlets will continue to function normally
- Easy re-calibration of lubricant dosing of each distributor even after installation
- Optimum monitoring and control possibilities using appropriate equipment
- The system keeps the pressure constantly regulated and is able to compensate temperature fluctuations
- The system is able to generate only the necessary pressure required for each lubrication cycle, therefore the pump and other system components of the system are not subjected to pressure variations able to affect their service life

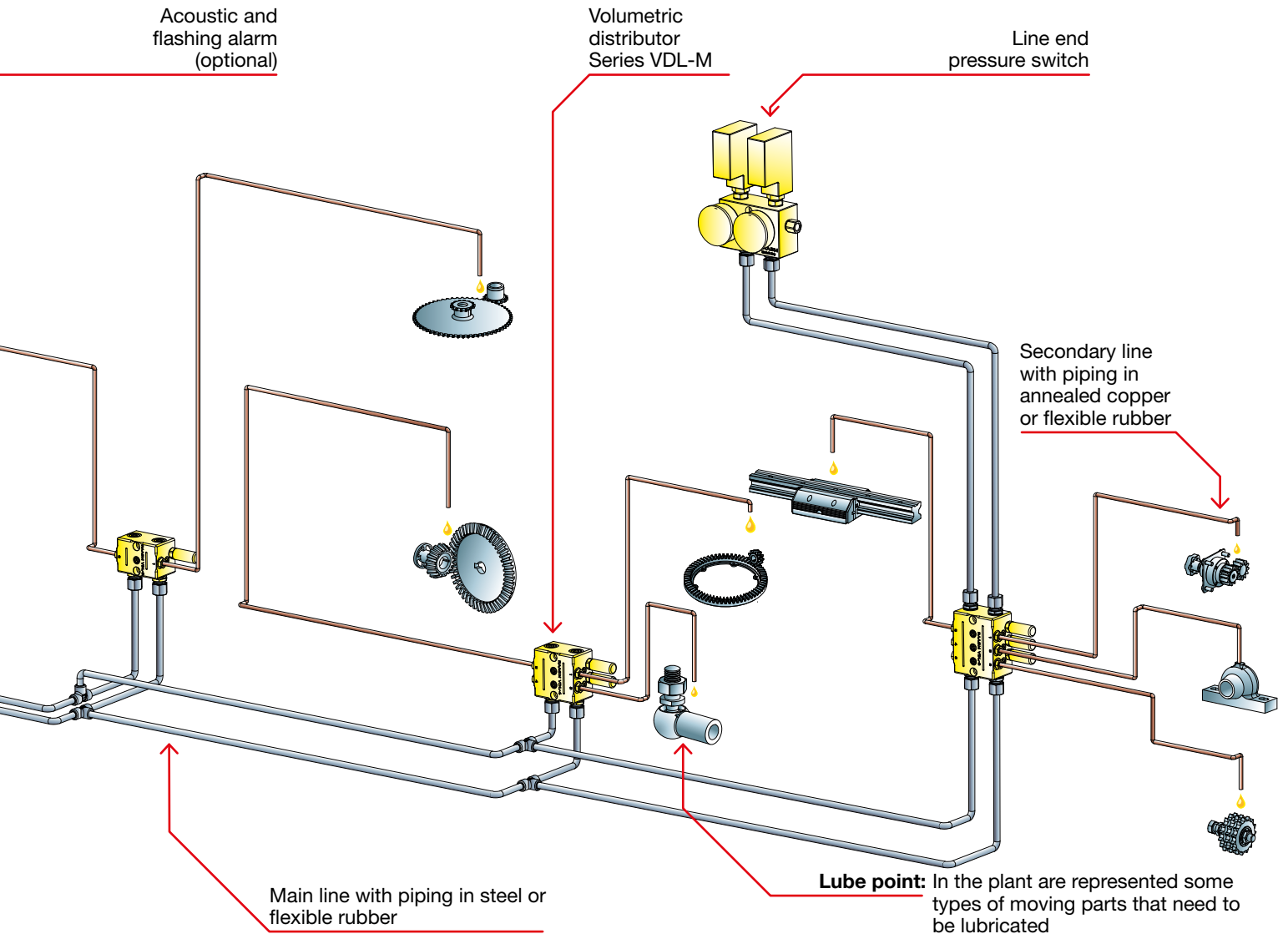




Acoustic and flashing alarm (optional)

Volumetric distributor Series VDL-M

Line end pressure switch



Main line with piping in steel or flexible rubber

Lube point: In the plant are represented some types of moving parts that need to be lubricated







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# SYSTEM 25





# SYSTEM 25 MULTY-DELIVERY

The multi-delivery system enables the lubrication of up to 16 separate users. The central pumping unit consists of an electric pump radially fitted with a series of pumping elements which, through the movement of a cam, push the lubricant in succession to the various deliveries, from which as many feed lines start.

With this system, lubricating oils and greases up to grade NLGI 2 can be used. The pump assembly can be supplied by a minimum of 1 to a maximum of 16 pumping elements adjustable in delivery.

Each pumping element is intended to feed a line, directly to users, volumetric distributors or distributors for spray lubrication.

A maximum pressure switch, connected to an appropriate manifold, enables the control of any sudden changes in pressure in the various lines, possibly due to impurities or foreign matter hindering the flow of lubricant.

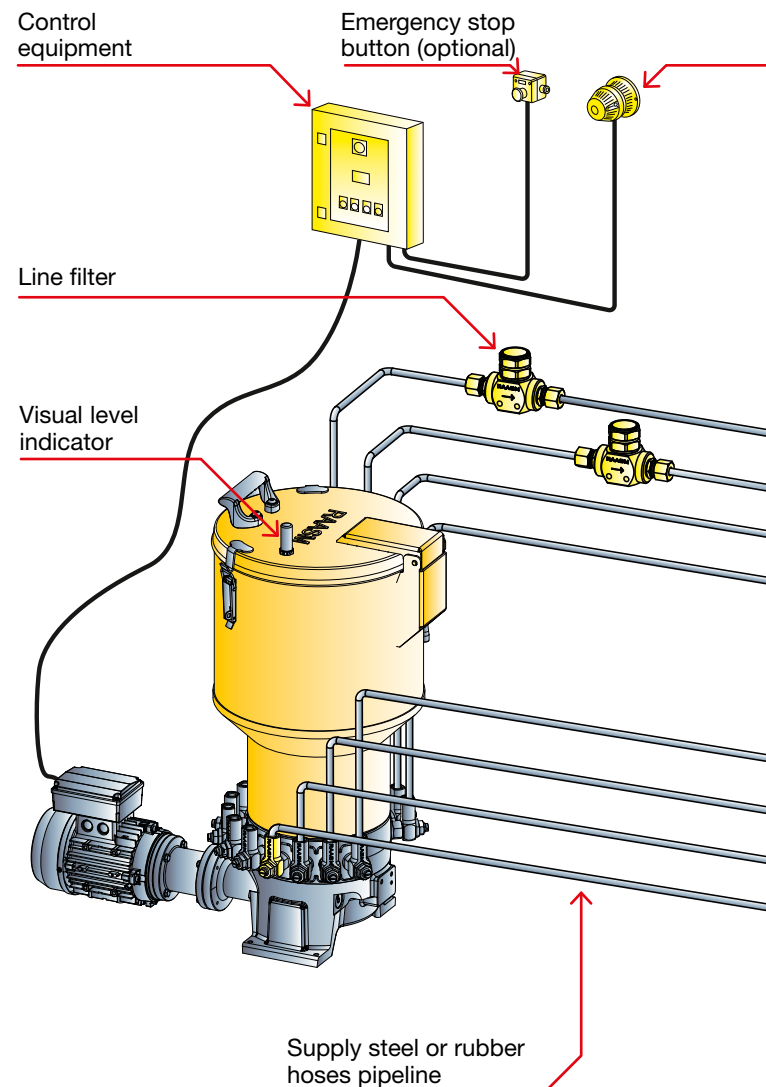


## Examples of application sectors

- Machine tools
- Woodworking machines
- Marble working machines
- Construction machinery, concrete mixers, plaster pumps
- Foundry and die casting machines
- Port facilities
- Rubber industry machinery
- Mines
- Machines for the steel industry
- Farm machinery
- Water scooping machine

## Advantages

- Supplies a precise quantity of lubricant from a pumping unit to various lubrication points placed at medium-short distances, through adjustment of the delivery of the pumping elements
- Very safe and easy to maintain pumping unit, working with grease or oil
- Delivery of pumping elements adjustable by means of adjustment screw
- Possibility of using 1 to 16 pumping elements, with their position and orientation as required by the user
- Pumping elements easily to remove and replace
- Possibility of monitoring the system by means of appropriate control and management equipment
- Variable delivery from 0.26 to 8.54 in<sup>3</sup>/min (grouping the pumping elements in a single delivery)



## control manifold

The control manifold with pressure switch, in white galvanized steel controls the delivery pressure of each line. It sends an alarm signal if the measured pressure is higher than a predefined value.

For example, this can occur in case of an obstruction on a pipe or at a user point. It is able to manage up to 8 delivery points. For more than 8 delivery points up to 16 connect in series another manifold. It is also provided with a discharge union on the bottom of the manifold block. Each inlet is equipped with a one-way valve with NPT 1/4" (f) connection.

The pump C25S is designed to be connected directly to the user points, therefore its pumping elements are used the same way as volumetric dosers. Each pumping element combines easy maintenance with high operating safety thanks to the two single-acting valves and delivery regulating unit. The pumping element is mounted radially on the chrome-plated aluminium base and fixed to a ring coupled to an eccentric shaft. This is centrally mounted to the pump from which receives the axial pumping movement. This movement allows the suction and pumping of the lubricant without using springs which could deteriorate or break.

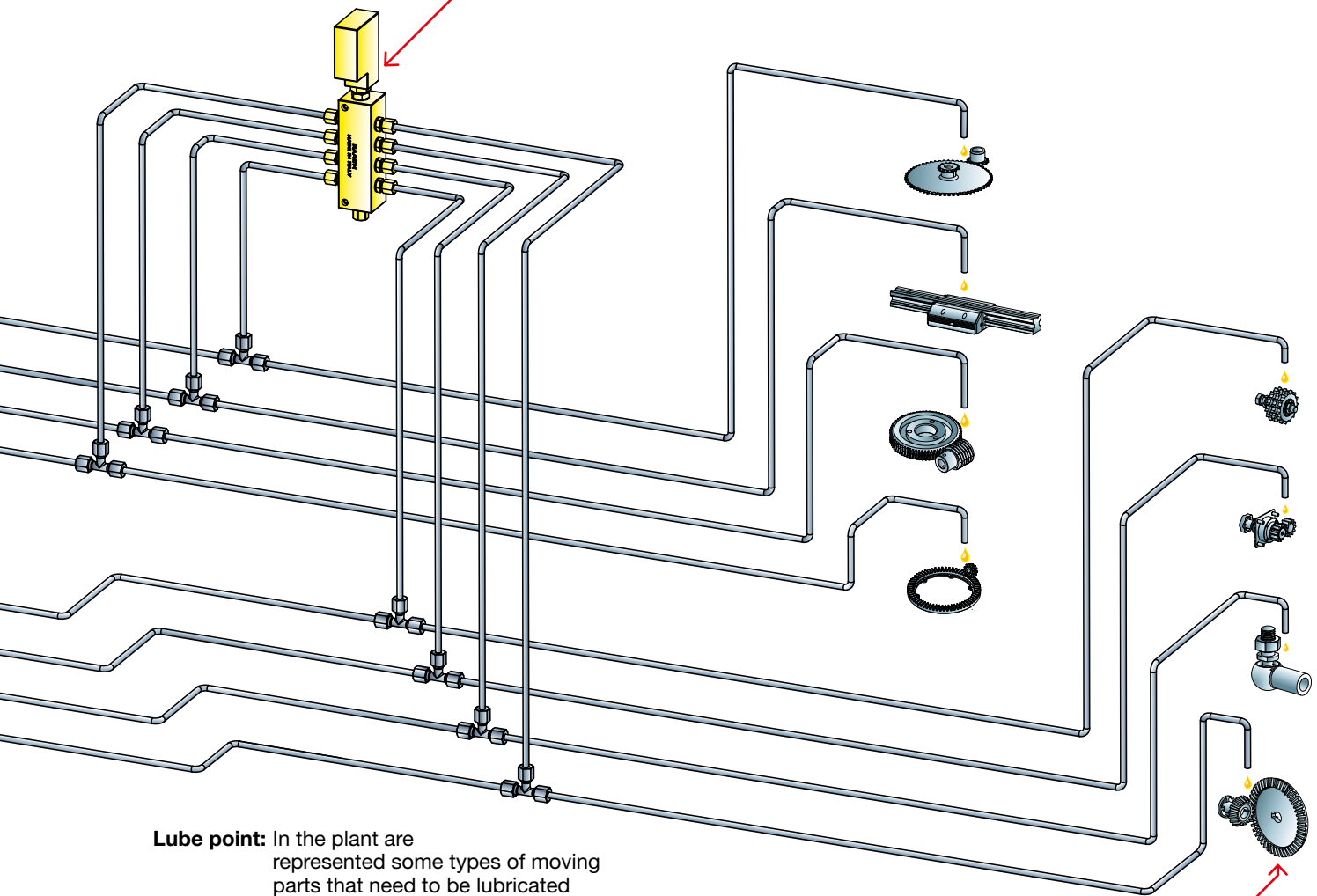


## pumping elements



Acoustic and flashing alarm (optional)

Control manifold with pressure switch









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## SYSTEM 30





# SYSTEM 30 PROGRESSIVE

The progressive lubrication system consists of a pumping unit connected to volumetric distributors which, through the pumping action of a piston placed inside them, ensure the delivery of a predetermined quantity of lubricant to a corresponding number of users.

This system is defined such, since the action of each piston inside the distributor, which allows the flow of lubricant to pass from one section to another of the distributor, follows a progressive sequence of distribution to the various users.

Each dispenser is placed in series with all the others, therefore malfunctioning of just one causes blocking of all the others. Consequently the control of operation of a single distributor allows the monitoring of the whole system.

With this system, lubricating oils and greases up to grade NLGI 2 can be used.

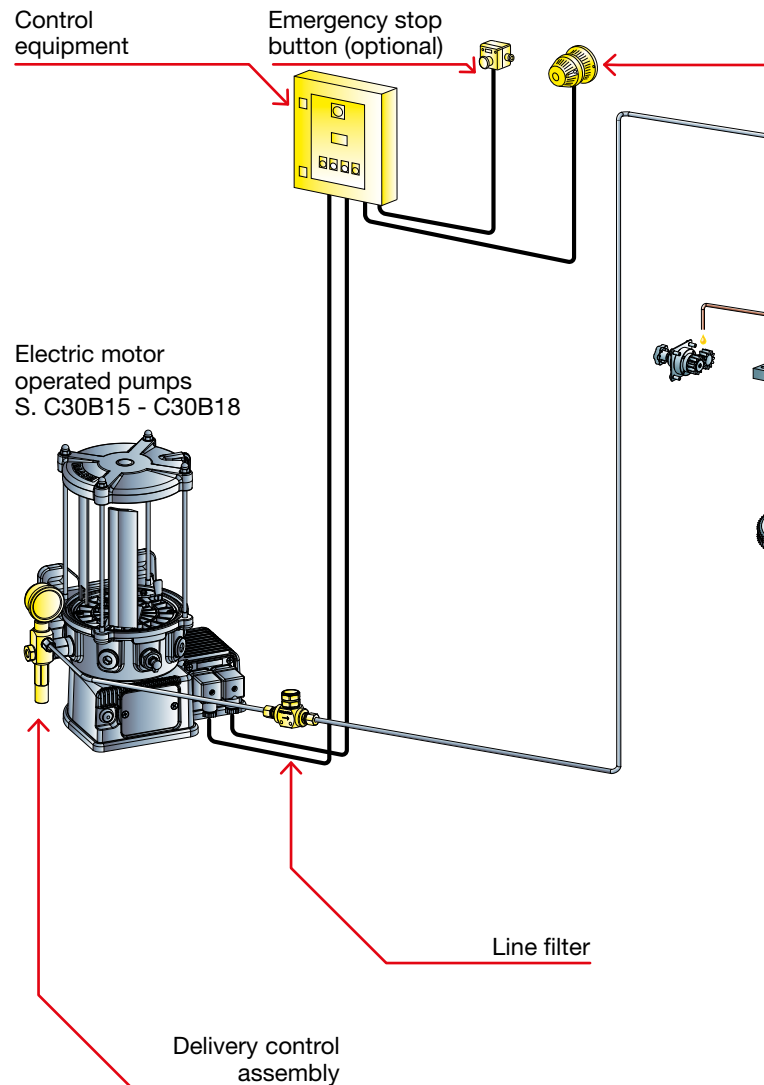


## Examples of application sectors

- Earthmoving
- Trucks - Transport
- Construction machinery, mobile concrete mixers
- Vehicles for garbage collection
- Port facilities
- Rubber industry machinery
- Railways, rolling stock
- Mines
- Machines for the steel industry
- Farm machinery

## Advantages

- The progressive system ensures that each individual point is properly lubricated through the control of any of the components making up the system
- Possibility of implementing the control for each individual point, when it is all-important to know where a malfunction can occur
- Possibility of installing visual or electric-type controls
- Various distributor models are available for the number of outlets and for deliveries
- Careful choice of materials and treatments, ensuring the long life of all components
- The progressive system is normally used for short work times that include long pause times, hence reduced wear of all parts of the system
- Suitable for medium short systems with a high number of users



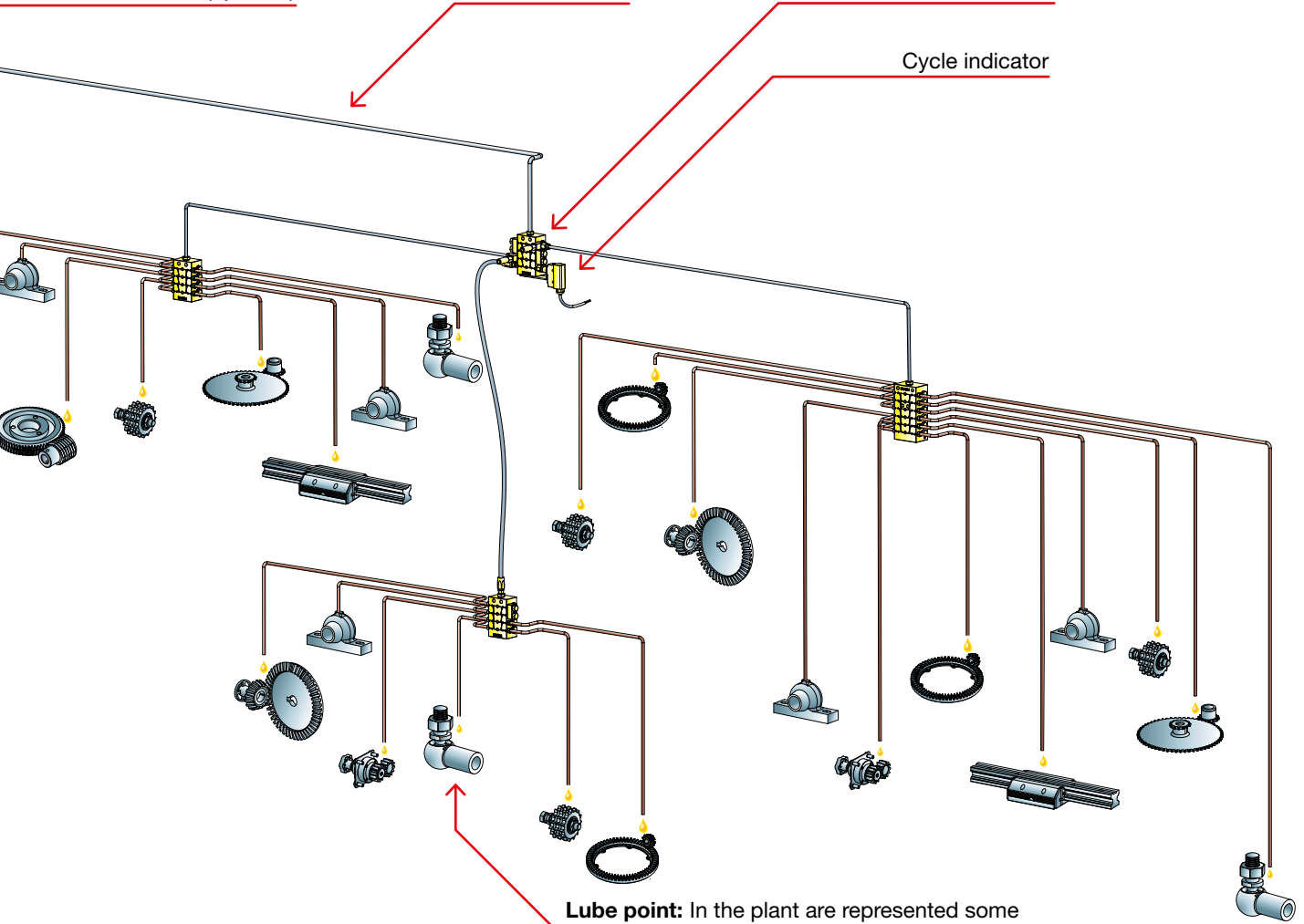


Acoustic and flashing alarm (optional)

Main line with piping in steel or in flexible rubber

Monobloc and modular "Master" divider valves MDV-M and MDV-L

Cycle indicator



**Lube point:** In the plant are represented some types of moving parts that need to be lubricated

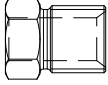

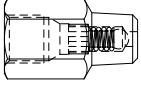
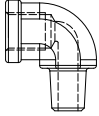
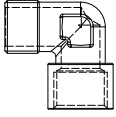
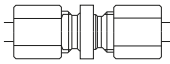
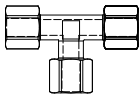
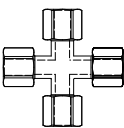
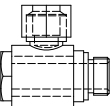
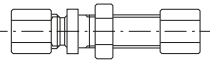
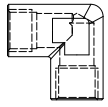
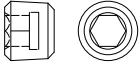





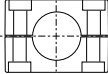
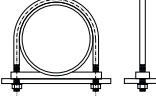

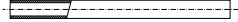

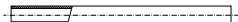

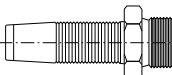

# Example accessories

	Description	Fittings	Delivery/ Pressure		Description	Fittings	Delivery/ Pressure
	Overpressure reversing valve	BSP 1/4" (f)	11.6 ft <sup>3</sup> /min		Pumping assembly	BSP 3/8" (f)	15.3 - 21.9 - 31.8 in <sup>3</sup> /min (adjustable pumping element) 110 - 146 - 220 - 293 - 439 in <sup>3</sup> /min
	Overpressure reversing valve with pressure gauge	BSP 3/8" (f)	14 ft <sup>3</sup> /min		Pressure relief valve	BSP 3/8" (f)	min. 29 psi max. 116 psi
	Electromechanical reversing valve	BSP 1/2" (f)	up to 16.3 ft <sup>3</sup> /min		Electric discharge valve	24 V DC BSP 3/8" (f)	max. lubricating pressure 7251 psi
	Pressure switch	BSP 3/8" (f)	from 435 to 5800 psi		Control pressure switch unit	BSP 1/4" (f)	5800 psi
	Filter 30-60-100 micron	BSP 1/2" (f)	7251 psi		Pressure relief and loading valve	On pumping element BSP 1/4" (f)	1450 - 4350 psi
	Filter 150-3000 micron						
	Pressure gauge ø 1.57"	BSP 1/8"	5800 psi		Delivery control valve	BSP 3/8" (f)	2.8 ft <sup>3</sup> /min
	Pressure gauge ø 1.36"	BSP 1/4"					
	Pressure gauge ø 2.48"	BSP 1/4"	8700 psi				
	Pressure gauge ø 3.93"	BSP 1/2"					

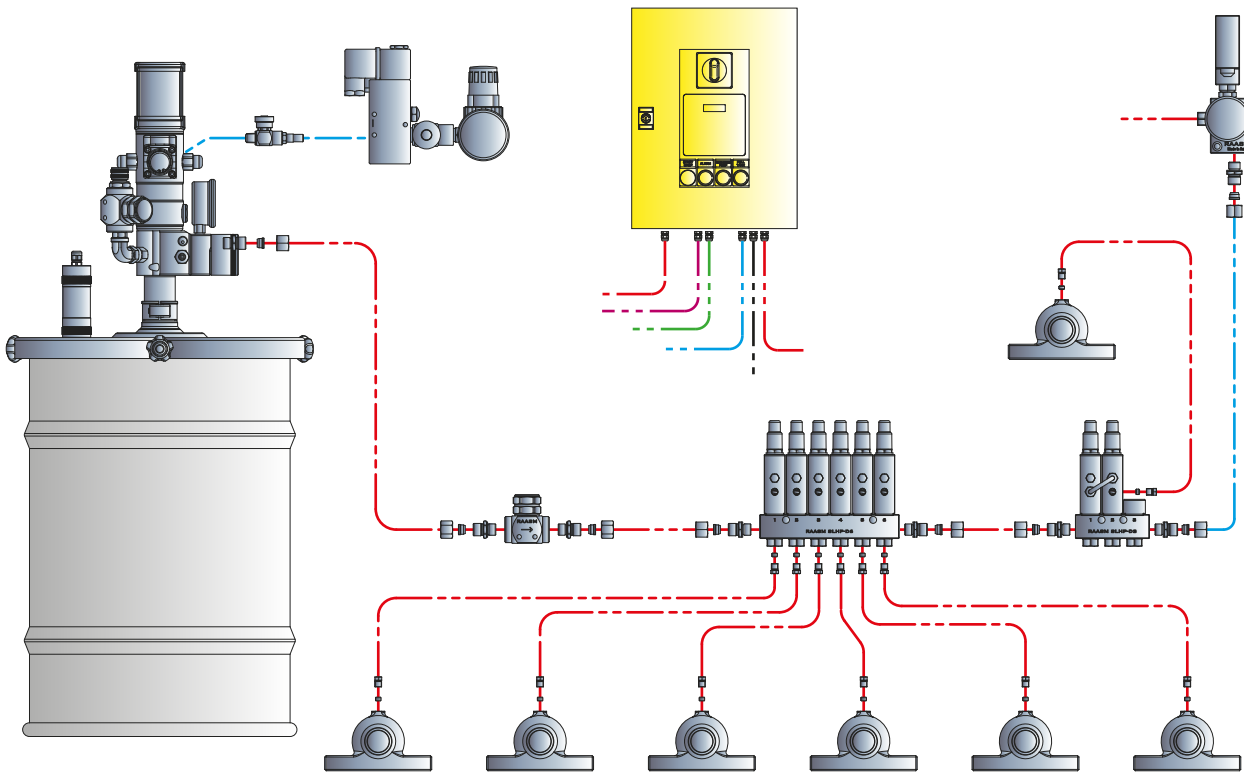
# Example fitting and tubes

Not provided by RAASM but available in the market

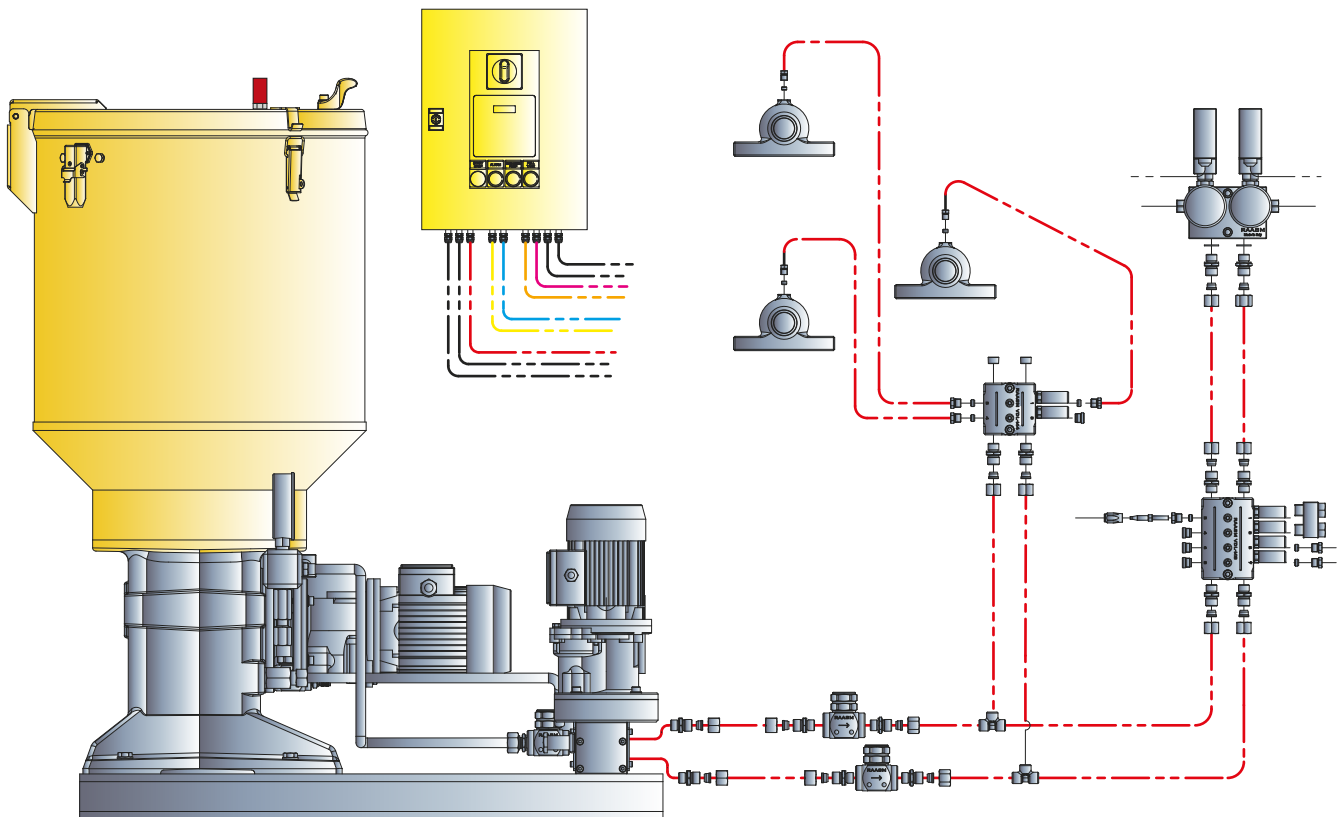
	Abbrev.	Description
	<b>RB</b>	Bicone union
	<b>RDR</b>	Reduction union
	<b>RTVD</b>	Straight and union with valve
	<b>RTVC</b>	Curved and union with valve
	<b>REG</b>	Elbow and union
	<b>RID</b>	Straight middle union
	<b>RIT</b>	Middle "T" union
	<b>RIC</b>	Middle mcross union
	<b>AG</b>	Swivel connectors
	<b>RAT</b>	Straight through union
	<b>GF</b>	90° female elbow
	<b>TCE</b>	Tapered hexagon socket plugs

	Abbrev.	Description
	<b>TTCE</b>	Cylindrical hexagon socket plugs
	<b>NI</b>	Nipples
	<b>GA</b> <b>GR</b>	Seal washers (Aluminium - Copper)
	<b>FB</b> <b>FBP</b>	Pipe collars
	<b>CG</b>	U bolts and couplings
	<b>TRA</b>	Calibrated copper pipe, annealed
	<b>TAC</b>	Annealed steel pipe, bonderised
	<b>TFL</b>	Flexible thermoplastic tube
	<b>TNY</b>	Polyamide tube (Nylon 6)
	<b>CRL</b>	Smooth recoverable shanks
	<b>AS</b>	Straight recoverable male connectors
	<b>CG</b>	Recoverable bushings

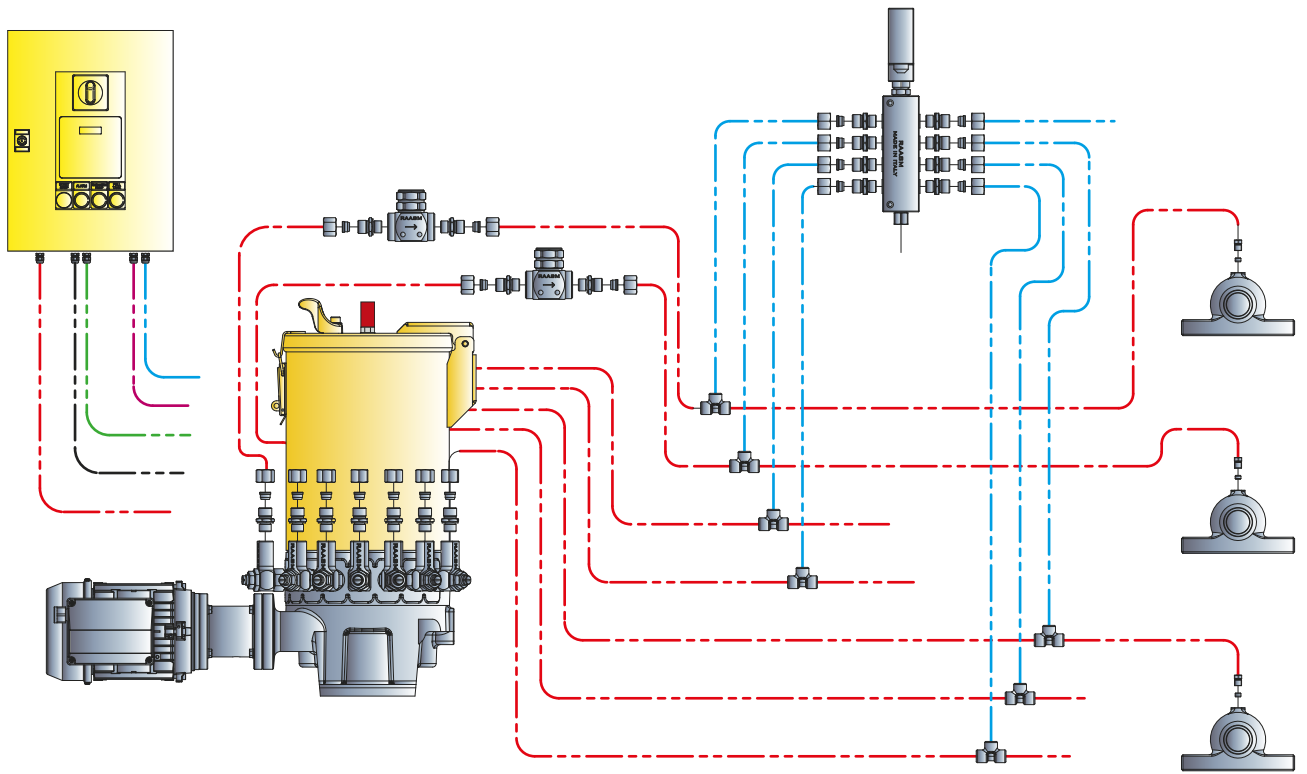
## Single line - System 15



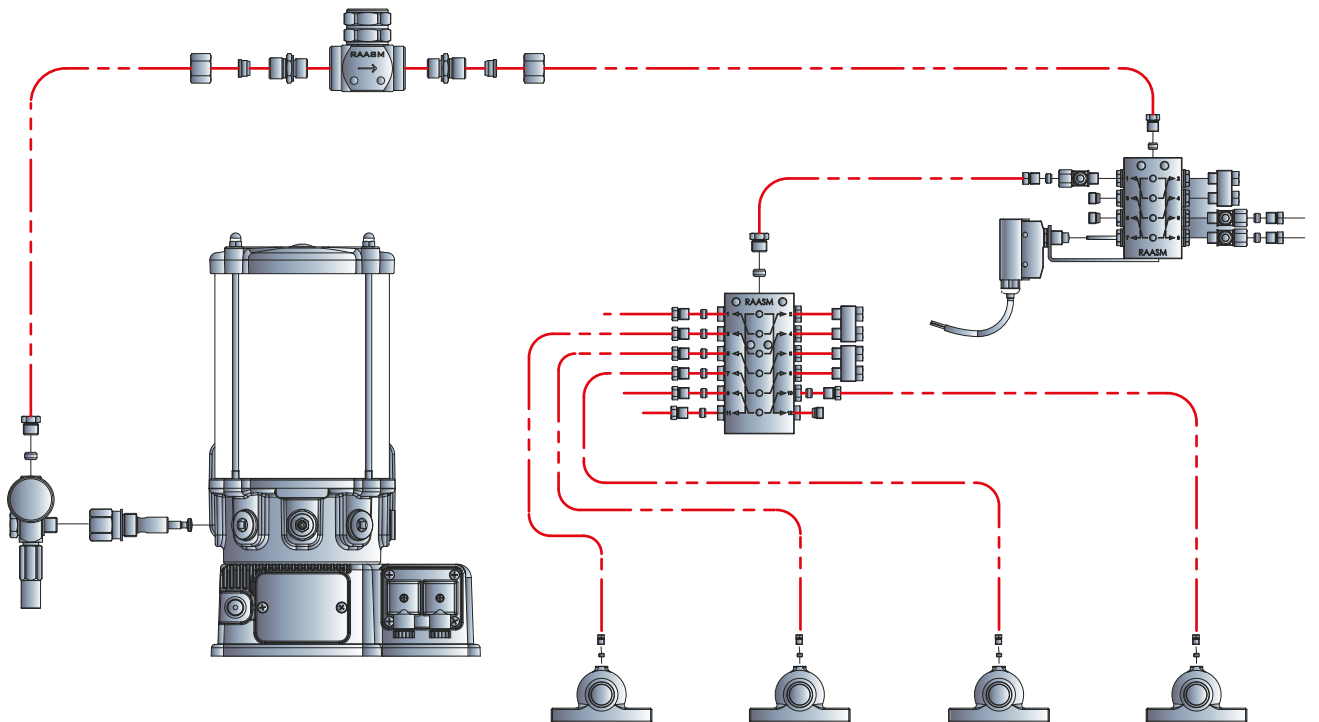
## Dual line - System 20



## Multi Delivery - System 15



## Progressive - System 30





## Glossary

<b>AIR-OIL</b>	A system where lubricant (oil) and air are conveyed together and, through a special device, reach the user points in the form of particles. The flow rate is adjusted by acting on the volume of air and the quantity of lubricant.
<b>CAM</b>	A circular-shaped element, with axis offset with respect to its axis of rotation and generally used to convert continuous rotary motion into reciprocating motion or to generate a vibrating force. (e.g. steam locomotives use cams to turn the rectilinear motion of the pistons into circular motion).
<b>CENTISTOKES (cSt)</b>	He practical unit of measure of kinematic viscosity 100 times smaller than the <b>stokes (St)</b> where $1 \text{ St} = 1 \times 10^{-4} \text{ m}^2/\text{s}$ or $10.000 \text{ St} = 1 \text{ m}^2/\text{s}$ $1 \text{ Cst} = 1 \times 10^{-2} \text{ St}$ or $1 \text{ Cst} = 1 \times 10^{-6} \text{ m}^2/\text{s}$
<b>CYCLE</b>	A lubrication sequence in which all the deliveries connected (distributors - user points) have carried out a lubricant dispensing operation.
<b>CYCLE SENSORS</b>	Electromechanical or magnetic-type devices for detecting the lubrication cycle or phase, by means of an electrical signal to the PLC.
<b>DISTRIBUTORS</b>	These are hydraulically operated devices (volumetric dosers, injectors and progressive), fed by the pumping unit, connected directly to the user points, arranged to deliver a predetermined and adjustable quantity of lubricant.
<b>DUAL LINE</b>	A system with double piping which, alternately in pressure or discharge, feeds distributors (volumetric dosers) that in turn feed user points.
<b>FEED LINES</b>	Usually pipes in different materials and diameters, depending on the pressures developed by the system. They convey lubricant and connect the pumping unit to the distributors (main line) and the distributors to the user points (secondary line).
<b>FRICTION</b>	Is a dissipative force that is exerted between two surfaces in contact with each other at their opposing relative motion. <b>Static friction:</b> if the contact surfaces are at a state of rest. <b>Dynamic friction:</b> if the surfaces are in relative motion.
<b>INJECTOR</b>	A hydraulically operated volumetric distributor, fed by the pumping unit, connected directly to the user points, arranged to deliver a predetermined and adjustable quantity of lubricant. Characteristic of the single line system 15 with decompression (high pressure).
<b>LEVEL SENSORS</b>	Capacitive or ultrasound devices for signalling the minimum or maximum level of lubricant in the tank to the PLC by impulse.
<b>LUBRICANT</b>	A substance in liquid, semi-solid or solid state which, interposed between two surfaces, is suitable for decreasing friction and therefore wear. It creates a very thin layer which allows the separation between two surfaces in contact. Lubricants are divided into: lubricating oils, fluid greases, lubricating greases, very thick greases.
<b>LUBRICATION SESSION</b>	The time interval in which the lubrication operation (adjusted according to a work time or a number of cycles) occurs followed by a pause (pause time).
<b>MAXIMUM PRESSURE SWITCH</b>	A device able to provide an electrical-type signal when the preset pressure is reached.

## Glossary

<b>MULTI-DELIVERY</b>	A system where every user point is fed by a pumping element (with adjustable or fixed delivery) installed directly in the pumping unit.
<b>NLGI</b>	The acronym of National Lubricating Grease Institute, i.e. the body that issued the technical standard for the classification of lubricating greases based on their consistency. The classification comprises a series of consistency intervals, identified by numbers (from 000 to 6). The belonging to a given class depends solely on the penetration value of the grease (expressed in tenths of a millimetre), measured at 25 °C, with standard cone dropped in the product. (according to standard ASTM D217-97). High penetration values (soft greases) correspond to low NLGI numbers and vice versa.
<b>PLC</b>	The acronym of Programmable Logic Controller, a modular hardware device that executes a programme and processes the digital and analogue signals coming from sensors and directed to the actuators present in an industrial system.
<b>PRESSURE RELIEF VALVE</b>	A pneumatic device (by means of the pump air feed) or electric device (by means of the electromagnetic effect - 24 V DC) allowing the pressure inside the system to be discharged and the return of the lubricant to the tank, when a maximum pressure value is reached in the system.
<b>PROGRESSIVE</b>	A system where the quantity of lubricant fed by the pumping unit is supplied to the user points following a progressive distribution sequence.
<b>PROXIMITY</b>	A device also called “proximity sensor” able to detect the presence of objects in the immediate vicinity of the “sensitive side” of the sensor itself, without there being actual physical contact. (e.g. car parking sensors).
<b>PUMPING ELEMENT</b>	A device that allows lubricant to be delivered outside, through the coaxial movement of a piston inside the pumping body. The delivery of lubricant can be adjustable or fixed.
<b>PUMPING UNIT</b>	Usually an electric, air-operated or hydraulically-operated pump with tank, for distributing lubricant through feed lines to the various distributors.
<b>RADIAL PUMPING ELEMENT</b>	A pumping element fixed along the circumference of the pump body. This position allows the pumping of lubricant, thanks to the coupling on the ring of the eccentric shaft. Characteristic of electric pumps C20S - C30S - C25S.
<b>RESISTIVE</b>	A system where the quantity of lubricant (oil) fed by the pumping unit is supplied to the user points by means of adjustable flow control valves which determine the quantity of lubricant to be dispensed.
<b>REVERSING VALVE</b>	A hydraulically operated or electric motor operated device used in the Double Line system. Its task is to reverse the lubricant feed from line 1 to line 2 (and vice versa) once a predetermined maximum pressure value is reached.
<b>SINGLE LINE</b>	A system in which a single pipe feeds distributors that in turn feed user points.
<b>USER POINTS</b>	The places of a machine to be lubricated in order to reduce the friction generated during operation.
<b>VISCOSITY</b>	Commonly defined as the resistance met by the mass of fluid (liquid or gas) flowing freely in a duct. This impediment depends on the cohesion forces existing between the molecules of the fluid, which exert a braking action on the free sliding of the layers of the substance on each other. The viscosity depends on the type of fluid and the temperature; in fact, in liquids it decreases as the temperature increases, but increases in gases. There are various viscosity classifications for lubricating oils, with respective comparison tables (e.g. from cSt to ISO VG - AGMA - SAE - SUS).





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