

progressive system centralised lubrication



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PROGRESSIVE

CATALOGUE 26



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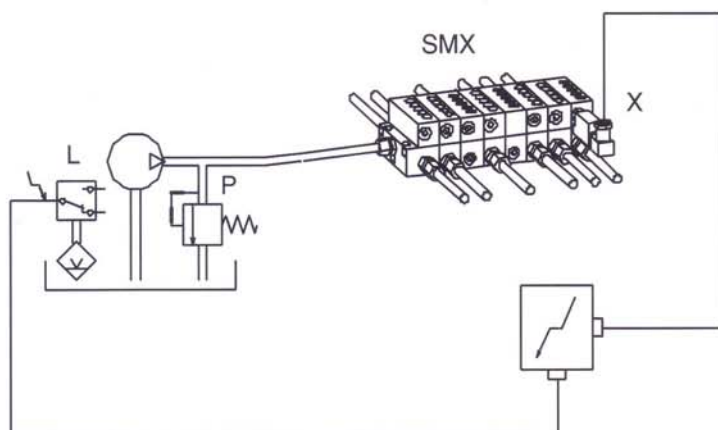
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CENTRALISED LUBRICATION SYSTEMS

APPLICATION EXAMPLES



Pump supplies distributor assembly.

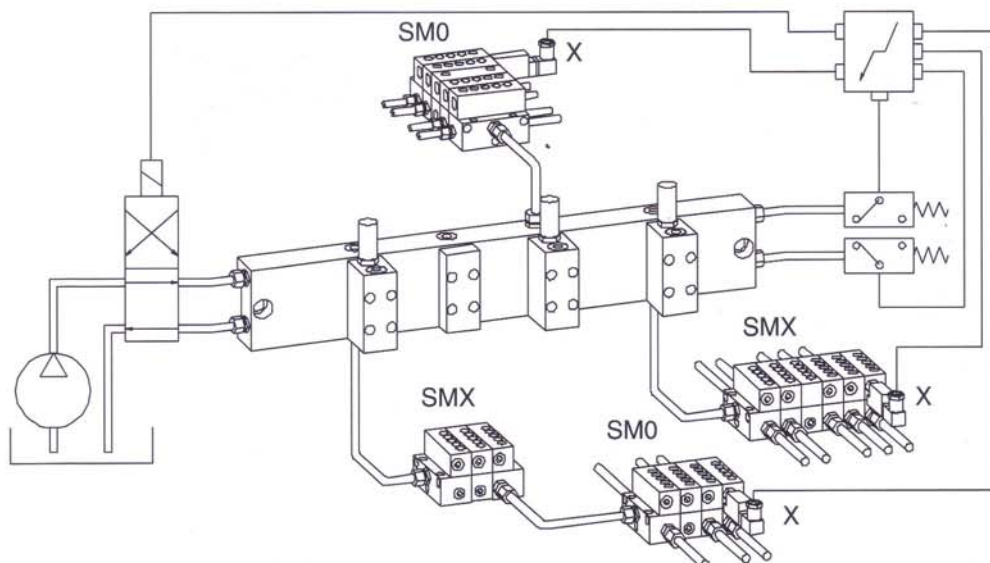
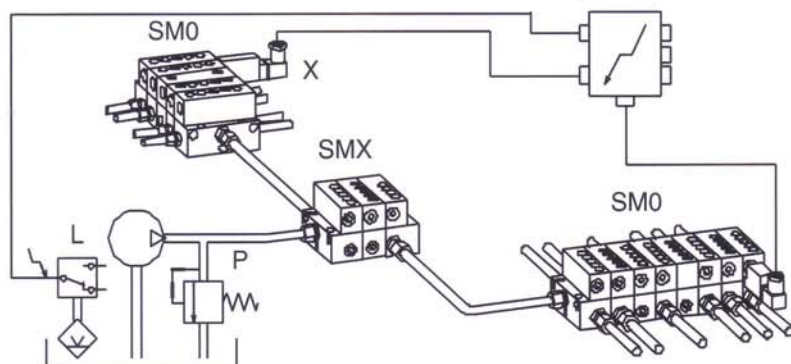
MONITORS:

L - Level of the lubricant in the reservoir.

P - Over-pressure in the delivery line.

X - Cycle control.

A distributor assembly of three metering elements pilots other distributor assemblies.



Combined dual line / progressive system can be used for applications where the lubrication points are a distance from the pump. For example; a transfer line in the car industry or a printing press.

METERING UNIT ELEMENTS: GENERAL NOTES

AVAILABLE SIZES

The metering elements are available in 6 sizes SM0 - SMX.

They require a minimum of 3 elements and permit a maximum of 10 elements, but with the "SM0 - SMX" series it is possible to assemble a larger number of elements.

IDENTIFICATION OF THE METERING ELEMENTS

A letter, a number and another letter are stamped on each metering element which indicate: the series, the capacity at each cycle.

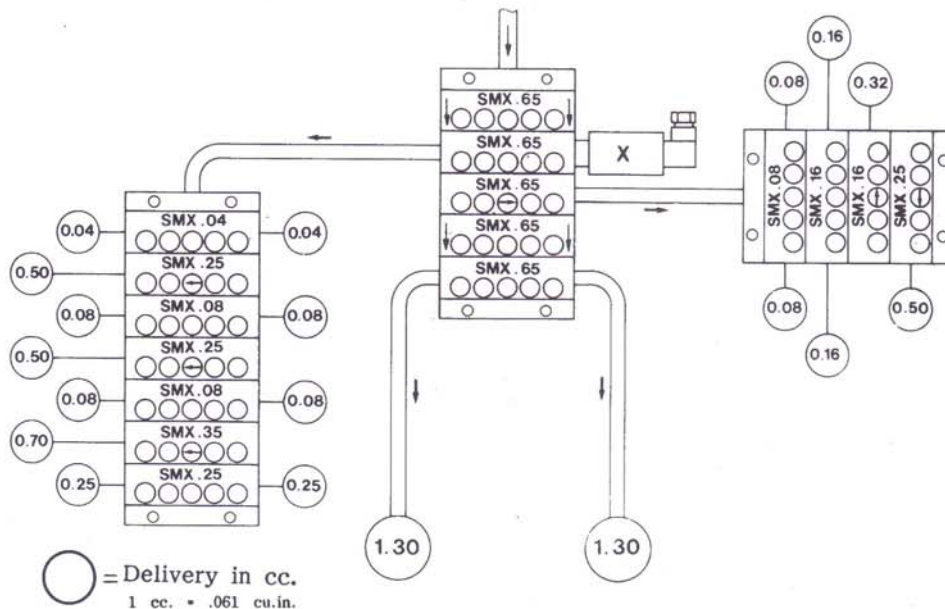
EXAMPLE:



The letters L - R Indicate if a bridging element and whether left or right outlet is bridged.
L = Left, R = Right.

HOW TO ORDER:

If assembled groups of metering elements are required, It is necessary to list the code number of each element, referring to the tables in the following pages



In the centre of this diagram is an assembly of SMX metering elements.

The second SMX65 metering element pilots a block of 7 metering elements SMX delivering 2.60cc./cycle.

The third SMX65 metering element pilots a block of 4 metering elements SMX delivering 1.30cc./cycle.

The third SMX65 metering element directly lubricates two points of the machine.

The cycle is controlled by the contact "X" which is a reed, micro or proximity switch.



CENTRALISED LUBRICATION SYSTEMS

MODULAR “SMO SMX” - SECOND GENERATION

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GENERAL FEATURES

- Integral porting adapter for simple single or double outlet conversion, thus providing reduced stock by eliminating external crossports and singling bars.
- Air bleed valves built into base.
- SAE Metric - BSP - NPTF threads available.
- Operates at 500 Bar (7,200 PSI)
- Operates with Oil or Grease.
- Full monitoring controls.
- The components are zinc-plated.
- The bases are always supplied complete with standard 'O' rings and fixing screws.
- Fixing screws
SMO M4 x 16 DIN 912
Threaded insert M8 x 1 x 8
- SMX M5 x 16 DIN 912
Threaded insert M10 x 1 x 8

EACH BASE AND FEEDER ELEMENT UNDERGOES A THERMAL EXPLOSIVE PROCESS THAT ELIMINATES FOREIGN MATTER

MODULAR "SM0 SMX" - SECOND GENERATION

THE MODULAR SYSTEM CONSISTS OF TWO MAIN COMPONENTS: THE BASE AND THE METERING ELEMENTS.

The Modular progressive Distributor is available in two sizes:

SM0 Miniature

SMX Standard

IMPORTANT ADVANTAGES FOR SYSTEM DESIGN ENGINEERS

FLEXIBILITY

Conventional tie rods are eliminated. There is no maximum limitation on the number of elements which can be used on the assembly. Equally, with this feature it is also very simple during installation to increase/decrease the number of elements or to re-group the distributor arrangement if required.

Auxiliary by-pass elements can be installed in the assembly to accommodate an increase or decrease in points without disturbing the base assembly or pipework.

Lubricant volume can be easily increased or decreased during system commissioning or service without disturbing the base assembly or pipework.

Conventional bridging pieces are eliminated. Bridging elements have been introduced and these interconnect and discharge into the adjacent element.

Distributor assembly principle enables factory floor distributor assembly to accommodate grouping of lubrication points.

The base assembly can be mounted and piped up without the metering elements. This provides the most advantageous routeing of pipework and the elements can then be fitted to suit.

IMPORTANT ADVANTAGES FOR SYSTEM MAINTENANCE ENGINEERS

LOW COST MAINTENANCE

The metering elements can be serviced without disturbing the pipework.

The system can be easily extended.

The modular concept provides low cost replacement of components.



CENTRALISED LUBRICATION SYSTEMS

MODULAR "SM0 SMX" - SECOND GENERATION

THE BASE

The base is made up of a minimum of three segments:

Inlet Base.
Intermediate Base.
End Base.

and can be increased in unlimited number by addition of intermediate sections.

This revolutionary system makes the assembly easy and flexible; there is no need to determine in advance the size of the base, just add on distributors in unlimited number by means of very simple threaded inserts supplied for the assembly (Patented).

This simple technique allows the system to operate even at very high pressure without any leakage in the assembly.

There is also the possibility of ordering with one part number only, the end base + the intermediate base already assembled. Simply add on the inlet base and you have a three base assembly.

With just 3 screws!

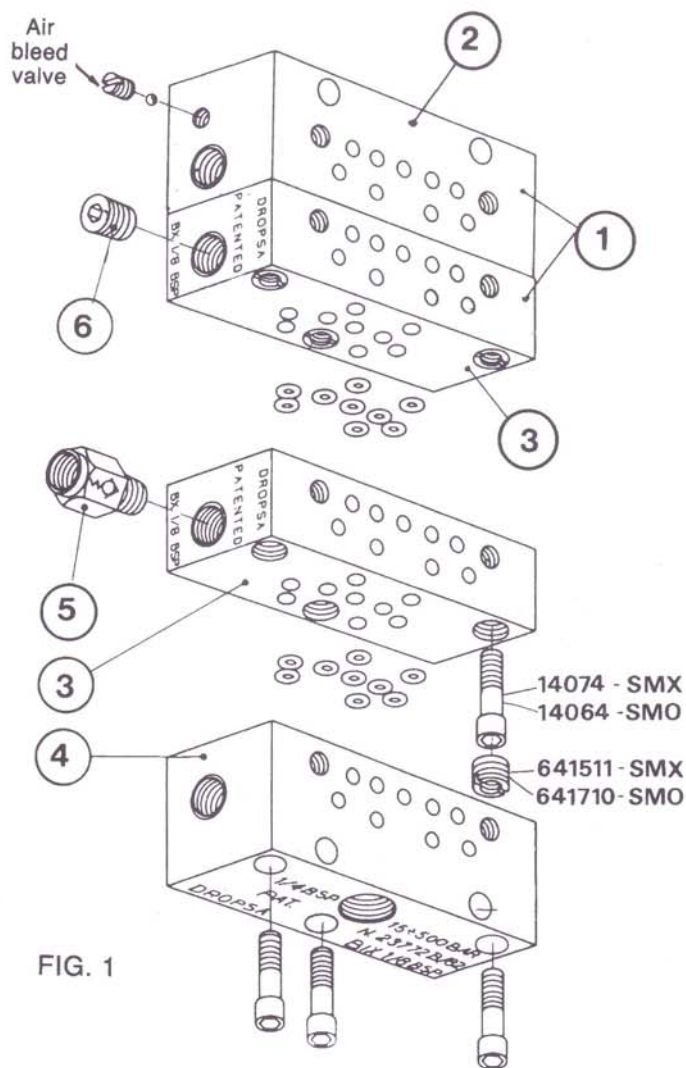
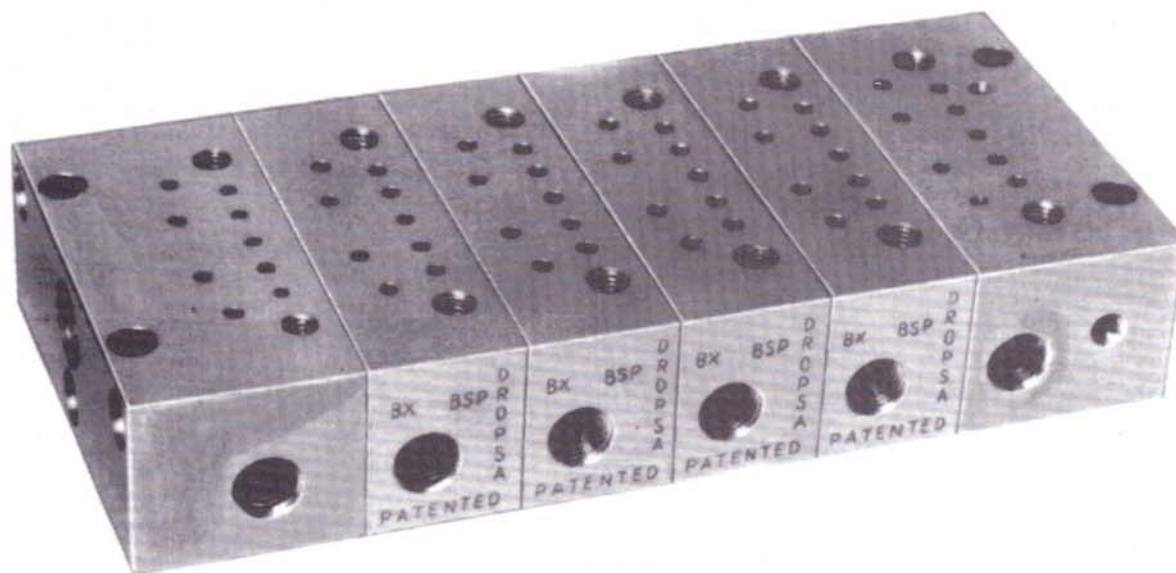


FIG. 1



BASE ASSEMBLY FOR SIX ELEMENTS

MODULAR "SMO SMX" - SECOND GENERATION

HOW TO ORDER A BASE ASSEMBLY

No. ELEM.	BASE ASSEMBLY SMO					BASE ASSEMBLY SMX				
	Thread Inlet - Outlet			Weight in.		Thread Inlet - Outlet			Weight in.	
	BSP	NPTF	METRIC	Kg.	lb..	BSP	NPTF	SAE-UNF	Kg.	lb..
3	641763	643543	645543	0.92	2.0	641583	643523	642703	1.3	2.9
4	641764	643544	645544	1.13	2.5	641584	643524	642704	1.6	3.5
5	641765	643545	645545	1.33	2.9	641585	643525	642705	1.9	4.2
6	641766	643546	645546	1.54	3.4	641586	643526	642706	2.2	4.8
7	641767	643547	645547	1.75	3.9	641587	643527	642707	2.5	5.5
8	641768	643548	645548	1.96	4.3	641588	643528	642708	2.8	6.2
9	641769	643549	645549	2.17	4.8	641589	643529	642709	3.1	6.8
10	641770	643550	645550	2.38	5.2	641590	643530	642710	3.4	7.5
11	641771	643551	645551	2.59	5.7	641591	643531	642711	3.7	8.1
12	641772	643552	645552	2.80	6.2	641592	643532	642712	4.0	8.8
13	641773	643553	645553	3.00	6.6	641593	643533	642713	4.3	9.5
14	641774	643554	645554	3.16	6.9	641594	643534	642714	4.5	9.9
15	641775	643555	645555	3.42	7.5	641595	643535	642715	4.9	10.8
16	641776	643556	645556	3.63	8.0	641596	643536	642716	5.2	11.4
17	641777	643557	645557	3.84	8.4	641597	643537	642717	5.5	12.1
18	641778	643558	645558	4.05	8.8	641598	643538	642718	5.8	12.8
19	641779	643559	645559	4.26	9.4	641599	643539	642719	6.1	13.4
20	641780	643560	645560	4.47	9.8	641600	643540	642720	6.4	14.0

Choose the part number according to the number of elements and thread required.

Fig.	Description	SMO			S Y M B O L	SMX			S Y M B O L
	Inlet Thread →	1/8 BSP	1/8 NPTF	M10x1		1/4 BSP	1/4 NPTF	7/16-20 UNF	
	Outlet Thread →	1/8 BSP	1/8 NPTF	M10x1		1/8 BSP	1/8 NPTF	7/16-20 UNF	
1	End Base + intermediate base	641792	643569	645571	↓	641561	643568	642028	↓
2	End Base	641713	643564	645566	BF0	641515	643561	643802	BFX
3	Intermediate Base	641712	643563	645565	B0	641513	643542	643801	BX
4	Inlet Base	641711	643562	645564	BI0	641512	643541	643800	BIX
5	Check Valve	92335	641564	645562		92335	641564	642029	
6	Plug	3232098	3232095	3232049		3232098	3232095	642031	

BSP
NPTF
METRIC
SAE

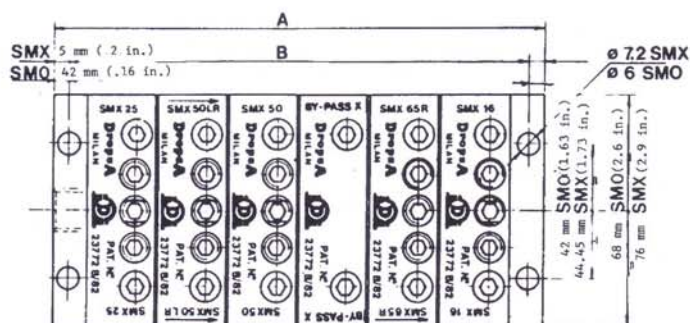
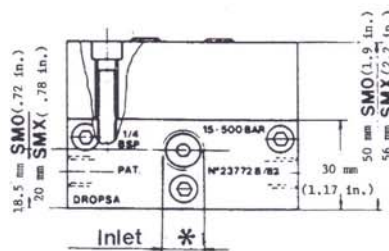
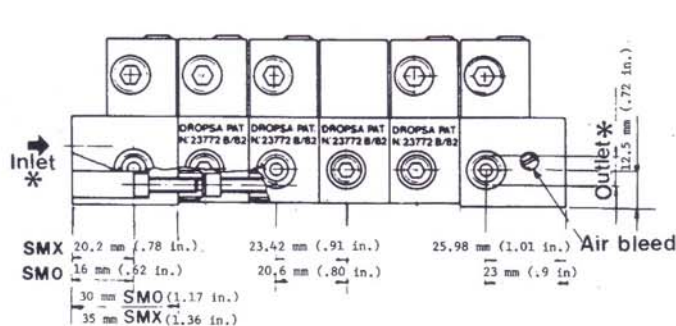
Inlet and outlet thread parallel DIN 3852/2 for fittings "A" and "C" shape
Inlet and outlet thread taper ASA B2-2
Inlet and outlet thread parallel DIN 3852/1 for fittings "A" and "C" shape
Inlet and outlet thread parallel SAE - UNF - 2B



CENTRALISED LUBRICATION SYSTEMS

MODULAR "SMO SMX" - SECOND GENERATION

OVERALL DIMENSIONS



* Threads are shown on page ?.

For the correct functioning of the assembly no air should be trapped inside.

To make sure operate the bleed valves on both sides of the outlet base to eliminate air.

SM0 No. Elements	Nominal dimensions mm. Tolerance for elements +0 -0,05				SMX No. Elements	Nominal dimensions mm. Tolerance for elements +0 -0,05			
	A		B			A		B	
	MM	INCHES	MM	INCHES		MM	INCHES	MM	INCHES
3	80,2	3.1	71,8	2.8	3	93,02	3.6	83,02	3.2
4	100,8	3.9	92,4	3.6	4	116,44	4.5	106,44	4.1
5	121,4	4.7	113,0	4.4	5	139,86	5.4	129,86	5.1
6	142,0	5.5	133,6	5.2	6	163,28	6.4	153,28	6.1
7	162,6	6.3	154,2	6.1	7	186,70	7.2	176,70	6.9
8	183,2	7.1	174,8	6.8	8	210,12	8.2	200,12	7.8
9	203,8	7.9	195,4	7.6	9	233,53	9.1	223,53	8.7
10	224,4	8.7	216,0	8.4	10	256,95	10.1	246,95	9.6
11	245,0	9.5	236,6	9.2	11	280,37	10.9	270,37	10.5
12	265,6	10.3	257,2	10.1	12	303,79	11.8	293,79	11.4
13	286,2	11.1	277,8	10.8	13	327,21	12.8	317,21	12.4
14	306,8	12.1	298,4	11.6	14	350,63	13.7	340,63	13.3
15	327,4	12.8	319,0	12.4	15	374,05	14.6	364,05	14.2
16	348,0	13.6	339,6	13.2	16	397,47	15.5	387,47	15.1
17	368,6	14.4	360,2	14.1	17	420,89	16.4	410,89	16.1
18	389,2	15.2	380,8	14.8	18	444,30	17.3	434,30	16.9
19	409,8	16.1	401,4	15.6	19	467,72	18.2	457,72	17.8
20	430,4	16.8	422,0	16.4	20	491,14	19.1	481,14	18.8

NB.: For an assembly with more than 20 elements, the nominal dimensions A and B should be increased respectively by 20,6 mm. (.80 in.) SMO and 23,42 mm. (.91 in.) SMX for each extra base element.

MODULAR "SM0 SMX" - SECOND GENERATION

PRINCIPLES OF OPERATION

Fig. 1

The flow of lubricant reaches all the elements and pushes all the metering pistons towards the right.

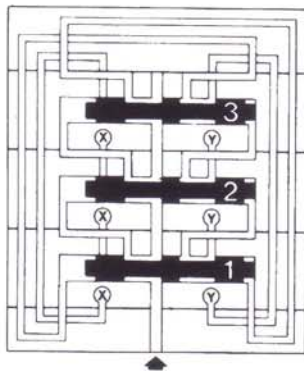


Fig. 2

Successively, the flow pushes on the right side of the first piston.

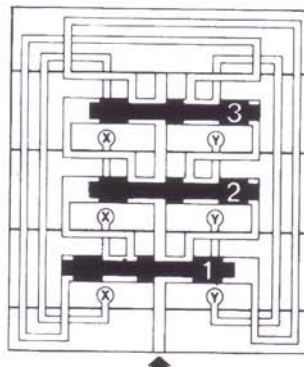
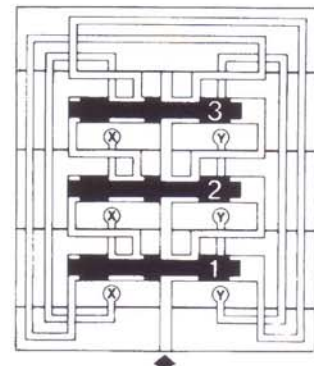


Fig. 3

The first piston, having moved to the left inverts the direction of the flow so that all the other pistons are moved to the left.



The continuing flow pushes the first piston towards the right, changing the system to the conditions in Fig. 1.

The progressive movement of the pistons discharges from the outlets X and Y the lubricant accumulated in the previous sequence.

TECHNICAL DATA

Operating pressure:

SM0 max. 300 bar (4353 P.S.I.)
min. 15 bar (215 P.S.I.)
SMX max. 500 bar (7255 P.S.I.)
min. 15 bar (215 P.S.I.)

No. of strokes/minute:

max. 500*

* depending on pressure and delivery.

Each outlet is in the Base Element directly under the metering elements.

Temperature:

	Min.		Max.		
	C°	F°	C°	F°	
with standard 'O' Rings.	-30°	-22°	100°	212°	
with 'O' Rings in Viton	-25°	-4°	200°	392°	(continuous)
	-25°	-4°	300°	572°	(max. 50 ore)
	-25°	-4°	350°	662°	(max. 15 hours)
with 'O' Rings Dow-Corning (for special applications at low temperature)	-65°	-76°	220°	428°	

Oil viscosity: min. 15 cSt (77.31 SSU)

Grease: max. 200 ASTM (4 NLGI)



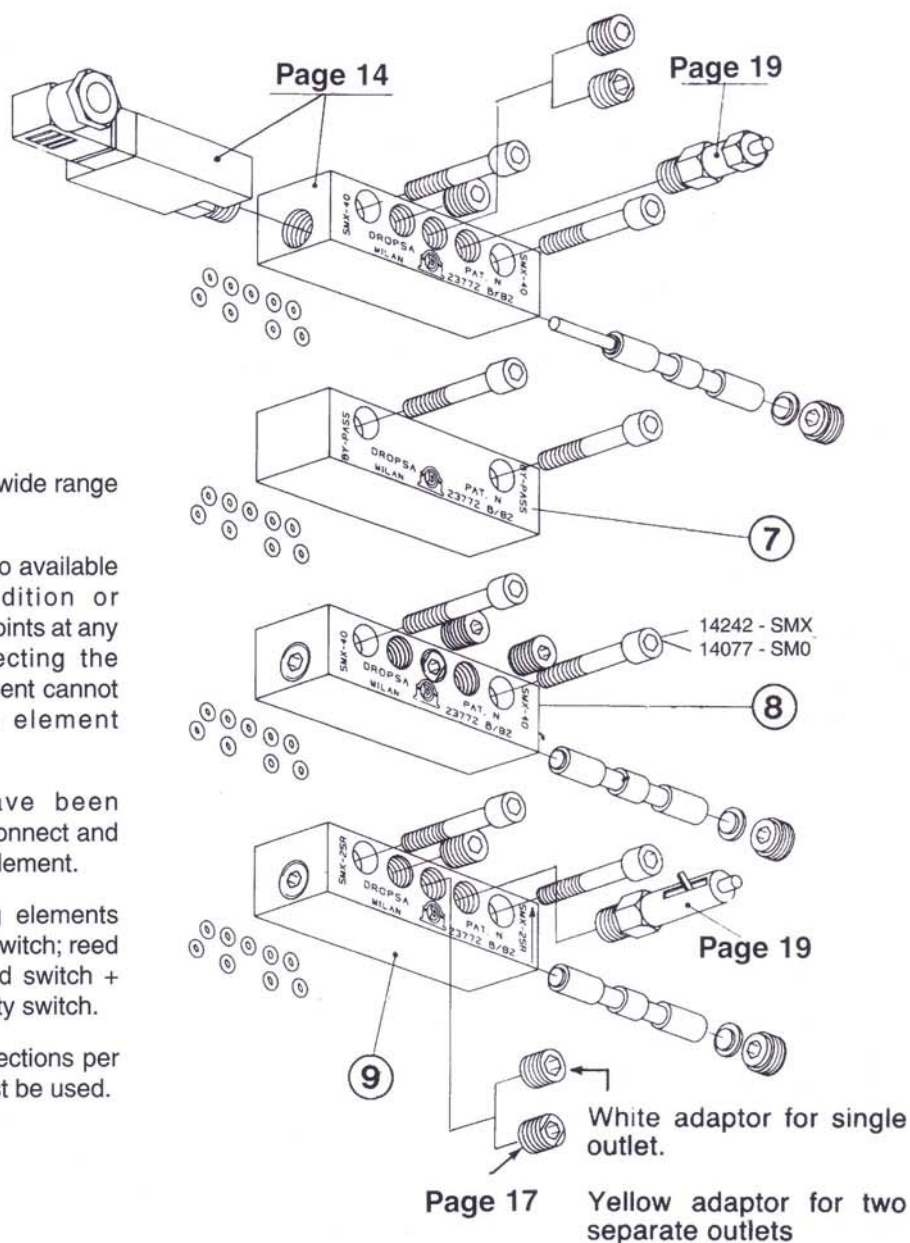
CENTRALISED LUBRICATION SYSTEMS

MODULAR "SM0 SMX" - SECOND GENERATION

THE METERING ELEMENTS ARE FITTED ON THE BASE BY MEANS OF TWO FIXING SCREWS SUPPLIED.

METERING ELEMENTS

- These are available in a wide range of deliveries
- A by-pass element is also available which allows an addition or reduction of lubrication points at any time without disconnecting the pipes. The by-pass element cannot be fitted in a three element assembly.
- Bridge elements have been introduced. These interconnect and discharge into the next element.
- Also available metering elements with: micro switch; reed switch; reed switch pin indicator; reed switch + pin indicator and proximity switch.
- Minimum of 3 working sections per distributor assembly must be used.

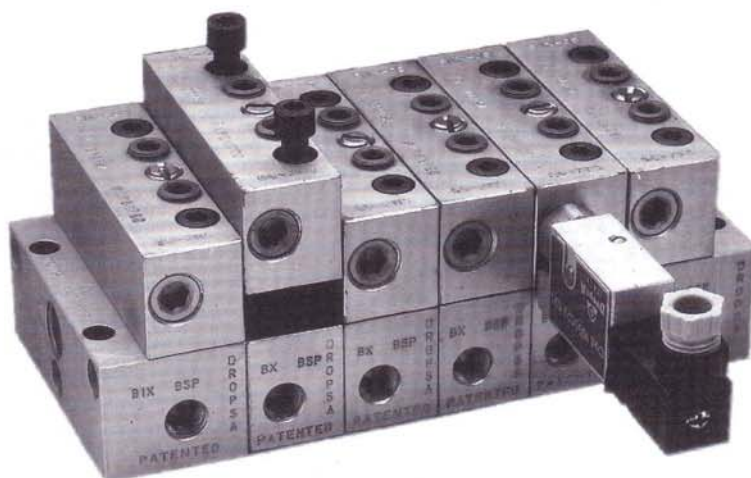


The element is set by the factory for two separate outlets with, yellow Adapter **Part No. 641709** included.

The white Adapter **Part No. 641708** should be ordered separately, see page 9.

All metering units including the by-pass element are fully interchangeable in the various positions

MODULAR "SM0 SMX" - SECOND GENERATION



SM0 BY-PASS ELEMENT		7	SMX BY-PASS ELEMENT		7
Symbol	0	Part No. 641714	Symbol	x	Part No. 641514

SM0		METERING ELEMENT		8	SM0		BRIDGE ELEMENT		9
Delivery per outlet		1 or 2 outlets		with delivery into the next element as indicated by the arrow.					
				left		left-right		right	
									
cc.	cu. in.	Symbol	Part No.	Symbol	Part No.	Symbol	Part No.	Symbol	Part No.
.04	.0024	SM0 04	641720	SM0 04L	641733	SM0 04LR	641744	SM0 04R	641738
.08	.005	SM0 08	641716	SM0 08L	641734	SM0 08LR	641745	SM0 08R	641739
.16	.010	SM0 16	641717	SM0 16L	641735	SM0 16LR	641746	SM0 16R	641740
.25	.015	SM0 25	641718	SM0 25L	641736	SM0 25LR	641747	SM0 25R	641741
SMX		METERING ELEMENT		8	SMX		BRIDGE ELEMENT		9
.04	.0024	SMX 04	641825	SMX 04L	641826	SMX 04LR	641827	SMX 04R	641828
.08	.005	SMX 08	641516	SMX 08L	641629	SMX 08LR	641637	SMX 08R	641621
.16	.010	SMX 16	641517	SMX 16L	641630	SMX 16LR	641638	SMX 16R	641622
.25	.015	SMX 25	641518	SMX 25L	641631	SMX 25LR	641639	SMX 25R	641623
.35	.021	SMX 35	641519	SMX 35L	641632	SMX 35LR	641640	SMX35R	641624
.40	.025	SMX 40	641520	SMX 40L	641633	SMX 40LR	641641	SMX 40R	641625
.50	.030	SMX 50	641521	SMX 50L	641634	SMX 50LR	641642	SMX50R	641626
.60	.036	SMX 60	641522	SMX 60L	641635	SMX 60LR	641643	SMX 60R	641627
.65	.040	SMX 65	641523	SMX 65L	641636	SMX 65LR	641644	SMX 65R	641628

Weight of a single Element: SM0 0.20 Kg. (.44 lb.)
 SMX 0.31 Kg. (.68 lb.)



CENTRALISED LUBRICATION SYSTEMS

MODULAR "SM0 SMX" - SECOND GENERATION

MONITORING OF PISTON MOVEMENT BY A REED SWITCH

For continuous or intermittent operating systems.

A permanent magnet fitted on the piston activates a high quality "reed" switch (with N.O. or changeover contact) with if connected to an electronic circuit can visualise up to 500 movements per minute. The reed switch is supplied in a waterproof enclosure and can be easily replaced.

Magnetic Contact part no. 1655059	Contact condition NO Normally open	International standard FORM A -ASA- 1 DIN
Technical data		
Electrical, mechanical, thermic acceptable values		
Max commutable voltage	220 V ac	
Max commutable current	3 A	
Max commutable power	continuous	50 W
	alternate	50 VA
Max resistance	100 mΩ	
Changeover time	Connection a - c* = 3 ms	Disconnection c - a* = 0,07ms
Max frequency	320 Hz	
Life expectancy *	50 millions cycles	
Operating temperature range	from (-55°C) to (+150°C)	

* Normal charge conditions
* C = closed - o = open

Magnetic Contact part no. 1655124	Contact condition Bidirectional changeover contact	International standard FORM C -ASA- 1 DIN
Technical data		
Electrical, mechanical, thermic acceptable		
NO		NC
Max commutable voltage	100 V dc	
Max commutable current	0,25 A	
Max commutable power	continuous	8W 3 W
	alternate	8 VA 3VA
Max resistance	100 mΩ	
Changeover time	Connection a - c* = 2 ms	Disconnection c - a* = 0,05ms
Max frequency	150 Hz	
Life expectancy *	700 millions cycles	
Operating temperature range	from (-55°C) to (+150°C)	

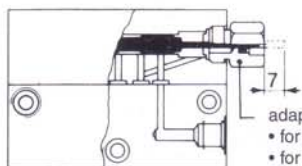
* Depending on circuit power
* C = closed - o = open

MONITORING OF PISTON MOVEMENT BY A MICRO SWITCH

For intermittent operating systems.

A micro switch with a change over contact is fed by an extended rod, integral with the metering element piston. Life: 1 million of cycles approximately. Contact characteristics: 220V/50-60 Hz. 5 Amp.

Part Numbers are referred to metering elements. (8)		Delivery		A	B		C	D	
				distributor with indicating pin	distributor with N.O. reed switch	distributor complete with change over reed switch	distributor with micro switch	distributor with pin and N.O. reed switch	distributor with pin and change over reed switch
		cc.	cu. ins.						
	SMX	.04	.0024	641829	641833	641972	641837	-	-
		.08	.005	641830	641834	641973	641838	-	-
		.16	.010	641831	641835	641974	641839	-	-
		.25	.015	641832	641836	641975	641840	-	-
		.35	.021	641695	641569	641976	641820	641690	641493
		.40	.025	641696	641570	641977	641821	641691	641494
		.50	.030	641697	641571	641978	641822	641692	641495
.60		.036	641698	641572	641979	641823	641693	641496	
.65		.040	641699	641573	641980	641824	641694	641497	
SMO	.04	.0024	641861	641786	641896	641867	-	-	
	.08	.005	641862	641787	641897	641868	-	-	
	.16	.010	641863	641788	641898	641869	-	-	
	.25	.015	641761	641811	641899	641815	641813	641568	

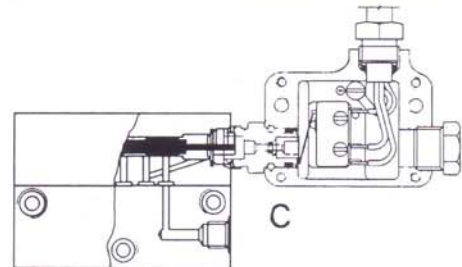


A

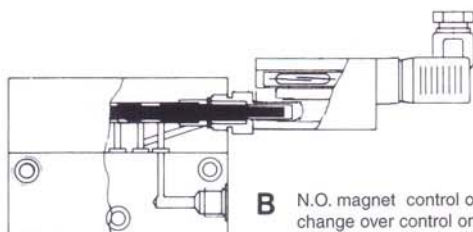
adaptor only

- for SMX 35 ÷ 65 code 1655133
- for SMX 04 ÷ 25 and SMO code 1655134

- for SMX 35 ÷ 65 code 1655133
- for SMX 04 ÷ 25 and SMO code 1655134

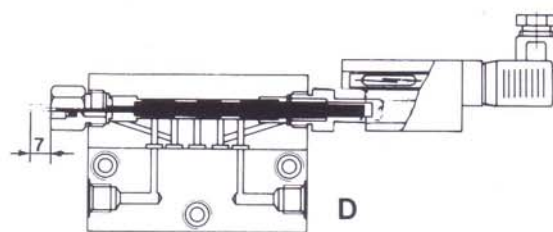


C



B

N.O. magnet control only part. n. 1655059
change over control only part. n. 1655124



D

MODULAR "SM0 SMX" - SECOND GENERATION

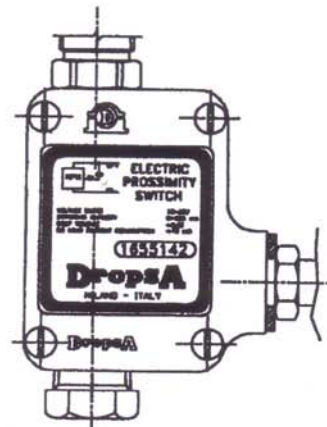
MONITORING OF PISTON METERING ELEMENT MOVEMENT WITH INDUCTIVE PROXIMITY SENSOR

This sensor is mounted in a light alloy die cast enclosure and has been designed to monitor a successful operation of a progressive system distributor.

This sensor is attached to the progressive metering element and accurately checks the back and forth movement of the metering piston. If a signal of piston movement is not received by the sensor from the progressive element, an alarm condition can be initiated by some form of electronic controller of PLC.

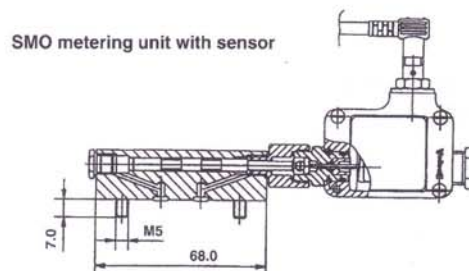
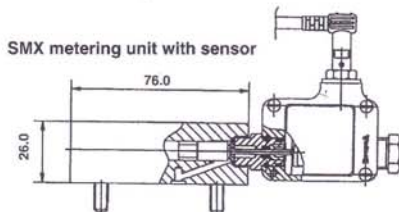
This signal can be used to activate a fault light, sound an alarm or shut down the machine if required.

In oil circulation systems where metering elements are working continuously at rates up to 500 cycles/max. per minute, the sensor offers high precision, reliability and repeatability because of the absence of moving parts and are therefore maintenance free.



TYPE OF METERING UNIT	DELIVERIES		METERING UNIT WITH NPN SENSOR	NPN SENSOR WITH ENCLOSURE	METERING UNIT WITH PNP SENSOR	PNP SENSOR WITH ENCLOSURE
	cm ³	Cu.in.				
SMX	.04	.0024	641905	1655143	641196	1655149
	.08	.005	641906	1655143	641197	1655149
	.16	.010	641907	1655143	641198	1655149
	.25	.015	641908	1655143	641199	1655149
	.35	.021	641900	1655142	641191	1655148
	.40	.025	641901	1655142	641192	1655148
	.50	.030	641902	1655142	641193	1655148
	.60	.036	641903	1655142	641194	1655148
	.65	.040	641904	1655142	641195	1655148
SM0	.04	.0024	641950	1655143	641186	1655149
	.08	.005	641951	1655143	641187	1655149
	.16	.010	641952	1655143	641188	1655149
	.25	.015	641953	1655143	641189	1655149

NOTE: The proximity switch is supplied with PNP or NPN sensor
NAMUR sensor is available on demand.



TECHNICAL INFORMATION

Max. outlet current: 200 mA
Power supply: 10 to 38V dc.
Vibration resistance: 25 g at 55 Hz.
(IEC 68-2-6 specs)
Protection grade: IP 68
Contacts: NPN or PNP (NO)
Operating temperature: from -25°C to +85°C

NPN sensor **Code 1523557**
PNP sensor **Code 1523565**

Cable for above sensor:
Code 1523558 - 2 metres long (standard)
Code 1523569 - 5 metres long (on demand)

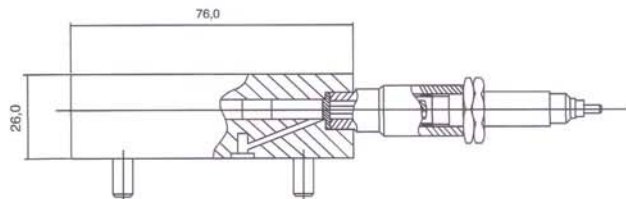


CENTRALISED LUBRICATION SYSTEMS

MODULAR "SMO SMX" - SECOND GENERATION
MONITORING OF PISTON METERING ELEMENT MOVEMENT
WITH DROPSA INDUCTIVE PROXIMITY SENSOR

1. DESCRIPTION:

This sensor has been designed to check the function of progressive metering systems. It enables monitoring of metering element piston movement in DROPSA system 26 "SMX" modules.



In the event of incorrect operation the sensor will show that the piston has not moved. The sensor is attached to the progressive metering element and accurately checks the back and forth movement of the metering piston.

Note: The piston does not come into contact with the sensor, this is prevented by a positive stop arrangement. Care must be taken during assembly to ensure that the sensor is not over-tightened onto the positive stop, as this will cause the sensor to be damaged.

If a signal of piston movement is not received by the sensor from the progressive element an alarm condition can be initiated by some form of electronic controller.

This signal can be used to activate a fault light, sound an alarm or shut down the machine if required.

2. SPECIFICATION:

Nominal sensing range:	5 mm.
Operating voltage:	10V - 30V
Hysteresis: (%Sn)	<10% mm.
Maximum operating frequency:	200Hz.
Repeatability:	<0,01 mm.
Current rating continuous:	100mA
Maximum load current:	200mA
Short circuit protection:	YES
LED Indicator:	YES
Voltage drop:	1.8V
Leakage current:	1.8mA
Pressure of lubricant:	35MPa (350 bar) max.
Operating temperature:	-25oC to + 70oC
Protection degree:	IP 67
Case material:	ANSI 303
Connection:	PVC cable 2m/3x020mm.

3. ORDERING INFORMATION:

Ordering is by Part No. according to application. See table:

SMX - NPN

Assembly Part No.	DELIVERY		SENSOR
	cc.	cu. in.	
641451	0,04	0.0024	1523739
641452	0,08	0.005	
641453	0,16	0.010	
641454	0,25	0.015	
641455	0,35	0.021	
641456	0,40	0.025	
641457	0,50	0.030	
641458	0,60	0.036	
641459	0,65	0.040	

SMX - PNP

Assembly Part No.	DELIVERY		SENSOR
	cc.	cu. in.	
641469	0,04	0.0024	1523812
641470	0,08	0.005	
641471	0,16	0.010	
641472	0,25	0.015	
641473	0,35	0.021	
641474	0,40	0.025	
641475	0,50	0.030	
641476	0,60	0.036	
641477	0,65	0.040	

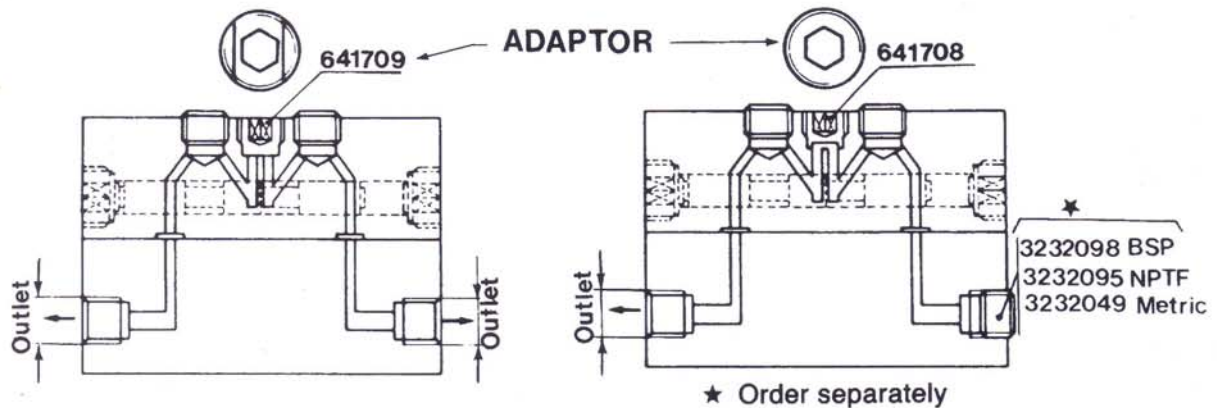
SMO - NPN

Assembly Part No.	DELIVERY		SENSOR
	cc.	cu. in.	
641478	0,04	0.0024	1523739
641479	0,08	0.005	
641480	0,16	0.010	
641481	0,25	0.015	

SMO - PNP

Assembly Part No.	DELIVERY		SENSOR
	cc.	cu. in.	
641482	0,04	0.0024	1523812
641483	0,08	0.005	
641484	0,16	0.010	
641818	0,25	0.015	

**MODULAR "SM0 SMX" - SECOND GENERATION
SINGLE AND DOUBLE OUTLET CONVERSION**



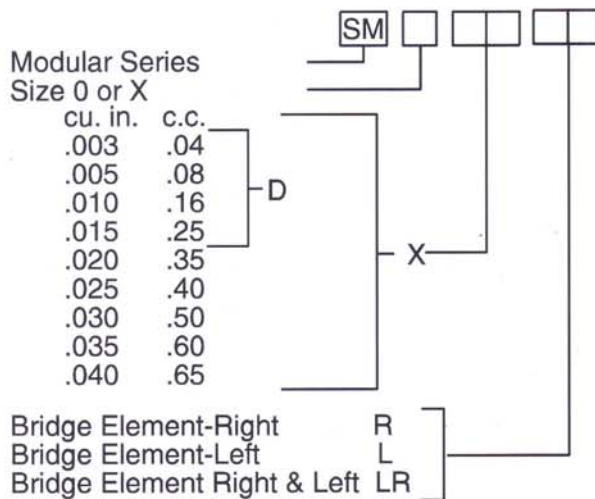
It is possible to double the delivery of a single element by replacing the Yellow Adapter **Part No. 641709** with the White adapter **Part No. 641708** as shown in the drawing.

When converted into single, plug off the second outlet.

SYMBOLS PRINTED ON THE ELEMENTS

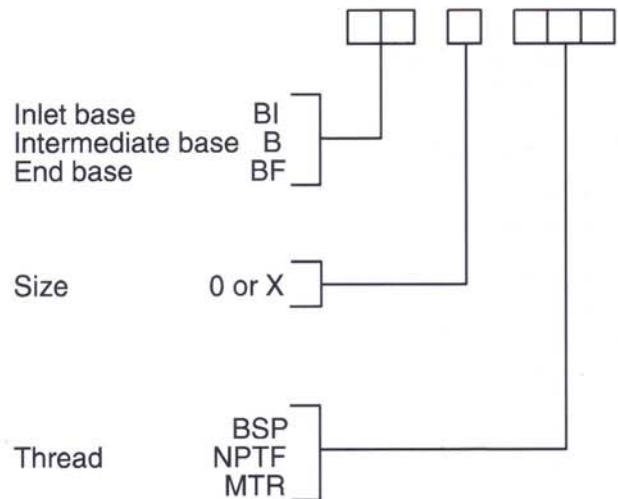
In case the user should wish to order the Spare Parts and should not know the Part No. it is sufficient to indicate the symbols printed on the elements.
Delivery can be read in cc. and cu. in. on each element.

METERING ELEMENTS



By-Pass Element
Size 0 or X

BASE ELEMENTS



SPARE PARTS:

Complete set of 'O-Rings' common to
SM0 - SMX bases and distributors.

Standard:

Viton:

Dow-Corning:

Part No. 641541

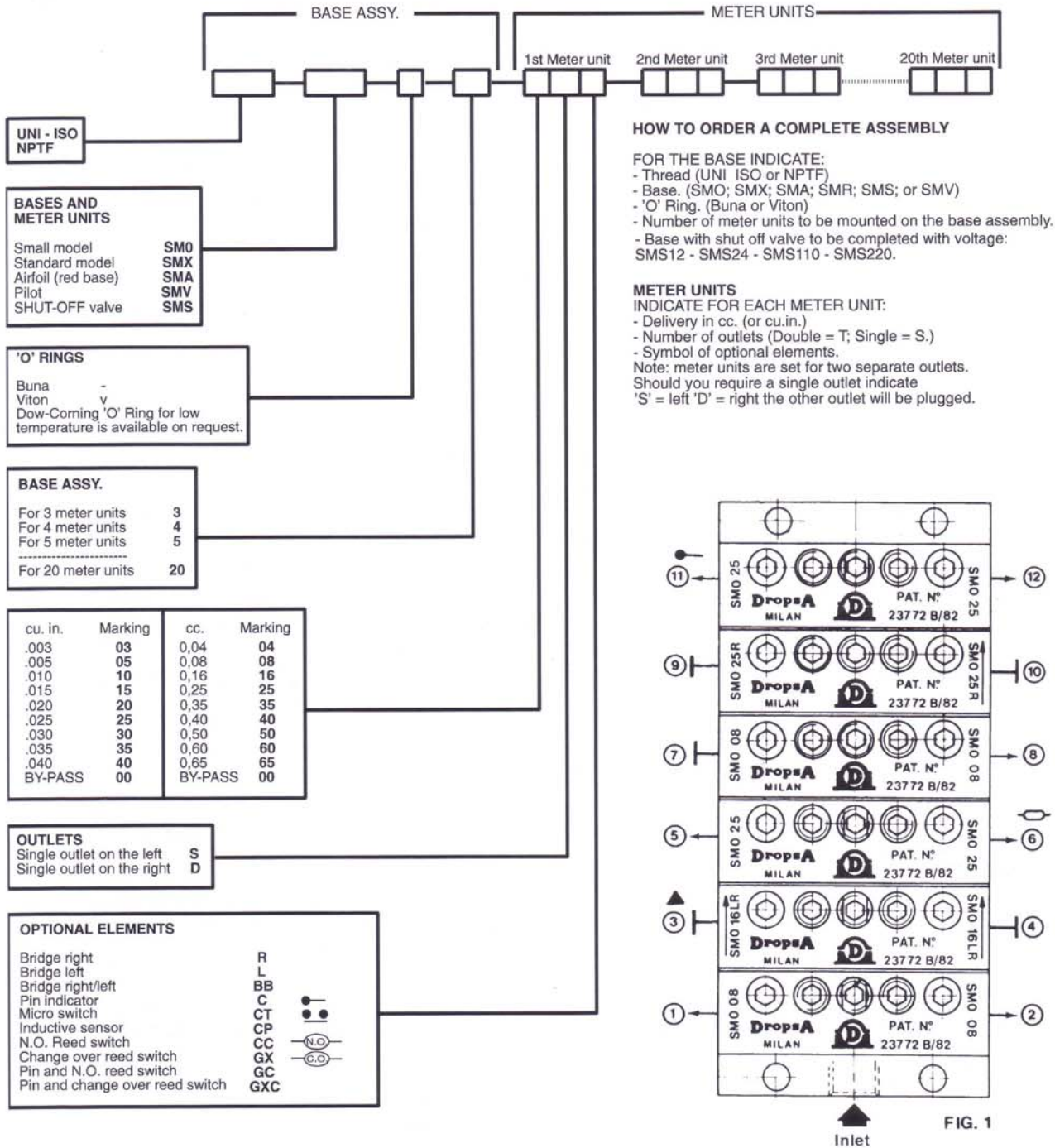
Part No. 641814

Part No. 641817



CENTRALISED LUBRICATION SYSTEMS

MODULAR "SMO SMX" - SECOND GENERATION



ACCESSORIES:

The items below are to be ordered separately:

- V Check Valve.
- IN Pressure Indicator.
- IP Disc Pressure Indicator.
- IA Pressure Indicator with Memory.

* Specify where the accessories are to be fitted and the operating pressure for indicators when ordering.

Order Example:

SMO - 6 (MO8 - M16LR - M25CC - M25R - M25C)

Note: the assembly is seen vertically and the outlets are in sequence; starting from the bottom (inlet) from left to right.
 Symbol 'LR' refers to bridge elements.

MODULAR "SM0 SMX" - SECOND GENERATION

PRESSURE INDICATOR

These pressure indicators are used to check the pressure in the main or secondary line.

In the spring loaded types (N) the pressure acts on a small hardened and ground piston which displaces the indicator rod when the set pressure is reached. The indicator returns when the pressure returns to zero. They are available for pressures up to 250 bar (3600 psi.).

The P Type has a disc which bursts, when the set pressure is accidentally exceeded.

PRESSURE INDICATOR WITH MEMORY

This patented device is very useful for checking the secondary supply line. The indicator rod X moves out when an abnormal pressure rise occurs in the line where the indicator is fitted due to blockage of the lubricant to the bearing.

A locking device prevents the return of the rod and indicates the fault to the operator.

The indicator rod is released by lifting lever

PRESSURE INDICATOR (TYPE N)



Height mm 31 Hex. 12
Thread 1/8 BSP

Pressure max.		Part No. assembly	Part No.	
P.S.I.	bar	1/8 BSP	X-Shaft	Y-Spring
300	20	3290019	3002101	3191131
450	30	3290006	3002101	3191100
750	50	3290007	3002101	3191102
1500	100	3290008	3002123	3191103
2200	150	3290009	3002101	3191104
2900	200	3290010	3002101	3191105
3600	250	3290011	3002101	3191106

DISC PRESSURE INDICATOR (TYPE P)



Height mm 28 Hex. 17
Thread 1/8 BSP

Pressure max.		Part No. assembly	Part No.
P.S.I.	bar	1/8 BSP	Disc
450	30	3290012	3189100
750	50	3290013	3189101
1500	100	3290014	3189102
2200	150	3290015	3189103
2900	200	3290016	3189104
3600	250	3290017	3189105

PRESSURE INDICATOR WITH MEMORY (TYPE M)



Height mm 43 Hex. 12
Thread 1/8 BSP

Pressure max.		Part No. assembly	Part No.	
P.S.I.	bar	1/8 BSP	X-Shaft	Y-Spring
450	30	3290000	3002100	3191100
750	50	3290001	3002100	3191102
1100	75	3290022	3002100	3191081
1500	100	3290002	3002118	3191103
2200	150	3290003	3002100	3191104
2900	200	3290004	3002100	3191105
3600	250	3290005	3002100	3191106



CENTRALISED LUBRICATION SYSTEMS

MODULAR SMX METERING ELEMENTS - SECOND GENERATION

AIR/OIL - RED BASE

THE ADVANTAGES OF AIR-OIL MIXING BASE

DROPSA "Air-oil" lubrication system is particularly suitable for lubricating and cooling bearing of high speed spindles, spindle heads, spindle head gear boxes and other friction points which require a continuous and uniform lubrication with a small quantity of oil.

The "Air-oil" lubrication system injects a metered amount of oil into a stream of compressed air.

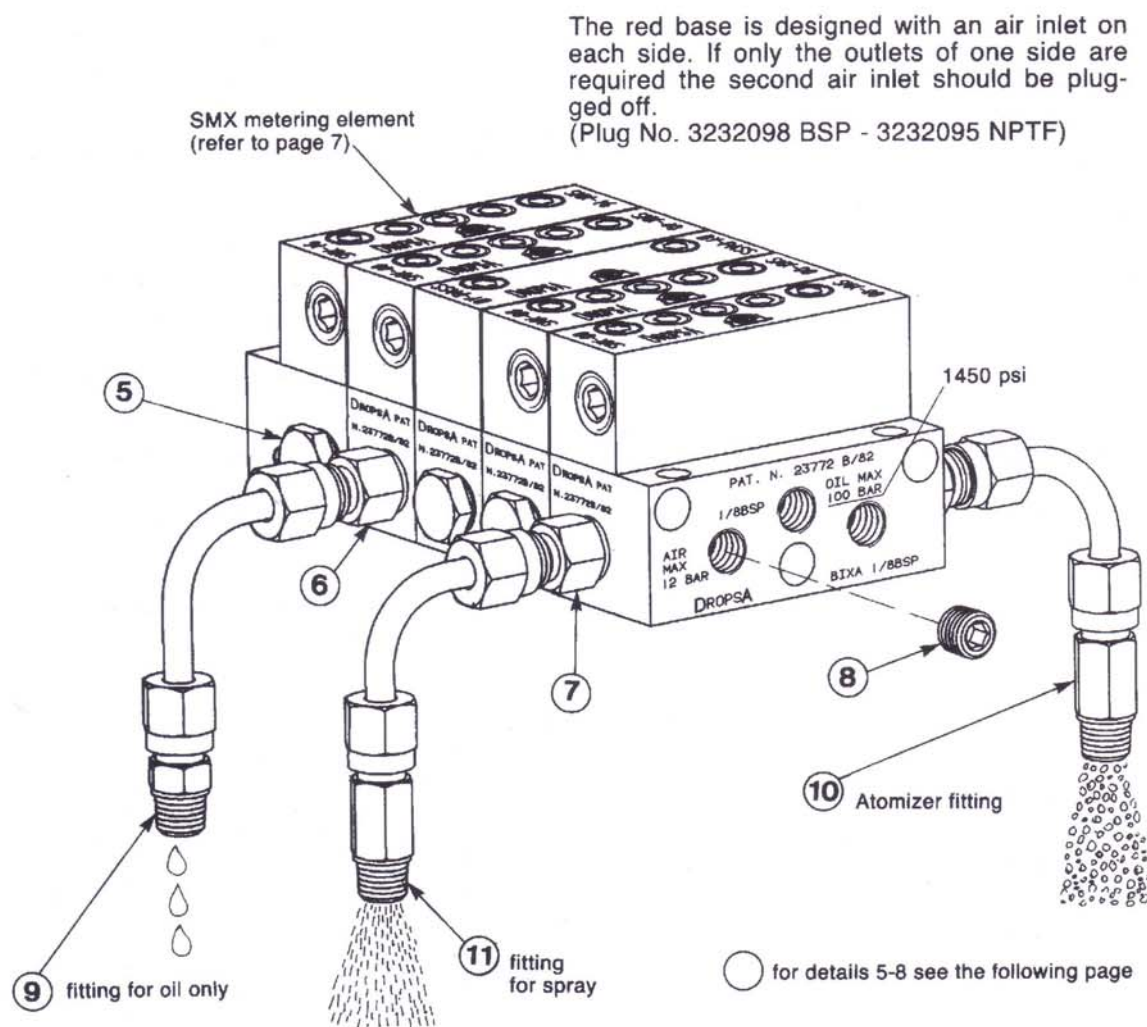
The oil divided into very fine particles is continuously fed in an air stream, through tubes, to the lubrication area where it is sprayed on the friction surfaces.

The principle component of DROPSA "Air-oil" system is the base element called the "RED BASE" on which are fitted the standard progressive SMX metering elements. The RED BASE has two inlets for compressed air connected to both the right and left outlets of the base and one inlet for oil.

Oil accurately metered by SMX metering elements through the special "Air-oil" fittings mounted on the outlets of the base is injected into the air stream.

Just by changing the fittings on the outlet ports of the RED BASE and on the lubrication points it is possible to spray fine (atomiser fitting) or coarse (spray fitting) Air-oil mixture on the bearing or to deliver oil (oil fitting) to other friction points such as slides, gears etc.. This means that in one assembly you can have the three possibilities as mentioned above. The "Air-oil" system is economic because lubricant quality is accurately metered and is independent from oil viscosity.

The "Air-oil" system is safe to use and is no health hazard to the operator since no oil mist is produced.



MODULAR SMX METERING ELEMENTS - SECOND GENERATION

AIR-OIL LUBRICATION SYSTEM

AREAS OF AIR-OIL LUBRICATION APPLICATION

- Lubrication of high speed rotating elements, where a steady distribution of small quantities of lubricant is required and is able to maintain, between the moving elements, the lubricating film which tends to be carried off by the high centrifuge power.
- Lubrication of machinery parts working at high temperatures where the lubricant tends to be dried or burned.
- Spray lubrication of chains or gears.
- Lubrication of slides and ways which require a thin film of lubricant all over their surface.
- Lubrication of bearings which need protection from dust infiltration, water or other damaging substances. The mixed air flow creates a slight over pressure inside the lubricated element, preventing the ingress of other polluted bodies.
- Lubrication of points which cannot be reached by traditional lubrication systems, where only an oil spray can solve the problem

ADVANTAGES OF AIR-OIL LUBRICATION

MODULAR CONCEPT of the SMX progressive metering elements allows flexibility of the lubrication system to suit the needs of the installed project.

COMPATIBILITY with DROPSA progressive system installations. The air-oil distributor is compatible with the traditional SMX systems thus allowing to fit one or more air-oil distributors on existing installations, it's only necessary to have a compressed air generator.

ECONOMY IN LUBRICANT. The oil delivered into the air stream is accurately metered according to the effective requirement of the lubrication point. This avoids expensive lubricant wastage.

LUBRICANT VISCOSITY. It is possible to use any type of lubricant with viscosity between 15 and 100 cSt at a fluids working temperature between 0°C and 80°C. The best conditions are obtained with oil viscosity between 32 and 100 cSt at a temperature of 40°C.

COOLING OF LUBRICATED PARTS. The continuous supply of a mixed air stream, besides lubricating, also has a cooling effect.

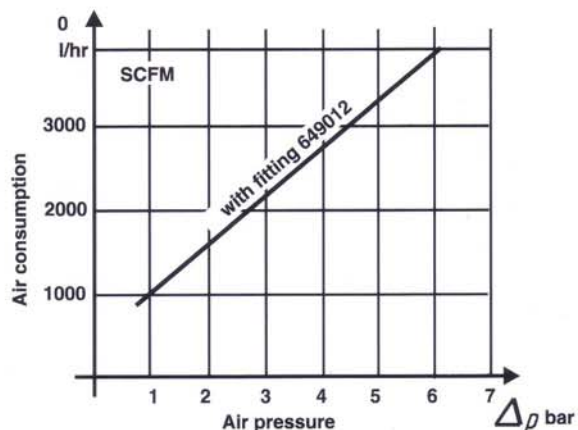
RETAINING ACTION. The over pressure inside the the lubricated element prevents the ingress of foreign bodies.

CONTROL FUNCTION. Thanks to the progressive system, the malfunctioning of a metering element is signalled by a control device.

ENVIRONMENT FRIENDLY. The air-oil system does not produce oil mist and therefore does not produce fogging.

AIR CONSUMPTION

The air consumption in Normal litres/hr. (NI/h) is a function of the pressure applied, the diameter of the mixing elements' holes and the number of the same.



CENTRALISED LUBRICATION SYSTEMS

MODULAR SMX METERING ELEMENTS - SECOND GENERATION

AIR-OIL LUBRICATION SYSTEM

HOW TO ORDER THE RED BASE ASSEMBLY

- 1) Select the code of base assy. according to the number of metering units to be mounted (see table below).
- 2) Select the codes of SMX metering units or select the delivery and other technical information as shown on page 11.
- 3) Select the code of fittings mounted on the base for each single metering units outlet (see next page).
- 4) Select the code of fittings mounted on lubrication points (see next page).

Note: To connect base fittings and end fittings a 6m.m. external diameter pipe is to be used.

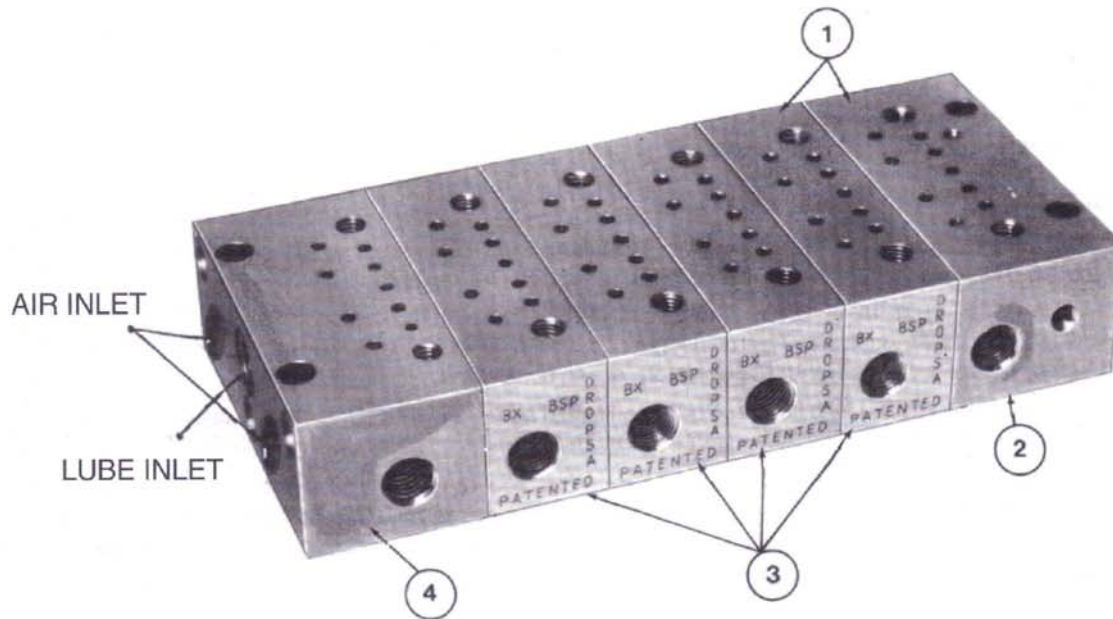


Fig. 2. - RED BASE ASSEMBLY FOR SIX METERING ELEMENTS

COMPONENTS CHOOSE

Fig.	Description	Part No.		Mark
		(BSP)	(NPTF)	
1	Final base + Intermediate base	649152	649152	
2	Final base	649055	649055	BFXA
3	Intermediate base	649054	649054	BXA
4	Initial base	649053	649023	BIXA
5	Outlet exclusion plug	649008	649008	
6	Oil outlet fitting	649007	649007	
7	Air-oil fitting	649006	649006	
8	Air line exclusion plug	3232098	3232095	
9	Fitting for oil only	91946	91944	
10	Atomiser fitting	649012	649013	
11	Fitting for spray	649014	649015	

CODES OF BASE ASSEMBLY

Number of metering units	Base assy. R 1/8 UNI-ISO 7/1	Base assy. NPTF
3	649153	649173
4	649154	649174
5	649155	649175
6	649156	649176
7	649157	649177
8	649158	649178
9	649159	649179
10	649160	649180
11	649161	649181
12	649162	649182

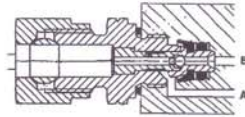
The base assembly is made of one inlet base, one or more intermediate bases and one end base.

MODULAR SMX METERING ELEMENTS - SECOND GENERATION

AIR-OIL LUBRICATION SYSTEM

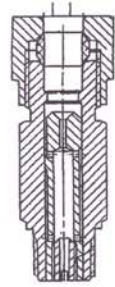
ATOMISED OIL FITTINGS

Fitting to be mounted on the base outlet:
Code 649006. Oil introduced from the metering chamber of SMX metering unit, is delivered, through passage 'A' into the oil fitting where it is brought into the compressed



air stream which reaches the same fitting through passage 'B'.

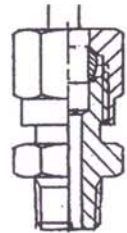
Connector fitting to be mounted on lubrication point: Code 649012 (R 1/8 UNI-ISO 7/1)
Code 649013 (1/8 NPTF)
Inside the fitting there is a small part in which the speed of mixed oil-air stream is increased causing the fragmentation



SPRAY OIL FITTINGS

Fitting to be mounted on the base outlet:
Code 649006
For description and drawing see above.

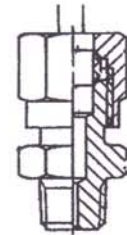
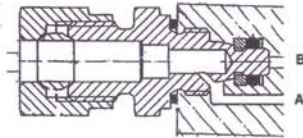
Connector fitting to be mounted on lubrication point: Code 649014 (R 1/8 UNI-ISO 7/1) - Code 649015 (1/8 NPTF)
The oil spray is obtained with the fragmentation, inside the fitting, of oil drops delivered by the air.



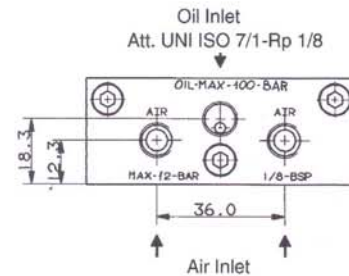
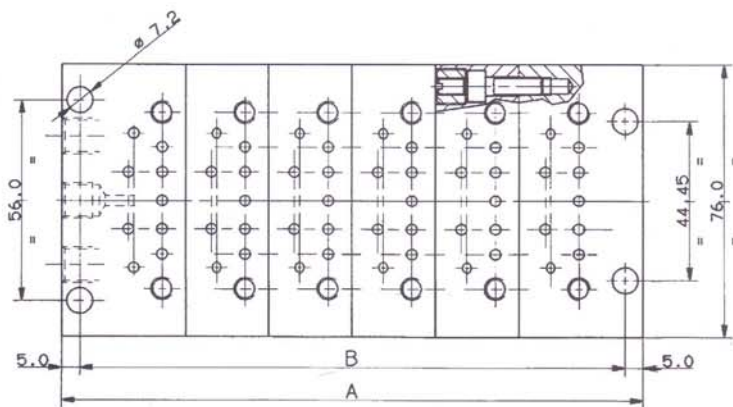
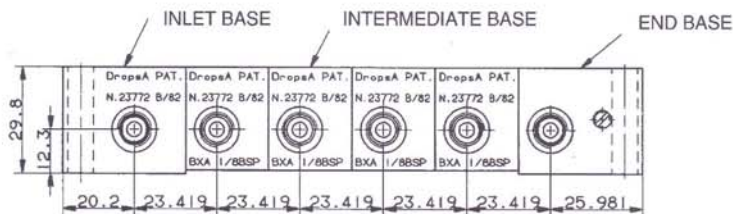
FITTINGS FOR OIL LUBRICATION

Fitting to be mounted on the base outlet:
Code 649007. Air passage 'B' is closed, thus the lubrication point will get oil through passage 'A' only.

Connector fitting to be mounted on the lubrication point:



DIMENSIONS



An air bleed valve is placed on both sides of the end base to enable air bubbles inside the distributor to be eliminated which can cause inconsistent deliveries.

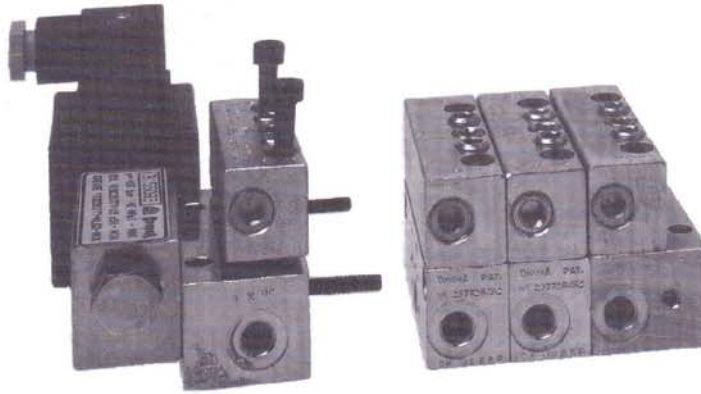
Number of elements	Nominal dimensions in mm. Tolerance/Element +0 -0,05	
	A	B
3	93,02	83,02
4	116,44	106,44
5	139,86	129,86
6	163,28	153,28



CENTRALISED LUBRICATION SYSTEMS

MODULAR "SM0-SMX" - SECOND GENERATION

SHUT OFF VALVE THE PROGRAMMABLE PROGRESSIVE LUBRICATION SYSTEM



- FUNCTIONALITY
- RELIABILITY
- PROGRAMMABILITY
- OPERATING PRESSURE UP TO 5800 psi. (400 bar)

Are the main features of DROPSA
"SHUT OFF" VALVE

"SHUT OFF" VALVE is the basic component to transform a standard progressive lubrication system into the "New programmable system"

The "SHUT OFF" VALVE comprises a solenoid valve and a special SMX modular base. This assy. replaces the initial base on a standard SMX progressive block.

All the other elements such as metering valves, intermediate bases and final base are the same as the modular SMX system.

"SHUT OFF" VALVES are available in BSP or NPTF threads.

UNI-ISO 7/1 (BSP) Part. No.	NPTF Part. No.	Voltage Frequency
3155093	3155085	110V - 50/60 Hz
3155097	3155087	220V - 50/60 Hz
3155094	3155086	12V dc
3155092	3155084	24V dc

ADVANTAGES OF PROGRESSIVE LUBRICATION SYSTEM FITTED WITH "SHUT OFF" VALVE

It is possible to section the installation in sectors with different lubrication cycles

SHUT OFF valve makes it possible to programme the amount of lubricant and the intervals of lubrication according to the requirements of different parts of the machine.

Operation with oil or grease at a pressure of 400 bar.

This valve is suitable for either light oil (min. viscosity of 15cSt) or thick grease (density up to NLGI 3) can operate at a pressure of 400 bar.

Reduction of pressure drop

The standard progressive system is comparable to series circuitry in electricity. The lubricant flow operates a series of valves in succession and this reduces step by step the operating pressure and limits the length of the installation. The "SHUT OFF" valve permits the design of installations with extended lines and many valves.

Quick location of faulty valve

An indicating micro switch mounted on the progressive block permits location of the damaged section of the installation.

Interchangeability of bases and metering valves thanks to the modular concept

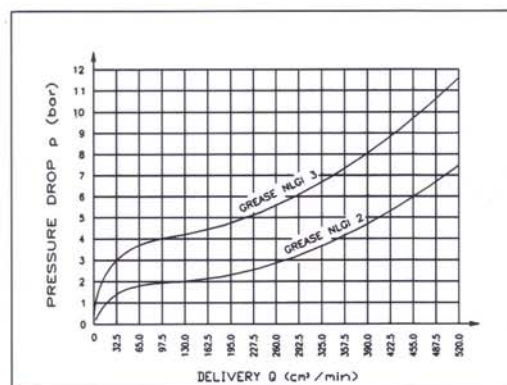
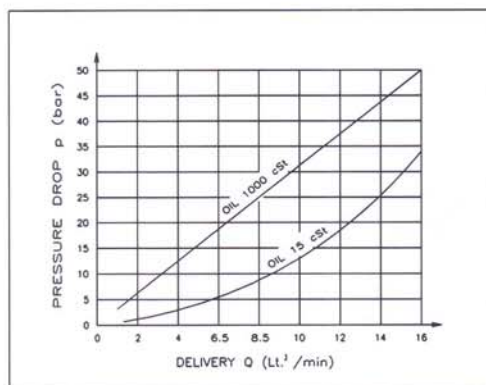
The metering valve can be serviced without disturbing the pipework.

The installation can be easily extended or modified.

MODULAR "SM0-SMX" - SECOND GENERATION

SHUT OFF VALVE

Graphs of pressure drop according to the delivery



TECHNICAL CHARACTERISTICS

Max. pressure: Oil (min. viscosity 15 cSt)
Grease max. density NLGI 3 at operating temperature.

Operating temperature: from -20°C up to +100°C
(from -4°F up to +212°F)

Voltage: 12V dc; 24V dc; 110V ac 50/60 Hz; 220V ac 50/60 Hz. (specify current and voltage when ordering).

Power: 43 Watt (dc) 8 VA (ac)

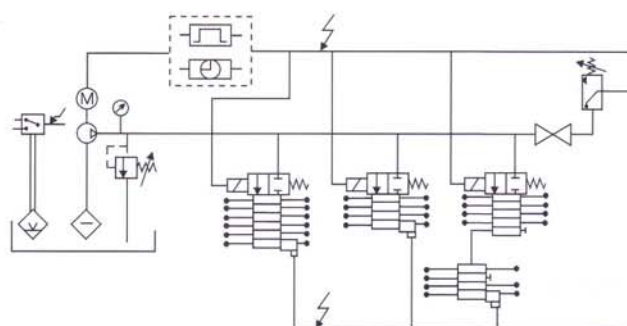
Type of connection: IP65 (electric connections)

Protection degree: IP54 (coil)

Lubricant inlet: Rp 1/4 UNI-ISO 7/1 or 1/4 NPTF

Lubricant outlet: Rp 1/8 UNI-ISO 7/1 or 1/8 NPTF

APPLICATION EXAMPLE

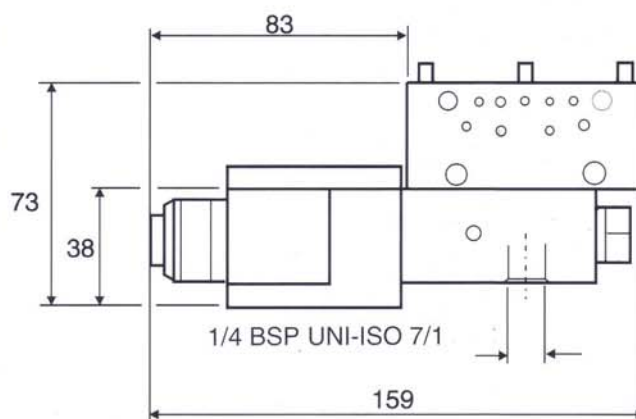


Each section of the system gets the lubricant directly from the main line through a shut-off valve driven by an electronic controller with timer or cycle counter.

BASE ASSY. WITHOUT INLET BASE

No. of SNX metering unit	Base assy.		No. of SMX metering unit	Base assy.	
	UNI-ISO	NPTF		UNI-ISO	NPTF
3	641561	643568	12	641989	643768
4	641981	643760	13	641990	643769
5	641982	643761	14	641991	643770
6	641983	643762	15	641992	643771
7	641984	643763	16	641993	643772
8	641985	643764	17	641994	643773
9	641986	643765	18	641995	643774
10	641987	643766	19	641996	643775
11	641988	643767	20	641997	643776

DIMENSIONS



HOW TO ORDER A DISTRIBUTOR WITH SHUT OFF VALVE

- 1) Indicate the SHUT OFF valve code according to the voltage and thread (See table in the previous page)
- 2) Indicate the base assy. code according to the number of metering units to be mounted (See above table)
- 3) Indicate the codes of SMX metering units or state the delivery and other information as shown on page 18.



CENTRALISED LUBRICATION SYSTEMS

MODULAR SMX METERING ELEMENT - SECOND GENERATION

THE PILOT VALVE: PROGRESSIVE LUBRICATION SYSTEM WITH INVERTED FLOW

The ingenious pilot valve system which allows the progressive lubrication system with inverted flow in a single line

ADVANTAGES OF THE NEW LUBRICATION SYSTEM

A precise dosage of lubricant is sent to the lubrication points thanks to the inverted flow system which determines the frequency of the lubrication cycles with mathematical accuracy.

Optimum reliability in the functioning of the installation is guaranteed by the safety control system, which is typical in progressive systems.

Saves lubricant

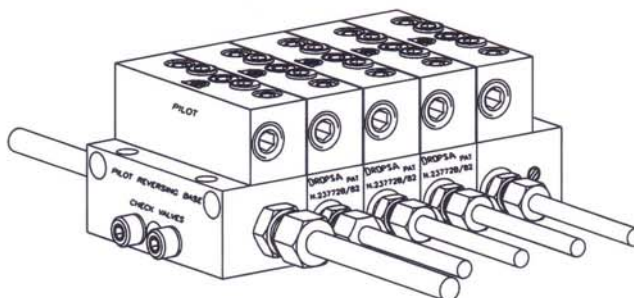
Reduction in pressure loss which in turn allows the use of long lines with small quantities of lubricant even in the farthest points of the line.

Allows the operation with only a single metering element in the case where the lubricant of only one or two points is required.

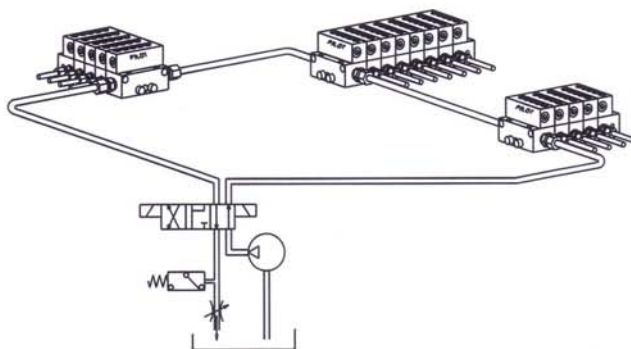
Flexibility of the design and construction of the metering blocks thanks to the modulation of the base and the metering units.

Special by-pass elements in the metering block, allow the retention of lubrication points for future uses. These same elements can be used to eliminate extra lubrication points. Bridge metering elements are provided to transfer the flow to the inside of the block.

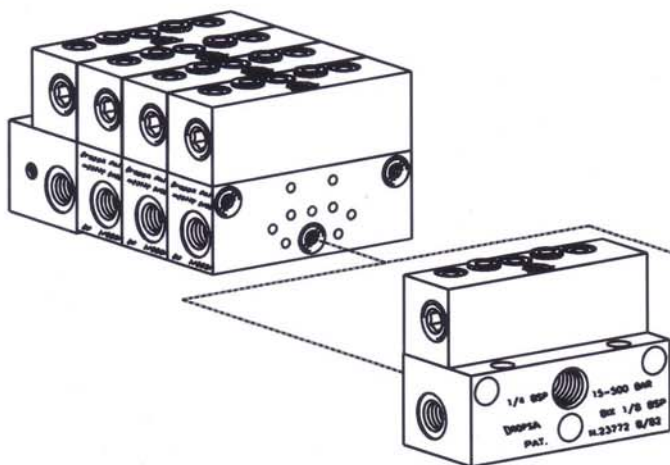
Low cost maintenance is possible because of the modularity of the block. The system may be easily modified and any element may be substituted without disturbing the pipework.



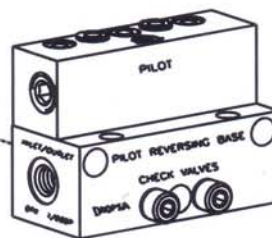
SET OF METERING ELEMENTS
WITH PILOT ASSY.



RING CIRCUIT WITH 3 PILOT ASSY.
AND INVERTED FLOW VALVE



STANDARD SET OF METERING ELEMENTS
CONSISTING OF SMX UNIT AND INLET BASE

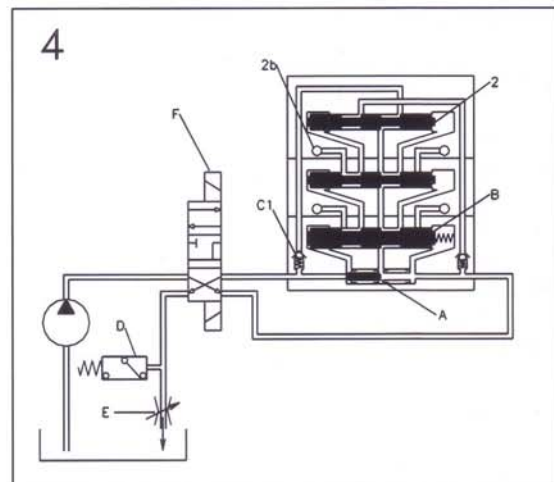
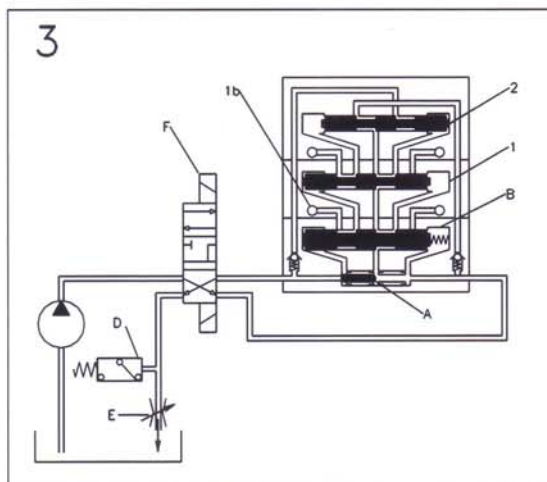
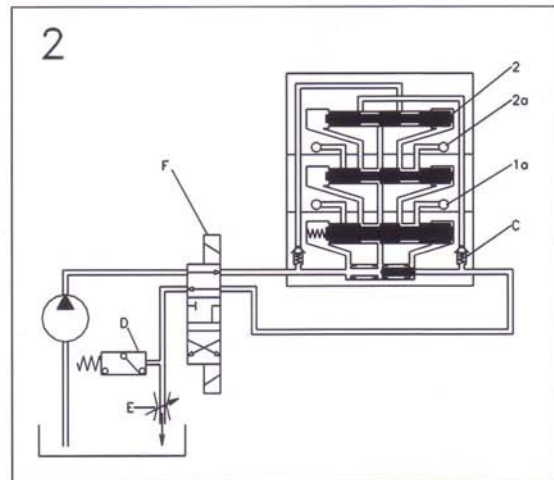
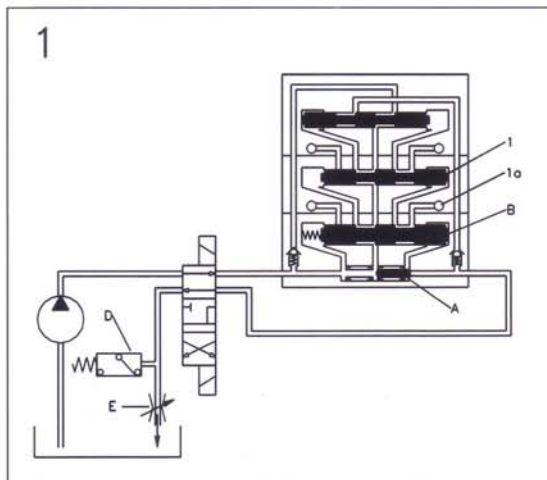


PILOT ASSY. CONSISTING OF
PILOT VALVE AND PILOT BASE

MODULAR SMX METERING ELEMENT - SECOND GENERATION

THE PILOT VALVE

PROGRESSIVE LUBRICATION SYSTEM WITH INVERTED FLOW



SCHEMATIC DIAGRAM

Fig. 1 The pressurised lubricant moves the spool piston **A** and the assist piston **B** towards the right, opening the outlet which allows the lubricant to move piston **1** towards the right, determining the dispensing of the lubricant across the exit **1a** and the opening of the outlet which will move piston **2** (fig. 2) to the right.

Fig. 2 Piston **2** with its movement, controls the dispensing of the lubricant across the exit **2a**. Because this piston is the last in the set, it also determines the passage of the successive Serial Pilot set or back to the tank, allowing for the first half-cycle of lubrication.

With the pressostat **D** and the restrict valve **E** set up, inverter **F** is put into action and the inversion of the flow of lubricant is obtained.

Figs. 3 & 4 Once the inversion of the lubricant has occurred, the lubricant uses the same line and reaches the set of metering units from the opposite side and it moves the spool piston **A** in the same method that has already been described, the assisted piston **B** and pistons **1** and **2** to the left, completing the second half cycle of lubrication using exits **1b** and **2b**.

Once the lubrication cycle is finished, the lubricant returns to the pump across the one way valve **C1**, using pressostat **D** and restrict valve **E**, and is ready for the successive lubrication cycle.

With the progressive lubricant system with flow inversion, it is possible to measure the amount of lubricant required for every lubrication point with extreme accuracy, increasing the reliability of the machines and at the same time reducing all waste of lubricant.



CENTRALISED LUBRICATION SYSTEMS

MODULAR SMX METERING ELEMENT - SECOND GENERATION

SERIAL PILOT:

PROGRESSIVE LUBRICATION SYSTEM WITH INVERTED FLOW

HOW TO ORDER A PROGRESSIVE DISTRIBUTOR WITH INVERTED FLOW

- 1) Indicate the pilot assy. code (See below)
- 2) Indicate the base assy. according to the required SMX metering units (See below table)
- 3) Indicate the code of required SMX metering units or indicate the delivery or other technical information as shown on page 18.

PILOT ASSY

Code 649521 (UNI-ISO 7/1) or 649528 (NPTF)

The complete pilot assy. is made of:

Pilot base code 649500 (UNI-ISO 7/1) or 649526 (NPTF)

Pilot valve 649510

Both pilot base outlets must be connected to the valve (inverter) whose function is to invert the delivery line with the return line and vice versa.

NOTE: Progressive system with inverted flow can also work with one metering element:

In this case you should order:

– Pilot assy. **code 649521 (UNI-ISO) or 649528 (NPTF)**

– End base **code 641515**

– One SMX metering element

No. of SMX metering units	Base assy.	
	UNI-ISO 7/1	NPTF
1	(SEE THE NOTE)	
2	641561	643568
3	641981	643760
4	641982	643761
5	641983	643762
6	641984	643763
7	641985	643764
8	641986	643765
9	641987	643766
10	641988	643767

TECHNICAL INFORMATION

Operating pressure: 500 bar (7250 psi.) Max.

15 bar (6225 psi.) Min.

Lubricant:

Oil 15 cSt Min.

Pilot base threads: Inlet R1/8 UNI-ISO 7/1 - 1/8 NPTF

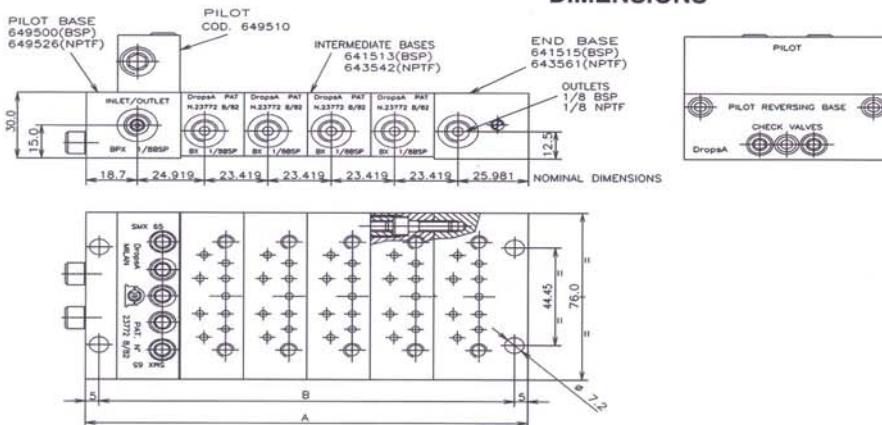
Outlet R1/8 UNI-ISO 7/1 - 1/8 NPTF

Intermediate base threads: Outlet: R1/8 UNI-ISO 7/1 - 1/8 NPTF

Plug for closing the outlets if bridge metering units or one outlet metering units are used.

code 3232098 (UNI-ISO 7/1) - code 3232095 (NPTF)

DIMENSIONS



No. of metering units	Dimensions			
	A		B	
	mm.	in.	mm.	in.
1	69,60	2.740	59,60	2.346
2	93,02	3.662	83,02	3.268
3	116,44	4.584	106,44	4.191
4	139,86	5.506	129,86	5.113
5	163,28	6.428	153,28	6.035
6	186,70	7.350	176,70	6.957
7	210,12	8.272	200,12	7.879
8	233,53	9.194	223,53	8.800
9	256,95	10.116	246,95	9.722
10	280,37	11.038	270,37	10.645

**PUMPS, FITTINGS AND ACCESSORIES
FOR
PROGRESSIVE SYSTEM 26**



CENTRALISED LUBRICATION SYSTEMS

HAND-OPERATED PUMPS FOR OIL AND GREASE

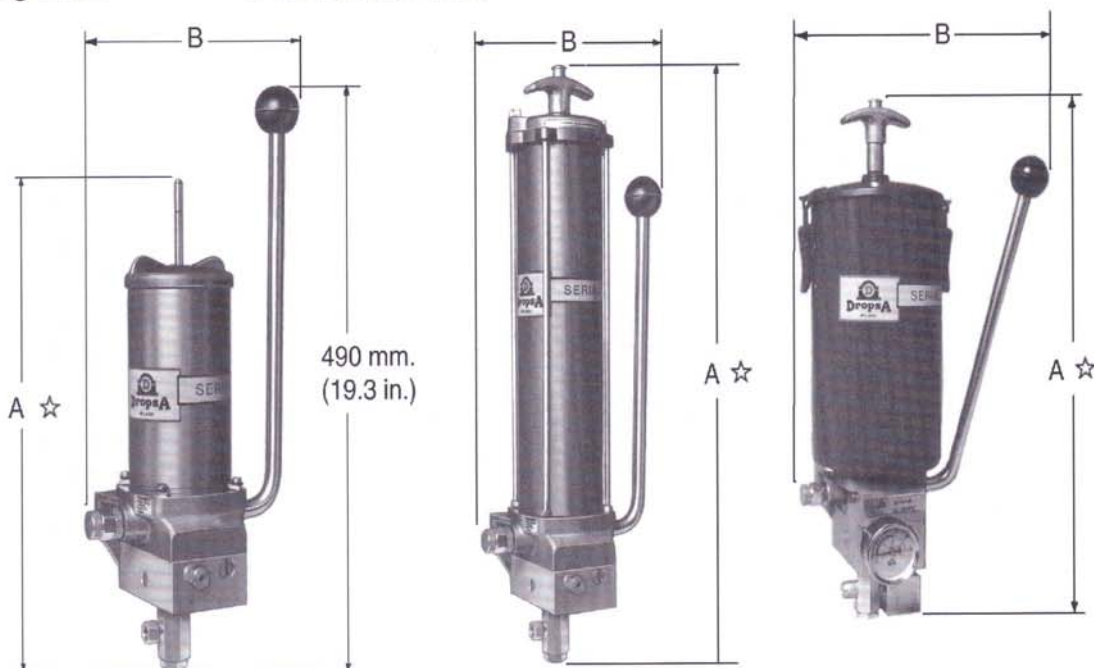
DOUBLE ACTING PISTON PUMPS

Pumps of sturdy construction for heavy duty; steel body, hardened and lapped double acting steel piston, with pressure gauge and by-pass valve.

The version for grease is complete with follower plate, with or without spring and re-filling valve. The level indicating rod is hooked to the follower plate, therefore the height dimensions change from minimum (empty reservoir) to maximum (full reservoir).

TECHNICAL INFORMATION:

Max. pressure:	Grease pumps 15 MPa (150 bar) (2175 psi.) Oil pumps 13 MPa (130 bar) (1885 psi.)
Delivery:	3,4 cc. (.20 cu.in.) for each back and forth movement of the operating lever.
Gauge:	Scale; 0 to 25 MPa (0 to 250 bar) (0 to 3625 psi.)
Lubricant outlet:	G 1/4 UNI-ISO 228/1
Re-filling valve:	G 1/2A UNI-ISO 228/1



3415011

3415013

3415008
3415020

Part No.	Reservoir	Lubricant	Height 'A' mm. (in.)	Width 'B' mm. (in.)	Depth mm. (in.)	Weight kg. (lb..)	Characteristics
3415008	kg. (11 lb..)	NLGI 1	550/800*(21.6/31.5)	275 (10.8)	285 (11.2)	12 (26.4)	reservoir with follower plate.
3415020	kg. (11 lb..)	NLGI 0	550/800*(21.6/31.5)	275 (10.8)	285 (11.2)	11,5 (25.4)	special follower plate for light grease.
3415013	kg. (4.4 lb..)	NLGI 2	600/910*(23.6/35.8)	218 (8.6)	285 (11.2)	8,6 (19.0)	reservoir with follower plate and spring.
3415011	kg. (2.2 lb..)	NLGI 1	405/530*(15.9/20.9)	205 (8.0)	285 (11.2)	6,2 (13.7)	reservoir with follower plate
3415012	kg. (2.2 lb..)	NLGI 2	405/530*(15.9/20.9)	218 (8.6)	285 (11.2)	6,5 (14.3)	reservoir with follower plate and spring
3416005	5 Lt.. (10.6 pints)	OIL	452 (17.6)	262 (10.2)	285 (11.2)	7,8 (17.2)	with visual indicator
3416006	2 Lt.. (4.2 pints)	OIL	487 (19.0)	205 (8.0)	285 (11.2)	6 (13.2)	with visual indicator
3416009	1 Lt.. (2.1 pints)	OIL	352 (13.7)	205 (8.0)	285 (11.2)	5,8 (12.8)	without visual indicator

* The two heights refer to the empty/full reservoir.

HAND-OPERATED PUMPS FOR OIL AND GREASE

SINGLE-STROKE PUMPS WITH OSCILLATING HANDLE

Pumps of sturdy construction for heavy duty: Cast iron body, hardened and lapped steel piston and reservoir in die cast light alloy.

Pressure indicator set at 10 MPa (100 bar) (1450 psi.) and check valve.

The version for grease is complete with follower plate and level indicating rod: the one for oil is complete with visual indicator and re-filling filter.

TECHNICAL INFORMATION:

Max. pressure: 10 MPa (100 bar) (1450 psi.)

Delivery per stroke: 1 cm³ (.06 cu.in.)

lubricant outlet: G 1/4 UNI-ISO 228/1

Part No.	Reservoir	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)
128075	kg. (2.2lb.)	NLGI 00	360/425* (14/16.7)	260 (10.1)	110 (4.33)	3,2 (7)
128505	1 Lt.. (11 pints)	OIL	360 (14)	260 (10.1)	110 (4.33)	3 (6.6)



SINGLE STROKE PUMPS

Pumps of sturdy construction with small dimensions and die cast light alloy reservoir. The version for grease is complete with follower plate and level indicating rod; the one for oil with re-filling filter.

TECHNICAL INFORMATION:

Max. pressure: 7 MPa (70 bar) 1015 psi.)

Delivery per stroke: 7,5 cm³ (.45 cu.in.)

Lubricant outlet: M10x1

Part No.	Reservoir	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)
3105024	0,8kg. (1.7lb.)	NLGI 00	340/350* (13.39/13.78)	120 (4.72)	138 (5.43)	2,2 (4.8)
3105023	0,8Lt.. (1.7 pints)	OIL	340 (13.39)	120 (4.72)	138 (5.43)	2 (4.4)



3105024

* The two heights refer to the empty/full reservoir.

SINGLE STROKE PUMPS

Pump of sturdy construction for heavy duty.

Special light alloy die-cast body with hardened ground and lapped piston.

They are equipped with by-pass valve, pin pressure indicator, check valve and delivery filter.

The version for grease is complete with follower plate and level indicating rod.

Re-filling valve (for pump code 152701 only)

TECHNICAL INFORMATION:

Max. pressure: adjustable up to 12,5 MPa (125 bar) (1812 psi.)

Delivery per stroke: 1,7 cm³ (.10 cu.in.)

Lubricant outlet: Rp 1/4 UNI-ISO 7/1



Part No.	Reservoir	Lubricant	Height 'A' mm. (in.)	Width 'B' mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)	Characteristics
152701	0,340 kg. (0.749 lb.)	NLGI 2	450/550* (17.7/21.6)	82 (3.23)	142 (5.6)	2 (4.4)	reservoir with follower plate and spring
153501	0,300 kg. (0.661 lb.)	NLGI 0	290/330* (11.4/13.0)	82 (3.23)	142 (5.6)	1,8 (4.0)	reservoir with follower plate.
153701	0,27 Lt.. (0.57 pints)	OIL	300 (11.7)	82 (3.23)	142 (5.6)	1,7 (3.7)	transparent reservoir.



CENTRALISED LUBRICATION SYSTEMS

HAND-OPERATED PUMPS FOR GREASE

HIGH PRESSURE SINGLE STROKE PUMPS

These hand pumps of sturdy construction and long life are used for the direct lubrication on the lube point. A driven hand valve allows the pressure release into the supply tube and interrupts the lubricant flow when the handle is put at rest.

These pumps complete with follower plate and filter at the outlet (filter code 1113210), are also available mounted on a trolley for easy transportation to the lubrication points.

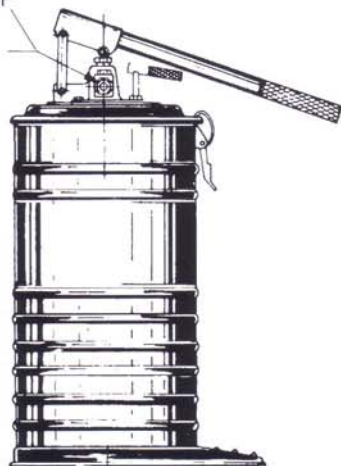
TECHNICAL INFORMATION:

Max. pressure: 35 MPa (350 bar) (5075 psi)

Delivery per stroke: 4,5 cm³ (.27 cu.in.)

Lubricant outlet: Rp 3/8 UNI-ISO 7/1

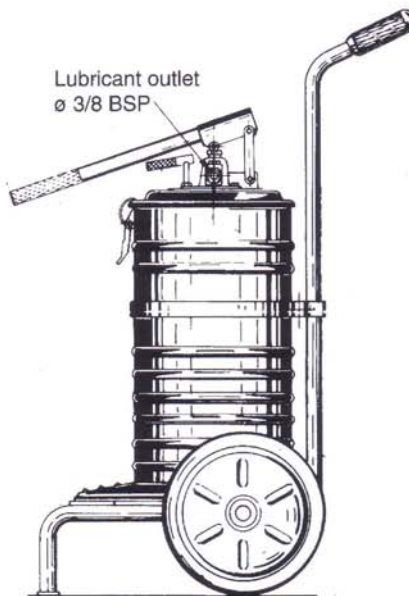
Lubricant outlet
ø 3/8 BSP



133000

133000

Lubricant outlet
ø 3/8 BSP

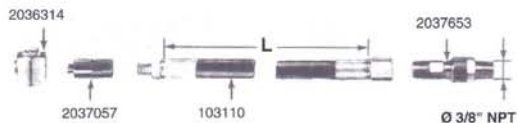


254800

254800

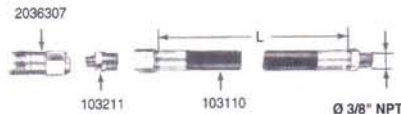
Part No.	Reservoir Lt.. (pints)	Lubricant	Height mm. (in.)	Width mm. (in.)	ø mm. (in.)	Weight kg. (lb..)	Characteristics
133000	12 (26.5)	NLGI 1	610 (24.0)	330 (13)	230 (9.1)	10 (22)	Trolley pump
254800	12 (26.5)	NLGI 1	1065 (41.9)	330 (13)	230 (9.1)	28 (61.7)	Trolley code 114000

ACCESSORIES (to be ordered separately).



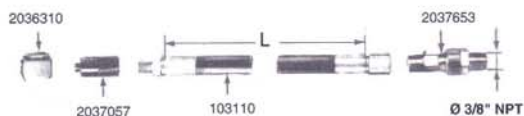
Assy. code 101835

Flex ø 10x22 with connector for button head nipple. Standard type.



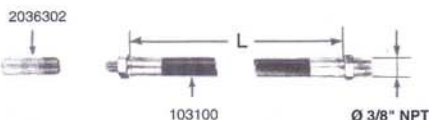
Assy. code 101820

Flex ø 10x22 with hydraulic connector for re-filling.



Assy. code 101840

Flex ø 10x22 with connector for button head nipple. Giant type



Assy. code 101831

Flex ø 6x16 with hydraulic connector for re-filling

Note: To order a hose the length (overall length) in cm. must be added to the hose code.

TRANSFER AND FILLING PUMPS

Pumps are supplied with filter:

(grease, **Part No. 1113220**; oil, **Part No. 1113250**). Filter outlet 1/2" BSPF (1/2" NPTF). Flex, **Part No. 101775**, thread $\varnothing$ 1/2" BSP (1/2" NPT) taper m. solid and 1/2" BSPF (1/2" NPTF) swivel (when specifying indicate flex length 'L' in cm.)

WITH TROLLEY for 12kg. (26.4 lb..) drums.

Height: 1110 mm. (43.2 in.)

Width: 800 mm. (31.2 in.)

Weight: 19 kg. (41.8 lb..)

PORTABLE

Height: 600 mm. (23.4 in.)

Width: 330 mm. (12.8 in.)

o.d. 230 mm. (8.9 in.)

Weight: kg. (19.8 lb..)



132055 = grease
132056 = oil



132000 = grease
132054 = oil

Piston pump equipped with suction hose. Discharge .050 kg. (.11 lb..) of lubricant per stroke with a back pressure of 35 bar (500 psi.) A manual built-in pressure release valve permits return of handle to down position without discharging lubricant. Can be used for transferring alcohol, asphalt emulsions, fuel, cleaning solvents, fuel oil, benzene, lacquer thinner, vegetable oils and many other non corrosive, non abrasive, materials.

Pumps are supplied without filter.

Lubricant outlet: 3/8" BSPF (3/8" NPTF)



132530
132540
132550
grease -
oil



132630
grease - oil
for 200kg
(44lbs)
tanks



132057
Complete with
follower plate and
cover for 20kg
(44lbs) tanks.

For drums		Pump Part No.	Cover Part No.	Follower plate (grease only) Part No.	Piston rod	
kg.	lb..				mm.	in.
220	440	132630	1141500	1141103	925	36.0
115	253	132530	1141530	1141130	690	26.9
56	123	132540	1141520	1141131	515	20.8
20	44	132550	1141545	1141140	375	14.6

ACCESSORIES AND SPARE PARTS

Charging valve:

Part No. 132160

Directly connected to the outlet pump.

Nipple for pump-filter joint:

Part No. 133085

Grease strainer:

Part No. 1113210

thread $\varnothing$ 3/8" BSP (3/8" NPT) taper.

Element: **Part No. 1113205**

Oil strainer:

Part No. 1113240

thread $\varnothing$ 3/8" BSP (3/8" NPT) taper.

Element **Part No. 1113231**



$\varnothing$ 3/8" BSP (3/8" NPT) taper. Hose with oil



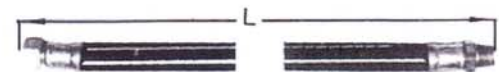
transfer valve **Part No. 101777** - $\varnothing$ tube 13x23.

$\varnothing$ 3/8" BSP (3/8" NPT) taper. Hose without oil



transfer valve **Part No. 101778** - $\varnothing$ tube 13x23.

$\varnothing$ 1/2" BSP (1/2" NPT) $\varnothing$ 3/8" BSP (3/8" NPT)



taper. Refilling pump hose:

Part No. 101779 $\varnothing$ tube 13x23

When specifying indicate flex length 'L' in cm.

Truck for 12kg. (26.4 lb..) drums: **Part No. 1140000**

Truck for 20 kg. (44 lb..) drums **Part No. 1140200**

Height: 1110 mm. (43.2 in.)



CENTRALISED LUBRICATION SYSTEMS

AIR OPERATED GREASE PUMPS

SINGLE ACTING AIR OPERATED GREASE PUMP

Pumps of sturdy construction for heavy duty: steel body, hardened and lapped steel piston, pneumatic driven cylinder housing a light alloy piston equipped with oil-resisting rubber gasket.

A 3-way (line-cylinder-discharge) solenoid control valve is required (available on demand) **code 45273** (110V 50 Hz.), **code 45274** (220V 50 Hz.), **code 45275** (24V 50 Hz.).

pumps are available with 3 different reservoirs:

A: Reservoir with follower plate (with or without spring) hooked to the level indicating rod (height dimension changeable))

B: Reservoir with level indicating rod and follower plate sliding along the rod (height dimension fixed).

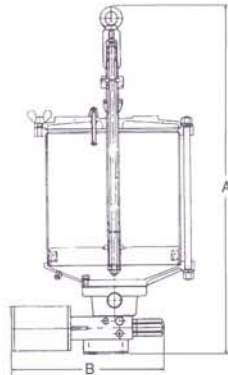
C: Pressurised reservoir for the pumping of thick grease.

TECHNICAL INFORMATION:

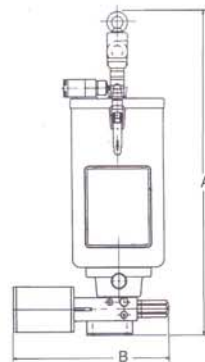
Ratio:	30:1
Driven air pressure:	0,4 MPa (4 bar) (58 psi.) min. 0,8 MPa (8 bar) 116 psi.) max.
Adjustable delivery:	from 0.5 to 2 cm ³ per stroke.
Lubricant outlet:	Rp 1/4 UNI-ISO 7/1
Air compressed inlet:	G 1/8 UNI-ISO 228/1 - Pipe housing ø 6
Re-filling valve:	G 1/2A UNI-ISO 228/1



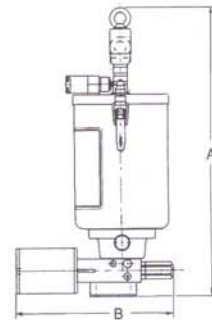
3413002



3413014



3413012



3413018

Part No.	Reservoir kg. (lb.)	Lubricant	Height mm. (in.)	Width 'B' mm. (in.)	Depth mm. (in.)	Weight kg. (lb..)	Characteristics
MODEL A: PUMPS WITH FOLLOWER PLATE HOOKED TO THE LEVEL ROD (height dimension changeable)							
3413002	5 (11)	NLGI 1	524/754* (20/29.7)	280 (11)	170 (6.7)	11,5 (25.36)	With minimum level electric contact.
3413001	2 (4.4)	NLGI 2	579/864* (22.8/34)	280 (11)	150 (5.9)	7,7 (16.98)	With spring-without minimum electric level
3413003	1 (2.2)	NLGI 2	357/454* (14.1/17.9)	280 (11)	150 (5.9)	6,2 (13.67)	With spring-without minimum electric level
3413007	1 (2.2)	NLGI 1	334/474* (13.1/18.7)	280 (11)	150 (5.9)	5,3 (11.68)	Without minimum level electric contact.
MODEL B: PUMPS WITH FOLLOWER PLATE SLIDING ALONG THE ROD (height dimension fixed)							
3413014	10 (22)	NLGI 1	885 (34.8)	280 (11)	310(12.2)	26,5 (58.43)	Without minimum level electric contact.
3413012	5 (11)	NLGI 1	558 (22)	280 (11)	160 (6.3)	11,8 (26.02)	With minimum level electric contact.
3413016	5 (11)	NLGI 1	558 (22)	280 (11)	170 (6.7)	12 (26.45)	With minimum level and re-filling filter.
3413018	3 (6.6)	NLGI 1	498 (19.6)	280 (11)	160 (6.3)	11,2 (24.70)	With minimum level electric contact.
MODEL C: PUMPS WITH PRESSURISED RESERVOIR							
3413019	10 (22)	NLGI 3	990 (39)	280 (11)	192 (7.6)	27,3 (60.20)	With minimum level electric contact.
3413005	5 (11)	NLGI 3	680 (26.8)	280 (11)	192 (7.6)	19,5 (43.00)	With minimum level electric contact.

* The two heights refer to the empty/full reservoir.

'LOCOPUMP' FOR GREASE NLGI2

DESCRIPTION:

The Dropsa 'LOCOPUMP' is a pump of sturdy construction and high reliability, consisting of zinc plated steel body, hardened and lapped steel piston and pneumatic driven cylinder housing a piston equipped with oil resisting rubber gasket.

The reservoir is made of transparent technopolymer and is equipped with electric level control-switch.

TECHNICAL DATA:

Compression ratio:	30:1
Driven air pressure:	min. 0.3 Mpa (3bar) max. 0.8 Mpa (8bar)
Fixed delivery:	2cm ³ per stroke.
Lubricant outlet:	G 1/4 UNI-ISO 7/1
Compressed air inlet:	G 1/8 UNI-ISO 228/1 compression cone seating Ø6 mm. tube.
Re-filling valve:	hydraulic fitting UNI 7663
Lubricant:	grease NLGI2
Minimum level contact:	
max. commutable tension:	100V d.c.
max. commutable current:	0.25A
max. commutable power:	*W (NA) - 3W (NC)
VIP Controller (optional):	
Cycle:	min. 10 seconds max. 59 hours 50 min.
Interval:	min. 1 minute max. 99 hours 59 min.

ORDERING INFORMATION:

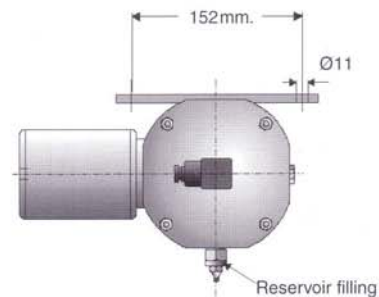
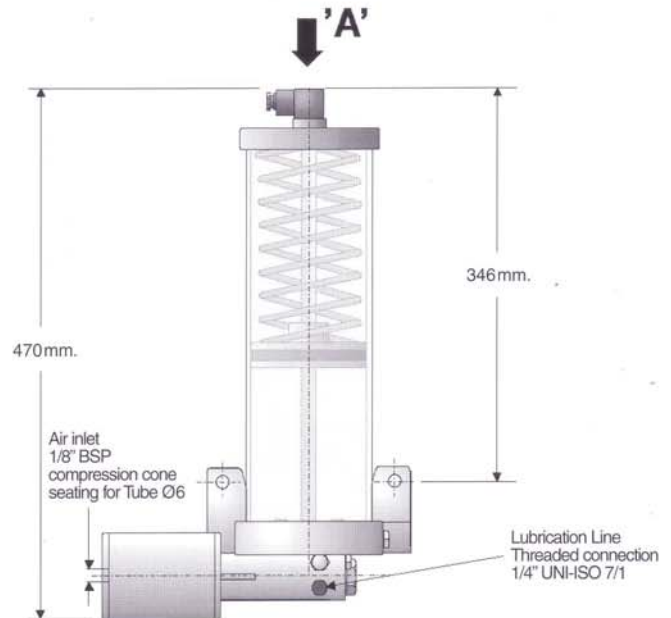
Ordering is by Part No. and Description
'LOCOPUMP' Part No. 3413026

ACCESSORIES:

To be ordered separately.

3-way solenoid valve:

110V - 50 Hz.	Part No. 45273
220V - 50Hz.	Part No. 45274
24V - 50Hz.	Part No. 45275



VIEW ON ARROW 'A'

VIP Controller:

24V d.c.	Part No. 1639076
110/120V - 220/240V 40/60Hz.	Part No. 1639977



CENTRALISED LUBRICATION SYSTEMS

AIR OPERATED OIL PUMPS

AIR OPERATED SINGLE ACTING OIL PUMPS

Pumps of sturdy construction for heavy duty; steel body, hardened and lapped steel piston, pneumatic driven cylinder housing a light alloy piston equipped with oil resisting rubber gasket.

A 3-way (line-cylinder-discharge) solenoid control valve is required (available on demand).

code: 45273 (110V-50Hz.).

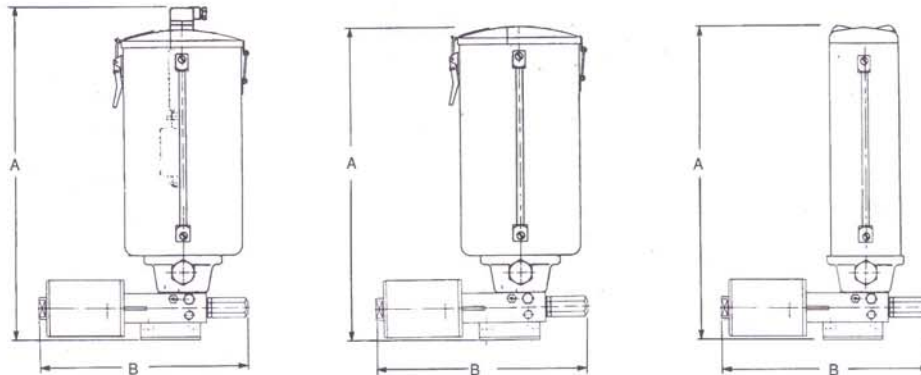
code: 45274 (220V-50Hz.).

code: 45275 (24V-50Hz.).

Pumps are equipped with a steel sheet reservoir with visual level indicator.

TECHNICAL INFORMATION:

Ratio:	30:1
Driven air pressure:	0,4 MPa (4 bar) (58 psi.) min. 0,8 MPa (8 bar) (116 psi.) max.
Adjustable delivery:	from 0,5 to 2 cm ³ per stroke.
Lubricant outlet:	Rp 1/4 UNI-ISO 7/1
Air compressed inlet:	G 1/8 UNI-ISO 228/1 - Pipe housing ø 6 mm.
Re-filling valve:	G 1/2A UNI-ISO 228/1



Part No.	Reservoir Lt.. (pints)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb..)	Characteristics
3414006	5 (10.6)	OIL	450 (17.7)	280 (11)	170 (6.7)	7 (15.4)	With minimum level electric contact
3414002	5 (10.60)	OIL	420 (16.5)	280 (11)	170 (6.7)	6,9 (15.2)	Without minimum level electric contact
3414001	2 (4.2)	OIL	454 (17.9)	280 (11)	130 (5.1)	5,1 (11.2)	Without minimum level electric contact

AIR OPERATED SINGLE ACTING PUMPS WITHOUT RESERVOIR

Pump to assemble with special reservoirs or customers' own reservoirs.

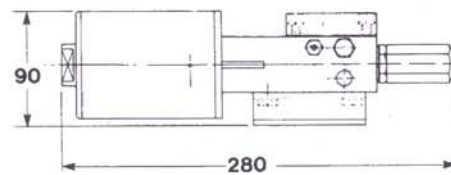
Equipped with base plate having a hole for the flow inlet with thread

G 1/2 UNI-ISO 228/1

PUMP CODE: 3414005

TECHNICAL INFORMATION:

Ratio:	30:1
Driven air pressure:	0,4 MPa (4 bar) (58 psi.) min. 0,8 MPa (8 bar) (116 psi.) max.
Adjustable delivery:	from 0,5 to 2 cm ³ per stroke.
Lubricant inlet:	G 1/2 UNI-ISO 228/1
Lubricant outlet:	Rp 1/4 UNI-ISO 7/1
Air compressed inlet:	G 1/8 UNI-ISO 228/1 - Pipe housing ø 6 mm.



3414005

AIR OPERATED OIL PUMPS

SINGLE ACTING AIR OPERATED OIL PUMPS FOR SMALL SYSTEMS

Pumps of sturdy construction consisting of: high resistance light alloy steel body, lapped steel piston and pneumatic driven cylinder housing a light alloy piston equipped with oil-resisting rubber gasket. a 3-way solenoid valve is required (available on demand): **code 45273** (110V 50 Hz.), **code 45274** (220V 50 Hz.), **code 45275** (24V 50 Hz.).

Pumps **code 3103025** and **3103026** with die cast light alloy reservoir and visual level indicator, are equipped with two outlets to be used on the right or left.

Pump **code 3103027** has one outlet only and is equipped with steel sheet reservoir and visual level indicator.

TECHNICAL INFORMATION:

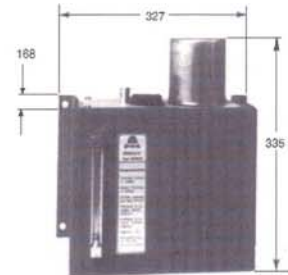
Ratio:	8.5:1
Driven air pressure:	0,4 MPa (4 bar) (58 psi.) min. 0,8 MPa (8 bar) (116 psi.) max.
Delivery:	7,5 cm ³ per stroke.
Lubricant outlet:	M10x1 pipe housing and cone ø mm. (Pumps code 3103025 and 3103027) M14x1,5 pipe housing and cone ø mm. (Pumps code 3103026)
Air compressed inlet:	M10x1 pipe housing and cone ø 6 mm.
Pumpable lubricant:	Oil 15 cSt min. - 1000 cSt max. at the operating temperature.



3103025



3103026



3103027

Part No.	Reservoir Lt.. (pints)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)	Characteristics
3103025	0,8 (1.7)	OIL	253 (10.0)	117 (4.6)	108 (4.2)	1,8 (4.0)	Without minimum level electric contact.
3102026	1,5 (4.7)	OIL	403 (15.9)	124 (4.9)	108 (4.2)	4 (8.8)	With minimum level electric contact.
3103027	1,6 (12.6)	OIL	335 (13.2)	327 (12.9)	168 (6.60)	8 (17.6)	With minimum level electric contact.

PRESSURISED RESERVOIRS

This type of reservoir has been designed to obviate all the difficulties that are normally associated with the use of contaminated, non-deaerated greases with low penetration indexes. It consists of a ground cylinder, a piston with double seal, by-pass valve, minimum level electric contact and a pump mounting flange complete with filter and filling valve.

On demand: max. level electric contact code 3164113 and bracket code 3050045.

TECHNICAL INFORMATION:

Air driven pressure:	0,2 MPa (2 bar) (29 psi.)
By-pass air valve setting:	0,3 MPa (3 bar) (43 psi.)
By-pass grease valve setting:	0,6 MPa (6 bar) 87 psi.)
Fitting thread for re-filling:	G 1/2A UNI-ISO 228/1

Part No.	Reservoir Lt.. (pints)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)
3044126	10 (21.1)	NLGI 3	815 (32.1)	182 (7.20)	182 (7.2)	22 (48.5)
3044125	5 (10.6)	NLGI 3	510 (20.1)	182 (7.2)	182 (7.2)	14 (30.9)



CENTRALISED LUBRICATION SYSTEMS

AIR OPERATED GREASE AND OIL PUMPS

DOUBLE ACTING AIR OPERATED GREASE AND OIL PUMPS

Pumps of sturdy construction for heavy duty consisting of: steel body, hardened and lapped steel piston and pneumatic driven cylinder housing a light alloy piston equipped with oil-resisting rubber gasket.

A 4-way solenoid valve is required (available on demand): code 44304 (110V 50Hz.), code 44305 (220V 50Hz.), code 44303 (24V 50Hz.).

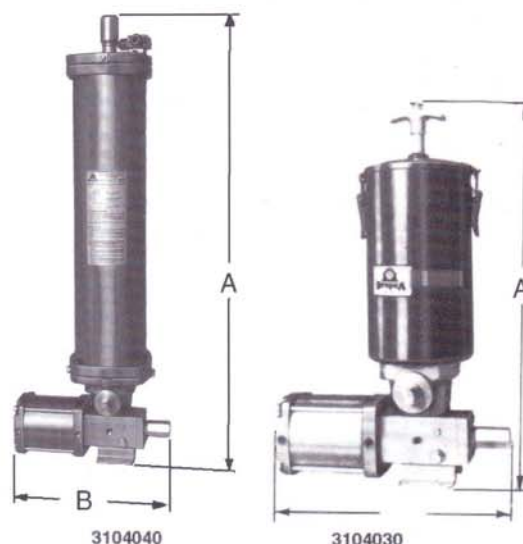
Pumps are available in two models according to the reservoir:

A: Reservoir with follower plate hooked to the level indicating rod (height dimension changeable).

B: Pressurised reservoir for the pumping of thick grease.

TECHNICAL INFORMATION:

Ratio:	25:1
Driven air pressure	0,4 MPa (4 bar) (58 psi.) min. 0,8 MPa (8 bar) (116 psi.) max.
Adjustable delivery:	from 6 to 15 cm ³ per stroke.
Lubricant outlet:	Rp 1/4 UNI-ISO 7/1
Air compressed inlet:	G 1/4 UNI-ISO 228/1 Pipe housing ø 8
Re-filling valve:	G 1/2A UNI-ISO 228/1



GREASE PUMPS

Part No.	Reservoir kg. (lb..)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb..)	Characteristics
MODEL A: PUMPS WITH FOLLOWER PLATE HOOKED TO THE LEVEL ROD (height dimension changeable)							
3104050	5 (11)	NLGI 1	590/820 *(23.2/32.3)	346 (13.6)	170 (6.7)	19,5 (42.9)	with minimum level electric contact
MODEL B: PUMPS WITH PRESSURISED RESERVOIR							
3104040	10 (22)	NLGI 3	995 (39.2)	346 (13.6)	192 (7.6)	35,5 (78.2)	with minimum level electric contact
3104030	5 (11)	NLGI 3	690 (27.2)	346 (13.6)	192 (7.6)	27,5 (60.6)	with minimum level electric contact

* The two heights refer to empty/full reservoir.

OIL PUMPS

Part No.	Reservoir kg. (lb..)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb..)	Characteristics
3103014	5 (10.5)	OIL	485 (19.1)	346 (13.6)	120 (4.7)	15,5 (34.1)	with minimum level electric contact

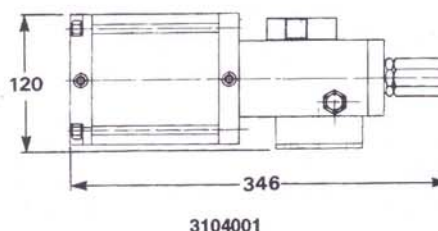
DOUBLE ACTING AIR OPERATED PUMPS WITHOUT RESERVOIR

Pumps to assemble with special reservoirs or customers' own reservoirs. Equipped with base plate having a hole for the flow inlet with thread G 1/2 UNI-ISO 228/1

PUMP CODE 3104001

TECHNICAL INFORMATION:

Ratio:	25:1
Driven pressure:	0,4 MPa (4 bar) (58 psi.) min. 0,8 MPa (8 bar) (116 psi.) max.
Adjustable delivery:	from 6 to 15 cm ³ per stroke.
Lubricant inlet:	G 1/4 UNI-ISO 228/1
Lubricant outlet:	G 1/4 UNI-ISO 7/1
Air compressed inlet:	G 1/4 UNI-ISO 228/1



PUMPS WITH PNEUMATIC MOTOR

OIL AND GREASE PUMPS 234000 SERIES.

Pumps of sturdy construction equipped with a pneumatic motor and pumping rod having a chromium plated steel piston. Fitted on standard commercial drums of any capacity, they can be used as lubrication pumps, refilling pumps or transfer pumps. Equipped with flexible hose and gun, they are used in the motor industry to refill oilcups or small reservoirs.

TECHNICAL DATA:

Compression rate: 40:1

Air driven pressure: Min. 0.4 MPa (4 bar) - Max. 1 MPa (10 bar)

Delivery: 400 gr. grease/minute with air pressure 10 bar

Lubricant outlet: Rp 1/4 UNI-ISO 7/1

Air compressed inlet: G 1/4 UNI-ISO 228/1 pipe ø8 mm.

Pump complete Part No.	Drums kg. (lb..)	Lubricant	Rod		Motor head Part No.
			Part No.	Length mm. (ins.)	
234000	5 (11)	NLGI 1	234050	300 (11.80)	234001
234150	20 (44)	NLGI 1	234160	395 (15.50)	
234200	56 (123)	NLGI 1	234210	697 (27.45)	
234250	180 (397)	NLGI 1	234260	852 (33.55)	
234324	56 (123)	Viscolite	234210	697 (27.45)	234315
234320	180 (397)	Viscolite	234260	852 (33.55)	



234000
234150
234200
234250
234320

-Filter code
234063
(to be ordered separately)

PUMPS 234000 SERIES WITH COVER AND FOLLOWER PLATE FOR COMMERCIAL DRUMS

These pumps are designed to be mounted on 20 and 180 kg. commercial drums; they can be used as lubrication pumps, refilling pumps and transfer pumps.

TECHNICAL DATA: See pumps 234000 series.

Part No.	Drums kg. (lb..)	Lubricant	Cover		Follower plate		Weight kg. (lb..)
			Part No.	ø mm. (in.)	Part No.	ø mm. (in.)	
234125	20 (44)	NLGI 1	1141550	315 (12.4)	1141132	280 (11.0)	6 (13)
234126	180 (397)	NLGI 1	1141552	608 (24.0)	1141102	550(21.65)	16 (35)
234360	180 (397)	Viscolite	3042054	608 (24.0)	Without follower plate		-

Pumps **234125** and **234126** are equipped with filter code **234063**

Pump **234360** is equipped with pressure regulator and 2 way e-valve (110V-50Hz.) code **44357**

For 56 kg. drums, pump code **234200**, follower plate code **1141136** and cover code **1141551** are to be ordered separately.

234125
234126



PUMPS 234000 SERIES WITH 20 KG RESERVOIR

These units consist of a pump type **234150** with suction filter and follower plate.

20 kg. reservoir is available in 3 versions: with flanges for fixing to the ground, with 3 rollers or installed on a 2 wheel trolley.

Pumps with gun, rotary connector and flex 200 cm. long are available.

TECHNICAL DATA: See pumps 234000 series.

PUMPS COMPLETE WITH GUN ROTARY CONNECTOR AND FLEX

Part No.	Tank kg. (lb..)	Lubricant	Height mm. (ins.)	ø mm. (ins.)	Weight kg. (lb..)	RESERVOIR
254500	20 (44)	NLGI 1	850 (33.5)	320 (12.6)	38 (84)	With 2 wheel trolley.
2513001	20 (44)	NLGI 1	680 (26.8)	320 (12.6)	29 (64)	With flanges.
254000	20 (44)	NLGI 1	760 (30.0)	320 (12.6)	36 (79)	With 3 rollers

PUMPS WITHOUT GUN ROTARY CONNECTOR AND FLEX

Part No.	Tank kg. (lb..)	Lubricant	Height mm. (ins.)	ø mm. (ins.)	Weight kg. (lb..)	RESERVOIR
254020	20 (44)	NLGI 1	850 (39.5)	320 (12.6)	35 (77)	With 2 wheel trolley
253021	20 (44)	NLGI 1	680 (26.8)	320 (12.6)	26 (57)	With flanges
254022	20 (44)	NLGI 1	760 (30.0)	320 (12.6)	33 (73)	With 3 rollers

25450



CENTRALISED LUBRICATION SYSTEMS

HEAVY DUTY PNEUMATIC PUMPS

TECHNICAL INFORMATION

Compression rate:	See table
Delivery:	See table
Air driven pressure:	Max. 1.4 MPa (14 bar)
Air inlet:	G 3/4 UNI-ISO 228/1
Air outlet:	G 1/2 UNI-ISO 228/1

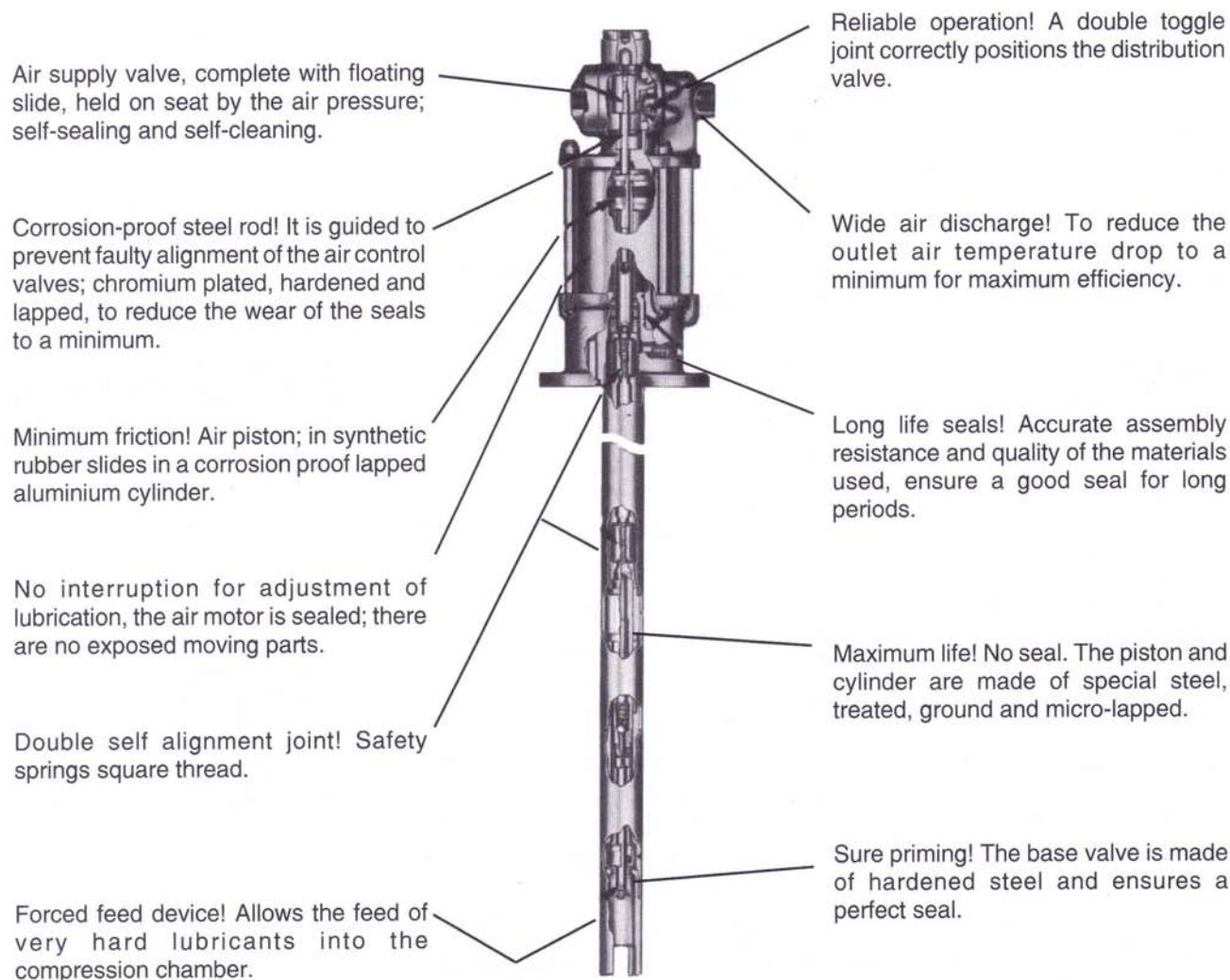
DIMENSIONS:

Total length:	1'330 mm.
Air motor height:	477 mm.
Air motor width:	238 mm.
Weight:	28 kg.

Pump assy. Part No.	Air motor only Part No.	Piston rod only Part No.	Lubricant	Ratio	Delivery 100 PSI. pressure (7 bar)
400200	400100	400170	NLGI 2	40:1	8.5 kg/min. NLGI 1/NLGI 2
400205	400100	400165	NLGI O	25:1	22 litres/min. SAE 140 OIL
400210	400100	400160	OIL	6:1	50 litres/min. SAE 140 OIL
400300	400000	400155	NLGI 2	75:1	4.5 kg/min. NLGI 1/NLGI 2

ACCESSORIES:

2034950: Exhaust silencer - **400040:** Cover for 180 kg. drums.



HYDRAULIC CONTROL PUMPS

SINGLE ACTING HYDRAULIC CONTROL GREASE PUMPS

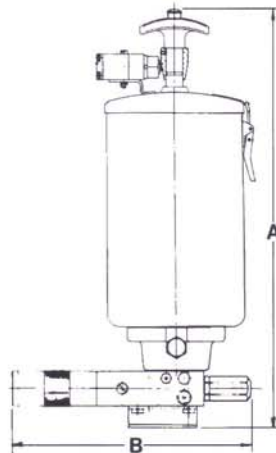
Pumps of sturdy construction for heavy duty consisting of: steel body, hardened and lapped steel piston and pneumatic driven cylinder housing a light alloy piston equipped with oil-resisting rubber gasket. Pumps are available in two models according to the type of reservoir:

Reservoir with follower plate.

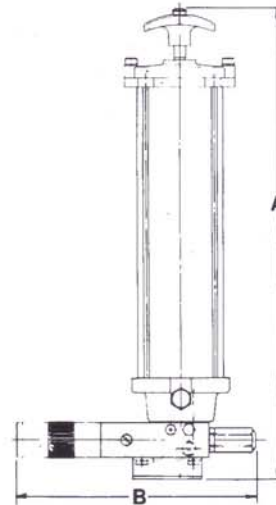
Reservoir with follower plate and spring.

TECHNICAL INFORMATION:

Ratio: 4.8:1
Driven oil pressure: 3 MPa (30 bar) (435 psi.) min.
 6 MPa (60 bar) (870 psi.) max.
Adjustable delivery: from 0,5 to 2 cm³ per stroke.



3414012



3414008

Part No.	Reservoir kg. (lb.)	Lubricant	height 'A' mm. (in.)	Width 'B' mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)	Characteristics
3414012	5 (11)	NLGI 1	511/761* (20.1/30.0)	276 (10.85)	192 (7.55)	11,5 (25.4)	With follower plate and minimum level electric contact.
3414022	5 (11)	NLGI 2	511/661* (20.1/26.0)	276 (10.85)	192 (7.55)	11,1 (24.5)	With follower plate and spring. Without minimum level electric contact.
3414008	2 (4.4)	NLGI 2	576/876* (22.7/34.4)	276 (10.85)	130 (5.12)	9 (19.8)	With follower plate and spring. Without minimum level electric contact.

* The two heights refer to the empty/full reservoir.

HYDRAULIC CONTROL PUMPS FOR SMALL SYSTEMS

Pumps of sturdy construction with die cast light alloy reservoir. The pump group consists of a cylinder housing a piston equipped with oil-resisting rubber gasket.

TECHNICAL INFORMATION:

Ratio: 1:2
Driven oil pressure: 6 MPa (60 bar) (870 psi.) min.
 15 MPa (150 bar) (2175 psi.) max.
Delivery: 7,5 cm³ per stroke.
Lubricant outlet: M10x1 pipe housing and cone ø6mm.
Driven inlet oil: M10x1 pipe housing and cone ø6mm.



Part No.	Reservoir Lt. (pints)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb.)	Characteristics
3107010	0,8 (1.7)	OIL	250 (9.84)	117 (4.61)	95 (3.74)	2 (4.4)	With two outlets to be used on the right or left.



CENTRALISED LUBRICATION SYSTEMS

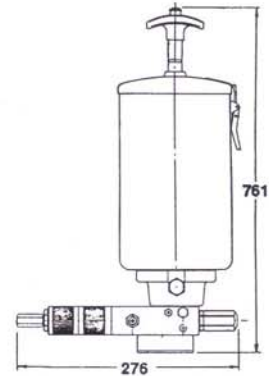
HYDRAULIC CONTROL PUMPS

DOUBLE ACTING HYDRAULIC CONTROL GREASE PUMPS

Pumps of sturdy construction for heavy duty consisting of; steel body, hardened and lapped steel piston and pneumatic driven cylinder housing a light alloy piston equipped with oil resisting rubber gasket.

TECHNICAL INFORMATION:

Ratio: 1:1
Driven oil pressure: 3 MPa (30 bar) (435 psi.) min.
 15 MPa (150 bar) (2175 psi) max.
Adjustable delivery: from 0,5 to 2 cm³. per stroke.
Lubricant outlet: G 1/4 UNI-ISO 7/1
Driven inlet, oil: G 1/4 UNI-ISO 228/1
Re-filling valve: G 1/2A UNI-ISO 228/1



Part No.	Reservoir kg. (lb..)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight kg. (lb..)	Characteristics
3414014	5 (11)	NLGI 1	511/761* (20.1/30.0)	276 (10.9)	192 (7.6)	11,5 (25.4)	With follower plate Without minimum level electric contact.

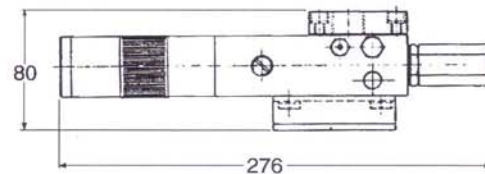
SINGLE ACTING HYDRAULIC CONTROL PUMPS WITHOUT RESERVOIR

Pump to assemble with special reservoirs or customers' own reservoirs. Equipped with base plate having a hole for the flow inlet with thread G 1/2 UNI-ISO 228/1

PUMP CODE: 3414004

TECHNICAL INFORMATION:

Ratio: 4.8:1
Driven oil pressure: 3 MPa (30 bar) (435 psi.) min.
 6 MPa (60 bar) (870 psi.) max.
Adjustable delivery: from 0,5 to 2 cm³. per stroke.
Lubricant inlet: G 1/2 UNI-ISO 228/1
Lubricant outlet: Rp 1/4 UNI-ISO 7/1
Driven inlet oil: G 1/4 UNI-ISO 228/1
Weight: 4,0kg.
Width: 115mm.



3414004

MOTORISED GEAR PUMPS "DRAGON" SERIES

MOTORISED GEAR PUMPS "DRAGON" SERIES FOR LUBRICATION WITH OIL OR NLGI 000 GREASE

These pumps are particularly suitable for lubrication systems and are available in three basic different types:

Motorised gear pumps for lubrication systems equipped with meter units or control units and for recirculating lubrication systems - max. operating pressure 290 psi (20 bar) - Lubrication system 01.

Motorised gear pumps with built-in relief valve for lubrication systems equipped with positive metering valves - Lubrication systems 03 - 04 and 06.

Motorised gear pumps for progressive lubrication systems and for recirculating lubrication systems controlled by progressive valves - Lubrication system 26.

TECHNICAL INFORMATION:

Gear pump:

Delivery - 350 or 500 cm³ at 1500 r.p.m.

Max. operating pressures - 70 bar (1015 psi.) with three-phase motor, 40 bar (580psi.) with Single phase motor. (intermittent service). 30 bar (435psi.) (continuous service).

Pumpable lubricant - Oil with viscosity from 15 to 1000 cSt or Grease grade NLGI000 at the operating temperature.

Operating temperature - from -20°C to +100°C

Electric motor :

Standard motor: three phase at 4 poles multivoltage or single phase as specified.

Special three phase motor with the following voltages: 220/380V - 240/415V - 255/440V - 50/60 Hz 90 Watts.

Single phase motor 220V - 50 Hz 90 Watts.

Frame size 56 - Protection degree IP 55.

Insulation class F - Continuous operation S1.

12V and 24V dc motors available on request.

Reservoir:

Capacity:

3 - 5 litres (.79 - 1.32 US gallons) in Polythene semi-transparent.

3 litres (.79 US gallons) in Aluminium with level sight glass.

6 litres (1.59 US gallons) in Steel with level sight glass.



Suction filter:

Filtering grade 260 micron.

Low level indicator, magnetic type:

Reversible float with contact normally closed on the minimum level.

Max. commutable power 50W - 50VA

Max. voltage 220 ac - 150V dc - max. current: 3A

Reserve and min. lubricant level indicator is available on demand;

Equipped with floats and two switches: the upper one is used for minimum level signal (reserve) the lower one for the absolute minimum level signal.

Minimum level with inductive sensor (for oil and light grease, for 3 litre reservoir only).

Min voltage 30V ac - max. voltage 250V ac

Min peak current 15 mA - max. 300 mA

Valve block:

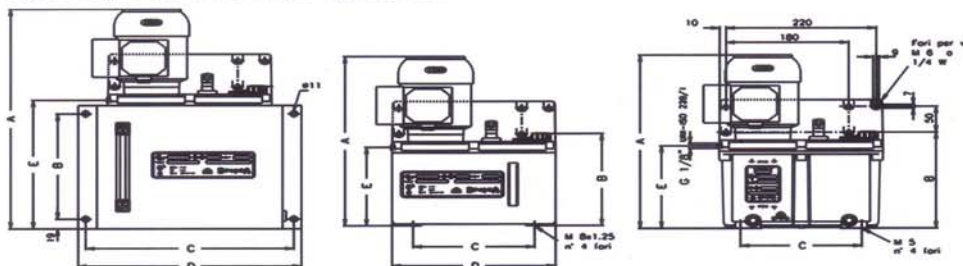
Fitted inside the reservoir, consists of:

By pass valve, easily adjustable from the outside.

Relief valve for systems equipped with positive metering valves.

ORDERING INFORMATION:

When specification is completed your individual part number will be assigned. (Please take a copy of the following page and complete accordingly):



CENTRALISED LUBRICATION SYSTEMS

MOTORIZED GEAR PUMPS

TECHNICAL INFORMATION:

Pump:

Delivery: 350 or 500 cm³/min. at 1500 r.p.m.

Max. pressure: 7MPa (70 bar) (1015 psi.) intermittent service. 3MPa (30 bar) (435 psi.) continuous service.

Oil viscosity: 15 to 1000 cSt at the operating temperature from -20°C to +100°C.

Suction filter: filtering grade 260 micron.

Motor:

Three phase 220/380V - 50Hz - 90W Frame size : 56 Protection degree IP44 (IP55 on demand)

Insulation class B (class F on demand)

Different voltages and frequency available on demand.

Using 60Hz frequency, the pump output increases by 20%

Contact of minimum level:

Magnetic with normally open contact. Max. commutable power 50W - 50VA.

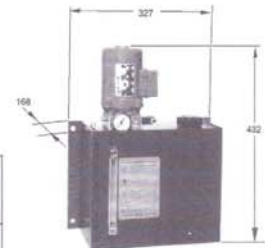
Max. voltage: 220V ac - 150V dc - Max. current 3A

Gauge:

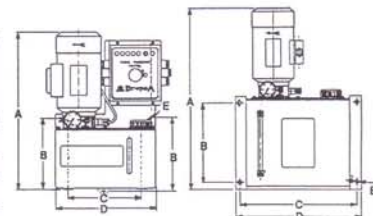
Scale: 0 to 10MPa (0 to 100 bar) (0 to 1450 psi.) to give signal of pressure on line.

MOTORIZED GEAR PUMPS WITHOUT ELECTRONIC CONTROLLER

Standard motor	Delivery cm ³ /min	Reservoir capacity in litres (pints)			
		3 (6.3)	6 (12.7)	11(23.2)	15(31.7)
Three phase with fan 220/380V 50Hz 90W	350	3405230	3405291	3405292	3405293
	500	3405231	3405232	3405251	3405252
Single phase with fan 110V 50Hz 90W	350	3405299	3405300	3405301	3405302
	500	3405436	3405237	3405253	3405254



Reservoir capacity		DIMENSIONS										Weight	
litres	U.S. pints	A		B		C		D		ø E		Kg.	lb..
2,7	5.7	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.		
3	6.3	328	12.9	166	6.55	175	6.9	240	9.45	6,5	0.26	5	1.1
6	12.7	470	18.5	205	8.05	305	12	327	12.90	11	0.43	12,6	30
11	23.2	630	24.8	365	14.35	305	12	327	12.90	11	0.43	15	33
15	31.7	740	29.1	470	18.5	305	12	327	12.90	11	0.43	17	37.5



GEAR PUMPS AND MOTORISED GEAR PUMPS

GEAR PUMPS

These pumps are suitable for the pumping of lubricant oils having viscosity between 15 and 1000 cSt at the fluid operating temperature from -20°C to +100°C. Max. pressure 8 MPa (80 bar) (1160 psi.) and rotation speed 1500 to 3000 r.p.m. Clockwise or counter-clockwise rotation can be obtained by exchanging the suction with the exhaust pipes.

Continuous or intermittent service.

Pumps are available in two versions

for external installation and for reservoir mounting.

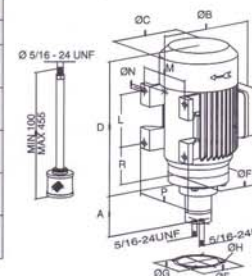
Part No.		Delivery litres/min. (pints/min.)	Height mm. (in.)
External installation	Reservoir mounting		
3099127	3099129	0,35 (0.74)	38 (1.5)
3099004	3099130	0,5 (1.06)	40 (1.6)
3099131	3099133	1,2 (2.54)	47 (1.8)



MOTORISED GEAR PUMPS FOR EXTERNAL INSTALLATION

Part No.	Delivery litres/min. (pints/min.)	Motor		Weight kg. (lb..)
		Power (kw.)	r.p.m.	
3405000	0,5 (1.06)	0.09	1500	3,7 (8.2)
3406000	1 (2.11)	0.25	3000	5,5 (12.1)
3407000	0,5 (1.06)	0.185	1500	5,5 (12.1)
3407000	0,35 (0.74)	0.09	1500	3,7 (8.2)
3405079	0,5 (1.06)	0.09	1500	3,7 (8.2)

Part No.	Dimensions mm. (in.)												
	A	B	C	D	E	F	G	Hø	L	M	N	P	R
3405000	171 (6.7)	137 (5.4)	104 (4.1)	56 (2.2)	80 (3.1)	65 (2.6)	56 (2.2)	5,5 (0.2)	71 (2.8)	90 (3.5)	6 (0.24)	106 (4.2)	36 (1.4)
3406000	194 (7.6)	153 (6.0)	119 (4.7)	56 (2.2)	90 (3.5)	75 (2.9)	58 (2.3)	5,5 (0.2)					
3407000	194 (7.6)	153 (6.0)	119 (4.7)	56 (2.2)	90 (3.5)	75 (2.9)	58 (2.3)	5,5 (0.2)					
3402002	171 (6.7)	137 (5.4)	104 (4.1)	56 (2.2)	80 (3.1)	65 (2.2)	56 (2.2)	5,5 (0.2)	71 (2.8)	90 (3.5)	6 (0.24)	106 (4.2)	36 (1.4)
3405079	171 (6.7)	137 (5.4)	104 (4.1)	56 (2.2)	80 (3.1)	65 (2.6)	56 (2.2)	5,5 (0.2)	71 (2.8)	90 (3.5)	6 (0.24)	106 (4.2)	36 (1.4)



Standard motor voltage and frequency: 220/380V - 50Hz.

(Different voltage and frequency to be specified when ordering)

Protection degree IP 55.

Suction filter with suction tube is available on demand.

Filtering grade 260 Micron - Max. suction height 500 mm.

Filter **code 3088172** (length 455 mm.)

MOTORISED GEAR PUMPS FOR RESERVOIR MOUNTING.

The assembly consists of a pump with gears, electric motor, valve block with a by-pass valve (adjustable from the outside) and check valve. A mounting for minimum level contact connector is provided.

Part No.	Delivery Lt./min. (pints/min.)	Power	Motor			Dimensions mm. (in.)			
			r.p.m.	Size	Voltage & frequency	A	B	C	D
3405099	0,35 (0.74)	0.09	1500	56	220/380V-50Hz.	205 (8.1)	156 (6.1)	110 (4.3)	38 (1.5)
3405101	0,50 (1.06)	0.09	1500	56	220/380V-50Hz.	205 (8.1)	156 (6.1)	110 (4.3)	40 (1.6)
3405121	0,35 (0.74)	0.06	1500	56	110V-50Hz.	205 (8.1)	156 (6.1)	110 (4.3)	38 (1.5)
3405122	0,50 (1.06)	0.06	1500	56	110V-50Hz.	205 (8.1)	156 (6.1)	110 (4.3)	40 (1.6)

Suction filter with suction tube and min. level electric contact is available on demand.

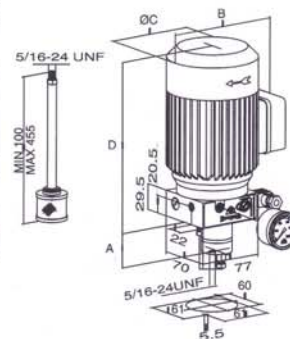
Filter **code: 3088172** (length 455 mm.)

Min. level contact **code: 1655570**

Connector for min. level contact:

code 38943

Connector base: **code 39842**



Tube for minimum level electric contact.	
Part No.	Length mm. (in.)
3079069	79 (3.1)
3079070	163 (6.4)
3079171	324 (12.8)
3079172	428 (16.8)

MODULAR MOTOR DRIVEN PUMPS FOR OIL OR GREASE 999000 SERIES

Modular pumps particularly suitable for the lubrication of small or medium size machinery. They are used for different types of oil and grease lubrication systems and in a very large range of applications because of their high quality, high performance and low cost.

The modular construction of 999 series pumps enables easy dismantling for maintenance, guarantees very high reliability and allows very fast adjustment of the units for different operating conditions.

Basic modules:

- ELECTRIC MOTOR
- REDUCTION UNIT
- SINGLE OR DOUBLE PUMPING UNIT
- RESERVOIR

Steel sheet reservoirs are equipped with low level indicator and electric contact.

Reservoirs for oil are equipped with re-filling filter.

TECHNICAL INFORMATION:

Operating pressure: up 75MPa (750 bar) (11000 psi.)

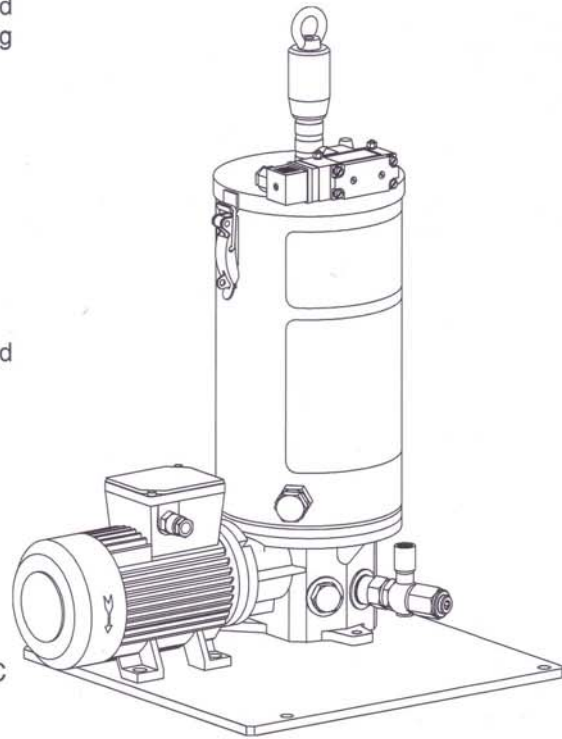
Delivery:

Fixed. up to 33 cm³/min. - 1500 r.p.m.

Adjustable. up to 51cm³/min. - 2200 r.p.m.

Lubricant: Oil viscosity 15 cSt min.
Grease NLGI 2*

* at the operating lubricant temperature between -20°C to +100°C



MOTORS:

A.C. Motors:

Code 3301137 Three phase 220/380V - 50Hz - 0.12kW

Code 3301269 Single phase 220V - 50Hz - 0.12kW

D.C. Motors:

Code 3301283 24V 120W

Code 3301274 12V - 100W

Specify voltage frequency and phase when ordering.

Type of motor and R.P.M.*	Adjustable delivery				max. pressure bar (psi.)	PART NUMBER OF MOTOR DRIVEN PUMP 999000 SERIES METAL RESERVOIRS CAPACITY										TRANSPARENT RES. CAPACITY GREASE MAX. NLGI 0	
	cm ³ /min.		cu.in./min.			GREASE MAX. NLGI 3				OIL VISCOSITY MIN. 15 cSt							
	min.	max.	min.	max.		3kg. 6.6lbs.	5kg. 11lb.	10Kg. 22lb.	30Kg. 66lb.	3 Lt.	5 Lt.	10 Lt.	30 Lt.	3kg. 6.6 lb..	kg. 11 lb..		
A.C. 1500 R.P.M..	1,4	9,5	.08	.6	750 (11000)	999234	999214	999224	999204	999244	999264	999274	999254	999414	999424		
	2,5	17	.15	1	400 (5800)	999236	999216	999226	999206	999246	999266	999276	999256	999416	999426		
	5	33	.30	2	200 (2900)	999232	999212	999222	999202	999242	999262	999272	999252	999412	999428		
D.C. 24V 2200 R.P.M..	2	14,5	.12	.9	750 (11000)	999634	999614	999624	999604	999644	999664	999674	999654	999684	999694		
	3,6	25,5	.22	1.5	400 (5800)	999636	999616	999626	999606	999646	999666	999676	999656	999686	999696		
	7,2	51	.44	3	200 (2900)	999632	999612	999622	999602	999642	999662	999672	999652	999682	999698		
Fixed delivery																	
A.C. 1500 R.P.M..	9,5		.6		750 (11000)	999334	999314	999324	999304	999344	999364	999374	999354	999514	999524		
	17		1		400 (5800)	999336	999316	999326	999306	999346	999366	999376	999356	999516	999526		
	33		2		200 (2900)	999332	999312	999322	999302	999342	999362	999372	999352	999512	999522		
D.C. 24V 2200 R.P.M..	14,5		.9		750 (11000)	999734	999714	999724	999704	999744	999764	999774	999754	999784	999794		
	25,5		1.5		400 (5800)	999736	999712	999726	999706	999746	999766	999776	999756	999786	999796		
	51		3		200 (2900)	999732	999716	999722	999702	999742	999762	999772	999752	999782	999792		
						GREASE MAX. NLGI 0				OIL VISCOSITY MIN. 15 cSt				GREASE MAX. NLGI 0			
D.C. 12V 2200 R.P.M..	14,5		.9		350 (5075)	999380				999390			999385				

R.P.M.* and lubricant deliveries indicated in the table refer to 50Hz. motors. With 60Hz. motors speeds and deliveries are increased by 20%.

MODULAR MOTOR DRIVEN PUMPS FOR OIL OR GREASE 999000 SERIES

ACCESSORIES (on request)

AUXILIARY PUMPING UNIT

Pumps are supplied with one pumping unit but are designed for the mounting of two pumping units. This allows a feed to two separate lines or the outlets of the pumping units may be combined to provide double the delivery to a single line.

Part numbers of second pumping units are given in the table below:

Last digit of Part No.	Features of 999 pump			Second pumping unit		
	Delivery cm ³ /min.	Pressure bar (psi.)	Part No. Delivery	Adjust.	Fixed	ø Piston mm.
4	1,4 to 9,5	9,5	750 (11000)	299041	299039	6
6	2,5 to 17	17	400 (5800)	299042	299040	8
2	5 to 33	33	200 (2900)	299042	299040	8

RE-FILLING FILTER (for grease reservoir)

Removable filter cartridge; to prevent contaminants and foreign bodies from entering the reservoir and to prevent air bubbles forming in the grease.

Code 299352 for metal reservoirs.

Code 299353 for transparent reservoirs.

Thread G 1/2A UNI-ISO 228/1

Cartridge (150 micron) code 1113006

The filter is provided with thread Rp 1/4 UNI-ISO 7/1 for the return line into the reservoir.

SAFETY BY-PASS VALVE

Available for different pressure ranges this adjustable valve can be fitted on the outlet line. It protects the system from over pressure.

Part No.	Range of pressure
299450	0 to 250 bar (0 to 3600 psi.)
299451	0 to 450 bar (0 to 6500 psi.)
299452	50 to 1000 bar (725 to 14500 psi.)

MAX. ELECTRIC LEVEL CONTACT

All metal reservoirs (except 3 and 5 litres) can be equipped with max. electric level contact for automatic re-filling of the reservoir.

Reservoirs for grease:

Electric contact **code 299197**

Reservoirs for oil:

Electric contact **code 291155**

PRESSURE GAUGE:

Available for different pressure ranges:

Code 299196 0 to 50 Mpa (0 to 500 bar)

Code 291395 0 to 100 Mpa. (0 to 1000 bar)

FIXING ACCESSORIES:

The pump has fixing holes on the base and side for wall mounting for 3 and 5kg. and 3 and 5 litre versions.

Base plate **code 299195**

Plate for wall mounting **code 299460**

(for reservoirs 10Kg. and 10 litres.)

ASSEMBLY KIT

999 Series pumps can be equipped with a kit consisting of: Re-filling filter -Gauge -Safety by-pass valve and base plate.

To order the assembly kit see the table below:

Assembly kit Part No.	Pumping units	Outlets	Pressure
299482	1	1	0 to 200 bar (0 to 2900 psi.)
299484	2	1	
299486	2	2	
299443	1	1	50 to 400 bar (725 to 5800 psi.)
299444	2	1	
299445	2	2	
299481	1	1	50 to 700 bar (725 to 10150 psi.)
299483	2	1	
299485	2	2	

Dim. mm. (in.)	RESERVOIR FOR OIL (Metal)												RESERVOIRS FOR OIL (Metal)							
	3kg. (6.6 lb..)				5kg. (11 lb..)				10Kg. (22lb.)		30Kg. (66 lb..)		3 litres (.8 U.S. gal.)		5 litres (1.3 U.S. gal.)		10 litres (2.6 U.S. gal.)		30 litres (8 U.S. gal.)	
	Transparent	Metal	Transparent	Metal	Transparent	Metal	Transparent	Metal	Metal	Metal	Metal	Metal	mm.	in.	mm.	in.	mm.	in.	mm.	in.
A	300	11.8	300	11.8	300	11.8	300	11.8	423	16.6	453	17.8	300	11.8	300	11.8	423	16.6	453	17.8
B	354	13.9	490	19.3	414	16.3	550	21.6	645,5	25.4	825,5	32.5	392,5	15.4	452,5	17.8	557	21.9	714,5	28.1
øC	197	7.8	197	7.8	197	7.8	197	7.8	299	11.8	358	14.1	197	7.8	197	7.8	299	11.8	358	14.1



CENTRALISED LUBRICATION SYSTEMS

ROLLO MICROELECTRIC PUMP

DESCRIPTION:

This motorised piston pump, fitted with 24V dc. motor, is particularly suitable for the distribution of oil or grease in lubrication plants with progressive distributors.

This type of lubrication system can be installed on Trucks, Buses, Gritters, Snow ploughs, Dust trucks and other types of vehicles or machinery fitted with 12V dc. to 30V dc. power supplies.

The pump is of sturdy construction with high strength aluminium body painted with special anti-corrosive paint.

The pumping unit is of hardened and lapped steel.

The pump is supplied as standard with one pumping unit but can be fitted with up to three pumping units. (When ordering specify the number of pumping units required.)

SPECIFICATION:

Pumping Unit.

Delivery - 2,5 cm³/min.

Max. pressure - 25MPa (250bar) (3625psi.)

Lubricant - Oil min.15 cSt or Grease max. NLGI2.

Lubricant outlet - Rp 1/4 UNI - ISO 7/1

Operating temperature - -20°C to +70°C

Motor:

Voltage - 24V dc. (the motor can operate from 12V dc. up to 30V dc.)

Standard Motor; 50 Watt (Intermittant service).

Heavy Duty Motor; 120Watt (Continuous service).

Duty type - S3 (Intermittent periodic duty 25%)

Example; Lubrication time 20 seconds - Pause time 60 seconds.

Reservoir:

Metacrylate transparent cylinder, usable capacity 2kg or 4kg.

Minimum level electric control:

A permanent magnet inserted in the follower plate (Grease pump part numbers **888110** & **888170**) or in a float (oil pump part number **888120**) activates a 'reed switch' inside the tube along which the follower plate or the float moves.

Maximum commutable power - Max. load 26VA - Max. voltage 120V dc. - Max. current 0,8A.



ORDERING INFORMATION:

The following types of pump for grease or oil are available.

PART NO.	DESCRIPTION
888100	Grease reservoir 2kg with impeller, no minimum level electric control, 50W motor
888110	Grease reservoir 2kg with follower plate and minimum level electric control, 50W motor
888115	Grease reservoir 4kg with follower plate and minimum level electric control, 50W motor
888120	Oil reservoir 2l with minimum level electric control, 50W motor
888130	Grease reservoir 4kg with impeller, no minimum level electric control, 50W motor
888140	Grease reservoir 4kg with impeller, no minimum level electric control, 120W motor
888150	Grease reservoir 2kg with impeller, no minimum level electric control, 120W motor
888170	Grease reservoir 2kg with impeller and minimum level electric control, 120W motor
888205	Metal grease reservoir 5kg with impeller, no minimum level electric control, 120W motor
888210	Grease reservoir 4kg with impeller and minimum level electric control, 120W motor
888215	Oil reservoir 4l with minimum level electric control, 120W motor

777000 SERIES MOTORISED PUMPS

Suitable for oil or grease.

Maximum pressure 500 bar (7250 psi.)

The **DROPSA 777000** series modular motorised pump is suitable for a wide range of applications.

Once installed it is a simple operation to adjust the pressure and adjust lubricant output (using a flow control)

Part No. 3293060.

The assembly consists of:

- Motor and reduction unit.
- Pump.
- Reservoir.
- Valves and delivery unit.
- Pressure gauge.
- Charging filter.

A trolley mounted version is illustrated on page 50.

The modular construction of the pump assembly uses common components throughout the range and therefore reduces spares holding.

The double pump body has two outlets which can either be combined together for one outlet or feed to two independent systems.

In the case of a dual line system the two pump outlets would operate an inverter.

Access to the pump is simple through the reservoir lid or through the covers surrounding the pump and reduction unit.

Re-filling of the reservoir is recommended through the charging filter to eliminate any ingress of contaminants. The frequency of operation can be monitored with DROPSA control panels or through the machines P.C.



TECHNICAL INFORMATION:

Lubricant:	Oil or grease.
* Adjustable delivery:	from 65 to 130 cc/min. (4 to 8 cu.in./min.) with 1500 r.p.m. 4 pole motor.
Maximum pressure:	500 bar (7100 psi.)
Viscosity:	Oil min. 100 cSt. Grease max. 220 ASTM (NLGI 3)
Pump:	Double body type; 4 pistons.
Delivery line:	Single or double.
Reservoir capacity:	10, 30 and 100 kg. (22, 66 and 220 lb.,)
Three phase motor:	220/380V 50/60 Hz. 4 poles. 1500 r.p.m. 0.37kW up to 0°C (32°F) 0.75kW up to -30°C (-86°F) Protection; IP44 Specify voltage and frequency when ordering.
Reduction unit:	1:1.5 ratio.
Temperature range:	from -30°C (-22°F) to +80°C (+176°F)

*on demand only

Pump with minimum and maximum level.	Reservoir capacity			Arrangement
	10kg. (22 lbs.)	30kg. (66 lbs.)	100kg. (220 lbs.)	
With impeller unit for hard greases.	777110	777030	777131	A
With pressure plate for soft greases.	777312	-	-	
For oil with minimum and maximum level.	777613	777624	777635	

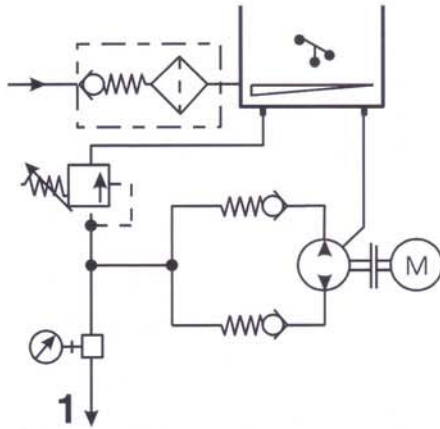
Weight in kg.					
Reservoir		With oil reservoir		With grease reservoir	
kg.	lbs.	kg.	lbs.	kg.	lbs.
10	22	31,5	69.3	35	77
30	66	35,0	77.0	40	88
100	220	42,5	93.5	50	110



CENTRALISED LUBRICATION SYSTEMS

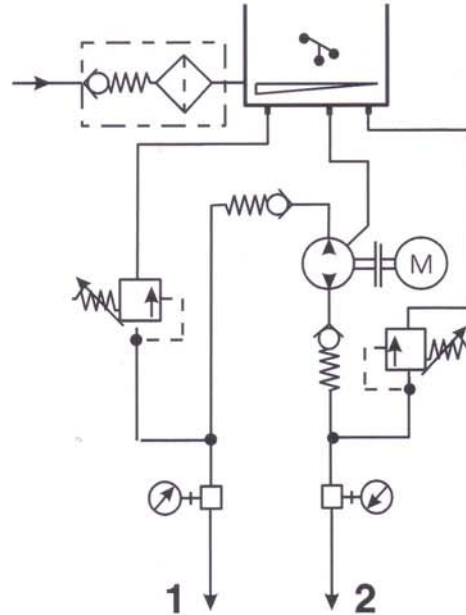
HYDRAULIC ARRANGEMENTS

A STANDARD 1 Outlet

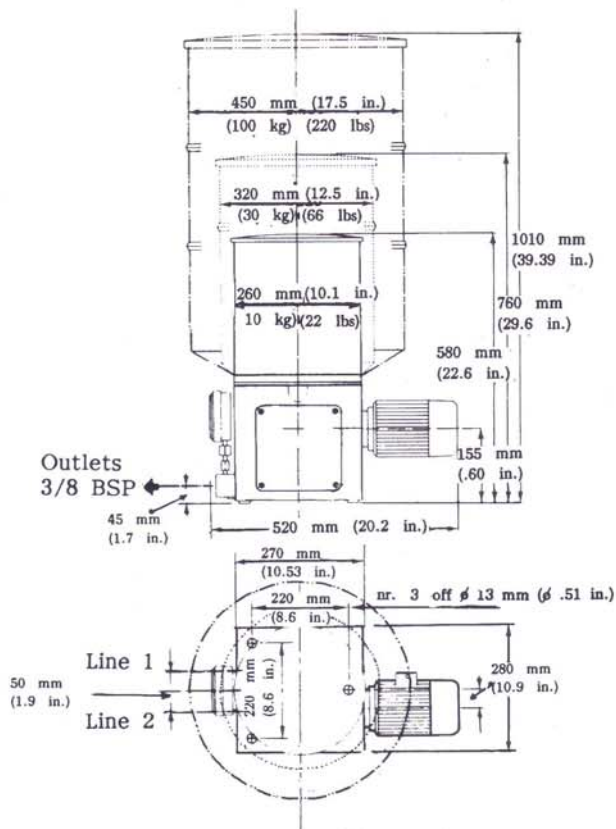


OVERALL DIMENSIONS

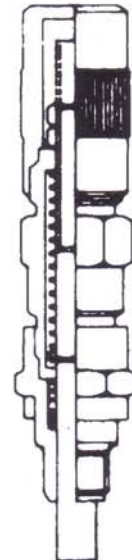
B ON DEMAND 2 Outlet



FLOW CONTROLLER



Part No. 3293060



Required if flow is to be adjustable within range of 14,5 cc. (.88 cu.in.) and 65 cc. (3.9 cu.in.) per minute. Must be ordered separately.

TROLLEY MOUNTED MOTOR DRIVEN PUMP - 777000

Mobile lubrication unit, delivers 130 cc. (.28 lb..) of lubricant per minute with a back pressure of 400 bar (5700 psi.), or 260 cc. (.57 lb..) at 200 bar (2850 psi.).

The piston pump has a double pumping impeller and is available with 4 or 2 pole three-phase AC or single-phase DC brush motor. The pump is supplied with a filter located under the impeller to prevent entry of foreign bodies into the suction chamber.

When removed from the trolley it becomes a fixed lubrication unit for the most various applications (refer to the technical manual).

The unit is complete with:

- Impeller suitable for the suction of greases with a low penetration index.
- Double body pump.
- Motor with geared unit.
- Pressure regulating valve.
- Pressure switch; stops the motor when the maximum pressure is reached in the line; on operating the gun the motor restarts.
- 2000 mm. (78 in.) long hose Part No. 2513005 - Part No. 2513021 (length to be specified when ordering).
- Continuous or intermittent flow gun.
- 10000 mm. (390 in.) long electric cable with earthing socket.
- 320 mm. (12.5 in.) dia. rubber wheels.



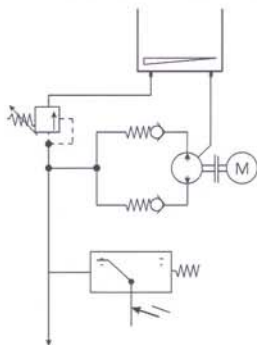
Weight of unit with empty tank: 42kg. (92.4 lb..)

Length: 710 mm. (27.7 in.)

Width: 500 mm. (19.5 in.)

Height: 1000 mm. (39.0 in.)

HYDRAULIC DIAGRAM



Motor	No. poles speed	Pump with reservoir Part No.		Pressure	Delivery cm ³ /min
		10kg. (22 lb..)	30kg. (66 lb..)		
THREE PHASE 220/380V 50Hz	4 poles 1500 r.p.m.	777950	777951	400 bar (5700psi.)	130
THREE PHASE 220/380V 50Hz	2 poles 3000 r.p.m.	777952	777953	200 bar (2850psi.)	260
SINGLE PHASE (brush motor) 220V 50Hz	3000 r.p.m.	777954	777955	200 bar (2850psi.)	260

Protection degree: IP 44

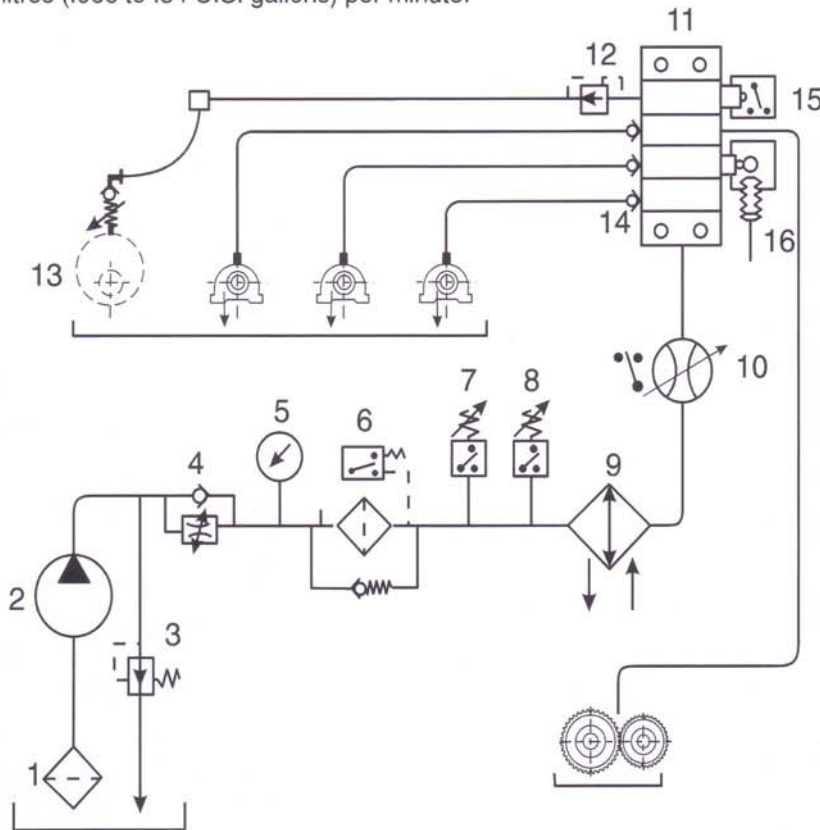
Motors with different voltage, frequency and protection degree are to be specified when ordering along with CSA motor specs.



CENTRALISED LUBRICATION SYSTEMS

RECIRCULATING SYSTEMS

Progressive distributor assemblies can be utilised to produce oil recirculating lubrication systems. By suitably selecting the type of gear pump it is possible to build systems with working pressures from 20 to 150 bar (290 to 2150 psi.) and deliveries from 0,25 litres (.066 to .34 U.S. gallons) per minute.

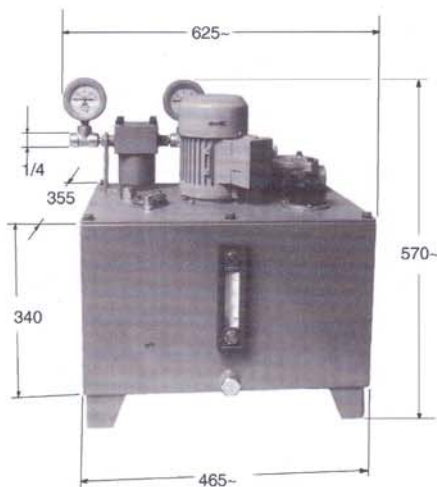


- 1 - Suction filter
- 2 - Motorised pump
- 3 - Max. pressure valve
- 4 - Flow regulator
- 5 - Pressure gauge
- 6 - Filter with electric blockage indicator
- 7 - Min. pressure switch
- 8 - Max. pressure switch
- 9 - Heat exchanger
- 10 - Flow indicator with electric contacts

- 11 - Serial metering block
- 12 - Control valve
- 13 - Adjustable check-valve
- 14 - Check-valve
- 15 - Electro-mechanical switch to check movement of the metering element piston.
- 16 - Piston movement control - Proximity switch - Electro-mechanical switch - Proximity switch control - Electronic control.

STANDARD MOTORISED PUMPS

Max. pressure 10MPa (100 bar) (1450 psi.) - adjustable to 7MPa (70 bar) (1000 psi.) - electric low level switch.



Part No.	Delivery		Motor power kW	Reservoir capacity		Weight	
	cc.	cu.in.		Lt.	pints	kg.	lb.
3408011	250	15.2	.185	-	-	22	48.4
3408012	250	15.2	.185	30	63.4	33	72.6
3408005	500	30.5	.185	-	-	22	48.4
3408004	500	30.5	.185	30	63.4	33	72.6
3408022	1000	61.0	.37	-	-	22	48.4
3408021	1000	61.0	.37	30	63.4	33	72.6

HIGH PRESSURE FILTERS

Available for any delivery with or without electric blockage indicator.



Part No.	Filter	Filtering degree		Delivery		Filtering element	
	Type	micron	micro in.	Lt.	pints	Part No.	Type
1522715	FMD 40B M125 N A G VE	125	.0050	90	190.2	1522990	M1 M125 N A
1522420	FMD 40B M60 N A G VE	60	.0024	55	116.2	1522991	M1 M60 N A
1522192	FMD 40B M25 N A G VE	25	.0010	45	95.1	1522992	M1 M25 N A

FLOW CONTROL SWITCH

Indicates the flow of lubricant. A valve adjusts the sensitivity - flow capacity from 0,25 to 10 litres/min. (.52 to 21.1 pints/min.). Change over contact.



Max. current:

N.O. contact
200 mA DC - 500 mA AC

N.C. contact
100 mA DC - 250 mA AC

Indicators for larger deliveries are available.
Part No. 3295010

HEAT EXCHANGERS

Heat exchangers for delivery, return or recycling are available when it is necessary to reduce the temperature of the lubricant. Suitable for fresh and salt water.



Part No.	No. of passages	Delivery oil Lt./hr.		Exchanging range		Water
		Lt.	pints	mm.	in.	
1521275	2	300	634.0	260	10.1	salt
1521276	1	320	676.3	200	7.8	salt
1522907	1	600	1268.0	320	12.5	fresh

Working pressure 0,75MPa (7.5 bar) (110 psi.)
Other models are available.

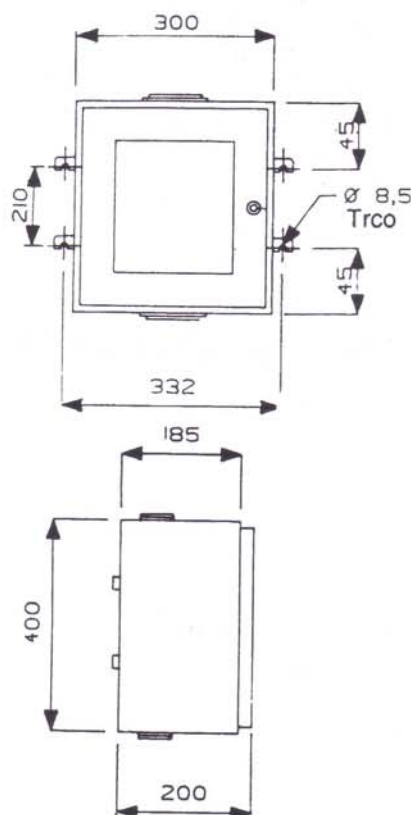


CENTRALISED LUBRICATION SYSTEMS

ELECTRIC EQUIPMENT

ELECTRIC EQUIPMENT FOR TIMER CONTROLLED SYSTEMS

Electronic cycle timer, remote control switch (or contactor for pneumatic pumps) overload protection for motor and minimum level visual indication. Push-button for manual lubrication. Device to check the lubrication cycle, for this control a change-over microswitch is necessary (available on request). This equipment is available where the pause time is controlled by an impulse counter. For applications on recirculating systems consult our Technical Department..



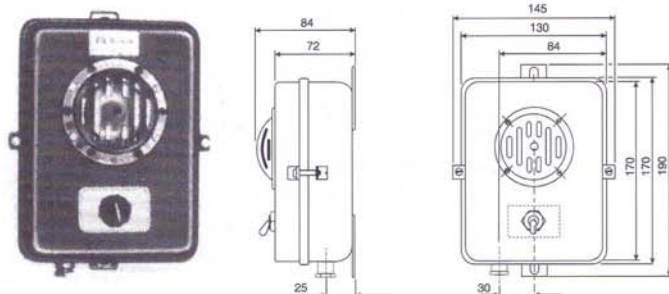
Pump type	Voltage	With adjustable control from 0 to 6	Max. pause time
Motor-driven pump with three phase electric motor.	110V 50 Hz	1636115	STANDARD 1 HOUR ON DEMAND: 8 HOURS OR 24 HOURS
	110V 60 Hz	1636128	
	220V 50 Hz	1636116	
	220V 60 Hz	1636353	
Pumps with pneumatic motor.	110V 50 Hz	1636021	ON DEMAND: 8 HOURS OR 24 HOURS
	110V 60 Hz	1636127	
	220V 50 Hz	1636023	
	220V 60 Hz	1636352	
Single acting pneumatically operated pump.	110V 50 Hz	1641190	
	110V 60 Hz	1636126	
	220V 50 Hz	1641198	
	220V 60 Hz	1636222	
DC motorised pumps.	Consult our Technical Department		

IMPORTANT

Standard maximum pause time: 1 hour. On demand when ordering, 8 hour or 24 hour versions are available or by modifying the adjustment of a bridge-part in the timer

AUDIBLE ALARMS

With cut-off switch. Used with the above electric equipment to give audible warning on the alarm condition. Weight: 0,90 Kg. (1.98 lb.)



Part No.	Voltage 50/60 Hz	Watt.	Amp.
1638430	110V	20	0.165
1638440	24V	4	0.165
1640670	220V	40	0.165
1638436	48V	8	0.165

ADVANCED LUBRICATION CONTROLLER with Quick Remote Configuration

DESCRIPTION:

This high performance/low cost Advanced Lubrication Controller has been designed to control and monitor most small to medium size lubrication systems.

The configuration parameters are all electronically stored in two separate menus, eliminating the need to set DIP switches or jumpers,

The operator Menu - is used to adjust pause and cycle intervals.

The Factory/System Menu - is used to configure the type of pump and lubrication system to which the controller is connected.

In addition the controller incorporates a scanner located under the remote control symbol on the front panel. When used with the Transmitter Module, the configuration can be downloaded and stored simply by positioning the module over the symbol and pressing the transmit button.

This allows for a considerable time saving for OEM's who use the system on a production line, eliminating the need to individually configure each controller.



TECHNICAL DATA:

INPUT CONTACTS:

Power:

110V/230V, 220V Single Phase
and 380V - 50Hz. and 500V - 50Hz. Three
Phase 24V DC.

Power Consumption:

20 Watts.

Operating Temperature:

-20°C. to +55°C.

Control Input:

12V Max.
N.O. Pressure Switch.
Micro/Reed Switch.
Proximity (NPN/PNP) Autodetection.

Oil Level:

12V Max.
Make on Low Level

Impulse Counter:

Max. Switching Frequency;
10Hz. at 25%

OUTPUTS:

Pump/Drive Line:

110V/230V 5A 50/60 Hz. or 24V

Alarm Output:

Voltage Free Contact. Max. 250V, 1A.

ENCLOSURE:

External Dimensions:

132 x 132 x 160 mm

Fixing Dimensions:

95 x 95 mm

Protection Grade:

IP55.

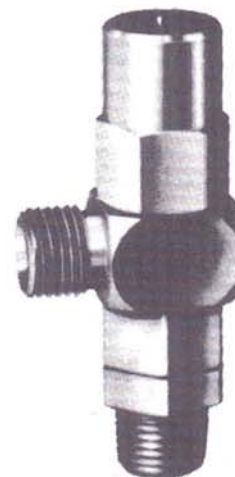
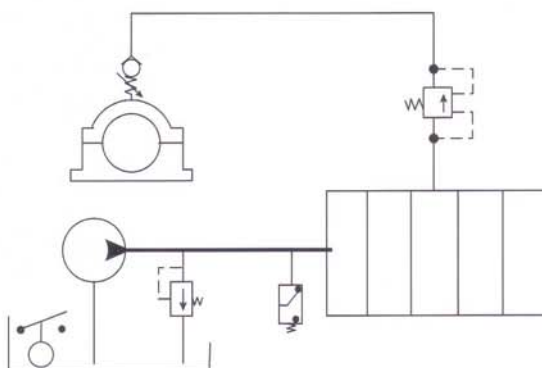
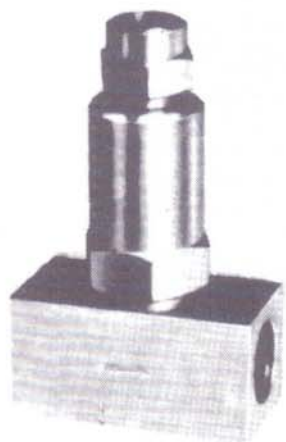
Part No.	DESCRIPTION
1639076	VIP Controller 24V Box version
1639077	VIP Controller 110/230V Box version
1639080	VIP Controller 24V Panel Mounted Version
1639084	VIP Controller 110/230V Panel Mounted Version
1639081	VIP Controller 220V Single phase in Steel Enclosure
1639087	VIP Controller 380V Three Phase in Steel Enclosure
1639088	Remote Transmit Module



CENTRALISED LUBRICATION SYSTEMS

CONTROLS FOR SECONDARY LINES

In special applications, it is possible to detect a broken secondary pipe by using control valve **Part No. 3096109** at the outlet of a metering element and a check valve **Part No. 3089204** at the point to be lubricated. With this device the broken pipe causes a rise in pressure in the main line, the pressure switch, inserted in the main line will indicate the fault.



Part No. 3089204

Part No. 3096109

FLOW CONTROL SWITCH

Inserted in a feed line. It controls the minimum flow, by detecting lubricant low level in the pump reservoir, pipe blockages, leakage in pipes upstream of the device and the decrease of flow in the metering elements or in loose fittings. It ensures positive protection of metering elements and vital machine parts.

ELECTRIC CHARACTERISTICS:

Max. voltage:	220v 50/60 Hz.
Max. breaking current:	0.8A
Max. load capacity of contact:	20 Watt

HYDRAULIC CHARACTERISTICS:

Min. delivery:	80mm ³ /min. (.005cu.in./min.)
Max. delivery:	1000 cm ³ /min. (60cu.in./min.)
Min pressure:	2MPa (20 bar) (280 psi.) with oil having a min. viscosity of 100 cSt at 40°C (104°F)

Max. pressure:	
Brass body:	42MPa (420 bar) (6000 psi.)
Light alloy body:	20MPa (200 bar) (2850 psi.)

DIMENSIONS:

Height:	61mm. (2.40in.)
Width:	110mm. (4.33in.)
Depth:	20mm. (.78in.)

Part No. 850740 20MPa (200 bar) (2850 psi.)
Part No. 850750 42MPa (420 bar) (6000 psi.)



PRESSURE SWITCHES

DIAPHRAGM TYPE

These may be used to control the pressure of liquids, or gases. The expansion of the diaphragm actuates the contact.



Max. voltage: 42V
Max. contact rating: 100VA
Operating temp.: -30°C to +120°C
 (-22°F to +248°F)
Mechanical duration: 10⁷
Protection: IP54
Max. safe pressure: 30MPa
 (300 bar) (4300 psi.)
Weight: 0,05 kg. (.11 lb.)
Connection: M10x1
Rubber cover Part No. 3042098 to be ordered separately.

Part No.*		Adjustment		Tolerance	
(1)	(2)	bar	psi	bar	psi
3291024	3291025	0.1 - 1	1.45 - 14.51	0.1	1.45
3291028	3291031	1 - 10	14.51 - 145.1	0.5	7.25
3291034	3291035	10 - 20	145.1 - 290.2	0.5	7.25
3291022	3291021	20 - 50	290.2 - 725.5	1.0	14.51

(1) Contact normally open
 (2) Contact normally closed

* Not suitable for inductive load.

Die cast light alloy body. Supplied with plug at four poles.

PISTON TYPE



Part No. 201257
Pressure 2MPa
 (20 bar) (280 psi.)

Part No. 201256
Pressure 4MPa
 (40 bar) (570 psi.)

Characteristics:
Change-over contact: 15A - 220V AC
 0.25A - 250V DC
Max. safe pressure: 10MPa (100 bar) (1420 psi.)
Differential: 0,5MPa (5 bar) (71 psi.)
Working temperature: -20°C to +70°C (-4°F to +158°F)
Protection: IP54
Weight: 0,4 kg. (.88 lb.)
Connection: 1/8" BSP (1/8" NPT)
 with seat for ø4 mm. tube

Part No. 54021 -Adjustable from 4MPa to 16MPa (40 to 160 bar) (570 to 2280 psi.)
 Supplied complete with fixing bracket.
Part No. 54025 -Adjustable from 0,5MPa to 3MPa (5 to 30 bar) (71 to 430 psi.)
 Supplied complete with fixing bracket.
Part No. 1124300 -Adjustable from 4MPa to 16MPa (40 to 160 bar) (570 to 2280 psi.)
 Supplied complete with fixing bracket and air purge fitting.



Characteristics:

Change-over contact: 10A - 110V AC - 0.6A - 110V DC
Protection: IP54
Max. safe pressure: 24MPa (240 bar) (3400 psi.)
Working temperature: -20°C to +70°C (-4°F to +158°F)
Connection: 5/16-24 NF with seat for ø4 mm. tube

PRESSURE GAUGES



Gauge Part No.		A	Diameter		Pressure		Glycerine gauge Part No.	
BSP	NPT		mm.	in.	bar	psi.	BSP	NPT
20553	3292125	1/8	43	1.7	60	850	-	-
20564	3292126	1/8	43	1.7	100	1420	-	-
20575	3292127	1/8	43	1.7	250	3560	-	-
20562	3292128	1/4	63	2.48	60	850	3292056	3292132
20563	3292129	1/4	63	2.48	100	1420	3292057	3292133
20551	3292130	1/4	63	2.48	250	3560	3292116	3292134
3292099	3292131	1/4	63	2.48	400	5700	3292058	3292135



CENTRALISED LUBRICATION SYSTEMS

PRESSURE SWITCHES

ADJUSTABLE PRESSURE SWITCHES

Designed for the automatic control of lubrication systems, these pressure switches can be used in hydraulic circuits where an accurate flow pressure is required. The pressure switch fitted on the feed line controls the whole system. When the pressure of the lubricant reaches the setting value, the microswitch contact closes and transmits a signal to an electric or electronic controller which monitors the correct operation of the system. Pressure switches are available in two versions; with moulded connector or screwed connector and grommet.

TECHNICAL INFORMATION:

Microswitch

contact rating:

up to 5 Amps 220V
or 2 Amps 220V

Degree of protection:

IP55

Port size (connection)

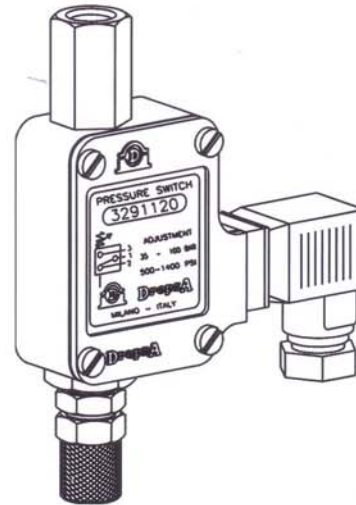
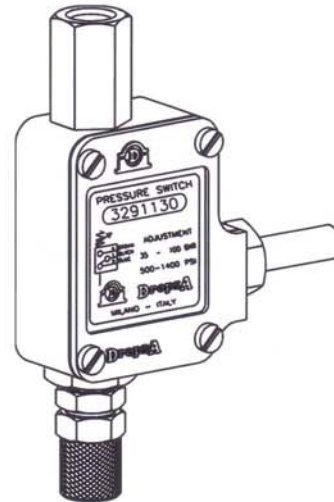
1/8" BSP thread (a 1/8" pipe fitting is also available on demand
code 3077075)

Max. working pressure:

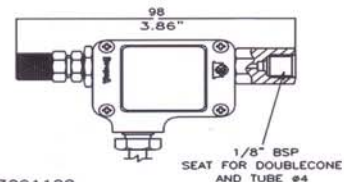
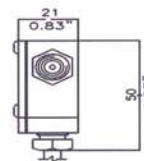
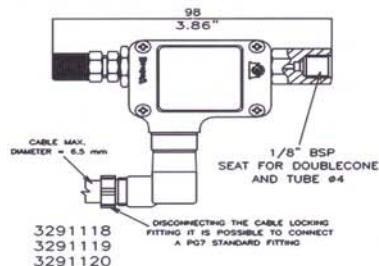
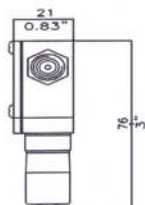
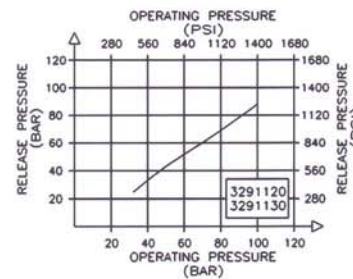
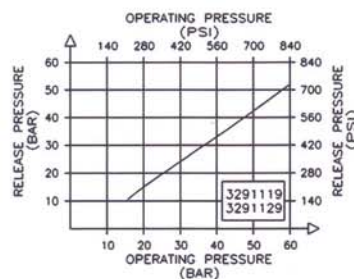
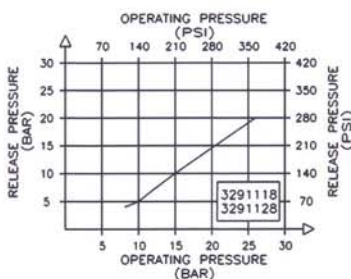
20MPa (200 bar) (2902 psi.)

Fixing holes:

two 4,2 mm. (.165 in.)



Part No.	Setting range		Standard setting		Wiring connection
	bar	psi.	bar	psi.	
3291119	8 - 26	116 - 377	20	290	Moulded connector
3291119	15 - 60	218 - 870	40	580	
3291120	35 - 100	508 - 1451	80	1160	
3291128	8 - 26	116 - 377	20	290	Screwed connector and grommet
3291129	15 - 60	218 - 870	40	580	
3291130	35 - 100	508 - 1451	80	1160	



3291128
3291129
3291130

FILTER REGULATOR LUBRICATOR UNITS

Assembly: filter regulator and lubricator

CHARACTERISTICS

Double acting filter in the air line. Air regulator to ensure a constant pressure. Constant ratio oil/air generator. Oil flow control - oil viscosity up to 110 cSt (509 SSU).

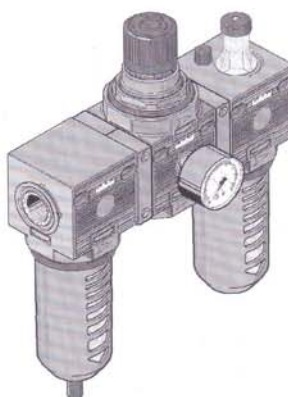
UNITS WITH VALVE TO AUTOMATICALLY DISCHARGE THE CONDENSATE

Thread NPT	Complete unit	Lubricator	Regulator	Pressure gauge	Filter	Fitting	Dimensions						Depth	
							A		B		C			
							mm.	in.	mm.	in.	mm.	in.	mm.	in.
1/4"	2043002	2043251	2043205	20613	2043102	3076010	222	8.6	194	7.5	137	5.3	105	4.0
3/8"	2043003	2043252	2043206	20613	2043103	3076011	222	8.6	194	7.5	137	5.3	105	4.0
1/2"	2043000	2043250	2043202	20611	2043100	3076012	273	10.6	206	8.0	146	5.6	121	4.7
3/4"	2043004	2043254	2043207	20611	2043104	3076013	400	15.6	267	10.4	197	7.6	152	5.9
1"	2043005	2043255	2043208	20611	2043105	3076014	400	15.6	267	10.4	197	7.6	152	5.9

UNITS WITH MANUAL VALVE TO DISCHARGE THE CONDENSATE

Grease Thread BSP	Complete unit	Lubricator	Regulator with pressure gauge	Filter	Fitting	Counter nut	Dimensions						Depth	
							A		B		C			
							mm.	in.	mm.	in.	mm.	in.	mm.	in.
1/8"	20676	21018	20961	20901	21075	21132	165	6.5	190	7.5	135	5.3	81	3.2
1/4"	20667	21019	20962	20902	21076	21133	165	6.5	190	7.5	135	5.3	81	3.2
1/4"	20678	21020	20963	20904	21076	21133	200	7.9	205	8.1	150	5.9	102	4.0
3/8"	20679	21021	20964	20905	21077	21134	200	7.9	205	8.1	150	5.9	102	4.0
1/2"	20680	21022	20965	20907	21078	21135	280	11.0	225	8.9	165	6.5	117	4.6
3/4"	20681	21023	20966	20909	21080	21136	410	16.1	270	10.6	200	7.9	147	5.8
1"	20682	21024	20967	20910	21081	21137	410	16.1	270	10.6	200	7.9	147	5.8

Pressure gauge: 1/8" - 1/4" - 3/8" - Part No. 20613 - 1/2" - 3/4" - 1" - Part No. 20611



CONSUMPTIONS

Flow rate		Number of oil droplets per minute					
Lt./min.	pints/min.	5		10		30	
140 - 280	295.8 - 591.7	0.07 gr./h	.0025 oz./h	0.14 gr./h	.0050 oz./h	0.42 gr./h	.0150 oz./h
280 - 560	591.7 - 1118.3	0.14 gr./h	.0050 oz./h	0.28 gr./h	.0100 oz./h	0.84 gr./h	.0300 oz./h
560 - 840	1183.5 - 1775.2	0.28 gr./h	.0100 oz./h	0.56 gr./h	.0200 oz./h	1.68 gr./h	.0600 oz./h
860 - 1680	1775.2 - 3550.5	0.35 gr./h	.0125 oz./h	0.70 gr./h	.0250 oz./h	2.10 gr./h	.0750 oz./h



CENTRALISED LUBRICATION SYSTEMS

SOLENOID VALVES

FOR PNEUMATIC CONTROLS

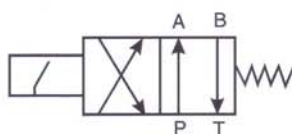
3 and 4 way solenoid valves, normally closed.



Solenoid valves		Voltage and frequency	Pressure max.	Absorbed current	Through hole	Connection	Spare coil	Weight
3 way	4 way							
45275	-	24v 50Hz	1MPa (10 bar) (145 psi.)	12 VA	1,5 mm. (.059 in.)	R 1/8	37946	0,3 kg. (.66 lb.)
45273		110V 50Hz					37947	
45274		220V 50Hz					37948	
-	44303	24V 50Hz	1,6MPa (16 bar) (232 psi.)	8 VA	6,0 mm. (.23 in.)	R 1/4	37999	0,4 kg. (.88 lb.)
	44034	110V 50Hz					38000	
	44305	220V 50Hz					38001	

FOR HYDRAULIC CONTROLS

4-way solenoid valves used as 3-way valves by plugging outlet 'A' off. These solenoid valves, modified for 3-way use are used for the pressure release on oil and grease systems.



Solenoid valves 4-way	Voltage and frequency	Pressure max.	Delivery	Connection	Spare coil	Weight
44306	24V 50Hz	14MPa (140 bar) (2000 psi.)	20 Lt./min. 42.2 pints/min.	CETOP PLATE	38002	1,2 kg. (2.6 lb.)
44348	24V 60Hz				3150002	
44307	110V 50Hz				38003	
44484	110V 50Hz				37933	
44450	220V 50Hz				38004	
44487	24V DC				37930	
44309	24V 50Hz	32MPa (320 bar) (4550 PSI.)	16 Lt./min. 72.6 pints/min.		38005	1,5 kg. (3.3 lb.)
44310	110V 50Hz				38006	
44327	110V 60Hz				38076	
44311	220V 50Hz				38007	

2-WAY SOLENOID VALVES NORMALLY CLOSED FOR PNEUMATIC PUMPS



Solenoid valves 2-way	Voltage and frequency	Pressure max.	ø mm.	Connection	Spare coil
44415	24V 50Hz	1MPa (10 bar)	6,4	R 1/4	37956
44416	110V 50Hz				37957
44417	220V 50Hz				37958
44421	24V 50Hz				37962
44422	110V 60Hz				37963
44423	220V 60Hz				37964
44418	24V 50Hz	1MPa (10 bar)	12,7	R 1/2	37959
44419	110V 50Hz				37960
44420	220V 50Hz				37961
44424	24V 60Hz				37965
44425	110V 60Hz				37966
44426	220V 60Hz				37967

COMPRESSION FITTINGS, MAX. PRESSURE 15MPa (150 BAR) (2150 PSI)

	Part No.	Tube Ø	Thread	
FITTING FOR TUBE				
	3084247	4	M8x1	-
	92004	4	5/16"-24 NF	-
	92041	4	1/8" BSP	-
	92052	6	1/8" BSP	-
	92014	6	1/4" BSP	-
	3084248	6	M 10 x 1	-
	92053	8	1/4" BSP	-
	3084249	8	M 14 x1,5	-
	92010	10	3/8" BSP	-
COMPRESSION CONE				
	93004	4	-	-
	93006	6	-	-
	93008	8	-	-
	93010	10	-	-
	93015	12	-	-
FEMALE CONNECTORS				
	92287	4	M8x1,25	5/16" - 24 NF
	3085110	4	M10 x1 taper	M8x1
	910005	4	1/8" BSP taper	5/16"-24 NF
	92068	4	1/4" BSP taper	5/16"-24 NF
	3085109	6	M10x1 taper	M10x1
	910051	6	1/8" BSP taper	1/8" BSP
	910011	6	1/8"BSP taper	1/4" BSP
	910007	6	1/8" BSP taper	1/4" BSP
	910052	6	1/4" BSP taper	1/8" BSP
	910013	6	3/8" BSP taper	1/4" BSP
	910083	6	1/2" BSP taper	1/4" BSP
	910012	8	1/8" BSP taper	1/4" BSP
	910008	8	1/4 BSP taper	1/4" BSP
	910014	8	3/8" BSP taper	1/4" BSP
	910084	8	1/2" BSPTaper	1/4" BSP
	92138	10	1/4" BSPTaper	3/8" BSP
	92141	10	3/8" BSP taper	3/8" BSP
	910085	10	1/2" BSP taper	3/8" BSP
	92248	6	1/4" BSP	1/4" BSP
	92250	6	3/8" BSP	1/4" BSP
	92255	8	1/4" BSP	1/4" BSP
	92257	8	3/8" BSP	1/4" BSP
	92260	10	1/4" BSP	3/8BSP
	92261	10	3/8" BSP	3/8 BSP

	Part No.	Tube Ø	Thread	
NUTS FOR COMPRESSION CONE				
	3235125	4	-	M8 x 1
	91354	4	-	5/16"-24 NF
	91358	6	-	1/8" BSP
	91359	6	-	M 10x1
	91366	8	-	1/4" BSP
	91370	8	-	M12x1
	91375	10	-	M18x1,5
	91378	12	-	M20x1,5
PLUGS				
	3232111	-	M10X1	-
	3232113	-	1/8" BSP	-
	622006	-	M12x1	-
	91124	-	M16x1	-
	3232117	-	1/4" BSP	-
FEMALE CONNECTORS				
	92288	4	M8x1,25	-
	3085118	4	M10x1	-
	92069	4	1/8" BSP	-
	92067	4	1/4" BSP	-
	3085119	6	M10x1	-
	92080	6	1/8" BSP	-
	92079	6	1/8"BSP	-
	92088	6	1/82 BSP	-
	92083	6	1/4" BSP	-
	92090	6	3/8" BSP	-
	92097	6	1/2" BSP	-
	92112	8	1/8" BSP	-
	92115	8	1/4"BSP	-
	92118	8	3/8" BSP	-
	92120	8	1/2" BSP	-
	92139	10	1/4"BSP	-
	92142	10	3/8" BSP	
	92143	10	1/2" BSP	
	92246	6	1/4" BSP	
	92251	6	3/8BSP	
	92256	8	1/4" BSP	
	92258	8	3/8" BSP	
	92263	10	1/4" BSP	
	92262	10	3/8"BSP	



CENTRALISED LUBRICATION SYSTEMS

COMPRESSION FITTINGS, MAX. PRESSURE 15MPa (150 BAR) (2150 PSI)

	Part No.	Tube Ø	Thread	
WITH CHECK VALVE				
	94390	4	M8x1,25	5/16"-24 NF
	94370	4	1/8" BSP taper	5/16"-24 NF
	94450	6	1/8" BSPtaper	1/4" BSP
	94470	6	1/4" BSP taper	1/4" BSP
	94550	8	1/8" BSP taper	1/4" BSP
	94570	8	1/4" BSP taper	1/4" BSP
	94650	10	3/8" BSP taper	3/8" BSP
MALE CONNECTORS				
	3085008	4	M8x1 taper	M8x1
	3085111	4	M10x1 taper	M8x1
	3085010	4	1/8" BSP taper	M8x1
	3085012	4	1/4" BSP taper	M8x1
	3085112	6	M10x1 taper	M10x1
	3085014	6	1/8" BSP taper	M10x1
	3085016	6	1/4" BSP taper	M10x1
	3085018	8	M10x1 taper	M12x1
	3085020	8	M12x1 taper	M12x1
	3085022	8	1/8" BSP taper	M12x1
	3085024	8	1/4" BSP taper	M12x1
	3085026	10	1/4" BSP taper	M18x1,5
	3085028	10	3/8" BSP taper	M18x1,5
90° ELBOWS				
	93453	4	M8X1,25	5/16"-24 NF
	911005	4	1/8" BSP taper	5/16"-24 NF
	93060	4	1/4" BSP taper	5/16"-24" NF
	911051	6	1/8" BSP taper	1/8" BSP
	911007	6	1/4" BSP taper	1/4" BSP
	911052	6	1/4" BSP taper	1/8" BSP
	93064	6	3/8" BSP taper	1/4" BSP
	911053	6	1/2" BSP taper	1/4" BSP
	911012	8	1/8" BSP taper	1/4" BSP
	911008	8	1/4" BSP taper	1/4" BSP
	93091	8	3/8" BSP taper	1/4" BSP
	911056	8	1/2" BSP taper	1/4" BSP
	93094	10	3/8" BSP taper	3/8" BSP
	911055	10	1/2" BSP taper	3/8" BSP

	Part No.	Tube Ø	Thread	
WITH CHECK VALVE				
	94392	4	-	-M8x1,25
	94373	4	-	1/8" BSP taper
	94452	6	-	1/8" BSP taper
	94473	6	-	1/4" BSP taper
	94552	8	-	1/8" BSP taper
	94572	8	-	1/4" BSP taper
	94653	10	-	3/8" BSP taper
MALE CONNECTORS				
	3085009	4	M8x1,25taper	-
	3085120	4	M10x1 taper	-
	3085011	4	1/8" BSP taper	-
	3085013	4	1/4" BSP taper	-
	3085121	6	M10x1 taper	-
	3085015	6	1/8" BSP taper	-
	3085017	6	1/4" BSP taper	-
	3085019	8	M10x1 taper	-
	3085021	8	M12x1 taper	-
	3085023	8	1/8" BSP taper	-
	3085025	8	1/4" BSP tape	-
	3085027	10	1/4" BSP taper	-
	3085029	10	3/8" BSP taper	-
90° ELBOWS				
	93454	4	M8x1,25	-
	93061	4	1/8" BSP taper	-
	93059	4	1/4" BSP taper	-
	93070	6	1/8" BSP taper	-
	93074	6	1/4" BSP taper	-
	93075	6	1/4" BSP taper	-
	93067	6	3/8" BSP taper	-
	93066	6	1/2" BSP taper	-
	93082	8	1/8" BSP taper	-
	93084	8	1/4" BSP taper	-
	93090	8	1/4" BSP taper	-
	93086	8	1/2" BSP taper	-
	93095	10	3/8" BSP taper	-
	93096	10	1/2" BSP taper	-

COMPRESSION FITTINGS, MAX. PRESSURE 15MPa (150 BAR) (2150 PSI)

	Part No.	Tube Ø	Thread	
90° ELBOWS WITH CHECK VALVE				
	94070	4	M8x1,25	5/16"-24 NF
	94050	4	1/8" BSP taper	5/16"-24 NF
	94130	6	1/8" BSP taper	1/4" BSP
	94150	6	1/4" BSP taper	1/4" BSP
	94230	8	1/8" BSP taper	1/4" BSP
	94250	8	1/4" BSP taper	1/4" BSP
90° ELBOWS				
	3085007	4	M6x1 taper	M8x1
	3085030	4	M8x1 taper	M8x1
	3085107	4	M10x taper	M8x1
	3085032	4	1/8" BSP taper	M8x1
	3085034	4	1/4" BSP taper	M8x1
	3085108	6	M10x1 taper	M10x1
	3085036	6	1/8" BSP taper	M10x1
	3085038	6	1/4" BSP taper	M10x1
	3085040	8	M10x1 taper	M12x1
	3085042	8	M12x1 taper	M12x1
	3085044	8	1/8" BSP taper	M12x1
	3085046	8	1/4" BSP taper	M12x1
	3085048	10	1/4" BSP taper	M18x1,5
	3085050	10	3/8" BSP taper	M18x1,5
45° ELBOWS				
	92720	4	M8x1,25	5/16"-24 NF
	914005	4	1/8"BSP taper	5/16"-24 NF
	914011	6	1/8" BSPtaper	1/4" BSP
	914007	6	1/4" BSP taper	1/4" BSP
	914012	8	1/8" BSP taper	1/4" BSP
	914008	8	1/4" BSP taper	1/4" BSP
STRAIGHT UNIONS				
	96135	6	1/4" BSP	-
	96142	8	1/4" BSP	-
	96145	10	3/8" BSP	-
STRAIGHT REDUCING UNIONS				
	96635	4-6	5/16"-24 NF	1/4" BSP
	96637	6-8	1/8" BSP	1/4" BSP
	96642	8-10	1/4" BSP	3/8" BSP
STRAIGHT UNIONS				
	96053	4	M8x1	-
	96055	6	M10x1	-
	96059	8	M12x1	-
	96061	10	M18x1,5	-
	96079	12	M20x1,5	-

	Part No.	Tube Ø	Thread	
90° ELBOWS WITH CHECK VALVE				
	94072	4	M8x1,25	-
	94052	4	1/8" BSP taper	-
	94132	6	1/8" BSP taper	-
	94152	6	1/4" BSP taper	-
	94232	8	1/8" BSP taper	-
	94252	8	1/4" BSP taper	-
90° ELBOWS				
	3085073	4	M6x1 taper	-
	3085073	4	M8x1 taper	-
	3085004	4	M10x1 taper	-
	3085033	4	1/8" BSP taper	-
	3085035	4	1/4" BSP taper	-
	3085005	6	M10x1 taper	-
	3085037	6	1/8" BSP taper	-
	3085039	6	1/4" BSP taper	-
	3085041	8	M10x1 taper	-
	3085043	8	M12x1 taper	-
	3085045	8	1/8" BSP taper	-
	3085047	8	1/4 BSP taper	-
	3085049	10	1/4" BSP taper	-
	3085051	10	3/8" BSP taper	-
45° ELBOWS				
	92721	4	M8x1,25	-
	92686	4	1/8" BSP taper	-
	92690	6	1/8" BSP taper	-
	92691	6	1/4" BSP taper	-
	92697	8	1/8" BSP taper	-
	92696	8	1/4" BSP taper	-
STRAIGHT UNIONS				
	96136	6	1/4" BSP	-
	96141	8	1/4" BSP	-
	96144	10	3/8" BSP	-
STRAIGHT REDUCING UNIONS				
	96636	4-6	5/16"-24 NF	1/4" BSP
	96638	6-8	1/8" BSP	1/4" BSP
	96643	8-10	1/4" BSP	3/8" BSP
STRAIGHT UNIONS				
	96054	4	M8x1	-
	96056	6	M10x1	-
	96060	8	M12x1	-
	96062	10	M18x1,5	-
	96080	12	M20x1,5	-



CENTRALISED LUBRICATION SYSTEMS

COMPRESSION FITTINGS, MAX. 40MPa (150 BAR) (2150 PSI)

	Part No.	Tube Ø	Thread	
90° ELBOWS				
	95136	4	M8x1	-
	95138	6	M10x1	-
	95143	8	M12x1	-
	95148	10	M18x1,5	-
	95159	12	M20x1,5	-
TEE UNIONS				
	95645	4	M8x1	-
	95647	6	M10x1	-
	95653	8	M12x1	-
	95656	10	M18x1,5	-
	95669	12	M20x1,5	-
CROSS UNIONS				
	95880	4	M8x1	-
	95882	6	M10x1	-
	95884	8	M12x1	-
	95886	10	M18x1,5	-
	95888	12	M20x1,5	-
REDUCERS				
	3077140	4	M10x1	M8x1
	3077137	4	M12x1	M8x1
	98716	4	M12x1	5/16"-24 NF
	3077138	4	M16x1,5	M8x1
	98714	4	M16x1	5/16"-24 NF
	3077141	6	M10x1	M10x1
	98720	6	M12x1	M10x1
	3077139	6	M16x1,5	M10x1
	98725	6	M16x1	M10x1
	98730	8	M16x1	M12x1
	98732	8	M16x1,5	M12x1
TAPER REDUCERS				
	94885	4	5/16-24 NF	5/16"-24 NF
	94891	6	5/16"-24 NF	M10x1
	3077142	6	M14x1,5	M10x1
	94896	8	5/16"-24 NF	1/4" BSP
VARIOUS REDUCERS				
	141695	-	1/8" BSP	M12x1
	92354	-	M12X1	1/8" BSP
	3077132	-	M10x1	M12x1
	3077100	-	1/4" BSP	1/8" BSP taper
	1112005	-	1/4" BSP taper	1/8" BSP taper
	3077106	-	1/2" BSP taper	1/4" BSP taper
	3077019	-	M16x1	M12x1

	Part No.	Tube Ø	Thread	
90° ELBOWS				
	95137	4	M8x1	-
	95139	6	M10x1	-
	95144	8	M12x1	-
	95149	10	M18x1,5	-
	95160	12	M20x1,5	-
TEE UNIONS				
	95646	4	M8x1	-
	95648	6	M10x1	-
	95654	8	M12x1	-
	95657	10	M18x1,5	-
	95670	12	M20x1,5	-
CROSS UNIONS				
	95881	4	M8x1	-
	95883	6	M10x1	-
	95883	8	M12x1	-
	95887	10	M18x1,5	-
	95889	12	M20x1,5	-
REDUCERS				
	3077145	4	M10x1	-
	3077146	4	M12x1	-
	98717	4	M12x1	-
	3077147	4	M16x1,5	-
	98715	4	M16x1	-
	3077148	6	M10x1	-
	98721	6	M12x1	-
	3077149	6	M16x1,5	-
	98726	6	M16x1	-
	98731	8	M16x1	-
	98733	8	M16x1,5	-
TAPER REDUCERS				
	94886	4	5/16"-24 NF	-
	94892	6	5/16"-24 NF	-
	94893	6	M14x1,5	-
	94898	8	5/16"-24 NF	-
SEALS				
	125030	for M10x1-1/8" BSP copper fitting.		
	97013	for M12x1 aluminium fitting.		
	97010	for 1/4" BSP aluminium fitting.		
	97011	for 3/8" BSP aluminium fitting.		
	97014	for M16x1 steel fitting.		
	3190178	for M16x1,5 copper fitting.		

COMPRESSION FITTINGS, MAX. 40MPa (400 BAR) (5700 PSI)

	Part No.	Tube Ø	Thread	
NUTS FOR RINGS				
	91396	6	M12X1,5	-
	91401	8	M14x1,5	-
	91402	8	8M16x1,5	-
	91406	10	M18x1,5	-
	91411	12	M20x1,5	-
	91416	16	M24x1,5	-
	91424	20	M30x2	-
	91433	30	M40x2	-
MALE CONNECTORS				
	91950	6	1/8" BSP taper	M12x1,5
	91952	6	1/4" BSP taper	M12x1,5
	91957	8	1/8" BSP taper	M14x1,5
	91959	8	1/4" BSP taper	M14x1,5
	91966	10	1/4" BSP taper	M18x1,5
	91967	10	3/8" BSP taper	M18x1,5
	91975	12	3/8" BSP taper	M20x1,5
	91976	12	1/2 BSP taper	M20x1,5
	91983	16	3/8" BSP taper	M24x1,5
	92387	6	M12x1	M12x1,5
	92208	6	1/4" BSP	M12x1,5
	92212	8	1/4" BSP	M14/1,5
	92399	8	M16x1	M14x1,5
	92220	12	3/8" BSP	M20x1,5
	92224	16	3/8" BSP	M24x1
	92228	20	3/4" BSP	M30x2
	92235	30	1.1/4" BSP	M42x2
MALE CONNECTORS WITH GASKET-LESS SEAL				
	92266	8	1/4" BSP	M16x1,5
	92242	10	1/4" BSP	M18x1,5
	92269	10	3/8" BSP	M18x1,5
	92198	12	1/4" BSP	M20x1,5
	92240	12	3/8" BSP	M20x1,5
	92241	16	3/8" BSP	M24x1,5
MALE CONNECTORS WITH HEAD FOR TAPER SEALING				
	96915	6	1/4" BSP	M12x1,5
	92245	8	1/4" BSP	M14x1,5
	3084128	8	3/8" BSP	M14x1,5
	3084134	10	1/4" BSP	M18x1,5
	3084130	10	3/8 BSP	M18x1,5
	3084106	12	3/8" BSP	M20x1,5

	Part No.	Tube Ø	Thread	
RINGS				
	91590		o.d. 6 tube	
	91596		o.d. 8tube	
	91601		o.d. 10 tube	
	91607		o.d.12 tube	
	91612		o.d. 16 tube	
	91618		o.d. 20 tube	
	91625		o.d. 30 tube	
MALE CONNECTORS				
	91951	6	1/8" BSP taper	-
	91953	6	1/4" BSP taper	-
	91958	8	1/8" BSP taper	-
	91960	8	1/4" BSP taper	-
	91969	10	1/4" BSP taper	-
	91968	10	3/8" BSP taper	-
	91977	12	3/8" BSP taper	-
	91978	12	1/2" BSP taper	-
	91984	16	3/8" BSP taper	-
	92384	6	M 12x1	-
	92209	6	1/4 BSP	-
	92213	8	1/4BSP	-
	92398	8	M16x1	-
	92217	10	3/8" BSP	-
	92221	12	3/8" BSP	-
	92225	16	3/8" BSP	-
	92229	20	3/4" BSP	-
	92234	30	1 . 1/4" BSP	-
MALE CONNECTORS WITH GASKET-LESS SEAL				
	92267	8	1/4" BSP	-
	92243	10	1/4" BSP	-
	92270	10	3/8" BSP	-
	92199	12	1/4\$ BSP	-
	92254	12	3/8" BSP	-
	92210	16	3/8" BSP	-
MALE CONNECTORS WITH HEAD FOR TAPER SEALING				
	96916	6	1/4" BSP	-
	3084131	8	1/4" BSP	-
	3084127	8	3/8" BSP	-
	3084133	10	1/4" BSP	-
	3084129	10	3/8" BSP	-
	3084145	12	3/8" BSP	-



CENTRALISED LUBRICATION SYSTEMS

COMPRESSION FITTINGS, MAX. 40MPa (400 BAR) (5700 PSI)

	Part No.	Tube Ø	Thread	
90° MALE ELBOWS				
	93184	6	1/8" BSP taper	M 12x1,5
	93186	6	1/4" BSP taper	M12x1,5
	93195	8	1/4" BSP taper	M14x1,5
	93201	10	1/4" BSP taper	M18x1,5
	93202	10	3/8" BSP taper	M18x1,5
	93207	12	3/8" BSP taper	M20x1,5
	93213	16	3/8" BSPtaper	M24x1,5
	93221	20	3/4" BSP	M30x2
93220	30	1 1/4" BSP	M42x2	
TEE CONNECTORS				
	93697	6	1/4" BSP taper	M 12x1,5
	93702	8	1/4" BSP taper	M14x1,5
	93706	10	3/8" BSP taper	M18x1,5
	93710	12	3/8" BSP taper	M20x1,5
	93715	16	3/8" BSP taper	M24x1,5
	93732	20	3/4" BSP taper	M30x2
	93734	30	1 1/4" BSP	M42x2
STRAIGHT UNIONS				
	96097	6	M 12x1,5	-
	96102	8	M14x1,5	-
	96107	10	M18x1,5	-
	96111	12	M20x1,5	-
	96115	16	M24x1,5	-
	96132	20	M30x2	-
	96134	30	M42x2	-
90° ELBOWS				
	95096	6	M12x1,5	-
	95101	8	M14x1,5	-
	95106	10	M18x1,5	-
	95111	12	M20x1,5	-
	95116	16	M24x1,5	-
	3074112	20	M30x2	-
	95123	30	M24x2	-
TEE UNIONS				
	95685	6	M12x1,5	-
	95689	8	M14x1,5	-
	95693	10	M18x1,5	-
	95698	12	M20x1,5	-
	95703	16	M24x1,5	-
	95728	20	M30x2	-
	95730	30	M42x2	-

	Part No.	Tube Ø	Thread	
90° MALE ELBOWS				
	93185	6	1/8" BSP taper	-
	93187	6	1/4" BSP taper	-
	93196	8	1/4" BSP taper	-
	93204	10	1/4" BSP taper	-
	93203	10	3/8" BSP taper	-
	93208	12	3/8" BSP taper	-
	93214	16	3/8" BSP taper	-
	93222	20	3/4" BSP	-
	93219	30	1 1/4" BSP	-
TEE CONNECTORS				
	93696	6	1/4" BSP taper	-
	93703	8	1/4" BSP taper	-
	93707	10	3/8" BSP taper	-
	93711	12	3/8" BSP taper	-
	93716	16	3/8" BSP taper	-
	93731	20	3/4" BSP	-
	93733	30	1 1/4" BSP	-
STRAIGHT UNIONS				
	96098	-	tube Ø 6	
	96103	-	tube Ø 8	
	96018	-	tube Ø 10	
	96112	-	tube Ø 12	
	96116	-	tube Ø 16	
	96131	-	tube Ø 20	
	96133	-	tube Ø 30	
90° ELBOWS				
	95095	-	tube Ø 6	
	95100	-	tube Ø 8	
	95105	-	tube Ø 10	
	95110	-	tube Ø 12	
	95115	-	tube Ø 16	
	3074111	-	tube Ø 20	
	95122	-	tube Ø 30	
TEE UNIONS				
	95684	-	tube Ø 6	
	95690	-	tube Ø 8	
	95694	-	tube Ø 10	
	95699	-	tube Ø 12	
	95704	-	tube Ø 16	
	95727	-	tube Ø 20	
	1520920	-	tube Ø 30	

COMPRESSION FITTINGS, MAX. 40MPa (400 BAR) (5700 PSI)

	Part No.	TubeØ	Thread	
CROSS UNIONS				
	95925	6	M12x1,5	-
	95932	8	M14x1,5	-
	95928	10	M18x1,5	-
	95930	12	M20x1,5	-
	95969	16	M24x1,5	-
	95982	20	M30x2	-
	95984	30	M42x2	-
REDUCING UNIONS				
	96717	8-6	M14x1,5	M12x1,5
	96722	10-8	M18x1,5	M14x1,5
	96727	12-10	M20x1,5	M18x1,5
REDUCING 90° ELBOWS				
	96838	10-8	M18x1,5	M14x1,5
	96841	16-8	M24x1,5	M14x1,5
	96843	16-10	M24x1,5	M18x1,5
REDUCING TEE				
	96596	M14x1,5-M12x1,5-M14x1,5		
	96600	M 18x1,5-M14x1,5-M18x1,5		
	96601	M24x1,5-M14x1,5-M24x1,5		
	96605	M24x1,5-M18x1,5-M24x1,5		
SEALS				
	97013	for M12x1 aluminium connectors		
	97010	for 1/4" BSP steel connectors		
	97011	for 3/8" BSP aluminium connectors		
	97014	for M16x1 steel connectors		
	3190094	for 3/4" BSP copper connectors		
	3190096	for 1 1/4" BSP copper connectors		

	Part No.	Tube Ø	Thread
CROSS UNIONS			
	95926	-	tube Ø 6
	95933	-	tube Ø 8
	95927	-	tube Ø 10
	95931	-	tube Ø 12
	95968	-	tube Ø 16
	95981	-	tube Ø 20
	95983	-	tube Ø 30
REDUCING UNIONS			
	96718	-	tubes Ø 8- 6
	96723	-	tubes Ø 10-8
	96728	-	tubes Ø 12-10
REDUCING 90° ELBOWS			
	96837	-	tubes Ø 10-8
	96842	-	tubes Ø 16-8
	96844	-	tubes Ø 16-10
REDUCING TEE			
	96595	-	tubes Ø 8-6-8
	96602	-	tubes Ø 10-8-10
	96603	-	tubes Ø 16-8-16
	96604	-	tubes Ø 16-10-16
ALL THE FITTINGS SUPPLIED WITH NUT ARE COMPLETE WITH RING OR CONE.			

FITTINGS

	Part No.	Tube Ø	Thread	
			Male	Female
ANCHOR BLOCK FOR FLEX TWO-LINE SYSTEM				
	118393	-	1/4" BSP tube Ø 6 mount 6,5	
	118394	-	1/4" BSP tube Ø 8 mount 6,5	
	118399	-	3/8" BSP tube Ø 10 mount 6,5	

	Part No.	Tube Ø	Thread	
			Male	Female
90° SINGLE ANCHOR BLOCK TWO-LINE SYSTEM				
	118318	-	1/4" BSP mount Ø 6,5	
	118319	-	3/8" BSP mount Ø 8,5	



CENTRALISED LUBRICATION SYSTEMS

FITTINGS

	Part No.	Tube Ø	Thread
REDUCERS			
	3077017		tubes Ø 12-10
	3077015		tubes Ø 16-12
	3077005		tubes Ø 20-10
	3077006		tubes Ø 20-12
	3077007		tubes Ø 20-16
	3077008		tubes Ø 30-20
	3077009		tubes Ø 30-16
	3077010		tubes Ø 30-10
	3077011		tubes Ø 30-12
PLUGS			
	91001	-	5/16"-24 NF -
	91002	-	1/8" BSP -
	3234045	-	M10x1 -
	91006	-	1/4" BSP -
	3234095	-	M14x1,5 -
	91003	-	3/8" BSP -
PLUGS			
	91005	-	5/16"-24 NF -
	640553	-	1/8" BSP -
	3234094	-	M 10x1 -
	91011	-	1/4" BSP -
STRAIGHT ANCHOR BLOCK FOR FLEX			
	3071012	-	M8x1 tube Ø 4mount 4,2
	118060	-	5/16" 24 NF tube Ø 4mount 4,5
	118067	-	1/8" BSP tube Ø 6mount 4,5
	118074	-	1/4" BSP tube Ø 6 mount 8,5
	3071013	-	M 10x1 tube Ø 6 mount 4,2
	118080	-	1/4" BSP tube Ø 8 mount 8,5
	118085	-	3/8" BSP tube Ø 10mount 8,5
3-WAY ANCHOR BLOCK			
	118205	-	1/8" BSP tube Ø 6 mount 5,5
	118203	-	1/4" BSP tube Ø 6 mount 8,5
	118210	-	1/4" BSP tube Ø 8 mount 8,5
	118216	-	3/8" BSP tube Ø 10 mount 8,5
CROSS ANCHOR BLOCK			
	118445	-	1/8" BSP tube Ø 6 mount 4,5
	118446	-	1/4" BSP tube Ø 8 mount 5,2
3-WAY ANCHOR BLOCK-TWO-LINE SYSTEM			
	118315	-	1/4" BSP mount Ø 6,5
	118320	-	3/8" BSP mount Ø 8,5

	Part No.	Tube Ø	Thread
BULKHEAD UNION			
	3084172		tube Ø 6
	3084173		tube Ø 8
	30841184		tube Ø 10
	30984055		tube Ø 12
	3084056		tube Ø 16
	3084057		tube Ø 20
	3084059		tube Ø 30
PLUGS			
	91144	-	1/8" BSP taper -
	926001	-	1/4" BSP taper -
	926002	-	3/8" BSP taper -
	3234097	-	M12x1 -
	926005	-	1/4" BSP -
	926006	-	3/8" BSP -
	3234096	-	M16x1,5 -
	622167	-	1/4" BSP-DIN -
90° SINGLE ANCHOR BLOCK FOR FLEX			
	3071001	-	M8x1tube Ø 4mount 4,5
	118110	-	5/16" -24 NF tube Ø 4mount 4,5
	118117	-	1/8" BSP tube Ø 6 mount 4,5
	118124	-	1/4" BSP tube Ø 6mount 8,5
	3071002	-	M10x1 tube Ø 6mount 4,5
	118130	-	1/4" BSP tube Ø 8mount 8,5
	118269	-	3/8" BSP tube Ø 10mount 8,5
90° SINGLE ANCHOR BLOCK FRONT CONNECTION FOR FLEX			
	118150	-	5/16"-24 NF tube Ø 4 mount 4,5
	118157	-	1/8" BSP tube Ø 6 mount 5,5
	118164	-	1/4" BSP tube Ø 6 mount 8,5
	118170	-	1/4" BSP tube Ø 8 mount 8,5
	118173	-	3/8" BSP tube Ø 10 mount 8,5
CROSS ANCHOR BLOCK-TWO-LINE SYSTEM			
	118355	-	1/4" BSP mount Ø 6,5
	118360	-	3/8" BSP mount Ø 8,5
ANCHOR BLOCK-TWO-LINE SYSTEM			
	118316	-	1/4" BSP mount Ø 6,5
	118321	-	3/8" BSP mount Ø 8,5

ACCESSORIES

SHUT OFF VALVES



1151100 - 1/4" BSP (1/4" NPT)
1151120 - 3/8" BSP (3/8" NPT)
1151130 - 1/2" BSP (1/2" NPT)

SPRAY CONTROL VALVES



1132100
1132300

Air inlet, lubricant inlet:
ø 1/4" BSP (1/4" NPT)
Weight 0,85 kg. (1.8 lb.)

Designed for the lubrication of slide surfaces, open gearing, chains and steel cables.
The measured amount of lubricant flowing out from the feeder opens the air valve.
Pressure is released when the pump is off.

RELIEF VALVES



For use on gear box housings and bearings.
Allows lubricant to be discharged externally to avoid excessive pressure.

Discharge pressure: 0,05 to 0,10 MPa (0.5 to 1 bar)
(7 to 15 psi.)

1112000 - 1/8" BSP (1/8" NPT) taper
1112010 - 1/4" BSP (1/4" NPT) taper

Discharge pressure: 0,30 to 0,55 MPa (3 to 5.5 bar)
(45 to 80 psi.)

1112008 - 1/8" BSP (1/8" NPT) taper

DOUBLE ACTING SEALING VALVES



These valves are mounted in the main lines (one in each line) of oil systems to prevent oil draining from feeders situated in high positions.

STRAINERS



Can be used in feed lines or for charging reservoirs. Removable filter cartridge.

Strainer BSP - NPT Part No.			Filtering degree		Filtering cartridge Part No.
1/4"	3/8"	1/2"	Microns	Micro inch.	
1113235	1113245	1113255	25	.110	1113265
1113236	1113246	1113256	40	.0016	1113266
1113237	1113247	1113257	60	.0024	1113267
1113238	1113248	1113258	125	.005	1113268
1113230	1113240	1113250	150	.006	1113231
1113200	1113210	1113220	300	.012	1113205

CONVERSION FITTINGS



Part No.	A BSP (male)	B NPT (female)	Hex		h.	
			mm.	in.	mm.	in.
3077086	3/8	1/8	17	43/64"	20	.79
3077125		1/4	17	43/64"	23,5	.93
3077128		3/8	22	7/8"	23,5	.93
3077087		1/2	24	61/64"	34	1.34
3077088	1/2	1/8	22	7/8"	22	.87
3077036		1/4	22	7/8"	22	.87
3077037		3/8	22	7/8"	28	1.10
3077038		1/2	24	61/64"	34	1.34
3077075	1/8	1/8	14	9/16"	21,5	.85
3077080		1/4	17	43/64"	25	1
3077081		3/8	22	7/8"	28	1.10
3077082		1/2	24	61/64"	31	1.22
3077083	1/4	1/8	14	9/16"	17	.67
3077059		1/4	17	43/64"	28	1.10
3077084		3/8	22	7/8"	30	1.18
3077085		1/2	24	61/64"	34	1.34



CENTRALISED LUBRICATION SYSTEMS

ACCESSORIES

PIPE CLIPS WITH ONE FIXING HOLE



- 111151** - tube $\varnothing$ 4 - mount $\varnothing$ 4,5
111201 - tube $\varnothing$ 6 - mount $\varnothing$ 5
111251 - tube $\varnothing$ 8 - mount $\varnothing$ 5
111301 - tube $\varnothing$ 10 - mount $\varnothing$ 5
111350 - tube $\varnothing$ 12 - mount $\varnothing$ 8,5
111370 - tube $\varnothing$ 16 - mount $\varnothing$ 10,5

111152 - 2 tubes $\varnothing$ 4 - mount $\varnothing$ 4,5
111153 - 3 tubes $\varnothing$ 4 - mount $\varnothing$ 4,5

END OF LINE FITTING



With built in sealing valve 'plate type'
Used for the lubrication points where water circulates under pressure.

Thread $\varnothing$ BSP	For tube $\varnothing$	with 90° connect. Part No.	without 90° connect. Part No.
1/8"	8	1123020	1123050
1/4"	8	1123000	1123040
1/4"	8	-	•1123060

- Pressure max. 10MPa (100 bar)
(1450 psi.)

ROTARY CONNECTORS



For speeds up to 500 r.p.m. max.

- 936000** - 1/2" BSP taper m. 1/4" BSP f.
936100 - 3/8" BSP taper m. 1/4" BSP f.
936200 - 1/4" BSP taper m. 1/4" BSP f.
936300 - 3/8" BSP taper m. 1/8" BSP f.
936400 - 1/4" BSP taper m. 1/8" BSP f.
936500 - 1/8" BSP taper m. 1/8" BSP f.
936700 - M10x1 m. M10x1 f.

For speeds up to 100 r.p.m. max.

- 1168000** - 1/8" BSP taper m. 1/8" BSP f.
2712000 - 1/4" BSP taper m. 1/8" BSP f.

Oscillating only

- 936035** - 1/8" BSP taper m. 1/8" BSP taper f.
936040 - M10x1 taper m. M10x1 f.

PIPE CLIPS WITH TWO FIXING HOLES



- 111154** - 4 tubes $\varnothing$ 4 - mount $\varnothing$ 4,5
111155 - 5 tubes $\varnothing$ 4 - mount $\varnothing$ 4,5
111156 - 6 tubes $\varnothing$ 4 - mount $\varnothing$ 4,5
111158 - 8 tubes $\varnothing$ 4 - mount $\varnothing$ 5
111202 - 2 tubes $\varnothing$ 6 - mount $\varnothing$ 5
111203 - 3 tubes $\varnothing$ 6 - mount $\varnothing$ 5
111204 - 4 tubes $\varnothing$ 6 - mount $\varnothing$ 5
111205 - 5 tubes $\varnothing$ 6 - mount $\varnothing$ 5
111252 - 2 tubes $\varnothing$ 8 - mount $\varnothing$ 5
111253 - 3 tubes $\varnothing$ 8 - mount $\varnothing$ 5
111254 - 4 tubes $\varnothing$ 8 - mount $\varnothing$ 5
111255 - 5 tubes $\varnothing$ 8 - mount $\varnothing$ 5
111302 - 2 tubes $\varnothing$ 10 - mount $\varnothing$ 5
111306 - 3 tubes $\varnothing$ 10 - mount $\varnothing$ 5
111307 - 4 tubes $\varnothing$ 10 - mount $\varnothing$ 5
111308 - 5 tubes $\varnothing$ 10 - mount $\varnothing$ 5

FIXING SCREWS

Self-tapping screw

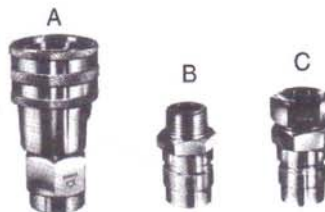


Self-threading rivet



For pipe clip $\varnothing$	Part No.	$\varnothing$ A mm.	L	$\varnothing$ Bore
mm. 4	14352	M3	8	2,7
mm. 6 - 8	14355	M4	10	3,6
mm. 4	18065	3,5	8	3
mm. 6 - 8	18067	4,2	9,5	3,6

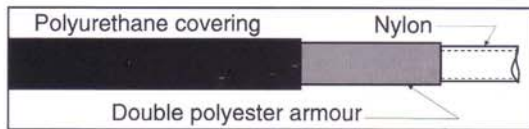
SNAP-ON CONNECTORS



$\varnothing$ taper thread	1 seal male- female assembly Fig. A+B	2 seals female female assembly Fig. A+C	1 seal connect only Fig. A.	Union without seal Fig. B.	Union with 1 seal Fig. C
*1/8	-	959010	959011	-	959012
*1/4	919000	-	919020	919007	-
*1/4	966040	-	966035	966030+ 102651	-
-	-	966025	966035	-	966030
*3/8	970100	-	970200	970400	-
-	-	970000	970200	-	970300
*1/2	958100	-	958200	958400	-
-	-	958000	958200	-	958300
*3/4	1520030	1520737	-	-	1522180
*1	1520738	1520538	-	-	-

- Max. operating pressure 15MPa (150 bar) (2150 psi.)
- * Max. operating pressure 40MPa (400 bar) (5700 psi.)

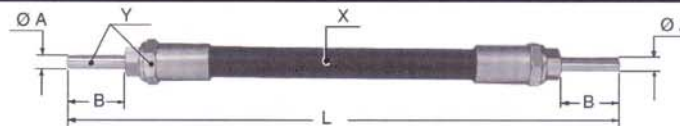
NYLON HOSES WITH REUSABLE FITTINGS



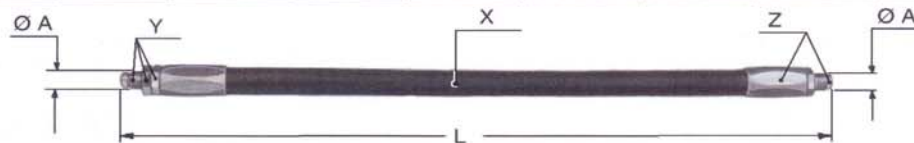
Tube only Part No.	ø Tube		Min. bend radius	Working pressure		Weight	
	Ext. mm.	Int. mm.		bar	psi.	kg.	lb.
3362026	8	3,18	38	200	3000	,050	,110
3362023	13	6,35	51	200	3000	,107	,335

FITTINGS	Part No.	For tube ø ext.	Thread	Straight tube ø	SWIVEL	Part No.	For tube ø Ext.	Thread	Straight tube ø
Solid male with cylindric thread	3084393 3084421	8 13	BSP 1/8" BSP 1/4"	- -	EYE	3084395 3084409	8 13	- -	- -
Straight tube	3084424 3084422 3084425 3084385	8 8 13 13	- - - -	4 6 6 8	Fitting	3084408 3084410	8 13	BSP 1/8" BSP 1/4"	- -
90° swivel female	3084423 3084386	8 13	BSP 1/8" M14x1,5	- -	Nipple connector	102620 102621	- -	BSP 1/8" BSP 1/4"	- -

HOSES



Hose assy. with external steel armour Part No.	Hose assy. in oil-proof rubber Part No.	Rubber tube only 'X' Part No.	Union 'Y' Part No.	ø tube mm.		ø 'A' mm.	'B' mm.	Min. bend radius mm.	Working pressure	
				o.d.	i.d.				bar	psi.
107015	107010	107013	107014	13	4	4	20	35	100	1450
107016	107009	107013	107008	13	4	6	25	35	100	1450
104190	107031	101446	107032	17	6	6	24	50	170	2465
107042	107041	101624	107043	19	8	8	25	60	150	2175
104244	104240	104007	104009	19	8	10	25	60	450	6530
104245	104241	104008	104010	21	10	12	25	65	400	5805
104246	104242	104005	104011	24	13	16	30	70	350	5080
104247	104243	104006	104012	28	16	20	32	80	300	4350



Hose assy. with external steel armour Part No.	Hose assy. in oil-proof rubber Part No.	Rubber tube only 'X' Part No.	Male fitting swivel 'Y' Part No.	Male fitting solid 'Z' Part No.	ø tube mm.		ø 'A' thread BSP	Min. bend radius mm.	Working pressure	
					o.d.	i.d.			bar	psi.
104177	101413	107013	102514	102455	13	4	1/8	35	100	1450
104013	101414	107013	102515	102456	13	4	1/4	35	100	1450
101268	101267	101215	102517	102215	16,5	6	1/4	50	40	580
3351005	3351000	5712201	102518	102194	17	8	1/4	90	100	1450
3352009	3352006	5711100	102519	102195	17,5	8	1/4	105	200	2900
3352010	3352007	5711101	102520	102196	19,5	9,5	3/8	125	200	2900
3352011	3352008	5711102	102521	102197	23	13	3/8	180	200	2900
104251	104249	104007	102522	102198	19	8	1/4	60	450	6530
104250	104248	104008	102523	102199	21	10	3/8	65	400	5805

Note: To order a flexible tube in addition to the Part No. the length 'L' in cm. must be specified. 1 mm. = .039 in.

Rubber flexible tubes can be supplied in coils (max. length 15 m.) with the fittings loose, for assembly in the desired length, on the customers premises. Those with external steel armour must always be ordered complete.



CENTRALISED LUBRICATION SYSTEMS

TUBING AND TOOLS

Material	Sizes	Part No.	Weight		Pressure		Bushes for tubes
			kg/ml	kg/ml	bar	psi.	
Drawn steel tube	ø 6 x 1 in bars	5119812	.120	.26	400	5700	-
	ø 8 x 1 in bars	5119813	.170	.37	400	5700	-
	ø 10 x 1 in bars	5119808	.220	.48	400	5700	-
	ø 12 x 1,5 in bars	5119809	.390	.86	400	5700	-
	ø 16 x 2 in bars	5119801	.690	1.52	400	5700	-
	ø 20 x 2 in bars	5119810	.890	1.95	400	5700	-
	ø 30 x 3 in bars	5119811	2.000	4.4	400	5700	—
Copper plated steel pipe	ø 4 x .71 in bars	5118000	.060	.13	500	7120	-
	ø 6 x .71 in bars	5118001	.097	.21	310	4400	-
	ø 8 x .71 in bars	5118002	.134	.29	220	3130	-
	ø 10 x .71 in bars	5118003	.171	.37	180	2550	3008118
	ø 12 x .71 in bars	5118004	.196	.43	150	2130	-
Annealed copper tube	ø 4 x .5 in coils	5501201	.049	.10	133	1900	-
	ø 6 x 1 in coils	5501203	.140	.30	200	2850	-
	ø 8 x 1 in coils	5501204	.196	.43	130	1850	-
	ø 10 x 1 in coils	5501205	.252	.55	100	1400	-
	ø 12 x 1 in coils	5501206	.308	.67	80	1139	-

Note: Drawn steel and annealed copper tubes must be ordered in kg. Copper plated steel pipes in metres.

NYLON TUBES								
Material	Sizes	Part No.	Weight		Pressure		Temperature	Bushes for tubes
			kg/m	lb./m	bar	psi.		
Nylon tube (L.P.)	ø 4 x 3 in coils	5717300	.006	.013	30	420	-70° C to +110°C (-94°F to +230°F)	3008117
Nylon tube (L.P.)	ø 6 x 4,5 in coils	5717301	.014	.030	30	420		3008116
Nylon tube (L.P.)	ø 8 x 6 in coils	5717302	.025	.055	30	420		3008114
Nylon tube (L.P.)	ø 10 x 8 in coils	5717303	.032	.070	30	420		3008115
Nylon tube (H.P.)	ø 4 x 2,5 in coils	5717202	.008	.017	80	1150		201359
Nylon tube (H.P.)	ø 6 x 4 in coils	5717203	.017	.037	80	1150		201360
Nylon tube (H.P.)	ø 8 x 5 in coils	5717204	.034	.074	80	1150		201361
Nylon tube (H.P.)	ø 10 x 6 in coils	5717205	.057	.125	80	1150		-

Note: L.P. = low pressure; H.P. = high pressure.

TUBE BENDER

For copper and steel tubes



1126000 - for ø 4 tubes
1127000 - for ø 6 tubes
1128000 - for ø 8 tubes
1129000 - for ø 10 tubes
1130000 - for ø 12 tubes

TUBE CUTTER

For copper and steel tubes:

Part No. 2038452

Spare wheel:

Part No. 2038453



For Nylon tubes:
Part No. 3237000



TECHNICAL INFORMATION

This table indicates the volume (in mm³) of lubricant required on the basis of the length and the diameter of the bearing. This volume of lubricant should be applied every two hours if grease and every hour if oil. For more frequent applications this volume may be reduced by using smaller capacity valves.

Treat ball bearings as if they were plain bearings and consider take 25 mm. in length to represent each row of balls or rollers.

This table applies to a speed of 600 r.p.m. for plain bearings and 1800 r.p.m. for ball or roller bearings.

	LENGTHS																		
	mm.	12	19	25	38	51	57	76	82	102	110	127	140	152	165	178	204	230	250
DIAMETERS	12	16	16	16	32	32	48	48											
	19	16	16	32	32	48	64	80	96										
	25	16	32	32	48	64	96	112	128	144	160	196	212						
	38	32	48	64	96	128	160	192	224	256	288	320	352						
	51	48	80	96	144	208	240	304	352	400	442	496	560	608	656	704			
	57	64	112	144	208	288	352	416	456	560	640	704	768	848	912	992			
	76	96	144	192	288	384	464	560	656	752	848	944	1040	1136	1232	1328	1504	1696	
	82		176	240	332	480	608	720	848	960	1088	1200	1328	1456	1568	1696	1336	2224	2280
	102		224	304	448	608	752	896	1056	1200	1360	1504	1648	1808	1952	2112	2416	2704	3008
	110			368	544	736	912	1104	1280	1472	1648	1824	2016	2192	2384	2560	2928	3296	3664
	127			448	656	880	1104	1328	1536	1760	1984	2192	2416	2640	2864	3088	3520	3952	4400
	140			512	784	1040	1296	1552	1808	2064	2336	2592	2848	3104	3360	3632	4144	4656	5184
	152			608	896	1200	1504	1808	2112	2416	2704	3008	3312	3616	3920	4224	4816	5424	6032
	165			688	1040	1392	1728	2080	2432	2784	3120	3472	3824	4160	4512	4864	5552	6240	6944
	178			784	1184	1584	1984	2368	2768	3168	3552	3952	4352	4736	5136	5536	6320	7120	7904
	190			896	1344	1792	2240	2688	3136	3584	4016	4464	4912	5360	5808	6256	7152	8048	8944
	204			1008	1504	2016	2512	3008	3520	4016	4528	5024	5520	6032	6528	7040	8032	9040	10048
	216			1120	1680	2240	2800	3360	3920	4480	5040	5600	6160	6720	7280	7840	8960	10080	11200
	230			1248	1872	2480	3104	3728	4352	4960	5600	6208	6832	7456	8080	8688	9936	11184	12432
	240			1376	2048	2736	3424	4112	4800	5488	6176	6848	7536	8224	8912	9600	10976	12336	13712
	250			1504	2256	3008	3776	4580	5280	6032	6816	7536	8288	9040	9792	10544	12064	13568	15072

When there are curves in the piping, the lengths shown in the above table must be reduced.

Ext. ø of tube in mm.	Maximum length in metres, of tubes at 20°C		
	OIL		GREASE NLGI-1
	Light	Heavy	
MAIN LINES			
6	70	17	10
8	85	35	15
10	100	70	20
12	240	170	38
20	300	250	64
25	590	500	90
SECONDARY LINES			
4	4	-	-
6	10	7	5
8	60	12	7

Light oil: less than 150 cSt
Heavy oil: from 150 to 750 cSt.

MAIN LINES: must be of a suitable diameter between the pump and the metering element. The following table indicates the minimum recommended bore on the basis of length and the type of lubricant.

SECONDARY LINES: the external diameter of the tube should not be less than 4 mm. for the 'SXO' type, 6 mm. for the 'SX1' and 'SA' type and for the modular metering elements 'SMX' and 'SMO'.

TEMPERATURE: -20°C to +100°C
OIL VISCOSITY: 15 cSt Minimum
GREASES: Max. 220 - 250 ASTM
PRESSURES: 2MPa (20 bar) min.
40MPa (400 bar) max.



CENTRALISED LUBRICATION SYSTEMS

FORMULA FOR THE CALCULATION OF LUBRICANT QUANTITY

Once the points, which must be lubricated have been identified it is necessary to calculate the quantity of lubricant necessary for each point to be lubricated.

Generally the supports, which must be lubricated are: bearings, ball bearings, gears, chains and slides.

The quantity of lubricant, which is necessary for each support of the machine can be calculated by taking into account three factors:

- **VD = Dimensional value**
It is calculated as a function of the dimension of the support or of the part of the machine, which must be lubricated (see table 1.).
- **CS = Service coefficient**
It is calculated as a function of the working conditions of the support (see table 2.)
- **LR = Required type of lubricant (see table 3.).**

Once the VD has been calculated as a function of the dimension of the support or the part of the unit, which must be lubricated, after having chosen CS and LR, the product, which will be obtained by multiplying three factors, is the **delivery coefficient CP**.

$$VD \times CS \times LR = CP$$

Table 4 indicates the lubricant needs in cm³ in relation to the CP, calculated for each single point.

TABLE 4 - CP

CP	cm ³	CP	cm ³
0 - 3	0,05	42 - 54	0,90
3 - 6	0,10	54 - 60	1,00
6 - 9	0,15	60 - 90	1,50
9 - 12	0,20	90 - 120	2,00
12 - 15	0,25	120 - 150	2,50
15 - 18	0,30	150 - 180	3,00
18 - 24	0,40	180 - 240	4,00
24 - 30	0,50	240 - 300	5,00
30 - 42	0,70	300 - 360	6,00

TABLE 1 - VD

Flat bearing (bushings)	$VD = \frac{D+L}{25}$
D = diameter of shaft in mm. L = length of bearings in mm.	
Roller bearings	$VD = \frac{D+N}{25}$
D = diameter of shaft in mm. N = Number of rows of balls	
Gears	$VD = \frac{S}{200}$
S = projected area in cm ² = 3.14 outer diameter in cm. x centre in cm.	
Chains	$VD = \frac{S}{200}$
S = projected area in cm ² = 3.14 outer diameter in cm. x centre in cm.	
Guides and slides	$VD = \frac{S}{500}$
S = contact area in cm ²	

TABLE 2 - CS

Rotation or alternate movement	
Intermittent:	CS = 0,5
Continuous:	CS = 1
Parts subjected to heavy duty with whichever movement and supporting high temperatures or working in dusty environments. Vertical guides or guides without gaskets	CS = 2

TABLE 3 - LR

Weak	LR = 0,5
Normal	LR = 1
Abundant	LR = 2
Very abundant	LR = 3

DESIGN

Example: Calculation of delivery coefficient CP for a press

Pos.	Qty.	Element to be lubricated	DIMENSIONS in mm.	VD	CS	LR	CP	Delivery to each lubricated point in cc.	Total delivery per pos. in cc.
A	1	Gear	Z-36 ø prim. 360 face width 214	12	2	3	72	1.50	1.50
B	2	Gear	Z-20 ø prim 320 face width 195	10	2	3	60	1.00	2.00
C	4	Flat bearing	ø 180 length 165	14	1	1	14	0.25	1.00
D	2	Flat bearing	ø 900 length 200	44	2	2	176	3.00	6.00
E	4	Flat bearing	ø 208 length 225	17.3	1	2	34.6	0.70	2.10
F	2	Piston	ø 420 run 610	18.8	1	2	37.6	0.70	1.40
G	2	Rod	ø 65 run 610	2.6	1	2	5.2	0.10	0.20
H	2	Adjustment group	-	-	-	-	5	0.10	0.20
I	2	Adjustment group	-	-	-	-	5	0.10	0.20
L	4	Vertical slides	Width 50, length 1260	1.26	2	2	5	0.10	0.40
M	4	Vertical slides	Width 60, length 1450	1.74	2	2	7	0.15	1.60
TOTAL DELIVERY PER LUBRICATION CYCLE									15.60 cc.

CHOICE OF INITIAL LUBRICATION INTERVAL

The lubrication interval for a machine can't. be fixed in a direct way by means of formulae or tables and due to this, in the beginning it will be necessary to reduce the intervals in order to feed an amount of lubricant greater than that required. Afterwards it will be possible to widen the intervals between one lubrication and the next by observing the working of the lubricated parts of the machine and ascertaining the correct lubrication delivery.

It is however possible to make an approximate calculation, bearing in mind that a .05 mm. thick lubricant film must be kept in a support.

The following formula is based on the total recirculation of the oil in the support every eight hours and will be applied by using as reference a critical support of the unit.

$$I = \frac{Px8}{DxLx3.14xSxCL}$$

I = Initial lubrication intervals in hours.
P = Delivery in cc. relative to the support.
D = Support diameter in cm.
L = Length of the support in cm.
S = 0,005 cm. (lubricant film thickness)
*CL = Lubricant coefficient.

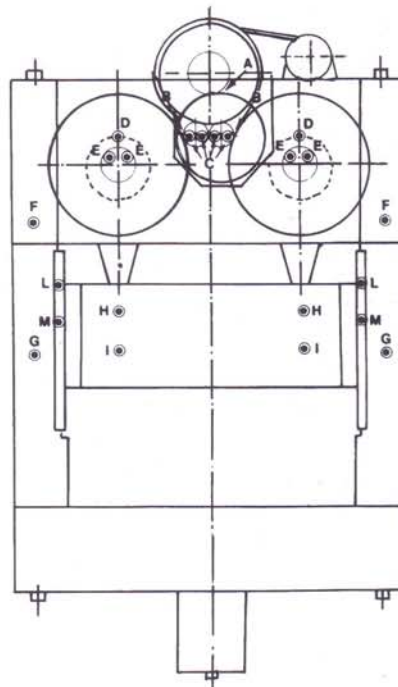
*CL change as a function of the density of the chosen lubricant and will be introduced in the formula with the following values:

Light oil:	CL = from 5 to 10
Medium oil:	CL = from 3 to 5
Heavy oil:	CL = 1
Semi-fluid oil:	CL = .50
Soft grease:	CL = .30
Middle grease:	CL = .25

Example of calculation of the initial lubrication interval. The critical support which is being considered is a flat bearing in the position D, whose dimensions are: ø 900 mm., length 200 mm. Required lubricant 2,5 cm:

$$I = \frac{Px8}{DxLx3.14xSxCL} = \frac{3x8}{90x20x3.14x.005x5} = 16 \text{ HOURS} = 10$$

Note: Lubricant with CL = .5



CENTRALISED LUBRICATION SYSTEMS

OIL VISCOSITY - ISO CLASSIFICATION

FOR INDUSTRIAL OIL LUBRICANTS

The series of the viscosity graduations was fixed by starting from a numerical succession, set in mathematical progression, which at the same time reflects the real situation of the viscosities of the grades available on the market.

1 Average viscosity cSt at 40°C	2 Viscosity range in cSt at 40°C		3 ISO Symbol	
	min.	max.		
2.2	1.98	2,42	ISO VG	2
3.2	2.88	3,52	ISO VG	3
4.6	4.14	5,06	ISO VG	5
6.8	6.12	7,48	ISO VG	7
10	9.00	11,00	ISO VG	10
15	13.50	16,50	ISO VG	15
22	19.80	24,20	ISO VG	22
32	28.80	35,20	ISO VG	32
46	41.40	50,60	ISO VG	46
68	61.20	74,80	ISO VG	68
100	90.00	110	ISO VG	100
150	135	165	ISO VG	150
220	198	242	ISO VG	220
320	288	352	ISO VG	320
460	414	506	ISO VG	460
680	612	748	ISO VG	680
1000	900	1100	ISO VG	1000
1500	1350	1650	ISO VG	1500

GREASE - NLGI - ASTM EQUIVALENTS

NLGI: National Lubricating Grease Institute.

ASTM: American Society For Testing and Materials.

NLGI Grade	ASTM worked penetration in tenths of mm.
000	445 - 475
00	400 - 430
0	355 - 385
1	310 - 340
2	265 - 295
3	220 - 250
4	175 - 205
5	130 - 160
6	85 - 115

COMPARISON TABLE OF VISCOSITIES

Centl stokes	Red- wood No. 1	Say- bolt SUS*	Engler	Centl stokes	Red- wood No. 1	Say- bolt SUS*	Engler	Centl stokes	Red- wood No. 1	Say- bolt SUS*	Engler
2.0	30.76	32.64	1.119	23.0	96.96	110.40	3.215	140.0	570.10	647.90	18.43
2.1	31.01	33.00	1.129	24.0	100.80	114.70	3.335	145.0	590.40	671.10	19.08
2.2	31.26	33.36	1.139	25.0	104.60	119.00	3.455	150.0	610.70	694.20	19.75
2.3	31.51	33.72	1.149	26.0	108.50	123.40	3.575	155.0	631.00	717.20	20.40
2.4	31.76	34.08	1.159	27.0	112.40	127.80	3.695	160.0	651.40	740.40	21.05
2.5	32.01	34.44	1.169	28.0	116.30	132.30	3.820	165.0	671.80	763.40	21.72
2.6	32.26	34.76	1.178	29.0	120.20	136.70	3.945	170.0	692.40	786.60	22.38
2.7	32.51	35.08	1.188	30.0	124.20	141.10	4.070	175.0	712.60	809.70	23.03
2.8	32.76	35.41	1.198	31.0	128.10	145.50	4.195	180.0	733.10	832.90	23.70
2.9	33.01	35.73	1.207	32.0	132.10	149.90	4.320	185.0	753.50	856.10	24.35
3.0	33.26	36.05	1.217	33.0	136.10	154.40	4.445	190.0	774.00	879.30	25.00
3.1	33.51	36.37	1.226	34.0	140.0	158.90	4.570	195.0	794.30	902.50	25.67
3.2	33.76	36.69	1.235	35.0	144.0	163.40	4.695	200.0	814.60	925.60	26.32
3.3	34.01	37.01	1.244	36.0	147.90	167.90	4.825	210.0	855.20	971.80	27.65
3.4	34.27	37.33	1.253	37.0	151.90	172.40	4.955	220.0	896.30	1018.00	28.95
3.5	34.52	37.65	1.262	38.0	155.90	176.90	5.080	230.0	936.90	1065.00	30.28
3.6	34.77	37.95	1.274	39.0	160.00	181.40	5.205	240.0	978.00	1111.00	31.60
3.7	35.03	38.25	1.283	40.0	164.00	185.90	5.335	250.0	1018.00	1157.00	32.90
3.8	35.28	38.55	1.291	41.0	168.00	190.50	5.465	260.0	1059.00	1203.00	34.25
3.9	35.53	38.85	1.300	42.0	172.00	195.00	5.590	270.0	1099.00	1249.00	35.55
4.0	35.78	39.15	1.308	43.0	176.10	199.50	5.720	280.0	1140.00	1296.00	36.85
4.5	37.03	40.76	1.350	44.0	180.10	204.10	5.845	290.0	1181.00	1342.00	38.18
5.0	38.31	42.36	1.400	45.0	184.20	208.70	5.975	300.0	1222.00	1388.00	39.50
5.5	39.65	43.96	1.441	46.0	188.20	213.30	6.105	310.0	1263.00	1434.00	40.80
6.0	40.91	45.57	1.481	47.0	192.20	217.90	6.235	320.0	1303.00	1480.00	42.12
6.5	42.26	47.17	1.521	48.0	196.30	222.50	6.365	330.0	1344.00	1527.00	43.45
7.0	43.57	48.77	1.563	49.0	200.30	227.10	6.495	340.0	1385.00	1574.00	44.75
7.5	44.89	50.42	1.605	50.0	204.30	231.70	6.630	350.0	1425.00	1620.00	46.10
8.0	46.26	52.07	1.653	55.0	224.60	254.80	7.238	360.0	1465.00	1666.00	47.40
8.5	47.66	53.77	1.700	60.0	244.80	277.80	7.896	370.0	1505.00	1712.00	48.70
9.0	49.04	55.48	1.746	65.0	265.20	300.80	8.554	380.0	1546.00	1759.00	50.00
9.5	50.47	57.18	1.791	70.0	285.50	323.80	9.212	390.0	1587.00	1805.00	51.35
10.0	51.92	58.88	1.837	75.0	305.70	347.00	9.870	400.0	1628.00	1851.00	52.65
11.0	54.94	62.39	1.928	80.0	326.00	370.20	10.530	450.0	1832.00	2082.00	59.25
12.0	58.05	66.00	2.020	85.0	346.30	393.30	11.190	500.0	2036.00	2314.00	65.80
13.0	61.24	69.70	2.120	90.0	366.60	416.50	11.850	550.0	2239.00	2545.00	72.40
14.0	64.50	73.50	2.219	95.0	386.80	439.50	12.510	600.0	2443.00	2777.00	79.00
15.0	67.89	77.31	2.323	100.0	407.30	462.60	13.160	650.0	2646.00	3008.00	85.60
16.0	71.34	81.21	2.434	105.0	427.70	485.80	13.820	700.0	2850.00	3239.00	92.20
17.0	74.80	85.22	2.540	110.0	447.90	509.00	14.470	750.0	3054.00	3471.00	98.80
18.0	78.36	89.32	2.644	115.0	468.20	532.10	15.140	800.0	3258.00	3702.00	105.30
19.0	82.00	93.43	2.755	120.0	488.60	555.30	15.800	850.0	3462.00	3934.00	111.90
20.0	85.66	97.64	2.870	125.0	509.00	578.50	16.450	900.0	3666.00	4165.00	118.50
21.0	89.42	101.80	2.984	130.0	529.30	601.60	17.110	950.0	3871.00	4396.00	125.00
22.0	93.16	106.10	3.100	135.0	549.60	624.70	17.760	1000.0	4074.00	4628.00	131.60

*SUS = Saybolt Universal 100°F



CENTRALISED LUBRICATION SYSTEMS