

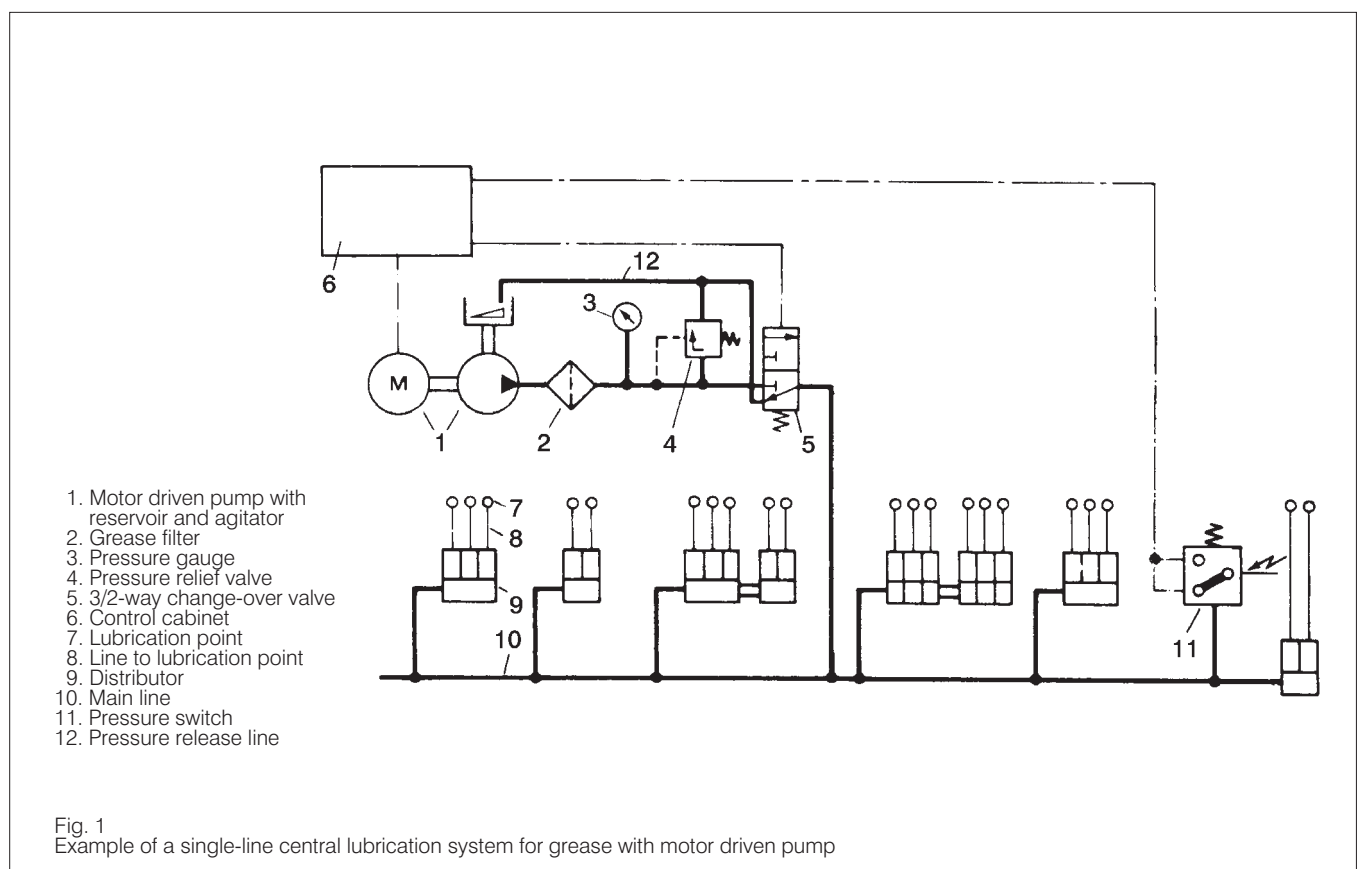
# Single - line Central Lubrication System for grease (or high viscosity oils)

## APPLICATION

Single-line central lubrication systems are used mainly for the lubrication of machinery with up to 100 lubrication points.

## EXAMPLE OF APPLICATION

General mechanical engineering, bottle cleaning machinery, calanders, plate conveyors, presses, type moulds, packaging machinery, machine tools, brickworks machinery, e.g.e.



## MODE OF OPERATION

The central lubrication pump feeds the lubricant into a main distribution line which runs alongside the machines. Branches lead to distributors of type ZE - C mounted singly or in groups in the vicinity of the lubrication points. Their function is accurately to meter the lubricant and to deliver it to the lines leading to the lubrication points, even against high back-pressures.

During one lubrication cycle the main line is pressurised, where upon metering of the lubricant to the lubrication points takes place. The pressure in the main line is then released into the suction chamber of the pump, causing the lubricant in the distributors to be supplied to the other side of the plunger, in readiness for the next cycle.

## OUTSTANDING FEATURES

- The metered quantity can be adapted to the requirement at the lubrication point by changing the metering screw in each distributor segment.
- The system can be extended subsequently by connecting additional distributors, or may be reduced by disconnecting distributors.
- During the intervals between lubricating cycles the pressure in the main line is released so that the lubricant led into the distributors is supplied to the other side of the plunger for the next lubrication cycle. This also ensures that no lubricant reaches the lubrication points during the interval in an uncontrolled manner.
- The quantity of lubricant delivered to the lubrication points is to a large extent independent of the back-pressure.
- Systems with motor-driven pumps can be operated fully automatically with variable intervals between lubrication cycles.
- In comparison with central lubrication systems using oil, grease systems have the following advantages:
  - Grease adheres better to the sliding surfaces and is therefore not so easily forced out of the lubrication gap, even at high bearing pressures.
  - Grease forms a reserve in the lubrication connections and the lubrication pockets.
  - Grease stands up better to heavy and intermittent loads.
  - The grease forced out of the bearing forms a collar of grease which protects the bearing from the ingress of dirt and dust.

## PUMPS

### VB-B (for grease)

Plunger pumps operated by hand lever with built-in pressure relief valve and indication of the maximum pressure by a cylindrical pin projecting from the pump case. The pressure in the main line is released by pivoting the hand lever into the position R.

### TB-D (for grease)

These pumps are available at choice for hand lever operation or pneumatic drive. Pressure relief is effected through an additional 3/2-way valve.

### BM-B

Motorised pump with built-on hydraulic reversing valve (SA-K) or without reversing unit for large single-line systems, which require a separately-located reversing valve, such as the following units are available at choice:

SA - K (hydraulic),  
SA - E (pneumatic)  
SA - V (electric)

or solenoid valves resp. for electric-magnetically-controlled single-line oil lubrication systems.

## LUBRICANTS

In selecting the grease, it should be borne in mind that during the interval between two lubrication cycles (pressure release period), the pressure at the end of the line must drop to about 20 bar.

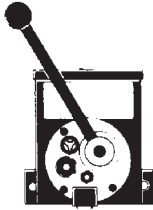

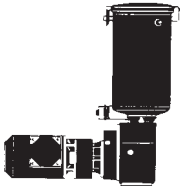
As a general guide it can be stated that for systems working at ambient temperature with a length of line up to 15 m between the pump and the most distant group of distributors and with a suitable interval diameter for the main line, soft greases with NLGI-class 000 to 1 give sufficiently short pressure relief times.

Under more favorable operating conditions, e.g. with shorter lines, stiffer greases having lower walk penetrations NLGI-class 2 will also give adequate pressure relief times.

If, for operational reasons, greases having different characteristics have to be used, or if operating conditions are difficult and particularly if low temperatures occur, we recommend that the suitability of the grease should be determined by measuring the pressure release time under the particular operating conditions. Instructions for testing the pressure release characteristics of lubricant greases vide DIN 51816 page 2 flow behaviour of lubricant grease.

The system can also be used for very viscous oils, if they are not able to be pumped by the cheaper single-line system for oils.

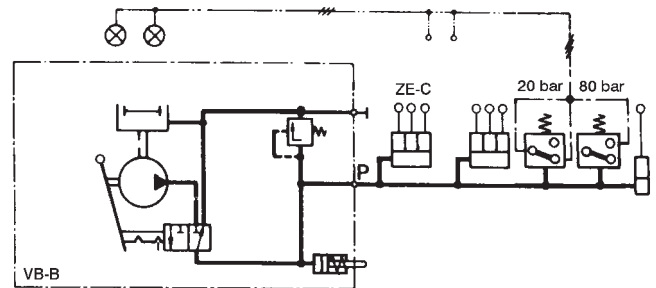
**Table 1 Pumps**

		<b>Type</b>  <b>Code no.</b>	<b>Drive</b>	<b>Reser- voir capacity</b> <b>l</b>	<b>Permissibly back pressure</b> <b>bar</b>	<b>Quantity delivered</b>	<b>Pipe connection</b>	<b>Reversing system</b>	<b>For further details see printlet</b>
<b>Handpump</b>		VB - B (for grease) VBB01A01OA00	manually operated	1.0	120	2 cm <sup>3</sup> per double stroke	G 1/4 inled	through spec. hand-lever position	P_GB_VBB
		VB - B VBB01A01OC00  VBB01A01OB00							
<b>Pneumatic pump</b>		TB - D (for grease) TBP0AA01OA00	manually or pneu- matically operated	1.6	hand 25 pneum. 100	hand 4,0 cm <sup>3</sup> pneum. 4,5 cm <sup>3</sup>	threaded bore LL 6W DIN 3854 (M 10 x 1)	through additional 3/2-way valve	P_GB_TBD
	TBP0AA01OB00	4.0							
<b>Pump with motor</b>		BM - B  BMB01A..OA00	Flange gear motor	8.0	350	63min <sup>1</sup> : 34 cm <sup>3</sup> / min (2.0l/h)			P_GB_BMB
	BMB01A..OB00	15.0		125min <sup>1</sup> : 67 cm <sup>3</sup> / min (4.0 l/h)					
	BMB01A..OC00	30.0							

## EXAMPLES of single-line central lubrication system

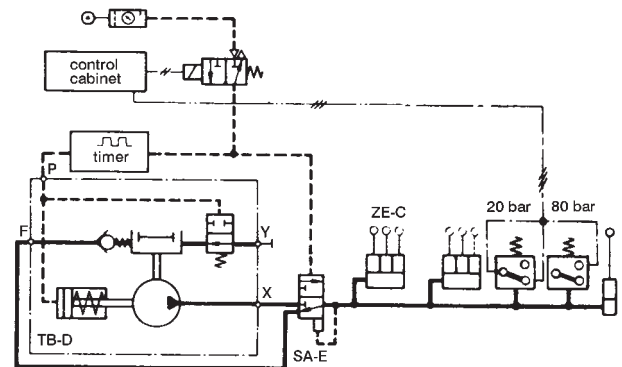
### ... with manually operated pump VB-B

for machines which have to be lubricated at fairly long intervals only and where the operator can be relied upon to initiate and monitor the lubrication operation. The pressure switch at the end of the line may be added to operate a pilot light which indicates that the pressure at the end of the lines reaches 80 bar as an indication that all the lubrication points have received lubricant. A second pilot light indicates that the pressure has dropped to 20 bar at the end of the line.



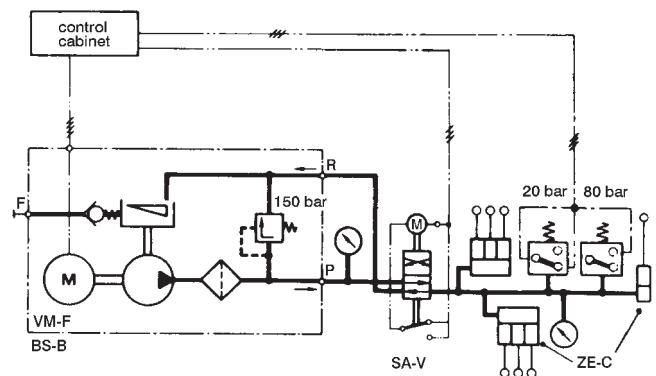
### ... with pneumatically operated pump TB-D and pneumatically operated 3/2-way valve SA-E

for machinery having a compressed air supply and for which the quantity of lubricant required per lubrication cycle exceeds 3 cm<sup>3</sup>. While the system is not being actuated, the pressure in its main line is released via the 3/2-way valve. After the preset time relay has elapsed, the solenoid valve is operated and the 3/2-way valve SA-E is turned to the pressure position. The pump drive is now actuated via an oscillator until the pressure switch at the end of the line signals that the pressure in the main line has risen to 80 bar. This signal rises the time relay to zero. The interval starts once the 3/2-way valve SA-E is turned to the pressure release position.



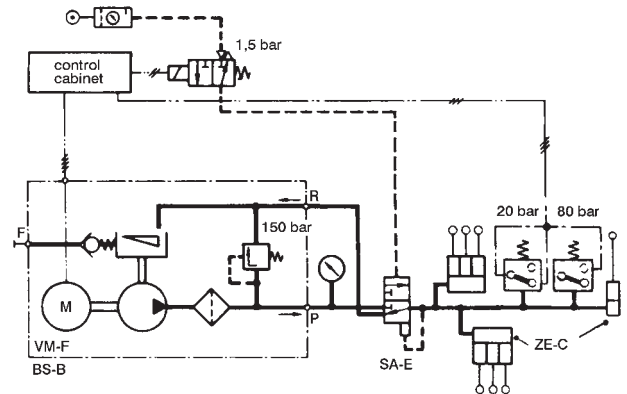
### ... with pump BM-B driven by electric motor,

separate motor driven 4/2-way change-over valve SA-V and pressure switch at end of the line. The pump is switched on by a time relay fitted in the control cabinet. At the same time the 4/2-way valve connects the pump to the main line. As soon as the pressure switch at the end of the line signals that the pressure has risen to 80 bar the 4/2-way valve switches over and the main line is connected to the pumps suction side and, at the same time, the pump is switched off. If necessary the pressure change is monitored by an extra time relay and a fault signal if the pressure in the main line has not dropped to 20 bar by the time the period set by the relay has elapsed. The system is suitable for a max. of 100 lubrication points.



## EXAMPLES of single-line central lubrication system (to be continue)

**... with pump BM-B driven by electric motor,** separate pneumatically operated 3/2-way change-over valve SA-E and pressure switch at end of the line. This system is similar to version 4, but a pneumatically operated change-over valve is used, which has an additional pressure regulating function and is controlled by a 3/2-way solenoid valve. Pneumatic pressure, 1.5 bar approx.



## DISTRIBUTORS

(For details see printlet P\_2006\_2\_GB\_ZEC )

The function of the distributors is to deliver the lubricant in quantities accurately metered regardless of the back-pressure, into the lines leading to the lubrication points.

In single-line systems for greases, distributors of type ZE-C are used.

Distributors are available with one, two or three outlets. The metered quantity is delivered during the pressure stroke and can be set separately for each outlet by fitting the corresponding feed screw. Feed screws are available for 0.1; 0.2; 0.4; 0.6 and 1 cm<sup>3</sup>.



## CHANGE - OVER VALVES for grease and oil

The function of change-over valves is to pressurise the main line and release the pressure alternately. During the pressure stroke the lubricant is delivered through the distributors to the lubrication points, whilst during the pressure release stroke the lubricant in the distributors moves from underneath the plungers to above them.

For use in single-line central lubrication system, the option of 3/2-way valves or 4/2-way valve is available.

### Valve types :

#### Hand-operated 4/2-way valve

incorporated in pumps of type VB-B

#### Hydraulic-mechanical change-over valve SA-K

#### Electromagnetically operated way valves

are suitable only for oil. Supplied to order.

#### 4/2-way valve, type SA-V, with two through-flow positions

Driven by geared motor. The motor generated a high torque which moves the plunger spool from one setting to the other in less than 0.5 s even with tacky grease and at low temperatures.



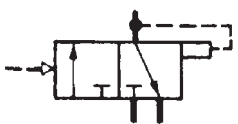
When used in a single-line system, one outlet is closed by a plug.

#### 3/2-way-valve, type SA-E


for operation by a pneumatic pressure of 2 - 3 bar approx. (1/100 of the pressure arising in the system).

For pilot control, 3/2-way valves of nom. diam 2 or larger, operated electromagnetically or pneumatically are used.

**Table 2 Change-over and stop valves for grease and oil**

Symbol	Designation	Drive	max. pressure	Code no.	Printlet
	4/2-way valve SA-K hydraulic operated	hydraulic	250 bar	SAK25A0000	P_GB_SAK
	4/2-way valve SA-V electric operated	electric 220 V, 50 - 60 Hz	400 bar	SAV11A00	P_GB_SAV
	3/2-way valve SA-E pneumatically operated	pneumatic	400 bar	SAE40A00	P_GB_SAE

**Table 3 Pilot control valve for 3/2-way valve SA-E and pump TB-D**

Symbol	Designation	Size	Protection class	Voltage	Code no.
	3/2-way valve electrically operated with spring return	DN 2.4	IP 65	24 V, DC 220 V, 50 Hz	38152 - 1423 38152 - 1413

## Equipment for pressure monitoring, control and pressure limitation

### Pressure gauges and pressure switches

In manually operated systems, a pressure gauge should be provided in the line to monitor the pressure change (Code no. 75111-5274).

In automatic system two pressure switches should be provided at the inlets to the last two distributors. The pressure switches serve to control the automatic system and monitor the pressure change. A contact in one pressure switch closes when the pressure in the main line reaches 20 bar. A contact in the second pressure switch closes when the pressure in the main line = 80 bar.

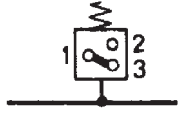
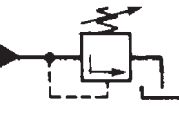
In manually operated systems, the state of the pressure switch can be indicated by means of two signal lamps mounted near the pump.

### Pressure limitation

Whereas pneumatically operated pumps automatically stop if no lubricant is taken from them, electrically driven pumps must be protected against over pressure by a pressure relief valve. The pump of type BM-B has a built-in pressure relief valve. With pumps without their own overpressure protection, a pressure relief valve should be provided between the pressure line and the pressure release line.

The manually operated pump of type VB-B also have built-in pressure relief valves.

**Table 4**

Symbol	Designation	Range of adjustment	Voltage	Code no.	Printlet
	Pressure switch	5 to 50 bar	max. 250 V	34241 - 1223	Dimensions sheet 34241-1200
		25 to 250 bar		34241 - 1243	
	Pressure relief valve SA - G	0 to 400 bar		SAG40A00	P_2006_1_GB_SAG

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