

SERIAL 26

PROGRESSIVE SYSTEM



Centralised lubrication systems
www.dropsa.com

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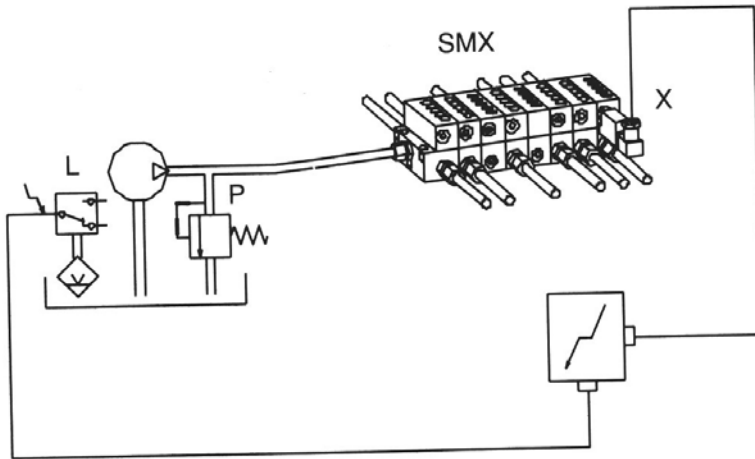
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APPLICATION EXAMPLES



Pump supplies distributor assembly.

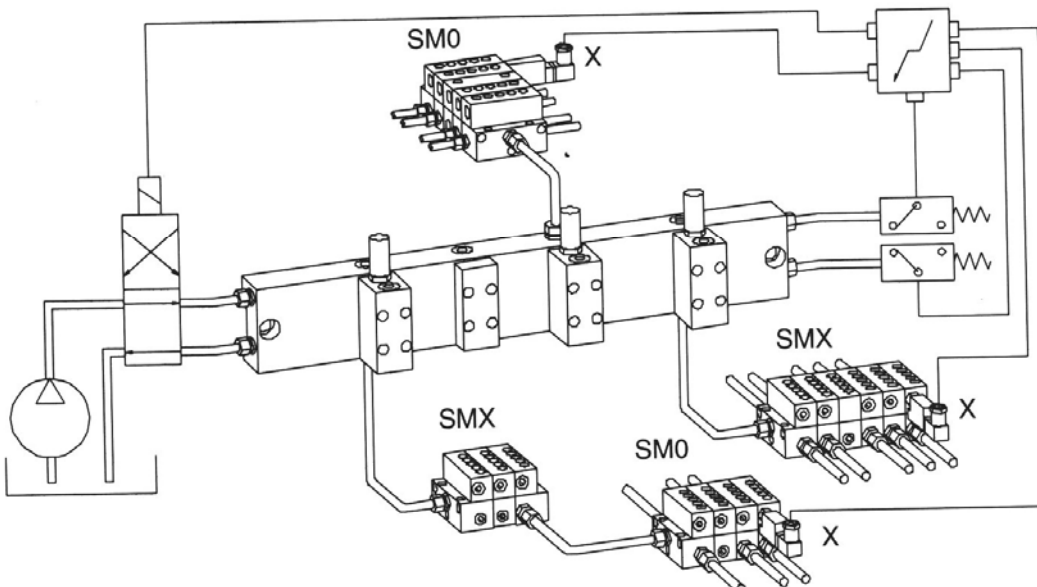
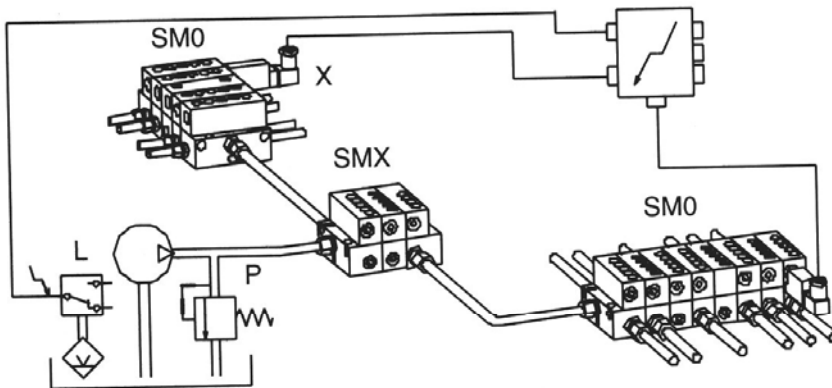
MONITORS:

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 available are: SMO – SMX – SMP – SMPM – SXO alluminium
They require a minimum of 3 elements and permit a maximum of 10 elements, but with the “SMO – 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.

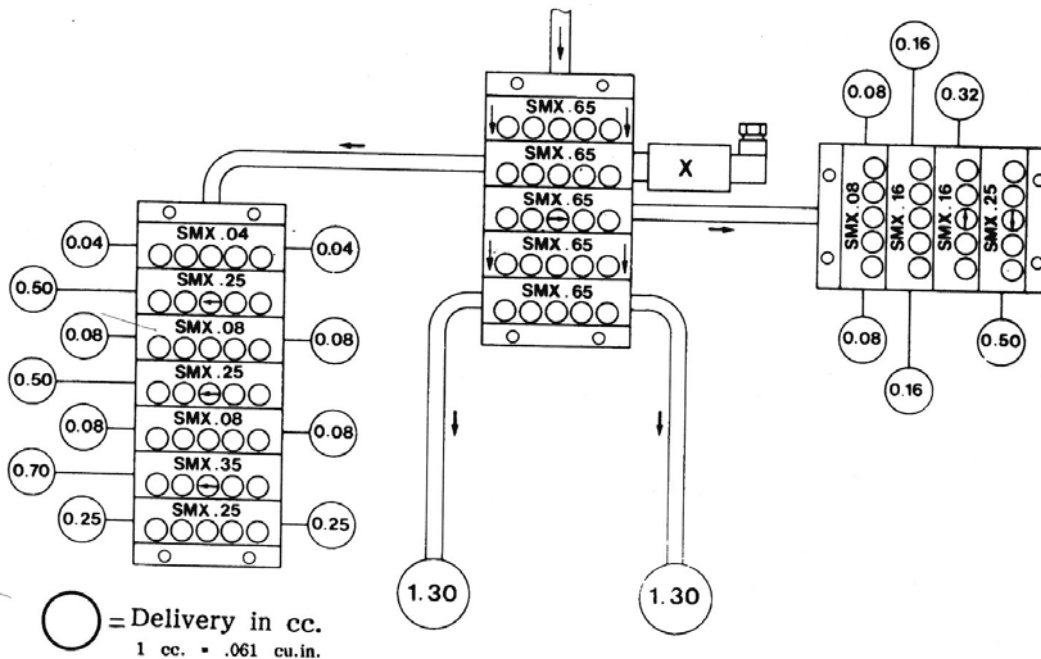
EXAMPLE:



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.



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Modular**

gives you
the flexibility you
always wanted

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 400 bar SMX – 250 bar SMO.
- 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



The modular system consists of two main components: the base and the metering elements. The Modular progressive Distributor is available in two sizes:

SMO: 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 routing 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.

MODULAR “SMO 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.

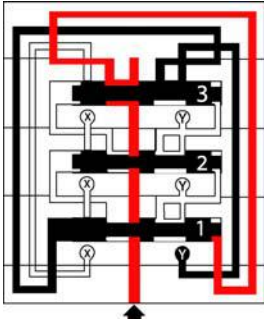


Fig. 2

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

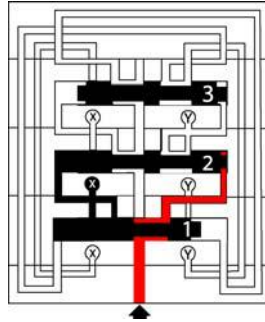
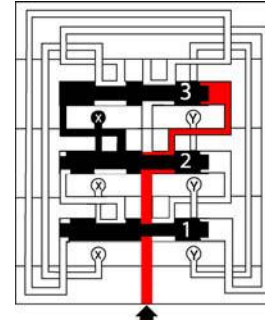


Fig. 3

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.

VERSIONS AVAILABLE

The metering elements SMX are available in four different versions to respond to specific application needs. For the same reason SMO are available in two different versions.

SMX METERING ELEMENT VERSIONS		SMO METERING ELEMENT VERSIONS	
Part Num.	Description	Part Num.	Description
641516 ÷ 641825	Standard	641716 ÷ 641747	Standard
641516L ÷ 641825L	Low pressure	641716L ÷ 641747L	Low pressure
641516P ÷ 641825P	High pressure		
641516U ÷ 641825U	NPT outlet		

APPLICATION EXAMPLES

METERING ELEMENT VERSION	METERING ELEMENT TYPE	APPLICATION
Standard	SMO - SMX	The standard version is ideal for the majority of oil and grease installation and for Air/Oil lubrication systems.
Low pressure - L	SMO - SMX	L version has been designed in order to use the metering elements in installations with lubricants (grease) with solid additive like, for example, graphite, copper or silicone. This version has a particular clearance between the piston and the metering element body which allows the passage of the thick particles which won't be possible with the standard version.
High pressure - P	SMX	These metering elements are ideal for high pressure oil installations where there could be high counter-pressure at the lubrication point. An example of application is the gas compression plants. For the P version has been realised a very precise coupling between the metering element body and the piston in order to reduce the risk of internal leakage.
NPT outlet - U	SMX	This type of metering elements have the upper outlet in NPT.

General characteristics for lubricants and working max pressure

	SMX	SMO
Oil	Mineral Oil viscosity 32 ÷ 6000 cSt	Mineral Oil viscosity 32 ÷ 6000 cSt
Grease	Type EP – without thickener Viscosity between 000 ÷ NLGI 2	Type EP - without thickener Viscosity between 000 ÷ NLGI 2
No. of strokes/minute	Max 500 for metering element without sensor, oil viscosity max. 220 cSt	Max 300 for metering element without sensor, oil viscosity max. 220 cSt
	For metering unit with sensor, please see table at pag. 15	For metering unit with sensor, please see table at pag. 15
Working pressure	Max 400 bar	Max 250 bar

Note: Pressure is directly proportional to no. of strokes.

Viscosity values for oil and grease are always related to operating temperature

TECHNICAL CHARACTERISTICS

Version	Type	Oil cSt (*)	Grease NLGI (*)	With oil 32 cSt		With grease NLGI 2		Temperature °C (°F)	Viton O'Ring
				Press. Min. Bar (Psi)	Press. Max Bar (Psi)	Press. Min. Bar (Psi)	Press. Max Bar (Psi)		
STANDARD	SMX 641516 ÷ 641825	68 ÷ 6000	000 ÷ 2	15 (220,5)	250 (3675)	5 (73,5)	400 (5880)	-25 ÷ +80 (-13 ÷ + 176)	
	SMO 641716 ÷ 641747								
LOW PRESSURE	SMX 641516L ÷ 641825L	-	00 ÷ 2	10 (147)	150 (2205)	5 (73,5)	250 (3675)	-25 ÷ + 100 (-13 ÷ + 212)	
	SMO 641716L ÷ 641747L								
HIGH PRESSURE	SMX 641516P ÷ 641825P	32 ÷ 220	-	20 (294)	400 (5880)	5 (73,5)	400 (5880)	-15 ÷ + 50 (5 ÷ +122)	X
NPT OUTLET	SMX 641516U ÷ 641825U	68 ÷ 6000	000 ÷ 2	15 (220,5)	250 (3675)	5 (73,5)	400 (5880)	-15 ÷ + 80 (5 ÷ +176)	X

(*) Oil and grease viscosity are always referred to operating temperature.



NOTE: Metering elements are ideal for a large range of applications also with higher conditions than those reported in this table (for example grease viscosity can reach NLGI 4 or they can work at higher temperature). Please, contact Dropsa Technical offices for support in the design of your application.

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!

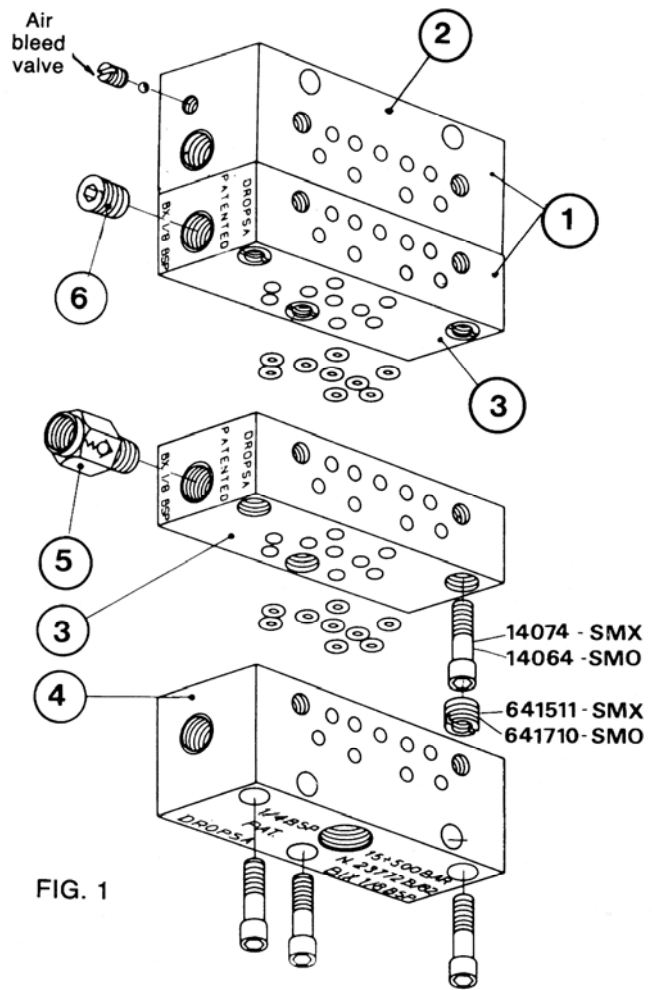


FIG. 1



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	Kg.	Lb..	BSP	NPTF	SAE-UNF	Kg.	Lb..
3	641763	643543	0.92	2.0	641583	643523	642703	1.3	2.9
4	641764	643544	1.13	2.5	641584	643524	642704	1.6	3.5
5	641765	643545	1.33	2.9	641585	643525	642705	1.9	4.2
6	641766	643546	1.54	3.4	641586	643526	642706	2.2	4.8
7	641767	643547	1.75	3.9	641587	643527	642707	2.5	5.5
8	641768	643548	1.96	4.3	641588	643528	642708	2.8	6.2
9	641769	643549	2.17	4.8	641589	643529	642709	3.1	6.8
10	641770	643550	2.38	5.2	641590	643530	642710	3.4	7.5
11	641771	643551	2.59	5.7	641591	643531	642711	3.7	8.1
12	641772	643552	2.80	6.2	641592	643532	642712	4.0	8.8
13	641773	643553	3.00	6.6	641593	643533	642713	4.3	9.5
14	641774	643554	3.16	6.9	641594	643534	642714	4.5	9.9
15	641775	643555	3.42	7.5	641595	643535	642715	4.9	10.8
16	641776	643556	3.63	8.0	641596	643536	642716	5.2	11.4
17	641777	643557	3.84	8.4	641597	643537	642717	5.5	12.1
18	641778	643558	4.05	8.8	641598	643538	642718	5.8	12.8
19	641779	643559	4.26	9.4	641599	643539	642719	6.1	13.4
20	641780	643560	4.47	9.8	641600	643540	642720	6.4	14.0

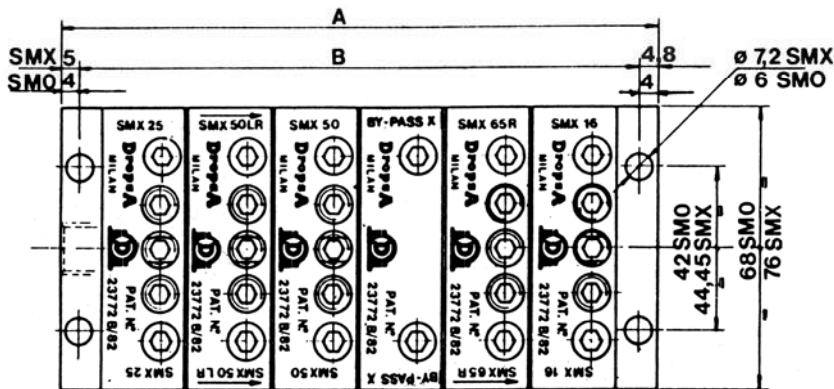
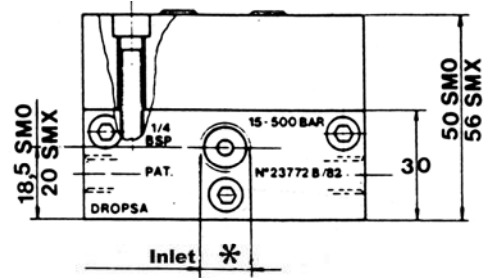
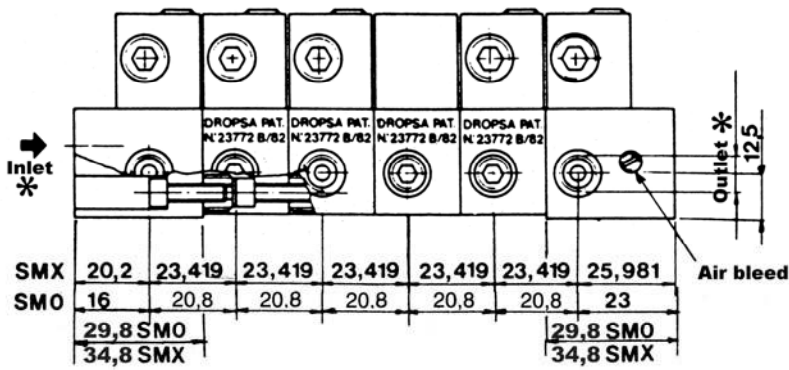
Choose the part number according to the number of elements and thread required.

Fig.	Description	SMO			SMX			
	Inlet Thread →	1/8 BSP	1/8 NPTF	SYMBOL	1/4 BSP	1/4 NPTF	7/16-20 UNF	SYMBOL
	Outlet Thread →	1/8 BSP	1/8 NPTF		1/8 BSP	1/8 NPTF	7/16-20 UNF	
1	End Base + intermediate base	641792	643569		641561	643568	642028	
2	End Base	641713	643564	BF0	641515	643561	643802	BFX
3	Intermediate Base	641712	643563	B0	641513	643542	643801	BX
4	Inlet Base	641711	643562	BI0	641512	643541	643800	BIX
50 5	Check Valve	92335	641564		92335	641564	642029	
6	Plug	3232098	3232095		3232098	3232095	642031	

BSP Inlet and outlet thread parallel DIN 3852/2 for fittings “A” and “C” shape
 NPTF Inlet and outlet thread taper ASA B2-2
 SAE Inlet and outlet thread parallel SAE – UNF – 2B

MODULAR "SMO SMX" – SECOND GENERATION

OVERALL DIMENSIONS



*Threads are shown on page 11

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.

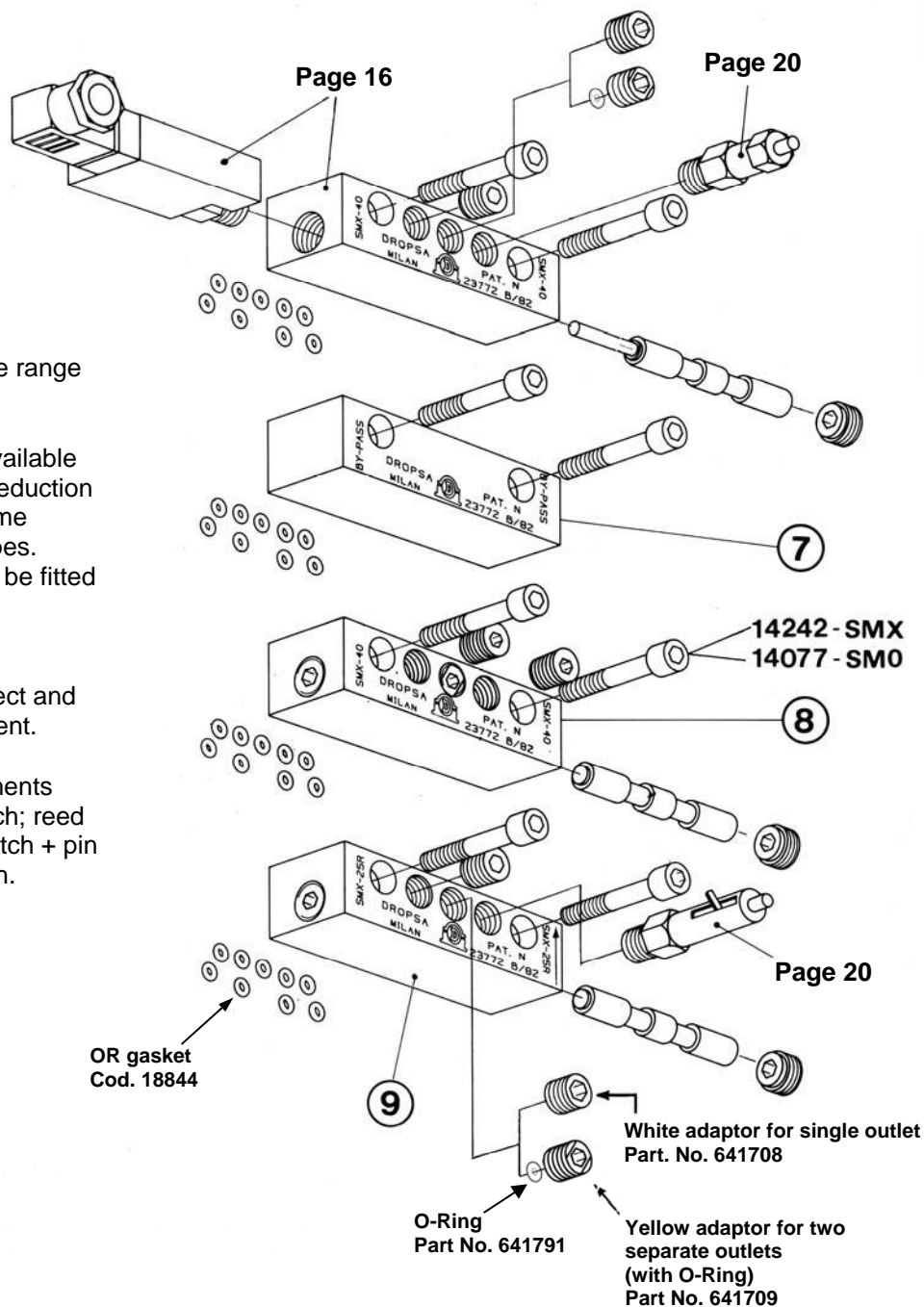
SMO No Elements	Nominal dimensions mm. Tolerance for elements +0 -0,05				SMX No. Elements	Nominal dimensions mm. Tolerance for elements +0 -0,05			
	A		B			A		B	
	mm	INCHES	mm	INCHES		mm	INCHES	mm	INCHES
3	80,4	3,17	72,40	2,85	3	93,02	3,66	83,02	3,276
4	101,2	3,98	93,20	3,67	4	116,44	4,58	106,44	4,190
5	122	4,80	114,00	4,49	5	139,86	5,51	129,86	5,112
6	142,8	5,62	134,80	5,31	6	163,28	6,43	153,28	6,034
7	163,6	6,44	155,60	6,13	7	186,70	7,35	176,70	6,956
8	184,4	7,26	176,40	6,94	8	210,11	8,27	200,11	7,879
9	205,2	8,08	197,20	7,76	9	233,53	9,19	223,53	8,801
10	226	8,90	218,00	8,58	10	256,95	10,12	246,95	9,723
11	246,8	9,72	238,80	9,40	11	280,37	11,04	270,37	10,645
12	267,6	10,54	259,60	10,22	12	303,79	11,96	293,79	11,567
13	288,4	11,35	280,40	11,04	13	327,21	12,88	317,21	12,489
14	309,2	12,17	301,20	11,86	14	350,63	13,80	340,63	13,411
15	330	12,99	322,00	12,68	15	374,05	14,73	364,05	14,333
16	350,8	13,81	342,80	13,50	16	397,47	15,65	387,47	15,255
17	371,6	14,63	363,60	14,31	17	420,89	16,57	410,89	16,177
18	392,4	15,45	384,40	15,13	18	444,30	17,49	434,30	17,099
19	413,2	16,27	405,20	15,95	19	467,72	18,41	457,72	18,021
20	434	17,09	426,00	16,77	20	491,14	19,34	481,14	18,943

NB.: For an assembly with more than 20 elements, the nominal dimensions A and B should be increased respectively by 20,8 mm. (.81 in.) SMO and 23,419 mm. (.92 in.) SMX for each extra base element.

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

METERING ELEMENTS

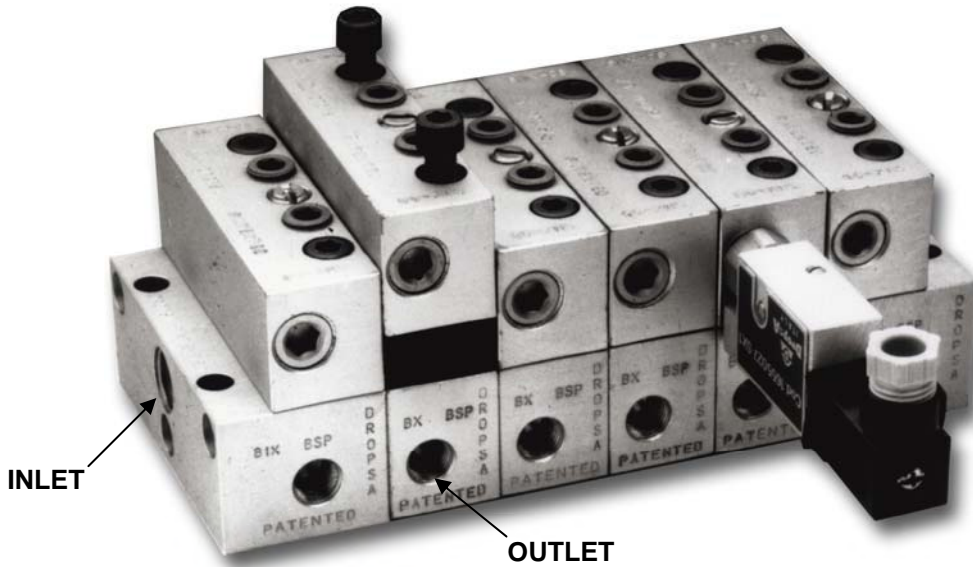
- These are available in a wide range of deliveries.
- A by-pass element is also available which allows an addition or reduction of lubrication points at any time without disconnecting the pipes. The by-pass element cannot be fitted in a three element assembly.
- Bridge elements have been introduced. 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.




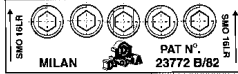

The single element (not assembled in the base) is set by the factory for two separate outlets with yellow adapter **Part No. 641709** and O-Ring and **Part No. 641791**. Also included are the white adapter for single outlet **Part No. 641708** and the fixing screw.

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

MODULAR “SMO SMX” – SECOND GENERATION



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

SMO METERING ELEMENT 8				SMO BRIDGE ELEMENT 9					
				With delivery into the next element as indicated by the arrow					
Delivery per outlet		1 or 2 outlets		 left		 left-right		 right	
cc.	cu. in.	Symbol	Part No.	Symbol	Part No.	Symbol	Part No.	Symbol	Part No.
.04	.0024	SMO 04	641720	SMO 04L	641733	SMO 04LR	641744	SMO 04R	641738
.08	.005	SMO 08	641716	SMO 08L	641734	SMO 08LR	641745	SMO 08R	641739
.16	.010	SMO 16	641717	SMO 16L	641735	SMO 16LR	641746	SMO 16R	641740
.25	.015	SMO 25	641718	SMO 25L	641736	SMO 25LR	641747	SMO 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	SMX 35R	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	SMX 50R	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: SMO 0,20 kg. (.44 lb.)
 SMX 0,31 kg. (.68 lb.)

Part number in this table refer to SMO –SMX standard version.
 For L – P – U versions, please add the letter L or P or U at the end of the part number.
 Please refer to page 9 for technical characteristics

MODULAR "SMO 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		International standard	
	NO Normally open	FORM A - ASA -	1 DIN	
Technical data	Electrical, mechanical, thermic acceptable values			
Max Commutable voltage	220 V ac			
Max Commutable current	3 A			
Max continuous Commutable Power alternate	50 W 50 VA			
Max resistance	100 mΩ			
Changeover time	Connection o - c* = 3 ms	Disconnection c - o* = 0,07 ms		
Max frequency	320 Hz			
Life expectancy •	500 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		International standard	
	Bidirectional changeover contact		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 continuous Commutable Power alternate	8 W		3W	
	8 VA		3 VA	
Max resistance	100 mΩ			
Changeover time	Connection o - c* = 2 ms		Disconnection c - o* = 0,05 ms	
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

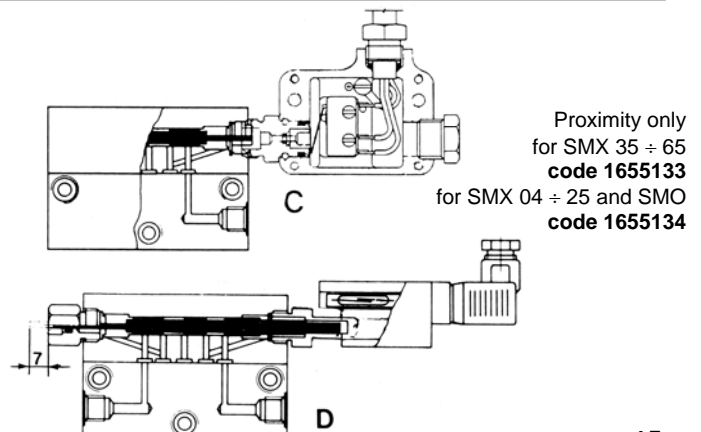
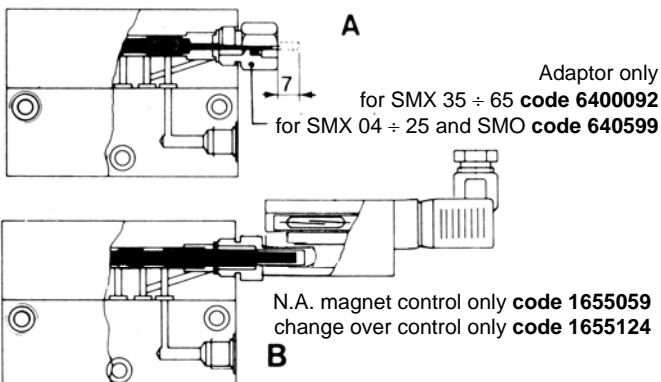
MONITORING OF PISTON MOVEMENT BY A MICRO SWITCH

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	
	cc.	cu. ins.	Distributor with indicating pin "C"	Distributor with N.O. reed switch "CC"	Distributor complete with change over reed switch "GX"	Distributor with micro switch "CT"	Distributor with pin and N.O. reed switch "GC"	Distributor with pin and change over reed switch "GXC"		
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		
SMO	.65	.040	641699	641573	641980	641824	641694	641497		
	.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		



MODULAR "SMO SMX" – SECOND GENERATION

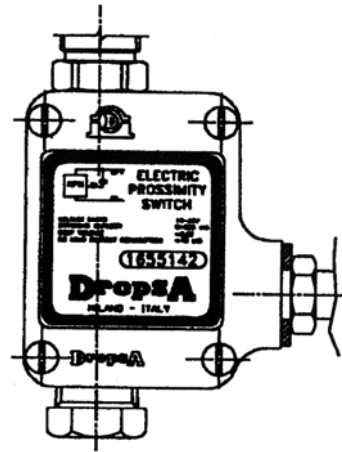
MONITORING OF PISTON METERING ELEMENT MOVEMENT WITH INDUCTIVE PROXIMITY SENSOR

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 or PLC.

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

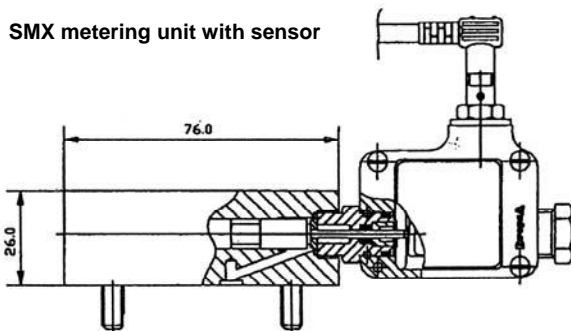
In oil circulation system where metering elements are working continuously at rates up to 500 cycles/max. per minute, the sensor offers high precision, reliability and repeatability because of the absence of moving parts and are therefore maintenance free.



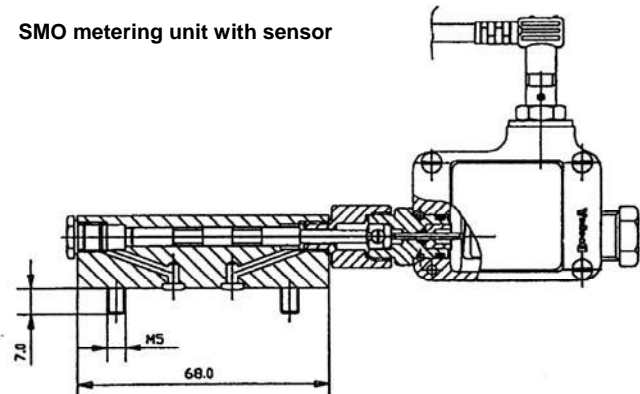
TYPE OF METERING UNIT	DELIVERIES		METERING UNIT WITH NPN SENSOR "CP"	NPN SENSOR WITH ENCLOSURE	METERING UNIT WITH PNP SENSOR "CP"	PNP SENSOR WITH ENCLOSURE
	cm ³	Cu.in.				
SMX	.04	.0024	641905	1655143	641196	1655149
	.08	.005	641906	1655143	641197	1655149
	.16	.010	641907	1655143	641198	1655149
	.25	.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
SMO	.65	.040	641904	1655142	641195	1655148
	.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.

SMX metering unit with sensor



SMO metering unit with sensor



TECHNICAL INFORMATION

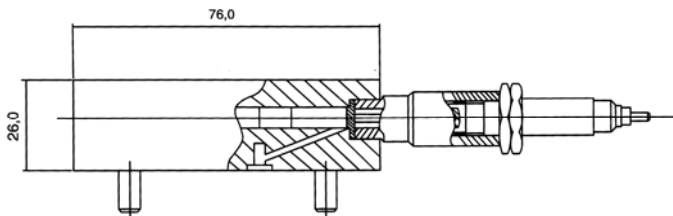
Max. outlet current : 200mA
 Power supply : 10 to 30V dc.
 Vibration resistance: 25 g at 55 Hz.
 (IEC 68-2-6 specs)
 Protection grade: IP 68
 Contacts: NPN or PNP (NO)
 Operating temperature: from -25°C to +70°C

NPN sensor Code 1523557
 PNP sensor Code 1523565

Cable for above sensor:
 Code 1523558 – 5 metres long (standard)

MONITORING OF PISTON METERING ELEMENT MOVEMENT
WITH DROPSA INDUCTIVE PROXIMITY SENSOR

This sensor has been designed to check the function of progressive metering system. It enables monitoring of metering element piston movement in DROPSA system 26 “SMX” or “SMO” 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 on to 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.

TECHNICAL INFORMATION:

- 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:** 1.8mA
- Pressure of lubricant:** 35Mpa (350 bar) max.
- Operating temperature:** -25°C to + 70°C
- 13° F to + 158° F
- Protection degree:** IP 67
- Case material:** ANSI 303
- Connection:** PVC cable
2m/3x020mm.

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

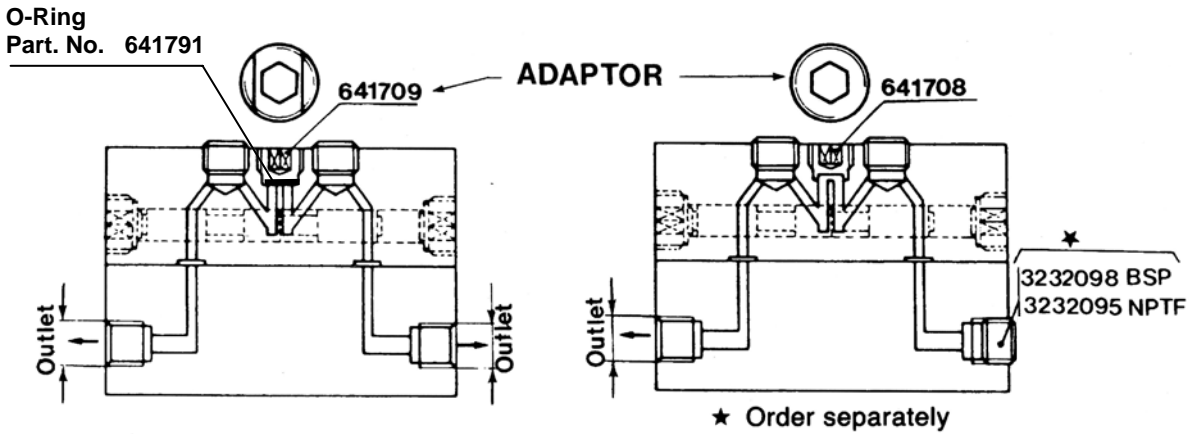
Assembly Part No.	DELIVERY		SENSOR
	cc.	Cu.in.	
641478	0,04	0.0024	1523739
641479	0,08	0.005	
641480	0,16	0.010	
641481	0,25	0.015	

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 "SMO SMX" – SECOND GENERATION

SINGLE AND DOUBLE OUTLET CONVERSION



It is possible to double the delivery of a single element by removing the O-Ring **Part. No. 641791** (use the central hole) and by replacing the Yellow Adaptor **Part. No. 641709** with the White adaptor **Part. No. 641708** as shown in the drawing.

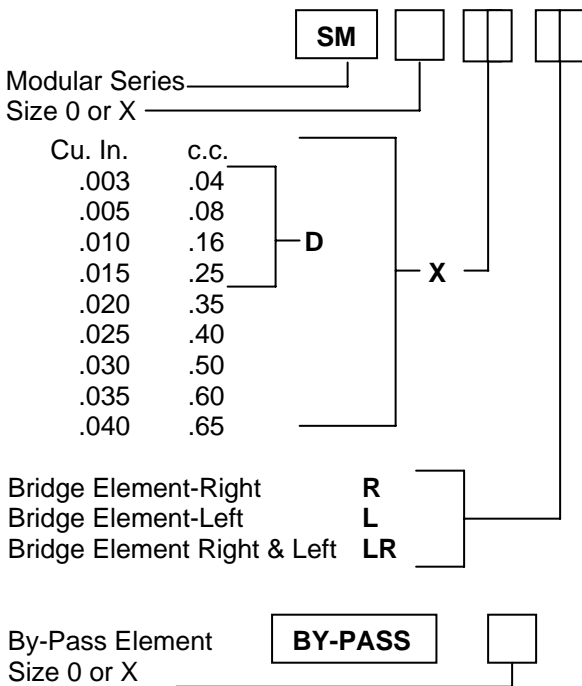
In order to guarantee either a proper seal or easy dismantling of the adaptor, the torque setting should be set to .8 to 1 Kg/m (8 ÷ 10 Nm). The torque setting for the plugs that are mounted on the side of the element would be 1 Kg/m (10Nm). The torque setting for the fixing screws to mount the element on the base is .5 Kg/m (5 Nm). When converted into single, plug off the second outlet.

SYMBOLS PRINTED ON THE ELEMENTS

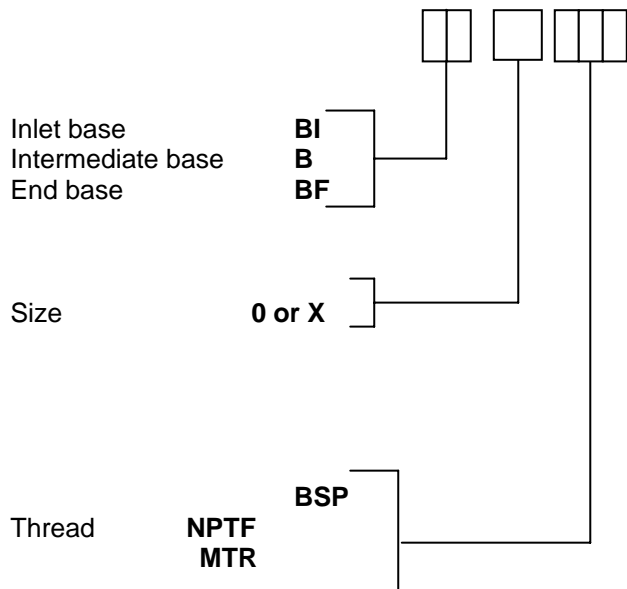
In case the user should wish to order the Spare Parts and should not know the Part No. It is sufficient to indicate the symbols printed on the elements.

Delivery can be read in cc. and cu. in. on each element.

METERING ELEMENTS



BASE ELEMENT



SPARE PARTS:

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

Standard:

Part No. 641541

(9 pieces of **Part No. 18844**)

Viton:

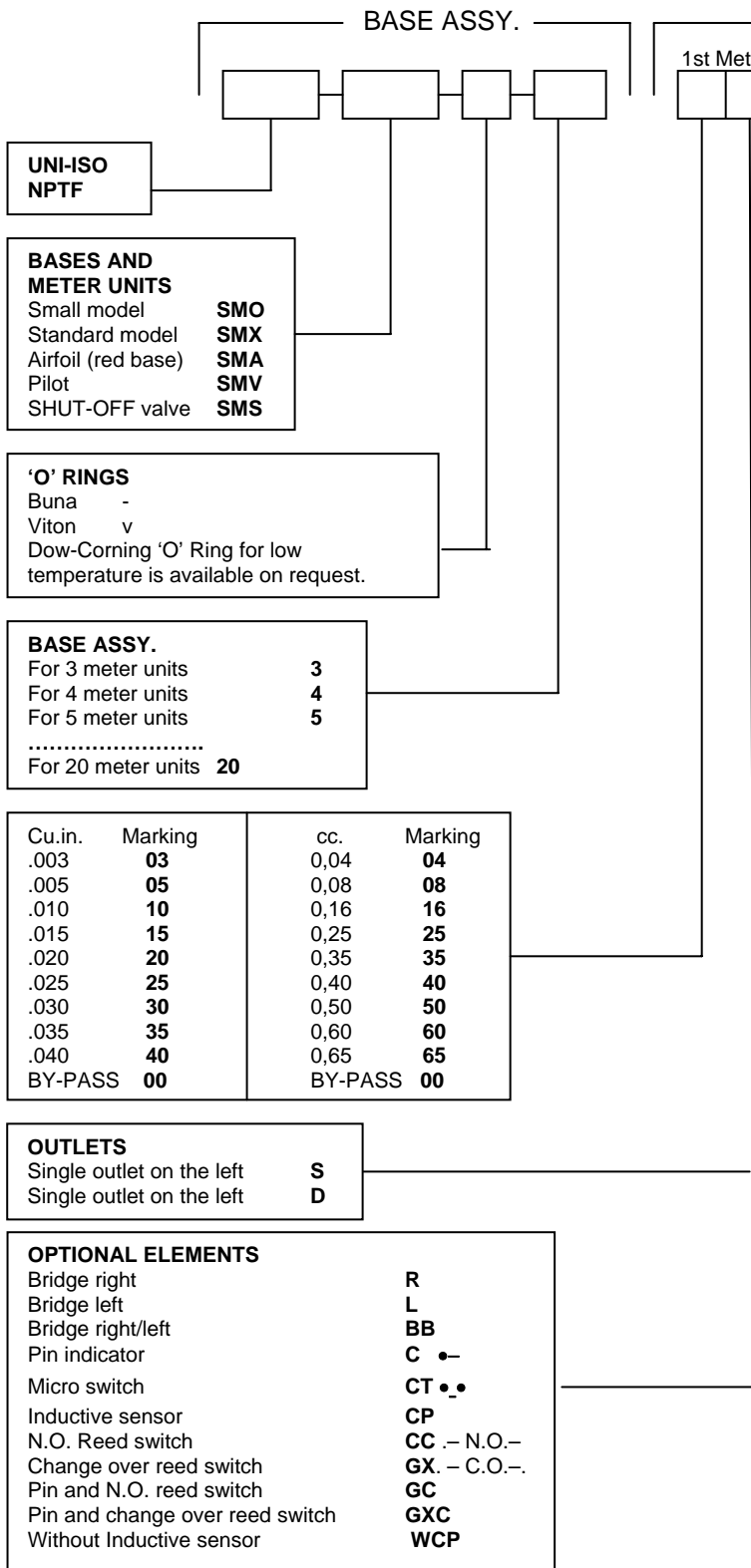
Part No. 641814

(9 pieces of **Part No. 18887**)

MODULAR "SMO SMX" – SECOND GENERATION

SMO - SMX

ORDERING EXAMPLE:



HOW TO ORDER A COMPLETE ASSEMBLY

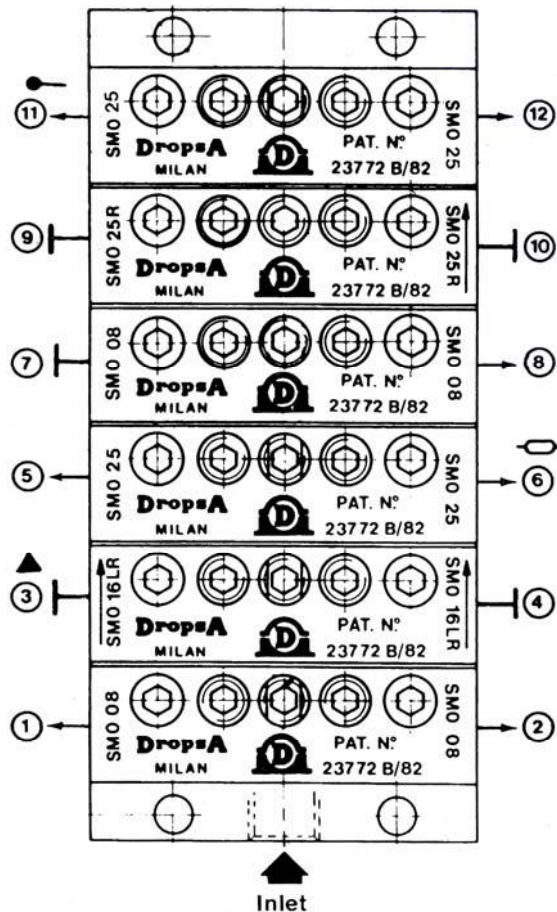
FOR THE BASE INDICATE:

- Thread (UNI ISO or NPTF)
- Base. (SMO; SMX; SMA; SMR; SMS; or SMV)
- 'O' Ring. (Buna or Viton)
- Number of meter units to be mounted on the base assembly.
- Base with shut off valve to be completed with voltage: SMS12 – SMS24 – SMS110 – SMS220.

METER UNITS

INDICATE FOR EACH METER UNIT:

- Delivery in cc. (or cu.in.)
 - Number of outlets (Double = T; Single = S.)
 - Symbol of optional elements.
- Note: meter units are set for two separate outlets. Should you require a single outlet indicate 'S' = left 'D' = right the other outlet will be plugged.



ACCESSORIES:

The items below are to be ordered separately:

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

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

Order Example:

SMO – 6 (M08 – M16LR – M25CC – M08D-M25R – M25C)

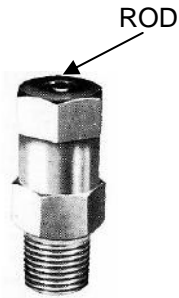
Note: the assembly is seen vertically and the outlets are in sequence; starting from the bottom (inlet) from left to right. Symbol 'LR' refers to bridge elements.



PRESSURE INDICATORS

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

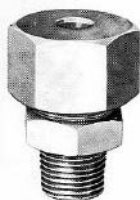
- **Type N** in the spring loaded the pressure acts on a small hardened and ground piston which displaced the indicator rod when the set pressure is reached. The indicator returns when the pressure returns to zero. They are available for pressures up to 250 bar (3600 psi.).
- **Type P** has a disc which bursts, when the set pressure is accidentally exceeded.
- **Type M** 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.



Height mm 31
Hex. 12
Thread 1/8 BSP

PRESSURE INDICATOR (TYPE N)

PRESSURE max.		Part No. assembly
P.S.I.	bar	1/8 BSP
300	20	3290019
450	30	3290006
750	50	3290007
1500	100	3290008
2200	150	3290009
2900	200	3290010
3600	250	3290011



Height mm 28
Hex. 17
Thread 1/8 BSP

DISC PRESSURE INDICATOR (TYPE P)

PRESSURE max.		Part No. assembly
P.S.I.	bar	1/8 BSP
450	30	3290012
750	50	3290013
1100	75	3290014
1500	100	3290015
2200	150	3290016
2900	200	3290017

PRESSURE INDICATOR WITH MEMORY (TYPE M)



Height mm 43
Hex. 12
Thread 1/8 BSP

PRESSURE max.		Part No. assembly
P.S.I.	bar	1/8 BSP
450	30	3290000
750	50	3290001
1100	75	3290022
1500	100	3290002
2200	150	3290003
2900	200	3290004
3600	250	3290005

MODULAR "SMX" STAINLESS STEEL AISI 316-304

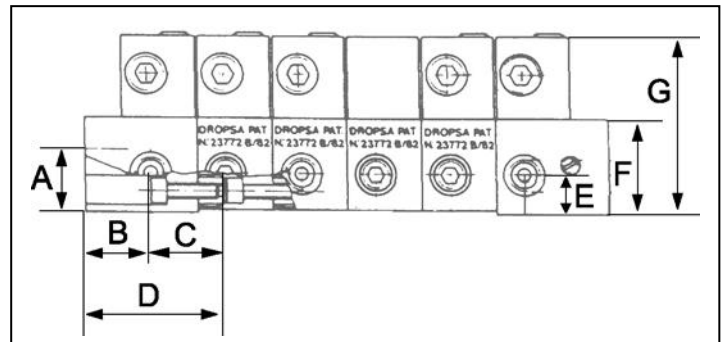
The modular system consists of two main components: the base and the metering elements. The modular progressive distributor is available in two versions: **stainless steel Aisi 316** and **Aisi 304**. Conventional bridging pieces are eliminated. Bridging elements have been introduced and these interconnect and discharge into the adjacent element. The 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 routing of pipe work and the elements can then be fitted to suit. Due to the modular concept, the system can be easily extended with extra components at a low cost.

DELIVERY AND DIMENSIONS:

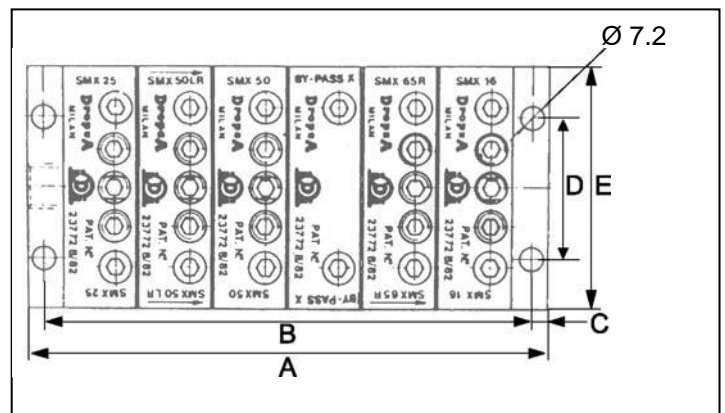
SMX METERING ELEMENTS				
DELIVERY PER OUTLET		1 or 2 outlets		
CU. IN.	Cm ³	Symbol	AISI 316	AISI 304
.0024	0.04	SMX 04	646524	647524
.005	0.08	SMX 08	646516	647516
.010	0.16	SMX 16	646517	647517
.015	0.25	SMX 25	646518	647518
.021	0.35	SMX 35	646519	647519
.025	0.40	SMX 40	646520	647520
.030	0.50	SMX 50	646521	647521
.036	0.60	SMX 60	646522	647522
.040	0.65	SMX 65	646523	647523



SMX DIMENSIONS							
A		B		C		D	
mm	in	mm	in	mm	in	mm	in
20	0.78	20.2	0.78	23.42	0.91	35	1.36
E		F		G			
mm	in	mm	in	mm	in		
12.5	0.72	30	1.17	56	2.2		



SMX DIMENSIONS				
No. Elements	A		B	
	mm	in	mm	in
3	93,02	3,66	83,22	3,276
4	116,44	4,58	106,44	4,190
5	139,86	5,51	129,86	5,112
6	163,28	6,43	153,28	6,034
7	186,70	7,35	176,70	6,956
8	210,11	8,27	200,11	7,879
9	233,53	9,19	223,53	8,801
10	256,95	10,12	246,95	9,723
11	280,37	11,04	270,37	10,645
12	303,79	11,96	293,79	11,567
13	327,21	12,88	317,21	12,489
14	350,63	13,80	340,63	13,411
15	374,05	14,73	364,05	14,333
16	397,47	15,65	387,47	15,255
17	420,89	16,57	410,89	16,177
18	444,30	17,49	434,30	17,099
19	467,72	18,41	457,72	18,021
20	491,14	19,34	481,14	18,943



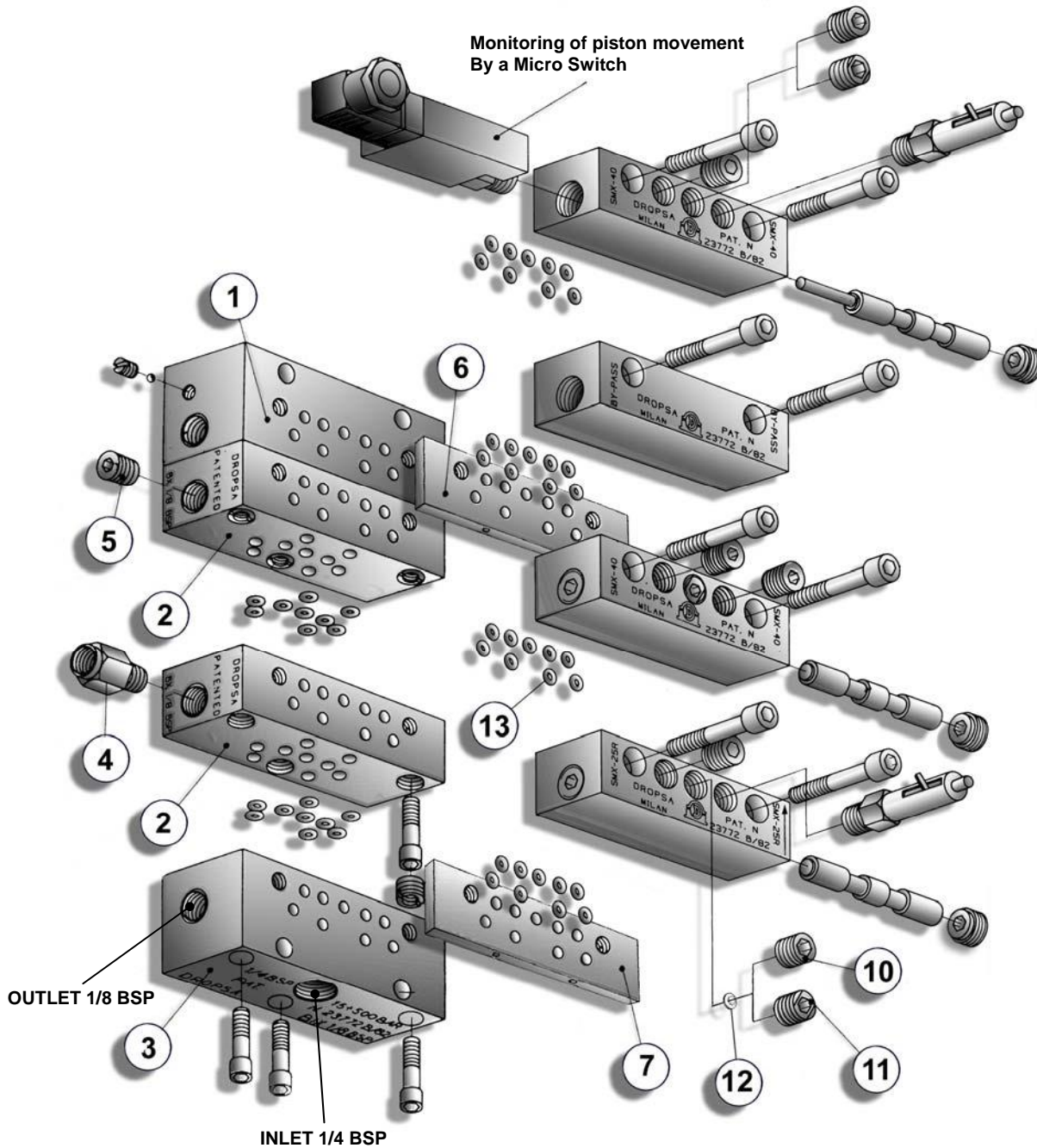
SMX DIMENSIONS						
C		D		E		Ø
mm	in.	mm	in.	mm	in.	
5,0	2	44,45	1,73	76	2,9	7,2

SMX STAINLESS STEEL AISI 316-304



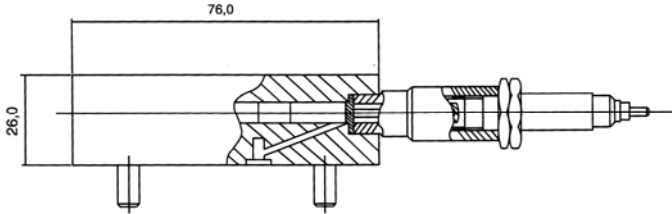
MODULAR "SMX" STAINLESS STEEL AISI 316-304

METERING ELEMENTS FITTED ON THE BASE



Ref.	Description	SMX AISI 316	SMX AISI 304
1	End Base	646515	647515
2	Intermediate base	646513	647513
3	Inlet base	646512	647512
4	Check Valve	519335	519335
5	Plug	646254	646254
6	Bridge Plate Left - Right	646223	-
7	Bridge Plate Left	646221	-
8	Bridge Plate Right	646220	-
9	Bridge Plate Single outlet	646222	-
10	White adaptor for single outlet	646251	-
11	Yellow adaptor for two separate outlets	646250	-
12	O-Ring	641791	641791
13	O-Ring Viton	18887	18887

This sensor has been designed to check the function of progressive metering system. It enables monitoring of metering element piston movement in DROPSA system 26 “SMX” or “SMO” 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 on to 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.

TECHNICAL INFORMATION:

- 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:** 1.8mA
- Pressure of lubricant:** 35Mpa (350 bar) max.
- Operating temperature:** -25°C to + 70°C
- 13° F to + 158° F
- Protection degree:** IP 67
- Case material:** ANSI 303
- Connection:** PVC cable
2m/3x020mm.

ORDERING INFORMATION:

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

Assembly Part No.	DELIVERY		SENSOR
	cc.	Cu.in.	
647469	0,04	0.0024	1523812
647470	0,08	0.005	
647471	0,16	0.010	
647472	0,25	0.015	
647473	0,35	0.021	
647474	0,40	0.025	
647475	0,50	0.030	
647476	0,60	0.036	
647477	0,65	0.040	

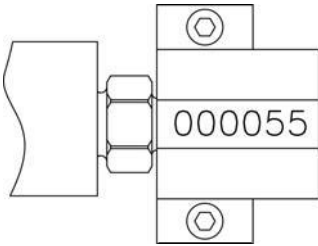
N.B. To control the progressive metering element it is available also the visual indicator Part No. **1655200** and electrical indicators Part No. **1655201** (with proximity PNP) and Cod **1655202** (with proximity NPN). For more information, please see page 29.

SMX STAINLESS STEEL AISI 316-304

MODULAR "SMX" STAINLESS STEEL AISI 316-304

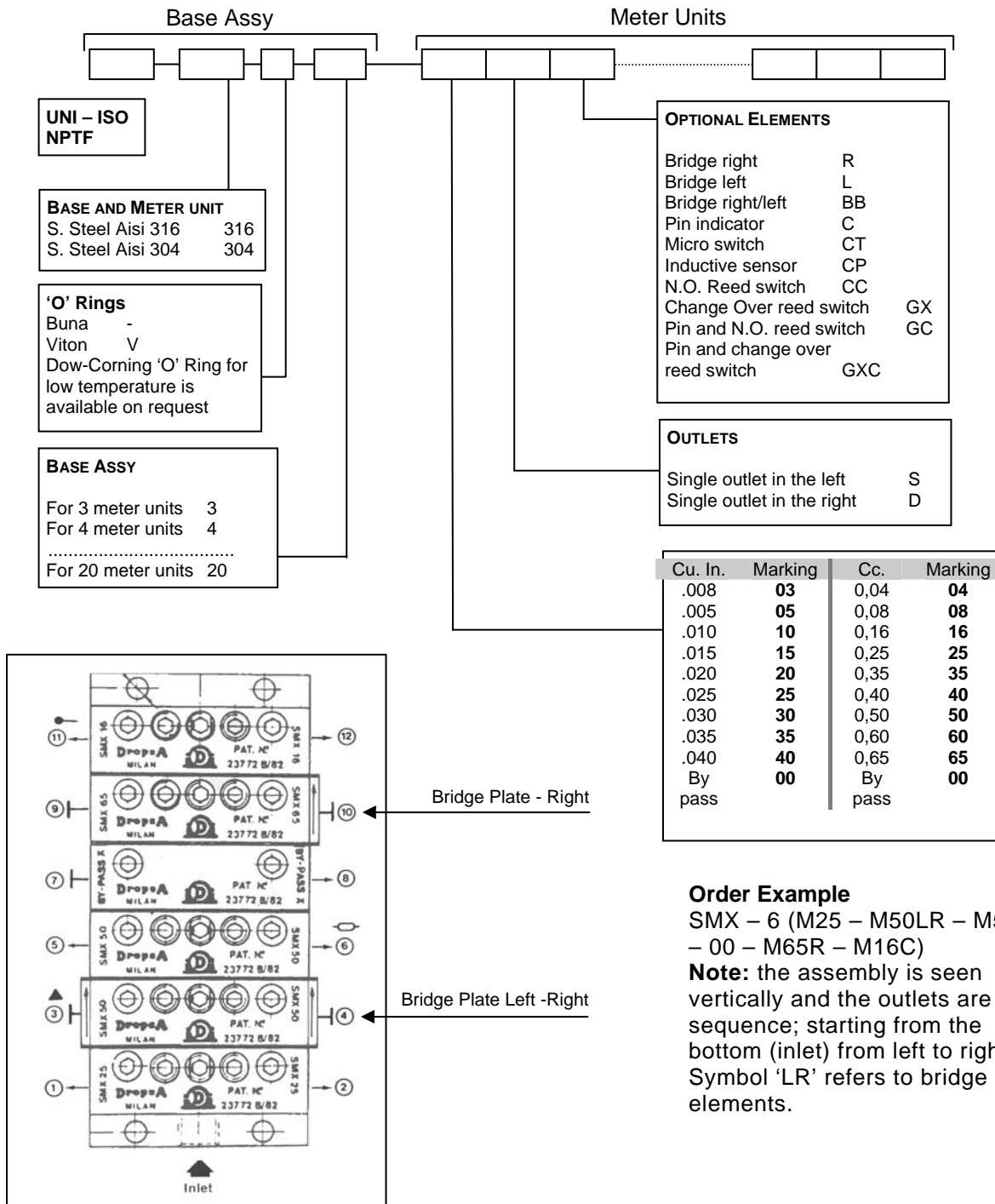
MODULAR SMX STAINLESS STEEL AISI 316 CYCLE COUNTER

This modular element is a special version of SMX. On the element mounted a cycle counter with 6 digits for counting the assembly cycles. The counter can't be reset.



Part No.	Body "A"	Piston "B"	Delivery cc.	Symbol
646536	646204	646537	0,16	SMX 16
646540	646205	646541	0,25	SMX 25
646538	646210	646532	0,65	SMX 65

ORDERING EXAMPLE:



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.

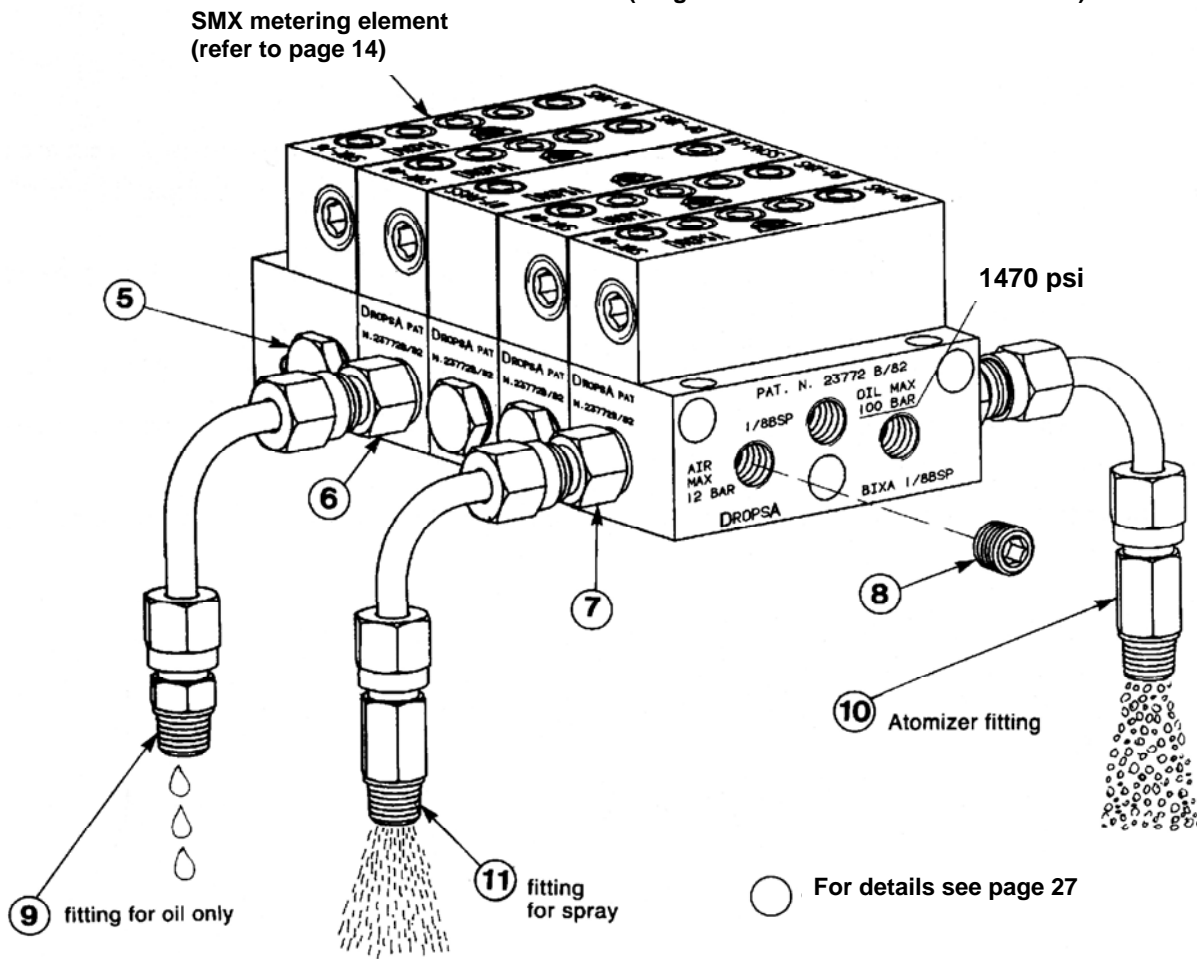
Oil accurately metered by SMX metering elements through the special “Air-oil” fitting mounted on the outlets of the base is injected into the air stream.

Just by changing the fitting on the outlet ports of the RED BASE and on the lubrication points it is possible to spray fine (atomiser fitting) or course (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.

SMX AIR-OIL

The red base is designed with an air inlet on each side. If only the outlets of one side are required the second air inlet should be plugged off.
(Plug No. 3232098 BSP – 3232095 NPTF)



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 need 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 320 cSt at a fluids working temperature between 0°C and 80°C (32°F ÷ 176°F). The best conditions are obtained with oil viscosity between 32 and 320 cSt at a temperature of 40°C (104° F).

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

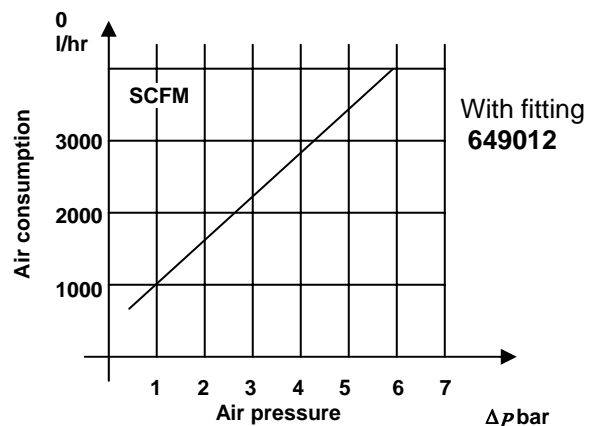
RETAINING ACTION. The over pressure inside the lubricated element prevents the ingress of foreign bodies.

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/hr) is a function of the pressure applied, the diameter of the mixing elements' holes and the number of the same.



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 or units or select the delivery and other technical information as shown on page 9.
- 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 fitting and end fittings a 6m.m. external diameter pipe is to be used.

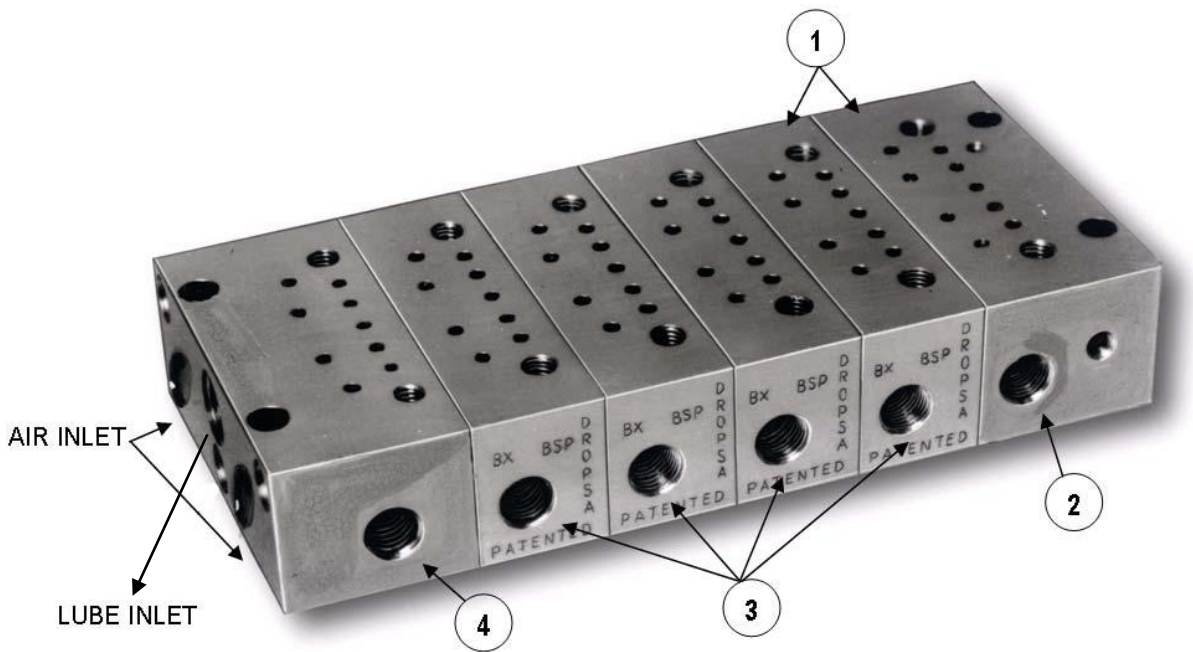


Fig. 2.- RED BASE ASSEMBLY FOR SIX METERING ELEMENTS

COMPONENTS CHOOSE

Fig.	N.	Description	Part no.		Mark
			R1/8 UNI-ISO 7/1	(NPTF)	
1	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
2	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. R1/8 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

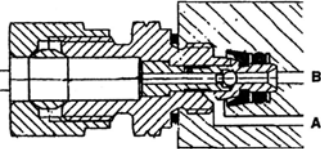
The base assembly is made of one inlet base, one or more intermediate bases one end base

MODULAR SMX METERING ELEMENTS – SECOND GENERATION

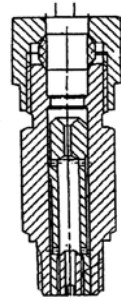
AIR-OIL LUBRICATION SYSTEM

ATOMISED OIL FITTINGS

Fitting to be mounted on the base outlet **Part No. 649006** for tube Ø 6. **Part No. 649006** for tube Ø 1/4. 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) for tube Ø 6, **Code 649013** (1/8 NPTF) for tube Ø 6, **code 649032** (1/8 NPTF) for tube Ø 1/4". Inside the fitting there is a small part in which the speed of mixed oil-air stream is increased causing the fragmentation.

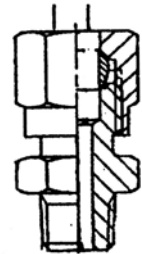


Fitting **code 649579** for tube Ø 6 and **Part No. 649029** for tube Ø 1/4 to be mounted on the base. When this fitting is mounted on all outlets, let the metering unit to work properly also when there are temporary outlet exclusions.

SPRAY OIL FITTING

Fitting to be mounted on the base outlet **code 649006** for tube Ø 6. **Part No. 649006** for tube Ø 1/4. For description and drawing see above.

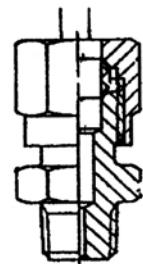
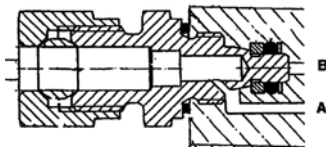
Connector fitting to be mounted on lubrication point: **code 649014** (R 1/8 UNI-ISO 7/1) for tube Ø 6 **code 649015** (1/8 NPTF) for tube Ø 6 **code 649033** (1/8 NPTF) for tube Ø 1/4". The oil spray is obtained with the fragmentation, inside the fitting, of oil drops delivered by the air.



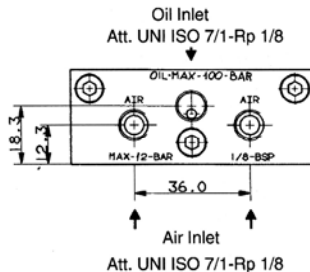
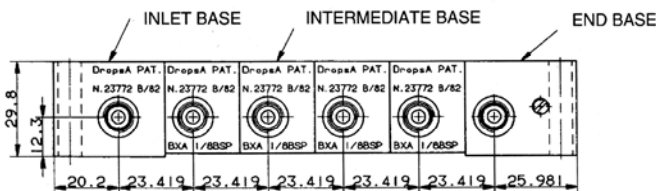
FITTINGS FOR OIL LUBRIFICATION

Fitting to be mounted on the base outlet **code 649007** for tube Ø 6. **Part No. 649006** for tube Ø 1/4. Air passage "B" is closed, thus the lubrication point will get oil through passage "A" only.

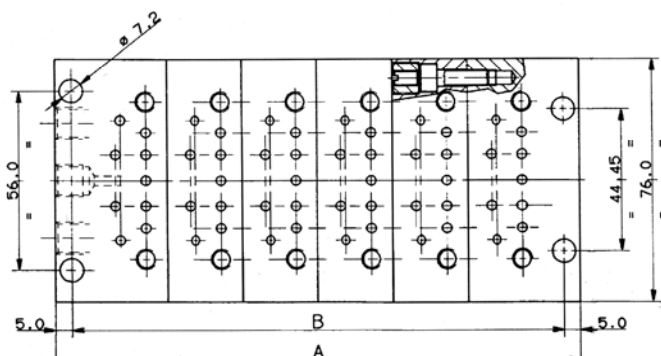
Connector fitting to be mounted on lubrication point **code 91946** (R 1/8 UNI-ISO 7/1) **code 91944** (1/8 NPTF)



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	
	A	B
3	93,02	83,02
4	116,44	106,44
5	139,86	129,86
6	163,28	153,28

MODULAR SMX METERING ELEMENTS – SECOND GENERATION

This sensor has been designed to monitor the correct functioning of a progressive system without allowing any lubricant to leak outside the operating chamber.

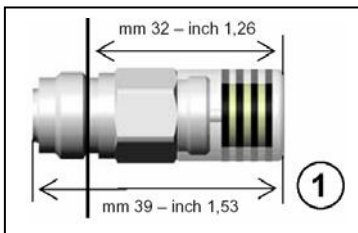
The indicator allows the checking of the SMX distribution element piston stroke.

The electronic logic characterizing the sensor allows the transmission of a visual or acoustic alarm warning or, if required, system shut down.

TECHNICAL INFORMATION:

Material:	AISI 316
Max. cycles per minute:	500
Voltage:	10 ÷ 30 V DC
Max. output current:	200 mA
Absorption at 24 V DC:	< 15 mA
Short circuit protection:	YES
Indicator Red Led:	YES
Temperature range:	-25 °C ÷ +70 °C (-77 °F ÷ +158 °F)
Protection degree:	IP 67

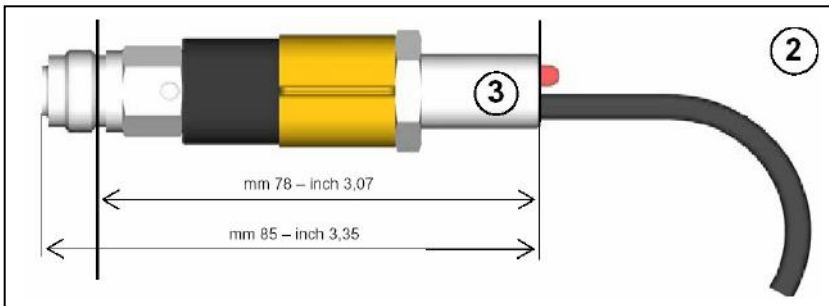
Visual Indicator for SMX 08 ÷ SMX 65



ORDERING INFORMATION:

PART NUMBER		Description
1655200	1	Visual indicator
1655201	2	Indicator with proximity PNP
1655202		Indicator with proximity NPN
1523765	3	Proximity PNP 3 wires
1523764		Proximity NPN 3 wires

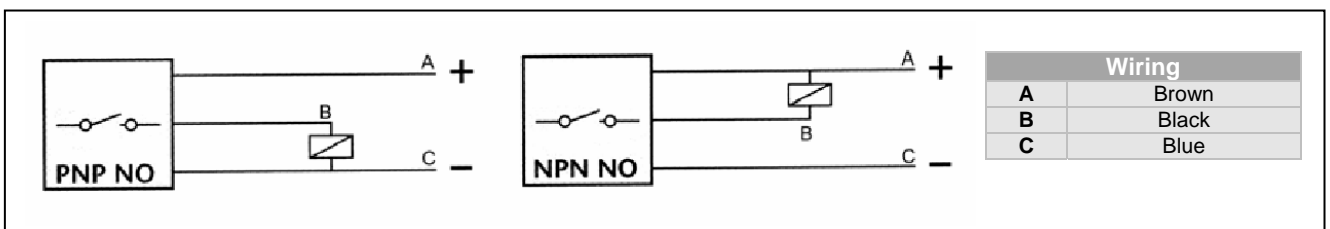
Electrical Indicator for SMX 08 ÷ SMX 65



WHEN INSTALLING:

1. Be sure that the indicator is in rest mode (piston opposite side)
2. Fasten the proximity (3) until the Led is on.
3. Unscrew for ½ turn and block off the lock nut
4. Start the system and check the correctness of the indication

Note = The magnetic system which activates the indicator is sensitive to vibrations



**SHUT OFF VALVE
THE PROGRAMMABLE PROGRESSIVE
LUBRICATION SYSTEM**



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

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 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.

ELECTRIC “SHUT OFF”

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

PNEUMATIC “SHUT OFF”

UNI-ISO 7/1 Part No.	Pressure (bar)
3155144	Min.3 Max.5

Pneumatic control with 3 way solenoid valve

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 (5880 psi.)

This valve is suitable for either light oil (min. viscosity of 15cSt) or thick grease (density up to NLGI 3) can operate at pressure of 400 bar (5880 psi.)

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.

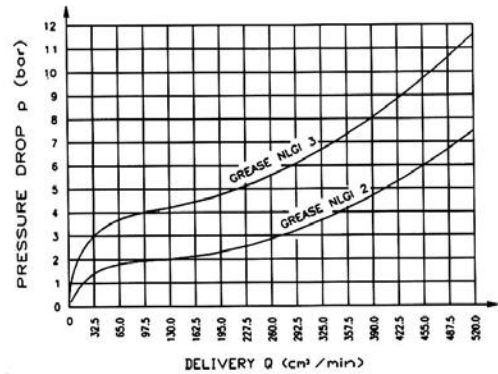
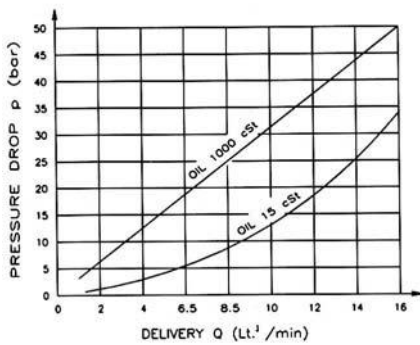
Quick location of faulty valve

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.

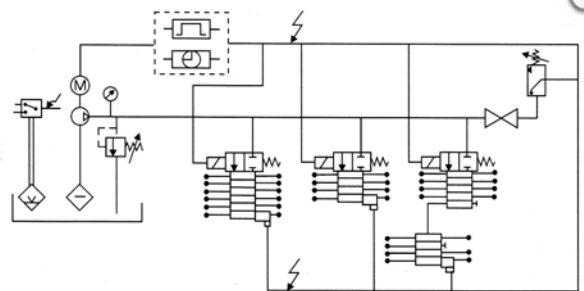
SHUT OFF VALVE
Graphs of pressure drop according to the delivery



TECHNICAL INFORMATION:

- 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, 24 V 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)
- Air driven:** min. 3 bar (44.1 psi)
max. 5 bar (73.5 psi)
- 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



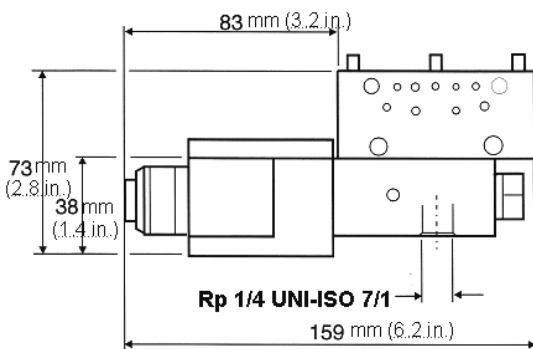
Each section of the system gets the lubricant directly from the main line through a shut-off valve controlled by an electronic controller, which is either time based or pulse / cycle counter.

No. of SMX metering unit No.	Base assy.		No. of SMX metering unit No.	Base assy.	
	UNI-ISO 7/1	NPTF		UNI-ISO 7/1	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

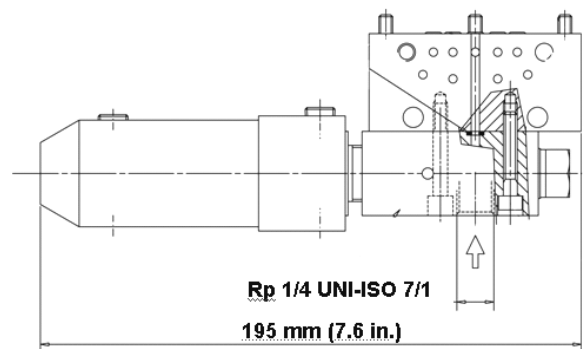
HOW TO ORDER A DISTRIBUTOR WITH SHUT OFF VALVE

- 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 17

ELECTRIC "SHUT OFF" DIMENSIONS



PNEUMATIC "SHUT OFF" DIMENSIONS



MODULAR “SMX” – SECOND GENERATION

SHUT OFF VALVE TO BE MOUNTED ON FEED LINE

These valves are similar to “SHUT OFF” valves for SMX metering elements. The difference is that they are not connected to metering elements but mounted directly on the feed line to create different sections or zones of the system.

The valves can be either:

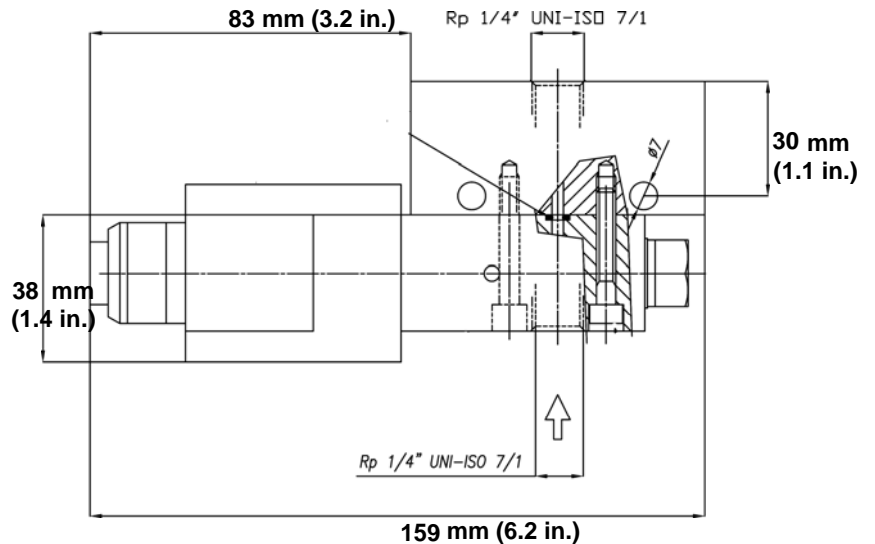
- ELECTRIC
- PNEUMATIC

TECHINICAL INFORMATION:

Lubricant:	Oil (min. 15 cSt) - Grease max. NLGI 3 at operating temperature
Temperature:	-10°C ÷ +100° C, 14 to 212° F
Voltage:	24 V dc, 110V ac 50/60 Hz, 220V ac 50/60 Hz. (Specify when ordering)
Power absorbed:	43 Watt (dc) 8 VA (ac)
Protection degree:	IP65 (connections) - IP54 (coil)
Air driven pressure:	Min. 3bar – Max. 5 bar (Pneumatic type)
Lubricant Inlet:	Rp 1/4 UNI-ISO 7/1 (BSP)
Lubricant Outlet:	Rp 1/4 UNI-ISO 7/1 (BSP)

ELECTRIC “SHUT OFF”

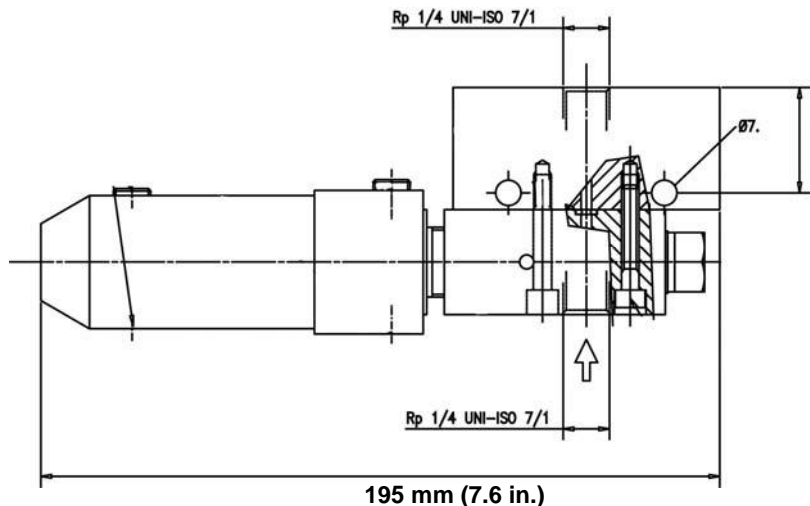
UNI-ISO 7/1 Part No.	Voltage
3155116	24V dc
3155117	110V – 50/60 Hz
3155119	220V – 50/60 Hz



PNEUMATIC “SHUT OFF”

UNI-ISO 7/1 Part No.	Pressure (bar)
3155145	Min.3 Max.5

Pneumatic control with 3 way solenoid valve



“SMP” COMPACT SIMPLE- MON BLOCK PROGRESSIVE DIVIDER VALVE

The SMP is a single block progressive divider valve that is ideal for applications where space is limited. It is available in 6,8,10 and 12 outlet versions, each with an output of 0.2 cm³ / 0.012 cu. inch per cycle. An outlet can also be merged with the sequential outlet on the block by removing the special outlet fitting and installing a plug. Visual or electronic monitoring sensor can be achieved simply by removing a plug and installing a visual or electronic monitoring can be achieved simply by removing a plug and installing a visual or electronic add-on device as shown below. The spools in a progressive metering valve operate sequentially, dispensing lubricant equally across the outlets. This is achieved by grease being pumped into the metering block inlet. In the event of a blocked lubrication point all the spools will stop, thereby allowing the user to monitor the entire system with a single monitoring device.

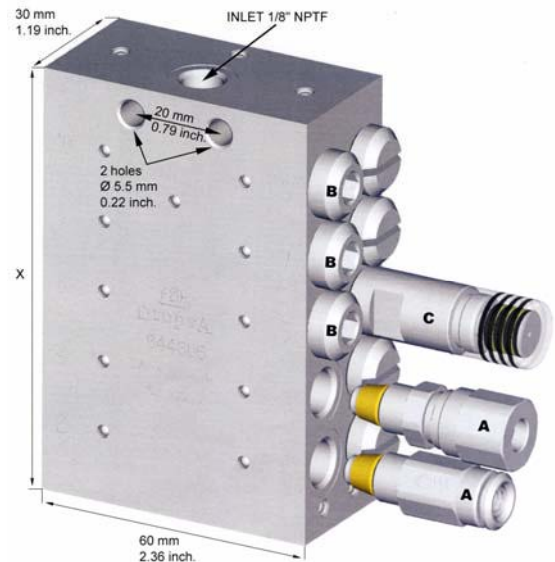
TECHNICAL INFORMATION:

SMP DIVIDER

Min. Pressure:	20 Bar, 300 psi
Max. Pressure:	300 Bar, 4400 psi
Max. Cycles per min:	625 cycles
Operating Temperature:	-10 to 70 °C, 14 to 158 °F
Lubricant viscosity:	Min.: oil 32 cSt Max.: grease NLGI 2
Material:	Zinc Plated Steel Stainless steel Aisi 304

CYCLE SENSOR

Material:	Stainless Steel
Proximity Type:	PNP or NPN 10-30V DC 200 mA



ORDERING INFORMATION:

SMP – Zinc Plated Steel			
Part. Num	X mm	X inch.	Description
644603	60	2.36	SMP 6 Outlet Divider
644604	75	2.95	SMP 8 Outlet Divider
644605	90	3.54	SMP 10 Outlet Divider
644606	105	4.13	SMP 12 Outlet Divider
Part. Num	Diagram	Accessory Description	
644637	A	Outlet fitting 1/8" BSP female	
644638		Outlet fitting compression cone Ø 4mm tube – inch. 5/32"	
644639		Outlet fitting compression cone Ø 6mm tube – inch. 15/64"	
644640		Outlet fitting push-in tube Ø 6 mm tube - inch. 15/64"	
644641		Outlet fitting compression ring Ø 6 mm tube - inch. 15/64"	
644611	B	Outlet Plug (merges into next outlet)	
1655220	C	Visual Indicator	
1655221		Electronic cycle indicator (with proximity PNP)	
1655222		Electronic cycle indicator (with proximity NPN)	
1655223		Electronic cycle indicator (with proximity NO 2 threads)	

SMP – Stainless steel			
Part. Num.	X mm	X inch.	Description
644593	60	2.36	SMP 6 Outlet Divider
644594	75	2.95	SMP 8 Outlet Divider
644595	90	3.54	SMP 10 Outlet Divider
644596	105	4.13	SMP 12 Outlet Divider
Part. Num.	Diagram	Accessory Description	
644646	A	Outlet fitting compression ring Ø 6 mm tube - inch. 15/64"	
644599	B	Outlet Plug (merges into next outlet)	
3190386		O-Ring to be ordered with outlet plug Part. Num. 644599	
1655220	C	Visual Indicator	
1655221		Electronic cycle indicator (with proximity PNP)	
1655222		Electronic cycle indicator (with proximity NPN)	
1655223		Electronic cycle indicator (with proximity NO 2 threads)	

“SMPM” COMPACT PROGRESSIVE DIVIDER VALVE

The SMPM is a single block progressive divider valve that is ideal for applications where space is limited. It is available in 6,8,10 and 12 outlet versions, each with an output of 0,07 cm³ (0,004 cu.inch) per cycle. An outlet can also be merged with the sequential outlet on the block by removing the special outlet fitting and installing a plug.

The spools in a progressive metering valve operate sequentially, dispensing lubricant equally across the outlets. This is achieved by grease being pumped into the metering block inlet. In the event of a blocked lubrication point all the spools will stop, thereby allowing the user to monitor the entire system with a single monitoring device.

TECHINICAL INFORMATION:

Min. Pressure:	15 bar (220 psi)
Max. Pressure:	100 bar (1470 psi)
Max Cycles per min.:	625 cycles
Operating Temperature:	-10 a 70 °C 14 a 158 °F
Lubricant Viscosity:	Min.: oil 32 cSt Max.: grease NLGI 2
Material:	Zinc Plated Steel

ORDERING INFORMATION:

Part Number	h mm	h inch.	Description
644623	48,5	1,90	SMPM 6 Outlet Divider
644624	60	2,36	SMPM 8 Outlet Divider
644625	71,5	2,81	SMPM 10 Outlet Divider
644626	83	3,26	SMPM 12 Outlet Divider
Part Number	Diagram	Accessories Description	
644776	A	Outlet fitting compression cone Ø 4 with valve	
644618-644619	B	Outlet Plug	

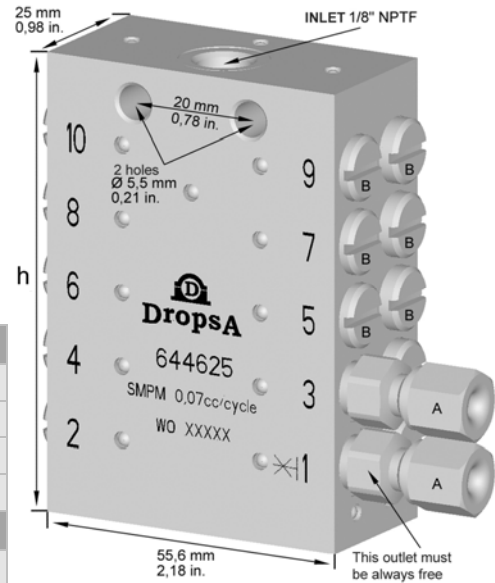
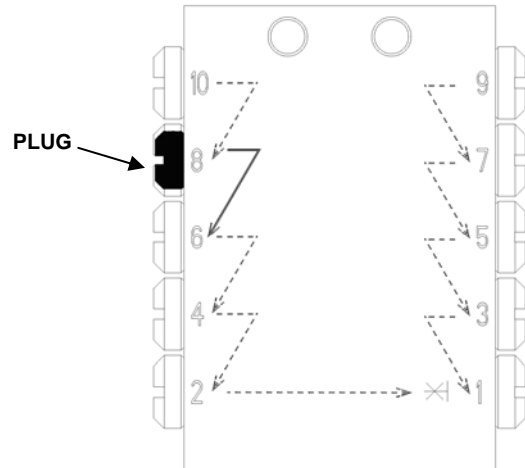
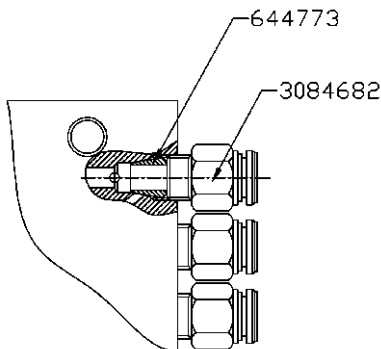


DIAGRAM OUTLETS FOR “SMP” - “SMPM”

Outputs from adjacent outlets may be combined by installing a closure plug in one or more outlets. In this example if you install a closure plug in outlet num. 8, the lubricant is redirected to the next adjacent outlet (num.6 in the example) in descending numerical order. If outlet num. 2 is plugged the lubricant is redirected to outlet num. 1. **Outlet num. 1 must never be plugged.**



PUSH-IN “SMP” - “SMPM”

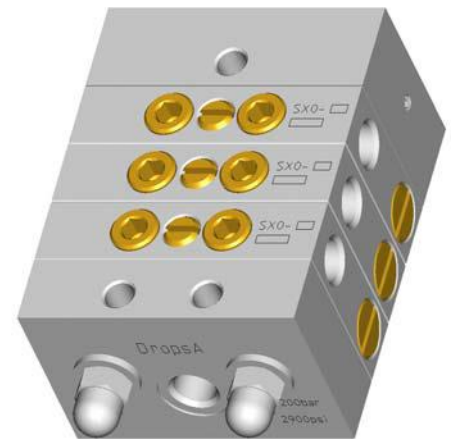


Part Number	Description
644773	Cone for single outlet
3084682	Straight connector push-in 5/16 UNF D4

MODULAR PROGRESSIVE DISTRIBUTOR "SXO" ALUMINIUM BODY

The modular progressive distributor SXO system uses a single line to distribute the lubricant. This allows full control of the system with a single control device mounted on one of the distributor elements.

As the piston movement is the essential condition for the movement of the following piston, all distributor elements of a system are connected. Therefore, if a single piston of any distributor element of the system blocks off (even if it belongs to a different base), the entire system is also blocked off. This feature is very important for the control of a centralized system: in fact, you only need a single microswitch, reed switch or inductive proximity sensor installed on a element outlet to control the full system.



SXO ALUMINIUM

TECHINICAL INFORMATION:

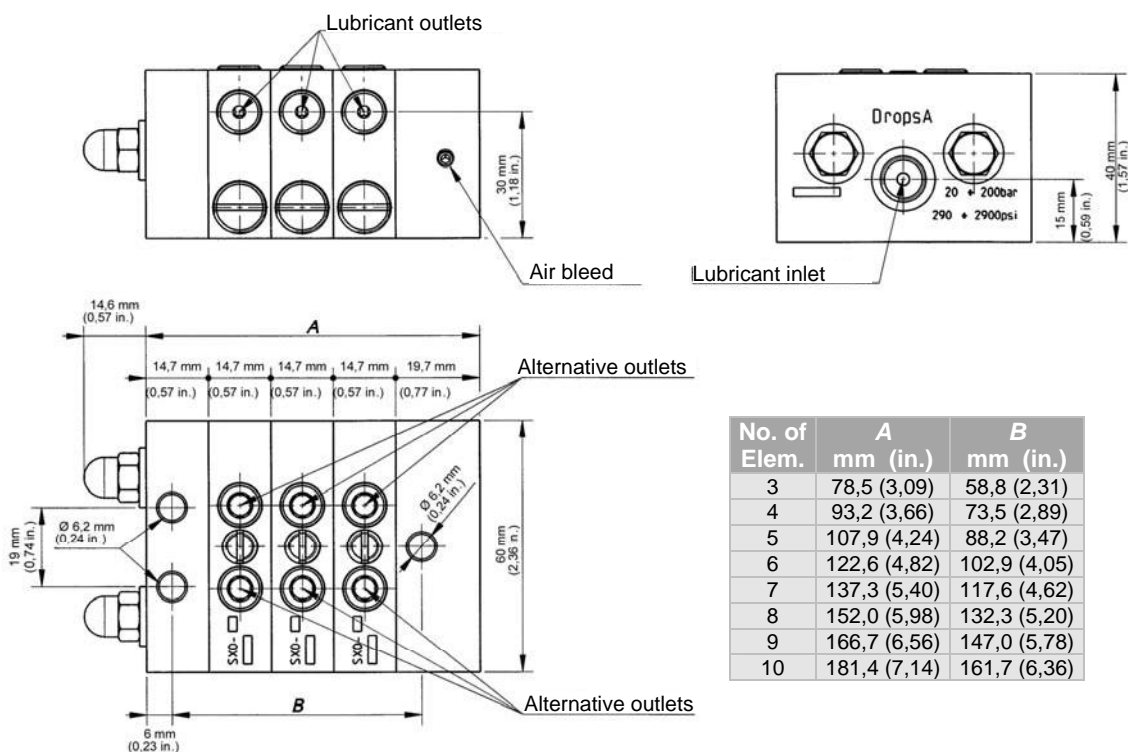
Operating pressure: min. 20 bar (290 psi)
max 200 bar (2900 psi)

No. of Cycles/minute: 200 max.

Tie-rod clamping torque: 1 kgm max.

Lubricant: oil min. 32 cSt (149 SUS)
grease max. 2 NLGI (265-295 ASTM)

		Part No.									
Nuts	Washer	Tie-rod		Inlet element			Metering element			End element	
2	2	2		1			min 3 - max 10			1	
Part No.	Part No.	No. of Elem.	Part No.	BSP 1/8	NPTF 1/8	Metric M10x1	cm ³ (cu.in.)	BSP 1/8	NPTF 1/8	Metric M10x1	Part No.
16742	16291	3	644666	644685	644695	644705	0.05 (0,003)	644680	644690	644700	644659
		4	644667				0.10 (0,006)	644681	644691	644701	
		5	644668				0.15 (0,009)	644682	644692	644702	
		6	644669				0.20 (0,012)	644683	644693	644703	
		7	644676				0.25 (0,015)	644684	644694	644704	
		8	644677								
		9	644678								
		10	644679								

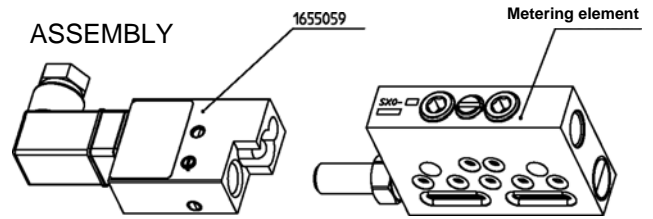


MODULAR PROGRESSIVE DISTRIBUTOR "SXO" ALUMINIUM BODY

SXO ALUMINIUM METERING ELEMENT WITH MAGNETIC CONTROL

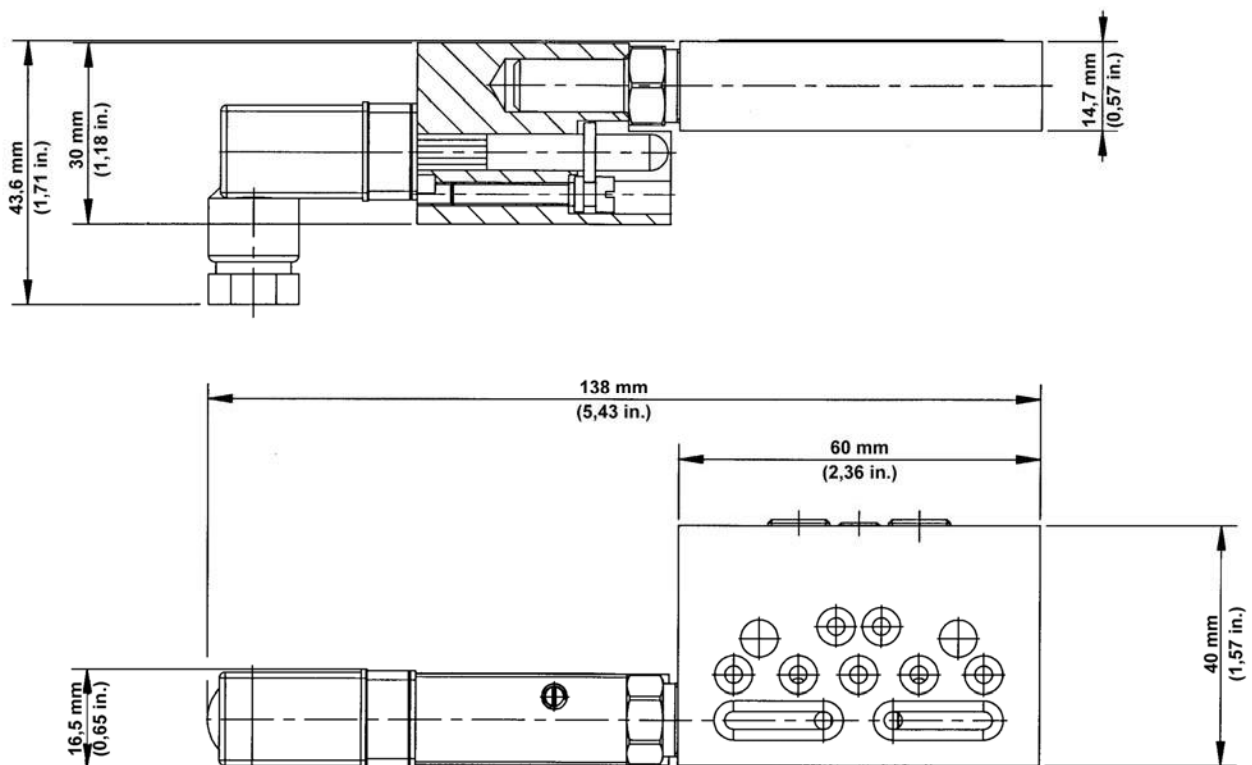
These metering elements have been designed to check the function of progressive systems. They assure that no loss of lubricant occurs outside the working chamber. They check the metering element's piston back-and-forth movement.

The magnet installed on the piston, activates a reed contact which, if it is connected to an electrical counter, can display up to 500 movements/minute.



Outlets	Symbol	Cm ³	Cu.In.	Element	Assembly
G 1/8" UNI-ISO 228/1	SX0 05	0,05	0,003	644710	644735
	SX0 10	0,10	0,006	644711	644736
	SX0 15	0,15	0,009	644712	644737
	SX0 20	0,20	0,012	644713	644738
	SX0 25	0,25	0,015	644714	644739
1/8" NPTF	SX0 05	0,05	0,003	644720	644740
	SX0 10	0,10	0,006	644721	644741
	SX0 15	0,15	0,009	644722	644742
	SX0 20	0,20	0,012	644723	644743
	SX0 25	0,25	0,015	644724	644744
METRIC 10x1	SX0 05	0,05	0,003	644730	644745
	SX0 10	0,10	0,006	644731	644746
	SX0 15	0,15	0,009	644732	644747
	SX0 20	0,20	0,012	644733	644748
	SX0 25	0,25	0,015	644734	644749

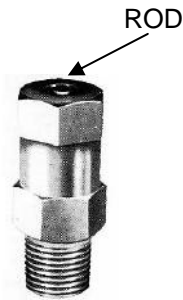
DIMENSIONS:



PRESSURE INDICATORS

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

- **Type N** in the spring loaded the pressure acts on a small hardened and ground piston which displaced 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.).
- **Type P** has a disc which bursts, when the set pressure is accidentally exceeded.
- **Type M** 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.

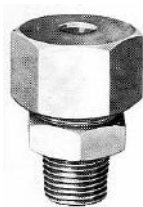


Height mm 31
Hex. 12
Thread 1/8 BSP

PRESSURE INDICATOR (TYPE N)

PRESSURE max.		Part No. assembly
P.S.I.	bar	1/8 BSP
300	20	3290019
450	30	3290006
750	50	3290007
1500	100	3290008
2200	150	3290009
2900	200	3290010
3600	250	3290011

DISC PRESSURE INDICATOR (TYPE P)



Height mm 28
Hex. 17
Thread 1/8 BSP

PRESSURE max.		Part No. assembly
P.S.I.	bar	1/8 BSP
450	30	3290012
750	50	3290013
1100	75	3290014
1500	100	3290015
2200	150	3290016
2900	200	3290017

PRESSURE INDICATOR WITH MEMORY (TYPE M)



Height mm 43
Hex. 12
Thread 1/8 BSP

PRESSURE max.		Part No. assembly
P.S.I.	bar	1/8 BSP
450	30	3290000
750	50	3290001
1100	75	3290022
1500	100	3290002
2200	150	3290003
2900	200	3290004
3600	250	3290005

MODULAR PROGRESSIVE DISTRIBUTOR "SXO" ALUMINIUM BODY

BRIDGE ELEMENTS:

Characteristics								Fitting				Bridge Elements							
Thread	A	B	C	Ch	L	Tube C	Code	Ch	L	H	I	Code	Ch	L	H	I	Code		
BSP	1/8	1/8	1/8	12	36,5	6	640999	12	29	15	14,7	640041	12	29	23,5	14,7	640061		
NPTF	1/8	1/8	1/8	12	34,5	-	640101	12	29	18,5	14,7	643156	12	29	23	14,7	643158		
Metric	M10x1	1/8 BSP	M10x1	12	36,5	6	640102	12	29	14	14,7	645016	12	29	23,5	14,7	645017		



STAINLESS STEEL VISUAL INDICATOR



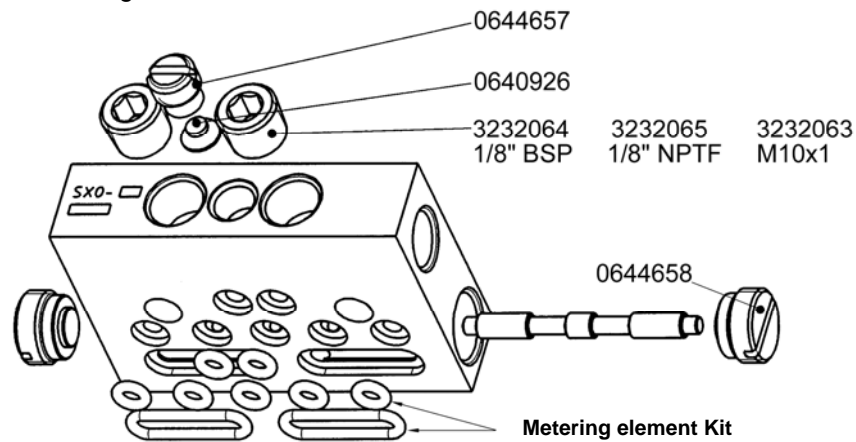
Assembly Part No.
1655210
M12x1

Height mm 38 (1,5 in.)
Hex. mm 13 (0,51 in.)

SPARE PARTS

Complete set of "O-Rings" for:

Inlet element: Part No. **0640817**
Metering Element: Part No. **0640816**
End Element: No "O-Rings"



Note: It is possible to double the delivery of a single element by removing the washer underneath the central plug. (Part No. **0640926**).
 The plugs to plug off the second outlet (Part No. **3232064 - 3232065 - 3232063**) must be ordered separately.

PUMPS, FITTINGS
AND ACCESSORIES FOR
SERIAL 26

HAND-OPERATED PUMPS FOR OIL AND GREASE

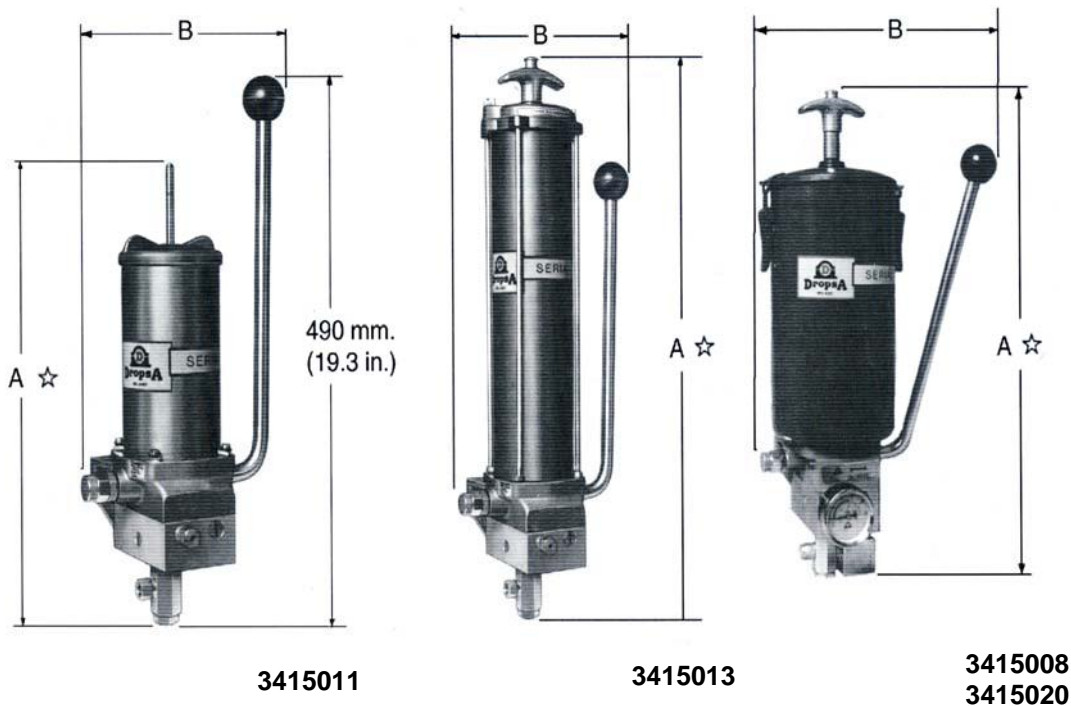
DOUBLE ACTING PISTON PUMPS

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 (BSP)
Re-filling valve:	G 1/2 A UNI-ISO 228/1 (BSP)



Part No.	Reservoir	Lubricant	Height 'A' mm. (in.)	Width 'B' mm. (in.)	Depth mm. (in.)	Weight Kg. (lb..)	Characteristics
3415008	5 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	5 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	2 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	1 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	1 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	5 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.

**Min 32 cSt – Max 1000 cSt

HAND-OPERATED PUMPS FOR OIL AND GREASE

SINGLE-STROKE 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.



128075

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 (BSP)

Part No.	Reservoir	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight Kg. (lb..)
128075	Kg. (2.2 lb..)	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)

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

**Min 32 cSt – Max 1000 cSt

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 is complete with visual indicator and re-filling filter.



3105024

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 'A' mm. (in.)	Width 'B' mm. (in.)	Depth mm. (in.)	Weight Kg. (lb..)
3105024	0,8 Kg. (1,7 lb)	NLGI 00	340/350 (13.39/13.78)*	120 (4.72)	138 (5.43)	2,2 (4.8)
3105023	0,8 Lt (1,7 pints)	OIL**	340 (13.39)	120 (4.72)	138 (5.43)	2 (4.4)

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

**Min 32 cSt – Max 1000 cSt

SINGLE-STROKE PUMPS

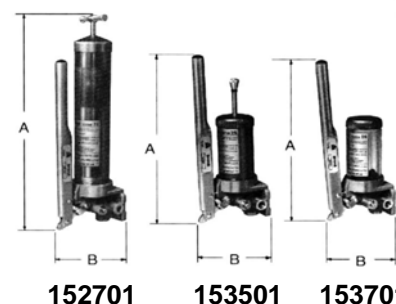
Pump of sturdy construction for heavy duty.

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)



152701

153501

153701

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

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

**Min 32 cSt – Max 1000 cSt

HAND-OPERATED PUMPS FOR GREASE

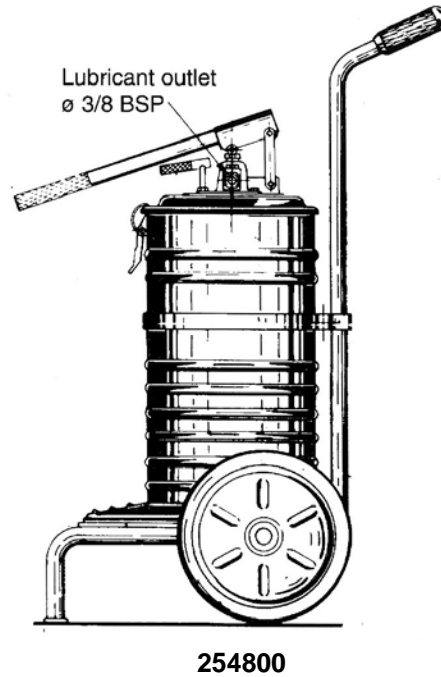
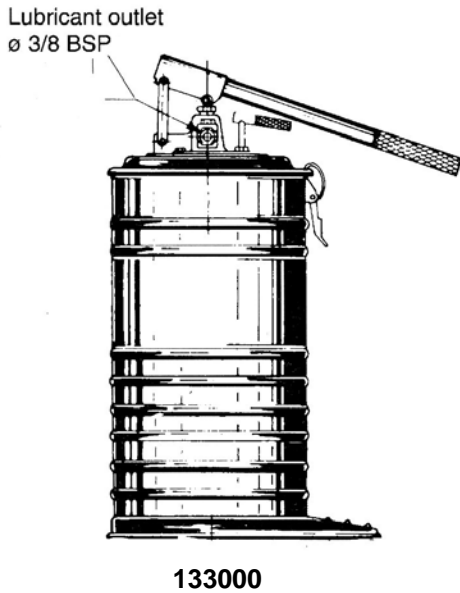
HIGH PRESSURE SINGLE STROKE PUMPS

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.

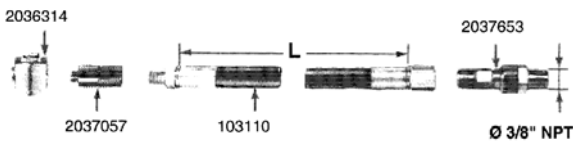
TECHNICAL INFORMATION:

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



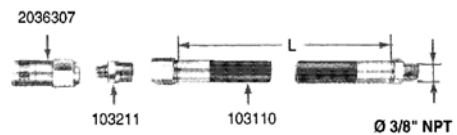
Part No.	Reservoir Lt. (pints)	Lubricant	Height mm. (in.)	Width mm. (in.)	Ø mm. (in.)	Weight Kg. (lb)	Characteristics
133000	12 (26.5)	NLGI 1	610 (24.0)	330 (13)	230 (9.1)	10 (22)	Trolley pump
254800	12 (26.5)	NLGI 1	1065 (41.9)	330 (13)	230 (9.1)	28 (61.7)	Trolley code 1140000

ACCESSORIES (to be ordered separately)



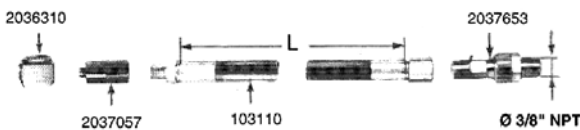
Assy. code 101840

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



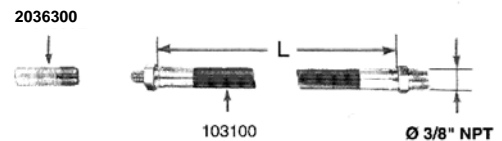
Assy. code 101820

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



Assy. code 101835

Flex Ø 10x22 with connector for button head nipple. Standard 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

TROLLEY MOUNTED OR PORTABLE PUMPS FOR REFILLING

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 Ø 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 12 Kg. (26.4 lb) drums
Height: 1110 mm. (43.2 in.)
Width: 800 mm. (31.2 in.)
Weight: kg. (19.8 lb.)



132055 = grease
132056 = oil



PORTABLE

Height: 600 mm. (23.4 in.)
Width: 330 mm. (12.8 in.)
Weight: kg. (19.8 lb)

132000 = grease
132054 = oil

TRANSFER PUMPS

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

Piston pump equipped with suction hose. Delivery 30 g. per stroke. Pressure 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 others non corrosive, non abrasive materials.

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



1524611
1524612
1524613
1524614
grease

For drums Kg.	Pump Part No. (*)	Cover Part No.	Follower plate (grease only) Part No.
12,5	1524611	154615	1141103
20	1524612	154616	1141130
50	1524613	154617	1141131
200	1524614	154618	1141140

(*) Pump part number already include Cover and follower plate.

ACCESSORIES AND SPARE PARTS

Charging valve:

Part No.132160

Directly connection 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**



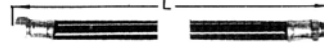
Transfer valve **Part No. 101777**- \varnothing tube 13x23. \varnothing 3/8" BSP (3/8" NPT) taper.



Hose without oil transfer valve **Part No. 101778** - \varnothing 3/8" BSP (3/8" NPT)



Refilling pump hose: **Part No. 101779** \varnothing tube 13x23



When specifying indicate flex length 'L' in cm.

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

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

Height: 1110 mm. (43.2 in.)



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.) **code 45297** (24V dc)
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: Pressurized reservoir for the pumping of thick grease.

TECHNICAL INFORMATION:

Ratio: 50:1

Driven air pressure: 0,3 MPa (3 bar) min.
0,8 MPa (8 bar) max

Adjustable delivery: from 0,5 to 2 cm³ per stroke.

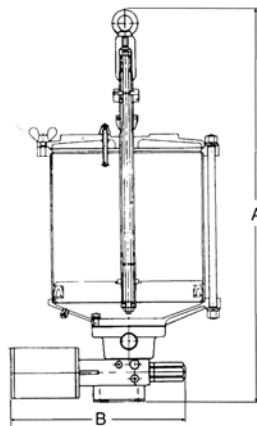
Lubricant outlet: Rp 1/4 UNI-ISO 7/1

Air compressed inlet: G 1/8 UNI-ISO 228/1 – Pipe housing Ø 6

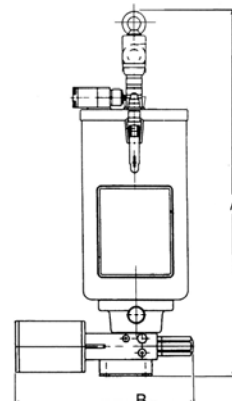
Re-filling valve: G 1/2 UNI-ISO 228/1



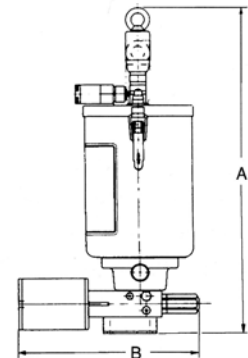
3413002



3413014



3413012



3413018

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)							
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.

AIR OPERATED PUMPS

'LOCOPUMP' FOR GREASE NLGI2

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 thechnopolymer and is equipped with electric control-switch.

TECHNICAL INFORMATION:

Compression ratio:	50:1
Driven air pressure:	min.0.3 Mpa (3bar) max.0.6 Mpa (3bar)
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)



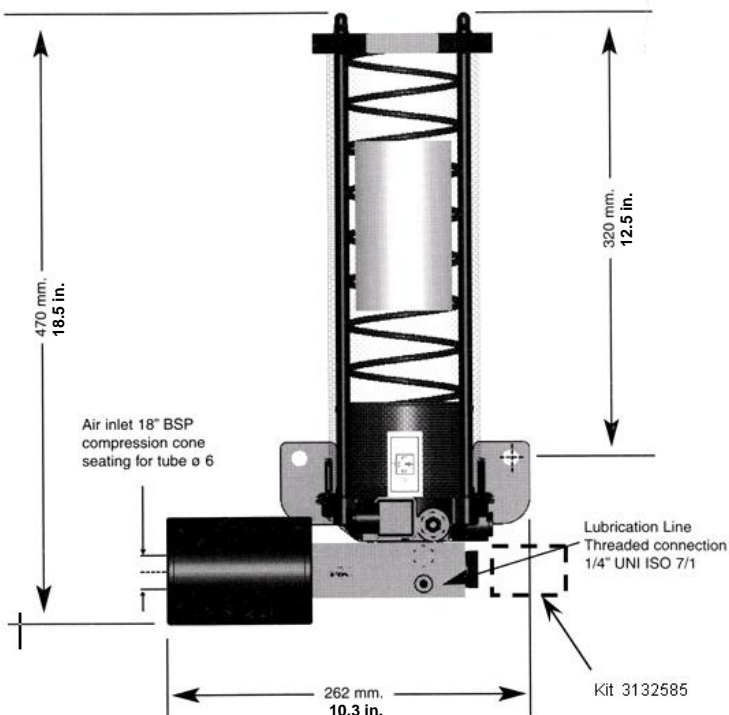
ORDERING INFORMATION:

Part No.	Description
3413050	Locopump

ACCESSORIES:

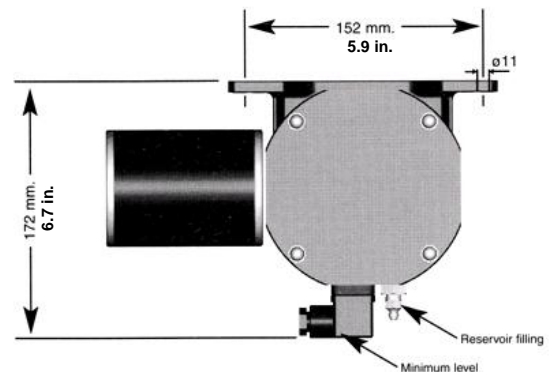
3-way solenoid valve	
Part No.	Description
45273	110V - 50 Hz.
45274	220V - 50 Hz.
45275	24V - 50 Hz.

DIMENSIONS:



VIP controller (optional):	
Part No.	Description
1639076	24V d.c.
1639077	110/120V 220/240V 40/60 Hz.

Cycle:	min. 10 seconds max. 59 hours 50 min.
Interval:	min. 1 minute max. 99 hours 59 min.



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.)

code 45297 (24V dc)

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

TECHNICAL INFORMATION:

Ratio: 50:1

Driven air pressure: 0,3 MPa (3 bar) min.

0,8 MPa (8 bar) max

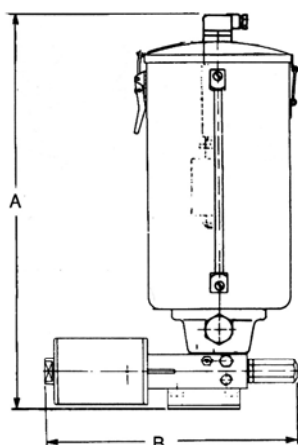
Adjustable delivery: from 0,5 to 2 cm³ per stroke.

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

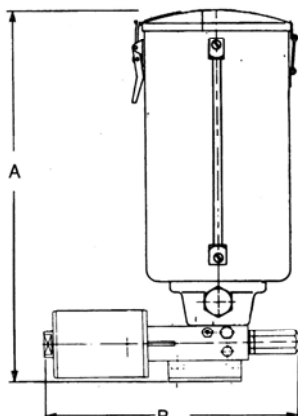
Air compressed inlet: G 1/8 UNI-ISO 228/1 – Pipe housing Ø 6 mm

Re-filling valve: G 1/2A UNI-ISO 228/1

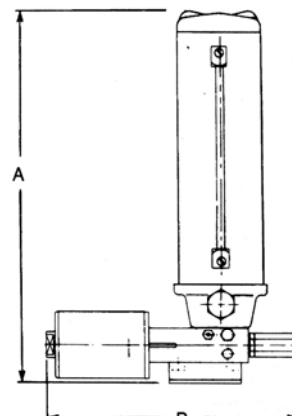
Pumpable lubricant: Oil min 32 cSt – max 2000 cSt at the operating temperature



3414006



3414002



3414001

Part No.	Reservoir Lt. (lb.)	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 (10.6)	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 PUMPS

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.

TECHNICAL INFORMATION:

Ratio: 50:1

Driven air pressure: 0,3 MPa (bar) min.

0,8 MPa (8 bar) max

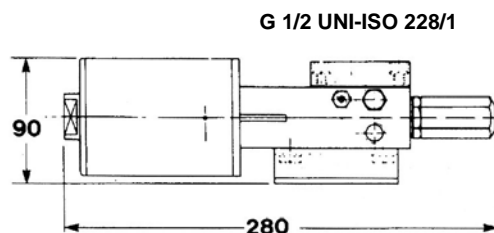
Adjustable delivery: from 0,5 to 2 cm³ per stroke.

Lubricant inlet: G 1/2 UNI-ISO 228/1

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

Air compressed inlet: G 1/8 UNI-ISO 228/1 – Pipe housing Ø 6 mm

Pumpable lubricant: Oil min 32 cSt – max 2000 cSt at the operating temperature



3414005

AIR OPERATED PUMPS

SINGLE ACTING AIR OPERATED MODULAR PUMPS

Pumps of sturdy construction and high resistance consisting of: steel body, hardened and lapped steel piston and pneumatic driven cylinder housing a light alloy piston equipped with oil-resisting rubber basket.

A 3-way solenoid valve is required (available on demand): **Part N. 45273** (110V – 50 Hz), **Part N. 45274** (220V – 50 Hz), **Part N. 45275** (24V – 50 Hz) **code 45297** (24V dc). Reservoir made of transparent technopolymes and is equipped with electric Min./Max. level control-switch (**Part N. 201670** without electric Min./Max. level control).

The modular concept of this pump allows to assembly the same pump body **Part N. 201674** with different reservoir for oil or grease of 2 Kg (Lt) o 4 Kg (Lt).

TECHNICAL INFORMATION:

Ratio:	50:1
Driven air pressure:	Min 0,3 Mpa (3bar)
	Max 0,8 Mpa (8bar)
Delivery:	8 cm ³ per stroke
Lubricant outlet:	G 1/4 UNI-ISO 228/1
Air compressed inlet:	G 1/8 UNI-ISO 228/1
Re-filling valve:	Rp 1/4 UNI-ISO 7/1
Lubricant:	Grease
	Oil min 15 cSt
	Max 1000 cSt at the operating temperature



Pump assy. Part No.	Reservoir Kg. (lb.)	Reservoir Part No.	Lubricant	Height mm./inc.	Length mm./inc.	Weight Kg/lb
201610	2 (4.4)	201680	NLGI 00	565 (2.22)	115 (4.5)	5 (11)
201618	2 (4.4)	201681	NLGI 2	565 (2.22)	115 (4.5)	5,4 (11.9)
201670	2 (4.4)	201682	NLGI 00	383 (1.50)	160 (6.2)	5 (11)
201686	2 (4.4)	201687	NLGI 00	420 (1.65)	160 (6.2)	5 (11)
201671	2 (4.4)	201683	NLGI 00	560 (2.20)	160 (6.2)	5,2 (11.4)
201620	2 (4.4)	201685	OLIO	565 (2.22)	115 (4.5)	5 (11)
201672	2 (4.4)	201684	OLIO	560 (2.20)	160 (6.2)	5,1 (11.2)

Note: A part from **Part No. 201670**, all pumps are equipped with electric Min./Max. level control-switch.

PNEUMATICALLY CONTROLLED PUMP – SIMPLE EFFECT – FOR RECOVERING OIL SYSTEM

The pump has a steel body and the control unit is made up of a cylinder in which slides a piston with an oil resistant rubber seal.

The control unit require a three-way distribution device (on request): **cod. 45273** (110V – 50 Hz), **cod. 45274** (220V – 50 Hz), **cod. 45275** (24V – 50 Hz), **cod. 45297** (24V dc).

The pump has a electrical minimum level indicator, magnetic type, and fitting with filter for the return in the reservoir. The reservoir is in polythene.

TECHNICAL INFORMATION:

Ratio:	9:1
Driven air pressure:	Min. 0,3 Mpa (3 bar)
	Max. 0,8 Mpa (8 bar)
Delivery:	2,6 cm ³ per stroke
Lubricant outlet:	Tube Ø 4
Air compressed inlet:	Tube Ø 4
Re-filling valve:	Raccordo portagomma per tubo Ø 6
Lubricant:	Oil Min. 15 cSt
	Max. 1000 cSt at the operating temperature



Part No.	Reservoir Lt. (lb.)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight Kg. (lb..)	Characteristics
3103068	1,7	OLIO	193 (0.7)	196 (0.7)	113 (0.4)	1,5 (3.3)	With paper return filter 10 micron
3103069	2,7	OLIO	200 (0.8)	242 (0.9)	133 (0.5)	1,7 (3.7)	With paper return filter 10 micron

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-50Hz.)

code: 45274 (220V-50Hz.)

code: 45275 (24V-50Hz.)

code 45297 (24V dc)

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. Pump **code 3103112** is equipped with polythene reservoir.

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 cm³ 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.

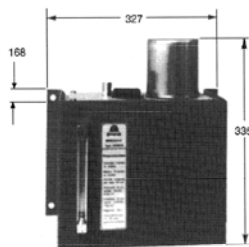
Pumpable lubricant: Oil 32 cSt min. – 1000 cSt max. at the operating temperature.



3103025



3103026



3103027



3103112

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
3103026	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 (12.3)	168 (6.60)	8 (17.6)	With minimum level electric contact
3103112	6 (12.6)	OIL	348 (13.7)	240 (9.4)	134 (5.27)	5 (11.0)	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-desaerated greases with low penetration indexes. It consists of a ground cylinder, a piston with double seal, by-pass valve, minimum level electric 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:

Driven air 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)	NGLI 3	815 (32.1)	182 (7.20)	182 (7.20)	22 (48.5)
3044125	5 (10.6)	NGLI 3	510 (20.1)	182 (7.20)	182 (7.20)	14 (30.9)



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.), **code 45297** (24V dc).

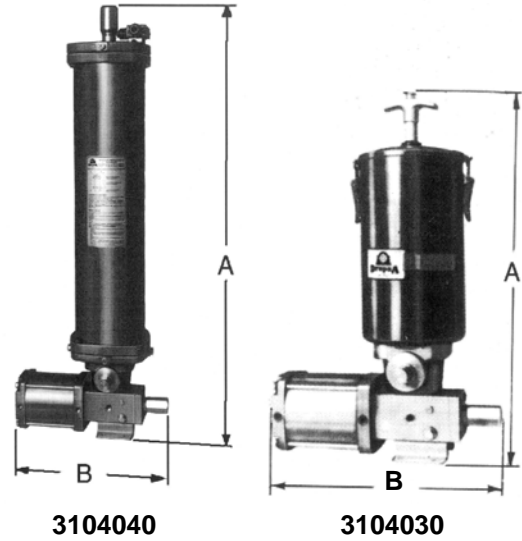
Pumps are available in two models according to the reservoir:

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 cm³ 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 the empty/full reservoir.

OIL PUMPS

Part No.	Reservoir Lt. (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

**Min 32 cSt – Max 1000 cSt

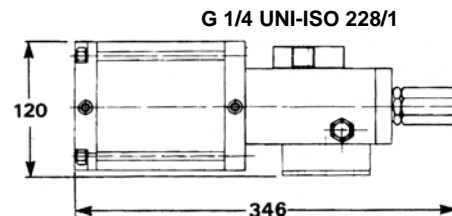
DOUBLE ACTING AIR OPERATED PUMPS WITHOUT RESERVOIR

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 air pressure: 0,4 MPa (4 bar) (58 psi.) min.
 0,8 MPa (6 bar) (116 psi.) max
Adjustable delivery: from 6 to 15 cm³ 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
Pumpable lubricant: Oil 32 cSt min. – 1000 cSt max. at the operating temperature.



3104001

PUMPS WITH PNEUMATIC MOTOR

OIL AND GREASE PUMPS 234000 SERIES.

Pumps of sturdy construction equipped with a pneumatic motor and pimping 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 INFORMATION:

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 Ø 8

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)	



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 INFORMATION: 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		-



234125
234126

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.

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 available.

TECHNICAL INFORMATION: see pumps 234000 series.

PUMPS COMPLETE WITH GUN ROTARY CONNECTOR AND FLEX

Part No.	Tank kg.(lb)	Lubricant	Height mm. (in.)	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. (in.)	Ø mm. (ins.)	Weight Kg. (lb)	RESERVOIR
254020	20 (44)	NLGI 1	850 (33.5)	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



254500

PUMPS WITH PNEUMATIC MOTOR

PUMPS SERIES 234000 WITH RESERVOIR 5 LITRE (10.5 PINTS)

Particular indicated for Progressive systems, these pumps are equipped with steel reservoir with pressure disk (for grease pumps), level indicator rod, minimum level electrical contact and filling valve fitting G 1/2 UNI-ISO 228/1.

The reservoir for oil pumps is equipped with filling filter, visual level and minimum level electrical contact.

Base pump is Series 234000.



TECHNICAL INFORMATION: see pumps Series 234000

Part No.	Reservoir kg. (lb)	Lubricant	Height mm. (in.)	Width mm. (in.)	Depth mm. (in.)	Weight Kg. (lb)
233335*	5 (44)	NLGI 1	580 (33.5)	275 (12.6)	240 (84)	18,5
233310	5 (44)	NLGI 1	580 (26.8)	240 (12.6)	240 (64)	18,3
233330*	5 (44)	OIL	580 (30.0)	275 (12.6)	240 (79)	18,5

* Pumps Part No. **233335** e **233330** are equipped with 2 way solenoid valve 110V – 50 Hz. Please ask for different voltages.

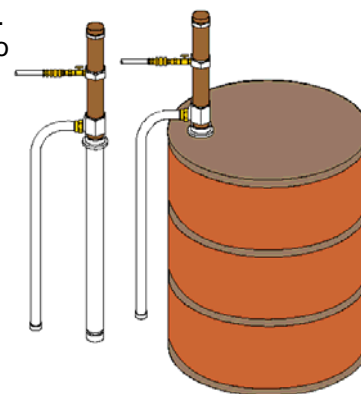
ACCESSORIES FOR SERIES 234000 PUMPS

Part No.	Description
101100*	Hose, flexible, air: R 1/4 UNI-ISO 7/1 Ø hose flex 8 x 17
234063	Suction filter
1140200	Trolley for tanks 20 Kg
1151000	Gun
2037659	Rotating connector
2513006	Nipple to connect pump to the flexible hose: Ø 1/2" – 27 threads flex side – R 1/4 UNI-ISO 7/1 pump side
2513021*	Hose flexible for lubricant: e Ø 1/2" – 27 threads Ø hose flex 6 x 17

* To order the flexible hose the overall length must be added to the Part No.
E.g.: Flexible hose 500 cm: 2513021 + 500 = 2513521 (code to insert in the order)

TRANSFER PUMP

This type of pneumatically controlled automatic pump is suitable for transferring oil, light grease and noncorrosive fluids from 400 lb. (180 Kg.) commercial drums. It can be fixed onto the drum using a mobile bung adapter that allows the pump to be positioned at the required depth and the outlet to be pointed in any direction. The pump is supplied complete with pump fixing collar cod. 72182 with thread G 2A UNI-ISO 228/1, air cock (code 50501) and snap on connector (code 919000) with thread G 1/4 UNI-ISO 228/1.



TECHNICAL INFORMATION:

Ratio: 1:1
Operating air pressure: Min. 4 bar – Max 14 bar
Delivery with pressure of 7 bar: 50 Lt/min. oil (SAE 50)
 25 Lt/min. oil (SAE 140)
Lubricant outlet: Rp 1 UNI-ISO 7/1
Air inlet: G 1/4 UNI-ISO 228/1

Part No.	For tanks Weight kg. (lb)	Hight mm. (in.)	Piston rod Ø mm. (in.)	Weight Kg. (lb)	Characteristics
72160	180 (44)	1347	60 (33.5)	9 (12.6)	Without flexible hose
72161	180 (44)	1347	60 (26.8)	9 (12.6)	With flexible hose cod. 72215*

***72215 Transfer flexible hose** length 120 cm (47.24 in)

PNEUMATIC GREASE PUMPS "234700" SERIES

DESCRIPTION:

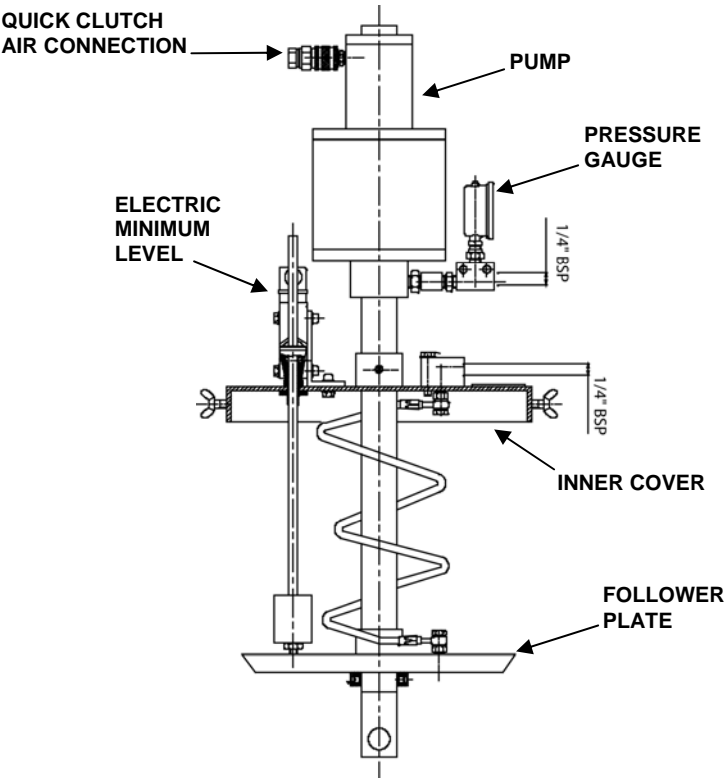
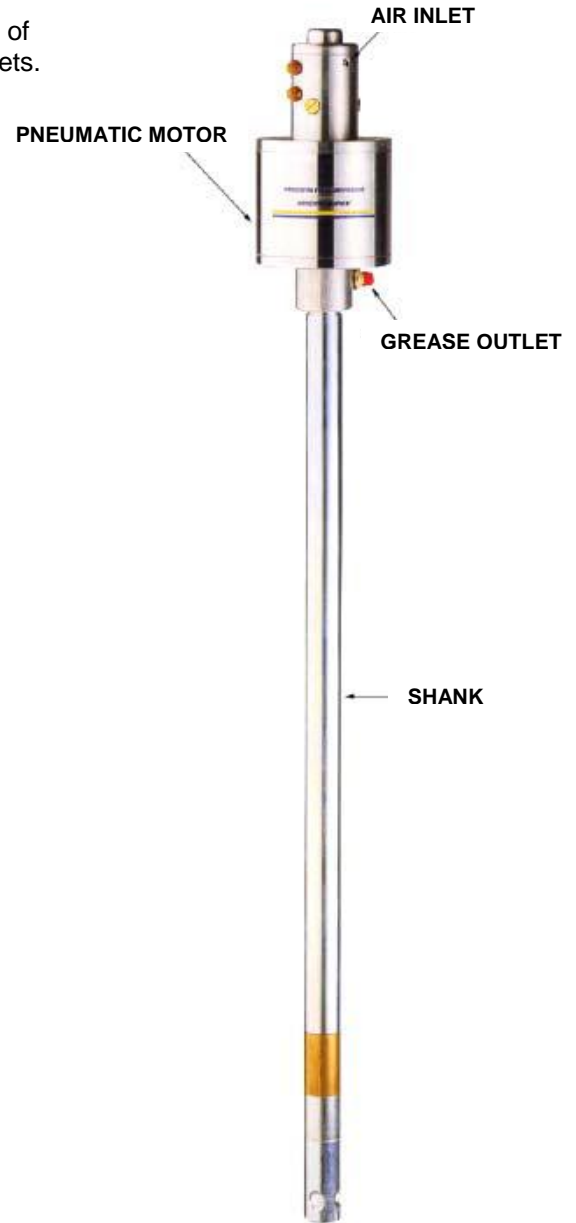
The pneumatic grease pump is an assembly consisting of a cam pneumatic motor connected to a piston-pump located at the bottom of the suction unit. This equipment is required in all working conditions where grease needs to be pumped under pressure (such as bearings, hubs, pins, fittings, etc.).

The motor consists of a pneumatic cylinder slave to an automatic device which alternatively supplies two chambers determining the in-continuous movement.

Pump designing features allow the suction of high viscosity fluids without pump priming or oil addition for pump operation. The pump, combined with a suitable grease follower plate completed with O-ring-seals both on the hub and on the outer lip, allows the suction of the whole lubricant inside the drum with no generation of air pockets.

TECHNICAL INFORMATION:

Compression ratio:	50 : 1 10 : 1
Working pressure:	Min. 2 bar (0,2 MPa) Max. 10 bar (1 MPa)
Recommended pressure:	6 bar (88.2 psi)
Lubricant outlet:	1/4" BSP
Air inlet:	1/4" UNI-ISO 228
Lubricant:	NLGI 2 Max. at the operating temperature
Electric minimum level:	15°-250 Vac Max.



PNEUMATIC PUMPS

ORDERING INFORMATION:

Part No.	For tanks kg. (lb)	Ø Follower plate mm (in.)	Inner cover Ø mm (in.)	Height mm. (in.)
1524136	20 (44)	290 (11.41)	315 (12.40)	490 (19.29)
1524365	25 (55)	310 (12.20)	345 (13.58)	490 (19.29)
1524850	50 (110)	350 (13.77)	400 (15.74)	750 (29.52)
1524598	200 (440)	590 (23.22)	600 (23.62)	930 (36.61)

HEAVY DUTY PNEUMATIC PUMPS

PUMPS FOR OIL AND GREASE SERIES 400000

Pumps of sturdy construction 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 oil cups or small reservoirs.

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: 1330 mm.
Air motor length: 447 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		400170	NLGI 2	40:1	8.5 kg/min. NLGI 1/NLGI 2
400205	400100	400165	Oil	25:1	22 litres/min. SAE 140 OIL
400210		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 – **1141617:** Follower plate.

Air supply valve, complete with floating slide, held on seat by the air pressure; self-sealing and self-cleaning.

Corrosion-proof steel rod! It is guided to prevent faulty alignment of the air control valves; chromium plated, hardened and lapped, to reduce the wear of the seals to a minimum.

Minimum friction! Air piston, in synthetic rubber slides in a corrosion proof lapped aluminium cylinder.

No interruption for adjustment of lubrication, the air motor is sealed; there are no exposed moving parts.

Double self alignment joint! Safety spring square thread.

Forced feed device! Allows the feed of very hard lubricants into the compression chamber.

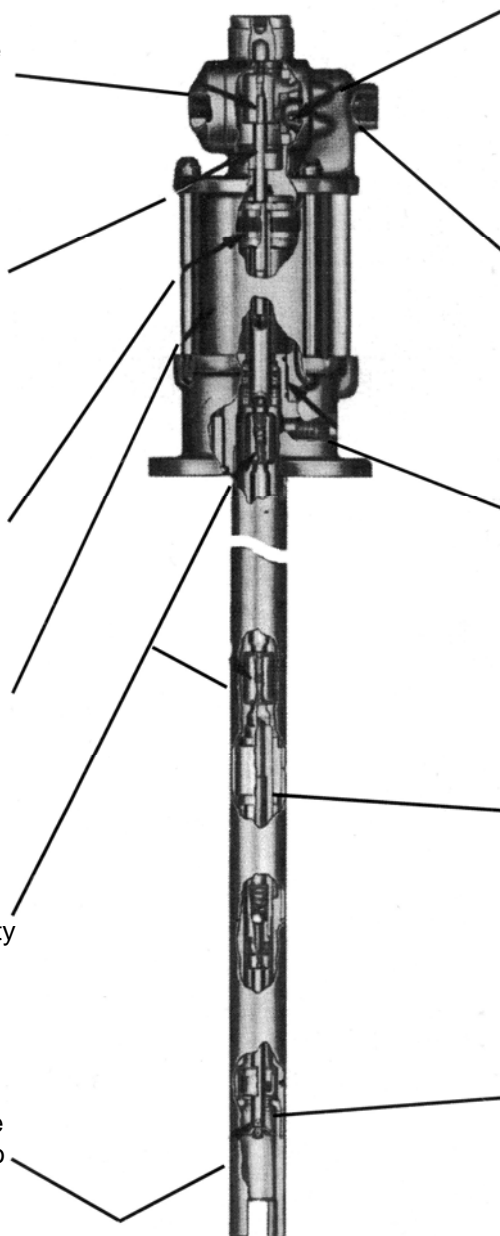
Reliable operation! A double toggle joint correctly positions the distribution valve.

Wide air discharge! To reduce the outlet air temperature drop to a minimum for maximum efficiency.

Long life seals! Accurate assembly resistance and quality of the materials used, ensure a good seal for long periods.

Maximum life! No seal. The piston and cylinder are made of special steel, treaded, ground and micro-lapped.

Sure priming! The base valve is made of hardened steel and ensures a perfect seal.



PNEUMATIC PUMPS WITH HOIST

PUMP WITH HOIST 400330

Pump with Hoist **400330** consist of a pneumatic-driven pump, a hoist and a follower plate.

These equipments are required in all working conditions where grease needs to be pressed under pressure. It is suitable for transferring hard fluids from commercial drums without cover.

It can be used also to feed central lubrication system with hard grease up to NGLI 2.

TECHNICAL INFORMATION:

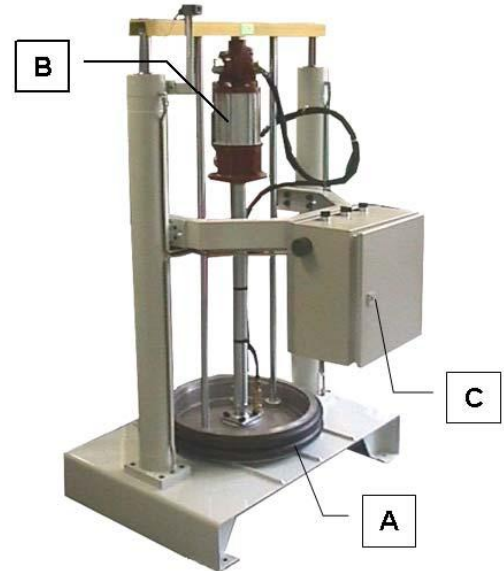
Ratio: 40:1
Lubricant: Grease max. NGLI 2
Delivery: pressure of 5 bar (73.5 psi) , 8.5 kg/min ca. (free flow)

N.B. Use of air filtered at a pressure of 8 bar (117.6 psi) max.

The pneumatic-driven piston "A" inserted in drum not only makes easier pump "B" aspiration but also guarantees **total pumping down of a drum**.

Insert of piston in a full drum and its extraction from the empty drum are carried out by unit "A-B" through a lifting and pushing down movement, via control-drive of pneumatic cylinders, which constitute bracket vertical rods.

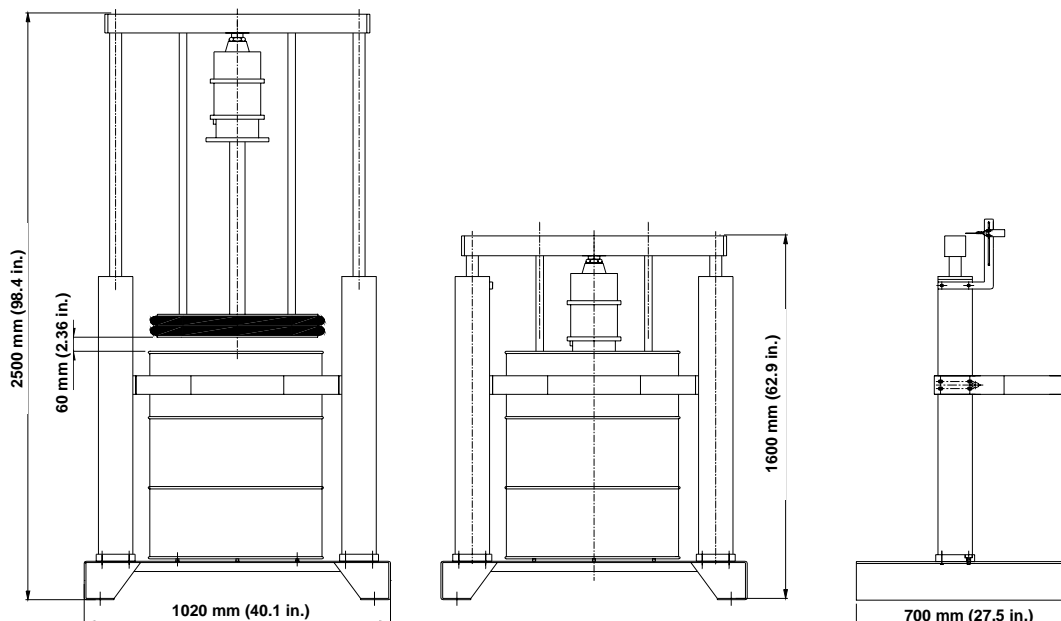
The unit can be hold by only one operator who operates control panel "C".



ORDERING INFORMATION:

Part No.	Description
400330	Pump Hoist - Pneumatic-driven Pump for 180 kg (396,82 lb) drums

DIMENSIONS:



PNEUMATIC PUMPS WITH HOIST

PUMP WITH HOIST 400320 AND 400332 SERIES

Pump with Hoist **400320** and **400332** consist of a pneumatic-driven pump, a hoist and a follower plate.

Pump with Hoist **400332** is also completed with an electro-pneumatic inverter.(*)

These equipments are required in all working conditions where grease needs to be pressed under pressure.

With an air-pressure of 4 bar (58.8 psi), the piston presses grease with a total load of 75 kg ca. (165.3 lb ca.).

N.B. (*) Electro-pneumatic inverter

It causes pressurization reversal in lines via an electro-valve controlled by an electric panel which is connected to the end of line pressure-switch.

TECHNICAL INFORMATION:

Ratio: 50:1
Lubricant: Grease max. NGLI 2
Delivery: pressure of 5 bar (73.5 psi) , 360 rev/min ca. (free flow)

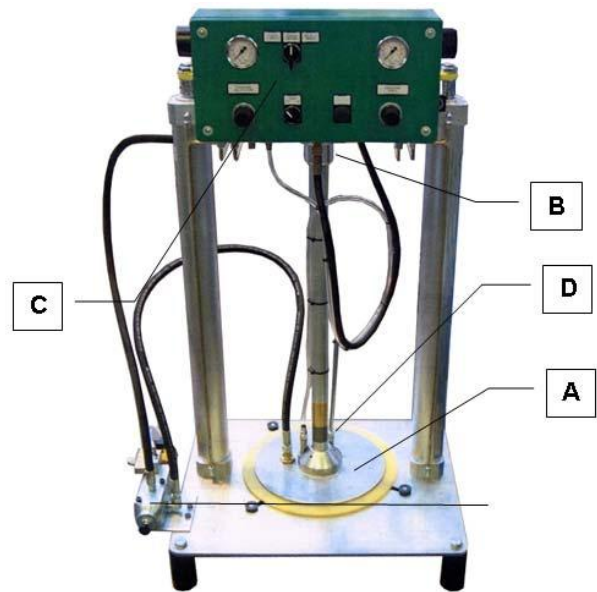
N.B. Use of air filtered at a pressure of 8 bar (117.6 psi) max.

The pneumatic-driven piston "A" inserted in drum not only makes easier pump "B" aspiration but also guarantees **total pumping down of a drum.**

Insert of piston in a full drum and its extraction from the empty drum are carried out by unit "A-B" through a lifting and pushing down movement, via control-drive of pneumatic cylinders, which constitute bracket vertical rods.

The unit can be hold by only one operator who operates control panel "C".

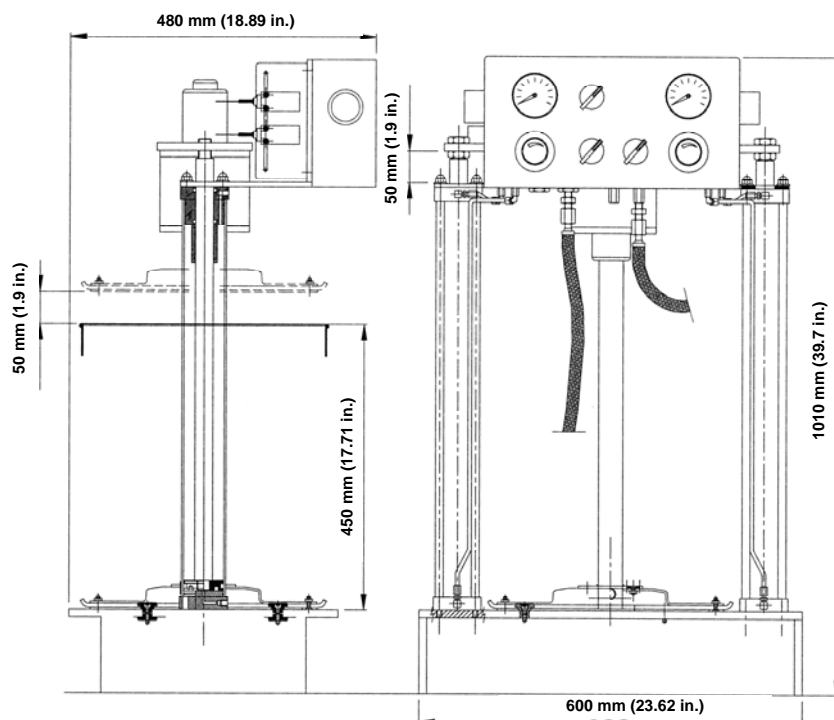
Follower plate is completed with a discharge valve "D" for loading a new drum. This valve is manually controlled via a shaft.



ORDERING INFORMATION:

Part No.	Description
400320	Pump Hoist - Pneumatic-driven Pump for 20 kg (44.09 lb) drums
400332	Pump Hoist - Pneumatic-driven Pump for 50 kg (110.23 lb) drums

DIMENSIONS:



HYDRAULIC CONTROL PUMPS

SINGLE ACTING HYDRAULIC CONTROL GREASE PUMPS

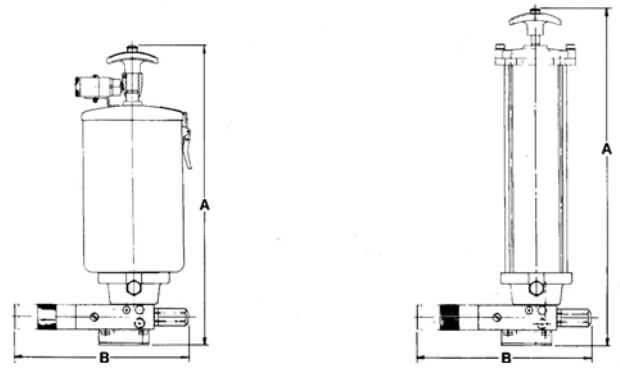
Pumps of sturdy construction for heavy duty consisting of: steel body, hardened and lapped steel piston and pneumatic driven cylinder housing a light alloy piston equipped with oil-resisting rubber gasket. Pumps are available in two models according to the type of reservoir:

Reservoir with follower plate.

Reservoir with follower plate and spring.

TECHNICAL INFORMATION:

Ratio: 4.8:1
Driven air 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 outlet: Rp 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



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.

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: Rp 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
Pumpable lubricant: Oil 32 cSt min. – 1000 cSt max. at the operating temperature.



3414014

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

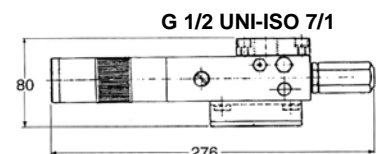
* The two heights refer to the empty/full reservoir.

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

TECHNICAL INFORMATION:

Ratio: 4.8:1
Driven oil pressure: 3 MPa (30 bar) (435 psi.) min.
 6 MPa (150 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: 4,0 kg
Width: 115mm



3414004

HYDRAULIC CONTROL PUMPS

MOTORISED GEAR PUMPS "DRAGON" SERIES

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

TECHNICAL INFORMATION:

GEAR PUMP

Delivery:	350 or 500 cm ³ at 1500 r.p.m.
Max. operating pressure:	70 bar (1015 psi.) with three-phase motor, 40 bar (580 psi.) with single phase motor. (intermittent service). 30 bar (435 psi.)
Pumpable lubricant:	oil with viscosity from 15 to 1000 cSt or grease grade NLGI000 at the operating temperature.
Operating temperature:	from +5°C at + 60°C
Suction filter:	filtering grade 260 micron.

ELECTRIC MOTOR

Standard motor:	three phase at 4 poles multivoltage or single phase as specified.
Standard three phase motor:	220/380V - 240/415V - 225/440V - 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. 24V dc motors and 110V 50 Hz 90 Watts motors available on request



RESERVOIR

Capacity:	3 - 6 litres in Polythene semi-transparent. 3 litres in aluminium with level sight glass and 6 litres in steel with level sight glass. Available on request.
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LOW LEVEL INDICATOR FOR OIL, MAGNETIC TYPE

Reversible float with contact normally closed on the minimum level.
Max. commutable power 50W - 50VA
Max. voltage 220 ac - 150 V 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 GREASE

Voltage 20V ac - max. voltage 250V ac
Peak current 10 mA - max. 300 mA

MOTORIZED GEAR PUMPS "DRAGON" SERIES

MOTORIZED GEAR PUMPS FOR OIL 15 ÷ 1000 cSt:

Reservoir (polypropylene) Part No.		Delivery cm ³ /min (1500 rpm)	Motor
3 Lt	6 Lt		
3903050 3903054	3903052 3903056	350 500	three-phase motor 220/380V - 240/415V 50 Hz 220/380V - 240/415V - 225/440V - 227/480V 60 Hz 90 Watts.
3903070 3903074	3903072 3903076	350 500	Single phase 220/50Hz 90 Watts.

MOTORIZED GEAR PUMPS FOR GREASE NGLI 000 MAX.:

Reservoir (polypropylene) Part No.		Delivery cm ³ /min (1500 rpm)	Motor
3 Lt	6 Lt		
3903081	3903142	350	three-phase motor 220/380V - 240/415V 50 Hz 220/380V - 240/415V - 225/440V - 227/480V 60 Hz 90 Watts.

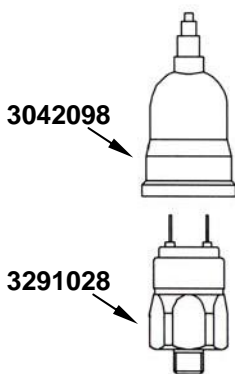
ACCESSORIES:

Part Number	Description
3291028	Pressure switch 10 ÷ 20 Bar
3042098	Rubber cover for pressure switch
20564	Pressure gauge 0 ÷ 100 Bar
3085230	Fitting

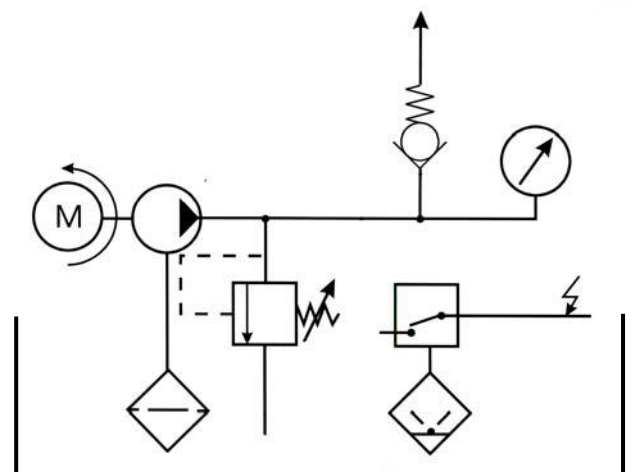
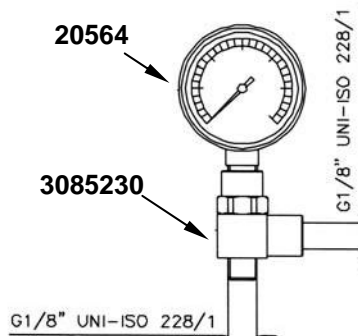
PUMPS SERIES DRAGON

HYDRAULIC DIAGRAM

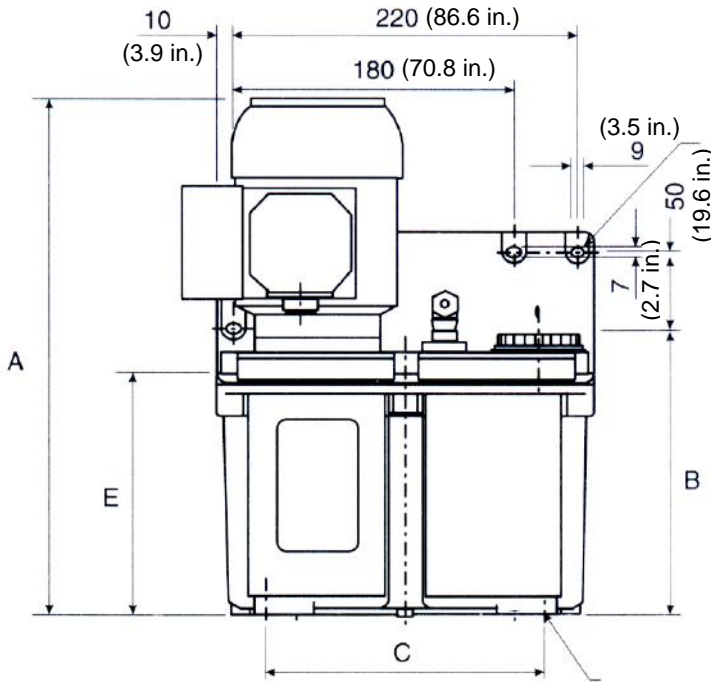
PRESSURE SWITCH



PRESSURE GAUGE



MOTORIZED GEAR PUMPS "DRAGON" SERIES

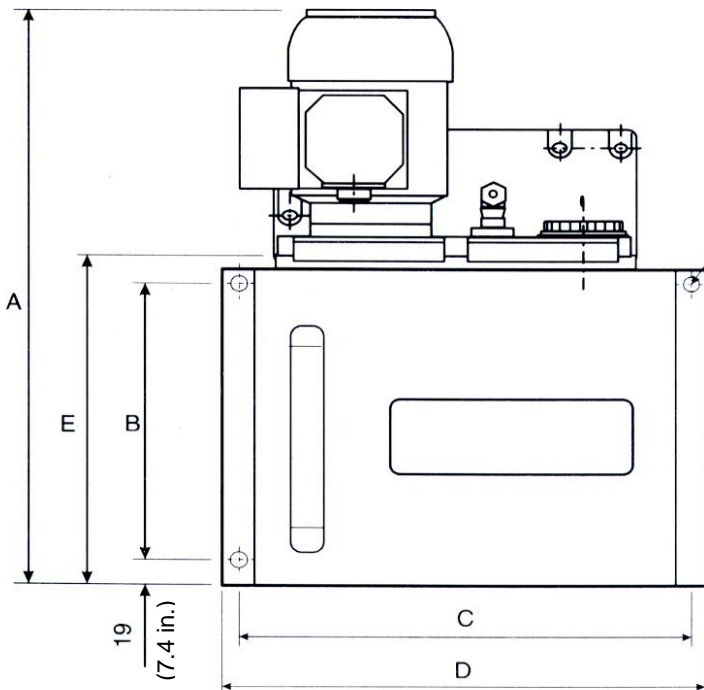


RESERVOIR CAPACITY 3 LITRE POLYTHENE

	mm	inches
A	337,5	13.28
B	187	7.36
C	177,8x101,5	7.0x3.96
D	240	9.45
E	160,5	7.00

RESERVOIR CAPACITY 3 LITRE ALUMINIUM

	mm	inches
A	330	12.99
B	179	7.05
C	177,8x101,5	7.0x3.96
D	240	9.45
E	152,5	6.0



RESERVOIR CAPACITY 6 LITRE POLYTHENE

	mm	inches
A	430,5	16.9
B	280	11
C	177,8x101,5	7.0x3.96
D	240	9.45
E	253,5	9.9

RESERVOIR CAPACITY 6 LITRE STEEL

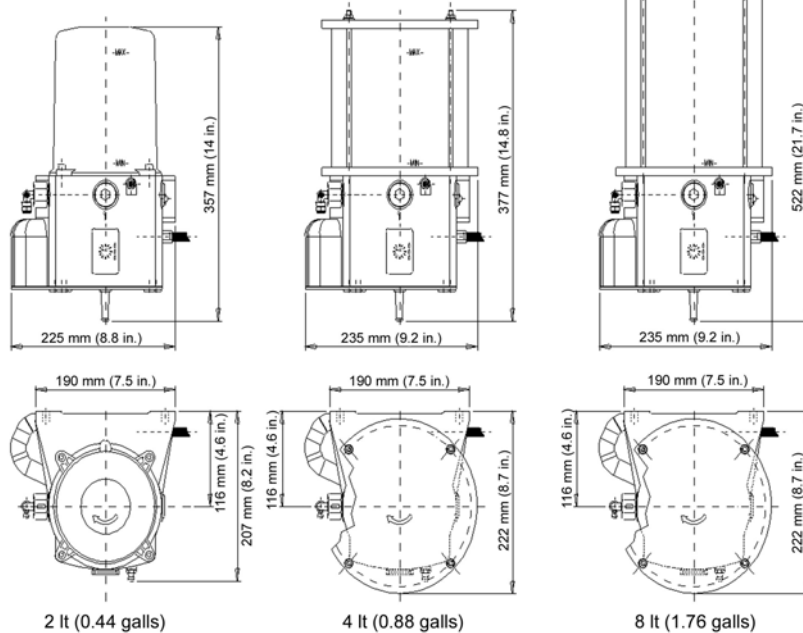
	mm	inches
A	421	16.5
B	205	8.0
C	305	12.0
D	327	12.8
E	243,5	9.5

MOTORISED GEAR PUMPS "MLP" SERIES

The MLP Electric Grease Lubrication Pump is particularly suitable for Mobile lubrication applications, where outdoor installation is necessary. It can be fitted with up to 3 pump outlets and used with progressive divider systems to construct a fully automatic mobile lubrication system. The unit has a choice of three sizes of reservoir all provided with the magnetic sensor for the minimum level. It can also incorporate a Cycle-Dwell/Cycle or Dwell-Sensor Timer! (Dwell-sensor will stop the pump after reading a cycle from a progressive distributor valve).

TECHNICAL INFORMATION:

Operating Temperature:	from - 15°C to + 80°C (+ 5 °F to + 176 °F)
Number of outlets:	1 standard, 3 max
Grease:	NLGI 2 max
Operating voltage:	12 V DC - 24 V DC 110 V AC - 230 V AC 80 V A
Power consumption:	
Delivery per min at 20°C (+68°F):	c. 2.8 cm ³ (0.17 cu.in)
Outlet port:	1/4" BSP
Incorporated pressure by-pass:	250 bar standard (3675 psi)
Non return valve:	Included on outlet
Work Time (ON Time):	Min. 20 sec. Max 8 min.
Pause Timer (OFF Time):	Min. 5 min. - max 12hr.
Short-circuit protection:	Included



PUMPS SERIES MLP

ORDERING INFORMATION:

Voltage	STANDARD (NO TIMER)			DWELL-ONTIMER			DWELL-SENSORTIMER		
	Reservoir 2 kg. 4.4 lb	Reservoir 4 kg 8.8 lb	Reservoir 8 kg 17.6 lb	Reservoir 2 kg. 4.4 lb	Reservoir 4 kg 8.8 lb	Reservoir 8 kg 17.6 lb	Reservoir 2 kg. 4.4 lb	Reservoir 4 kg 8.8 lb	Reservoir 8 kg 17.6 lb
12V	888300	888301	888302	888312	888313	888314	888324	888325	888326
24V	888303	888304	888305	888315	888317	888317	888327	888328	888329
110V	888306	888307	888308	888318	888320	888320	888330	888331	888332
230V	888309	888310	888311	888321	888323	888323	888333	888334	888335



MOTORISED GEAR PUMPS

TECHNICAL INFORMATION:

PUMP

Delivery: 350 or 500 cm³/min. at 1500 r.p.m.
Max. pressure: 7MPa (70 bar) (1015 psi.) 40 bar three phase motor intermittent service. 3MPa (30 bar) (435 psi.) continuous service.
Oil viscosity: 15 to 1000 cSt at the operating temperature
Suction filter: filtering grade 260 micron.
Operating temperature: +5°C a +60°C
Lubricant outlet: ready for 6 mm tube connection

MOTOR

Three phase 220/380V - 50Hz - 90W Frame size 56 Protection degree IP55 (IP55 on demand)
 Insulation class F
 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 - 50 VA.
Max. voltage: 220V ac - 150V dc - Max. current 3A

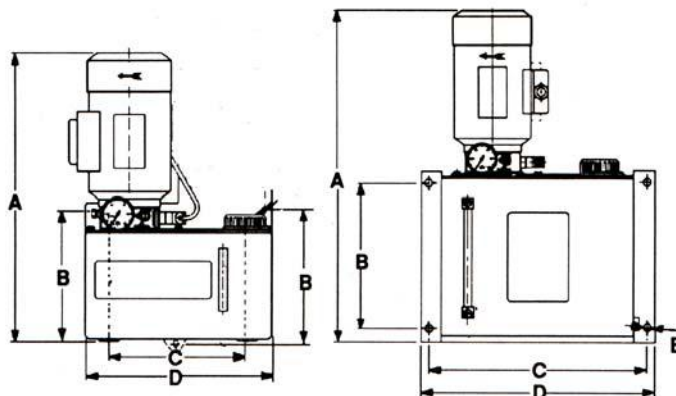
GAUGE:

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

ORDERING INFORMATION:

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	3405236	3405237	3405253	3405254

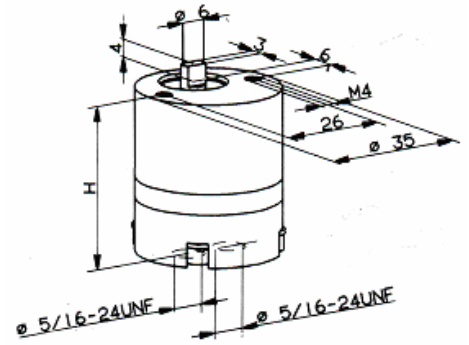
RESERVOIR CAPACITY		DIMENSIONS										WEIGHT	
Litres	U.S pints	A		B		C		D		E		Kg.	Lb
		mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.		
2,7	5.7	328	12.9	166	6.55	175	6.9	240	9.45	6,5	0.26	5	1.1
3	6.3	378	14.9	171,5	6.75	177,8	7.0	240	9.45	6,5	0.26	6,1	13.4
6	12.7	470	18.5	205	8.05	305	12	327	12.90	11	0.43	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. Max. pressure 7 MPa (70 bar) 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.

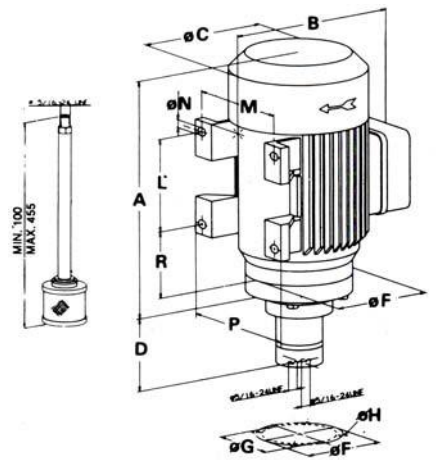


Part No.		Delivery litres/min. (pints/min.)	Height mm. (in.)
External installation	Reservoir mounting		
3099127	3099129	0,35 (0.74)	38 (1.5)
3099004	3099130	0,5 (1.06)	40 (1.6)
3099131	3099133	1,2 (2.54)	47 (1.8)

MOTORISED GEAR PUMPS FOR EXTERNAL INSTALLATION

Part No.	Delivery litres/min. (pints/min.)	Power (kw.)	Motor		Weight kg. (lb.)
			r.p.m.	Size	
3405000	0,5 (1.06)	0.09	1500	56	3,7 (8.2)
3406000	1 (2.11)	0.25	3000	63	5,5 (12.1)
3407000	0,5 (1.06)	0.185	1500	63	5,5 (12.1)
3407000	0,35 (0.74)	0.09	1500	56	3,7 (8.2)

Part No.	Dimensions mm. (in.)												
	A	B	C	D	E	F	G	H	L	M	N	P	R
3405000	171	137	104	56	80	65	56	5,5	71	90	6	106	36
3406000	194	153	119	56	90	75	58	5,5					
3407000	194	153	119	56	90	75	58	5,5					
3402002	171	137	104	56	80	65	56	5,5	71	90	6	106	36

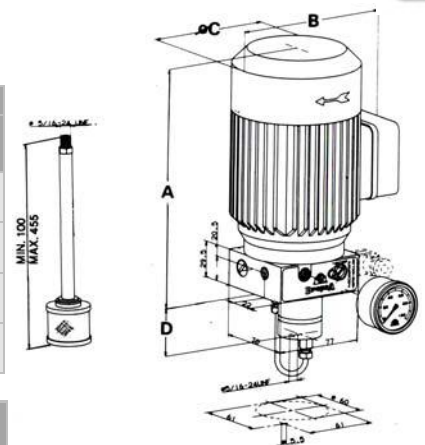


Standard motor voltage and frequency: 220/380V - 50Hz. (different voltage and frequency to be specified when ordering) protection degree IP 55. Suction filter with suction tube is available on demand. Filtering grade 260 micron - max. suction height 500 mm. Filter **code 3088172** (length 455 mm.)

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 litres/min. (pints/min.)	Power (kw.)	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** (455 mm.)

Min. level contact **code 165570** connector for min. level contact **code 39843** connector base **code 39842**.

Tube for minimum level electric contact	
Part No.	Length mm. (in.)
3079069	79 (3.1)
3079070	163 (6.4)
3079071	324 (12.8)
3079072	428 (16.8)

MODULAR MOTOR DRIVEN PUMPS FOR GREASE 989000 SERIES

DESCRIPTION:

989 Series is a compact and low cost pump particular suitable for lubrication of small or medium size machinery. The modular construction of 989 series pumps enables easy dismantling for maintenance, guarantees very high reliability and allows very fast adjustment of the units for different operating conditions. 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.) All the pumping unit are interchangeable with 999 Series.

TECHNICAL INFORMATION:

Fixed delivery: 10 cm³ / min (0.61 cu. in/min)
with pumping unit Ø 6 mm
17 cm³ / min (1.03 cu. in/min)
with pumping unit Ø 8 mm

Adjustable delivery: 1,4 - 10 cm³ / min (0.085 - 0.61 cu. in/min)
with pumping unit Ø 6 mm
2,5 - 17 cm³ / min (0.15 - 1.03 cu. in/min)
with pumping unit Ø 8 mm

Pressure max: 300 bar (4410 psi.)

Lubricant: NLGI 000, NLGI2 Max

Reservoir: 5 Kg (11 lb)

Motor: 220/380 V – 50/60 Hz

Working temperature: +10 ÷ +40 (+50 ÷ +104 °F)



ORDERING INFORMATION:

FIXED DELIVERY

PART NO.	DESCRIPTION
989001	Grease electric pump with 1 pumping unit Ø 6 mm
989002	Grease electric pump with 1 pumping unit Ø 8 mm

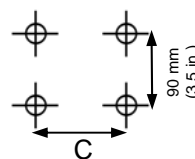
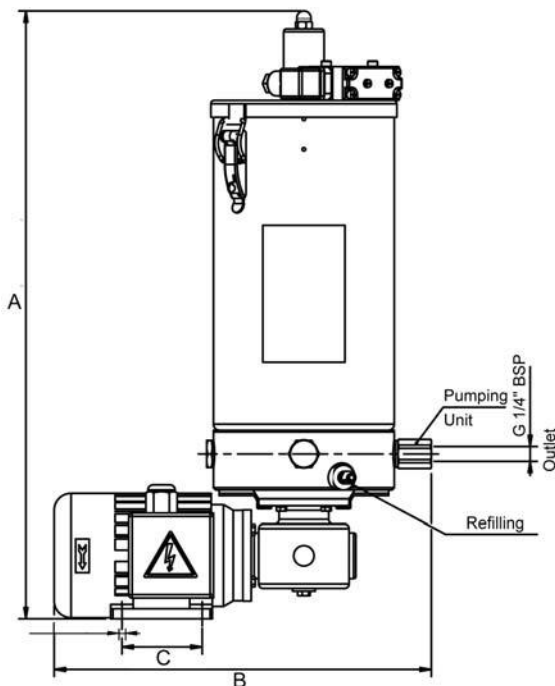
ACCESSORIES:

PART NO.	DESCRIPTION
299642	Pumping unit Ø 6 mm - Fixed delivery 10 cm ³ /min (0.61 cu. in/min)
299643	Pumping unit Ø 8 mm - Fixed delivery 17 cm ³ /min (1.03 cu. in/min)
299041	Pumping unit Ø 6 mm - Adjustable delivery 1,4-10 cm ³ /min (0.085 - 0.61 cu. in/min)
299042	Pumping unit Ø 8 mm - Adjustable delivery 2,5-17 cm ³ /min (0.15 - 1.03 cu. in/min)
888036	By Pass 0-250 Bar
3292099	Pressure gauge 0-400 Bar

ADJUSTABLE DELIVERY

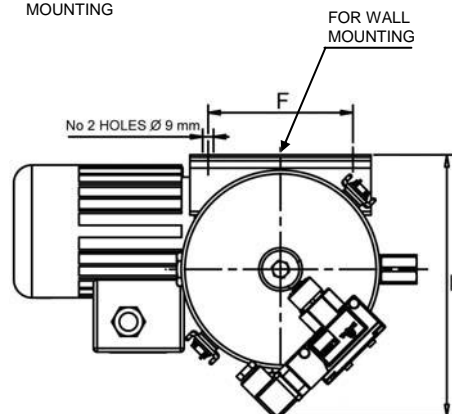
PART NO.	DESCRIPTION
989003	Grease electric pump with 1 pumping unit Ø 6 mm
989004	Grease electric pump with 1 pumping unit Ø 8 mm

DIMENSIONS:



No 4 HOLES Ø 6 mm
FOR BASE PLATE
MOUNTING

Pos.	DIMENSIONS mm (in.)
A	539,5 (21.24)
B	~ 334 (13.15)
C	71 (2.79)
D	~ 220 (8.66)
E	120 (4.72)



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**
- **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 to 50 MPa (500 bar) (11000 psi.)
Delivery fixed: up to 33 cm³/min. - 1500 r.p.m.
Delivery Adjustable: up to 51 cm³/min. - 2200 r.p.m.
Lubricant: oil viscosity 15 cSt min.
 Grease NLGI 2 max. at the working lubricant temperature between -20°C to +100°C.

MOTORS:

A.C. Motors:

Code 3301137 three phase 220/380V - 50Hz - 0.185 kW

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

D.C. Motors

Code 3301283 24V-120W

Specify voltage frequency and phase when ordering.

ORDERING INFORMATION:

Type of motor and R.P.M.*	Adjustable delivery				Max. pressure bar(psi.)	PART NUMBER OF MOTOR DRIVEN PUMP 999000 SERIES METAL RESERVOIRS CAPACITY							
	cm ³ /min.		cu.in./min			GREASE MAX. NLGI-2				OIL VISCOSITY MIN 15 cSt			
	Min	Max	Min	Max		3kg. 6.6 lbs.	5kg. 11 lbs.	10kg. 22 lbs.	30kg. 66 lbs.	3 Lt	5 Lt	10 Lt	30 Lt
A.C. 1500 R.P.M.	1,4	9,5	.08	.6	750 (11000)	999234	999214	999224	999204	999244	999264	999274	999254
	2,5	17	.15	1	400 (5800)	999236	999216	999226	999206	999246	999266	999276	999256
	5	33	.30	2	200 (2900)	999232	999212	999222	999202	999242	999262	999272	999252
D.C 24V 2200 R.P.M.	2	14,5	.12	.9	750 (11000)	999634	999614	999624	999604	999644	999664	999674	999654
	3,6	25,5	.22	1.5	400 (5800)	999636	999616	999626	999606	999646	999666	999676	999656
	7,2	51	.44	3	200 (2900)	999632	999612	999622	999602	999642	999662	999672	999652
	Fixed delivery												
A.C. 1500 R.P.M.	9,5		.6		750 (11000)	999334	999314	999324	999304	999344	999364	999374	999354
	17		1		400 (5800)	999336	999316	999326	999306	999346	999366	999376	999356
	33		2		200 (2900)	999332	999312	999322	999302	999342	999362	999372	999352
D.C 24V 2200 R.P.M.	14,5		.9		750 (11000)	999734	999395	999724	999704	999744	999764	999774	999754
	25,5		1.5		400 (5800)	999736	999712	999726	999706	999746	999766	999776	999756
	51		3		200 (2900)	999732	999716	999722	999702	999742	999762	999772	999752

R.P.M.* and lubricant deliveries indicated in the table refer to 50Hz. motors. With 60Hz. motors speed 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 digital of Part No.	Features of 999 pump		Pressure bar (psi.)	Second pumping unit		Ø Piston mm.
	Delivery cm ³ /min			Part No. Delivery		
	Adjust.	Fixed		Adjust.	Fixed	
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.

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

Cartridge (150 micron) **code 113006**

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 500 bar (0 to 3600 psi.)

MAX. ELECTRIC LEVEL CONTACT

All metal reservoirs (except 3 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 299440**

Plate for wall mounting **code 299460**

(for reservoirs 10Kg. And 10 litres)

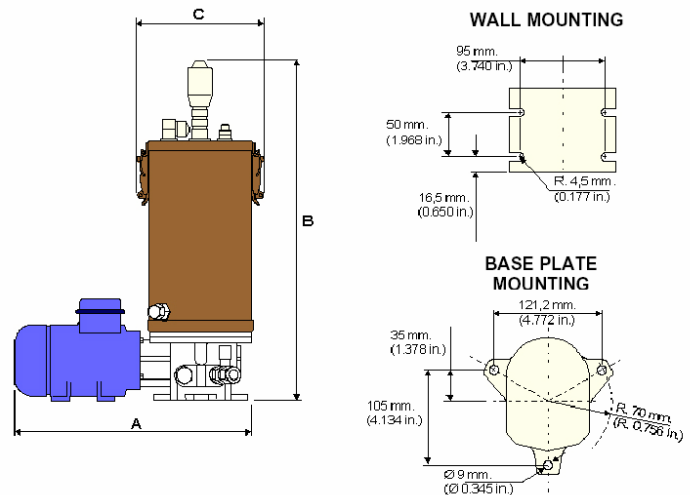
ASSEMBLY KIT

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:

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 500bar (725 to psi.)
299483	2	1	
299485	2	2	

DIMENSIONS



Dim .mm. (in)	RESERVOIR FOR OIL								RESERVOIR FOR GREASE							
	3kg. (6.6lb.)		5kg. (11lb.)		10kg. (22lb.)		30kg. (66lb.)		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.)	
	Metal															
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
A	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	332	19.3	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
C	197	7.8	197	7.8	299	11.8	358	14.1	197	7.8	197	7.8	299	11.8	358	14.1

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 operating to adjust the pressure and adjust lubricant output (using a flow control)

Part No. 3293060.

The assembly consist of:

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



A trolley mounted version is illustrated on page 53. 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 outlets or feed to independent systems. In the case of a dual line system the two pump out lets 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 contaminates. The frequency of operation can be monitored with DROPSA control panels or through the machines P.C.

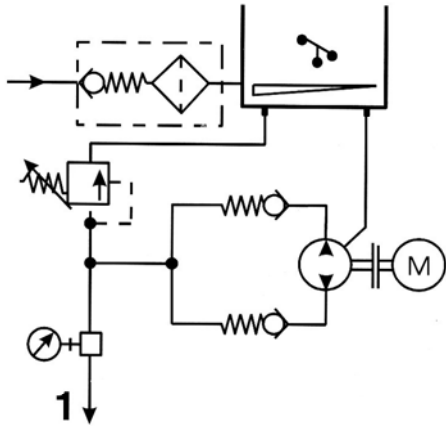
TECHNICAL INFORMATION:

- Lubricant:** oil or grease.
Adjustable delivery: 130 cc/min. (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. 265 ASTM (NLGI 2)
Pump: double body type; 4 pistons
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: 1:15 ratio.
Temperature range: from -30°C (-22°F) to +80°C (+176°F)

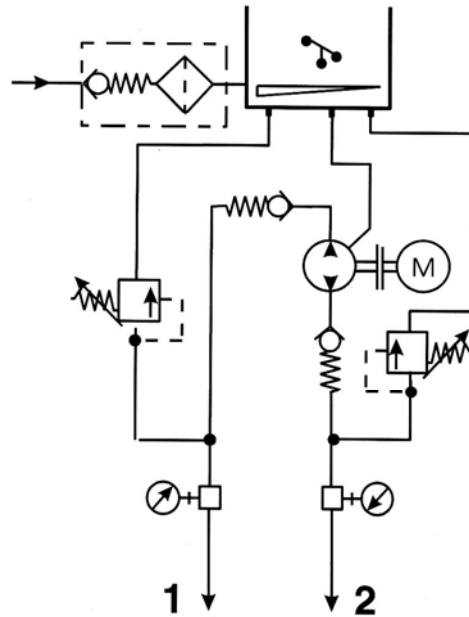
Pump with minimum and maximum level.	Reservoir capacity			Arrangement
	10kg. (22 lbs.)	30kg. (66 lbs.)	100kg (220 lbs.)	
With impeller unit for hard greases.	777110	777030	777131	A
For oil with minimum and maximum level.	777613	777624	777635	

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

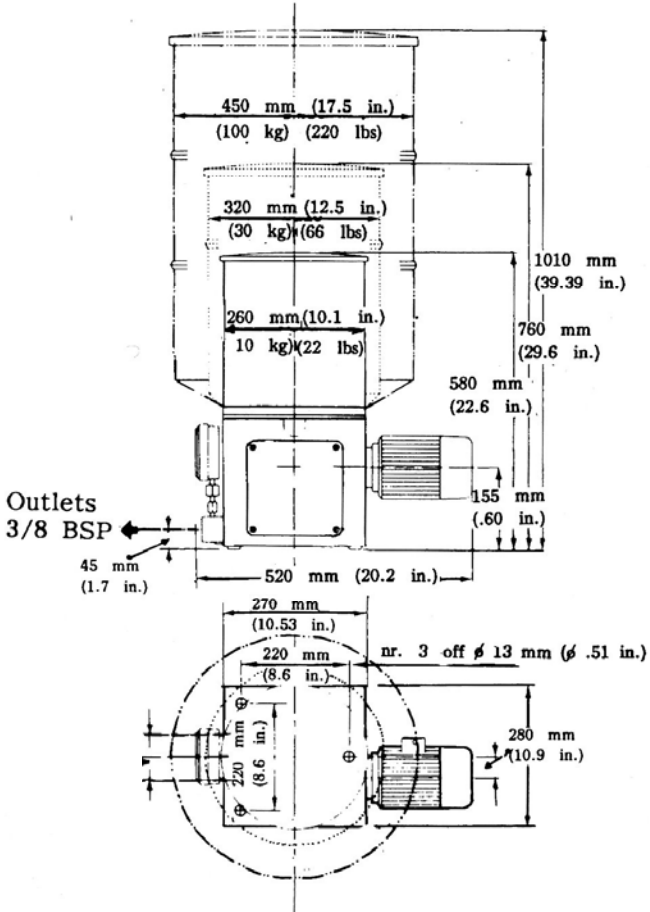
**(A) STANDARD
1 Outlet**



**(B) ON DEMAND
2 Outlet**

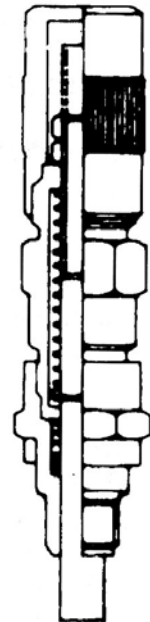


OVERALL DIMENSIONS



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

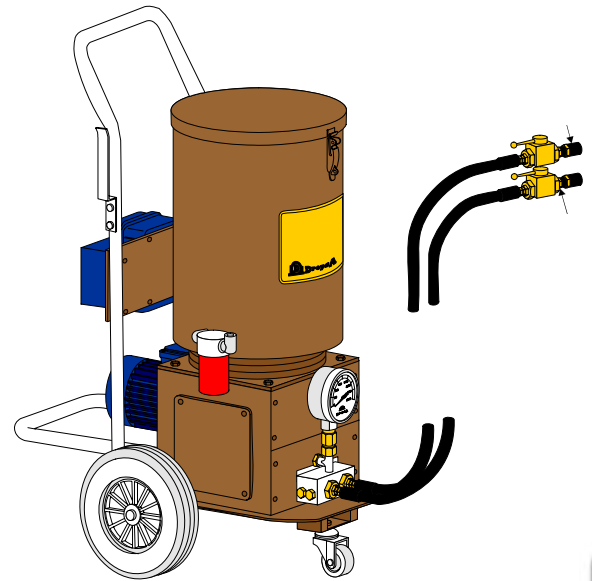
Mobile lubrication unit, delivers 130 cc. (.28 lb) of lubricant per minute with a back pressure of 400 bar (5700 psi.), or 260 cc. (.57 lb..) at 200 bar (2850 psi.).

The piston pump has a double 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 supplied complete with:

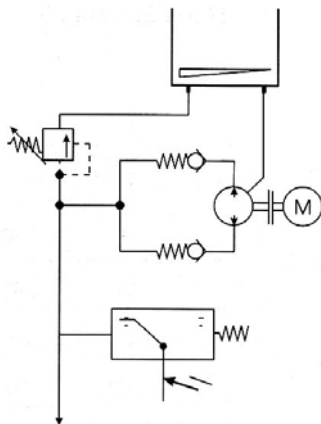
- Impeller suitable for the suction of greases with a low worked cone penetration index.
- Double body pump.
- Motor with geared unit.
- Pressure regulating valve.
- Pressure switch; stops the motor when the maximum pressure is reached in the line; on operating the gun the motor restarts.
- 2000 mm. (78 in.) long hose Part No. 2513005 - Part No. 2513021 (length to be specified when ordering).
- Continuous or intermittent flow gun.
- 1000 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.)



TROLLEY MOUNTED PUMPS SERIES 777

HYDRAULIC DIAGRAM



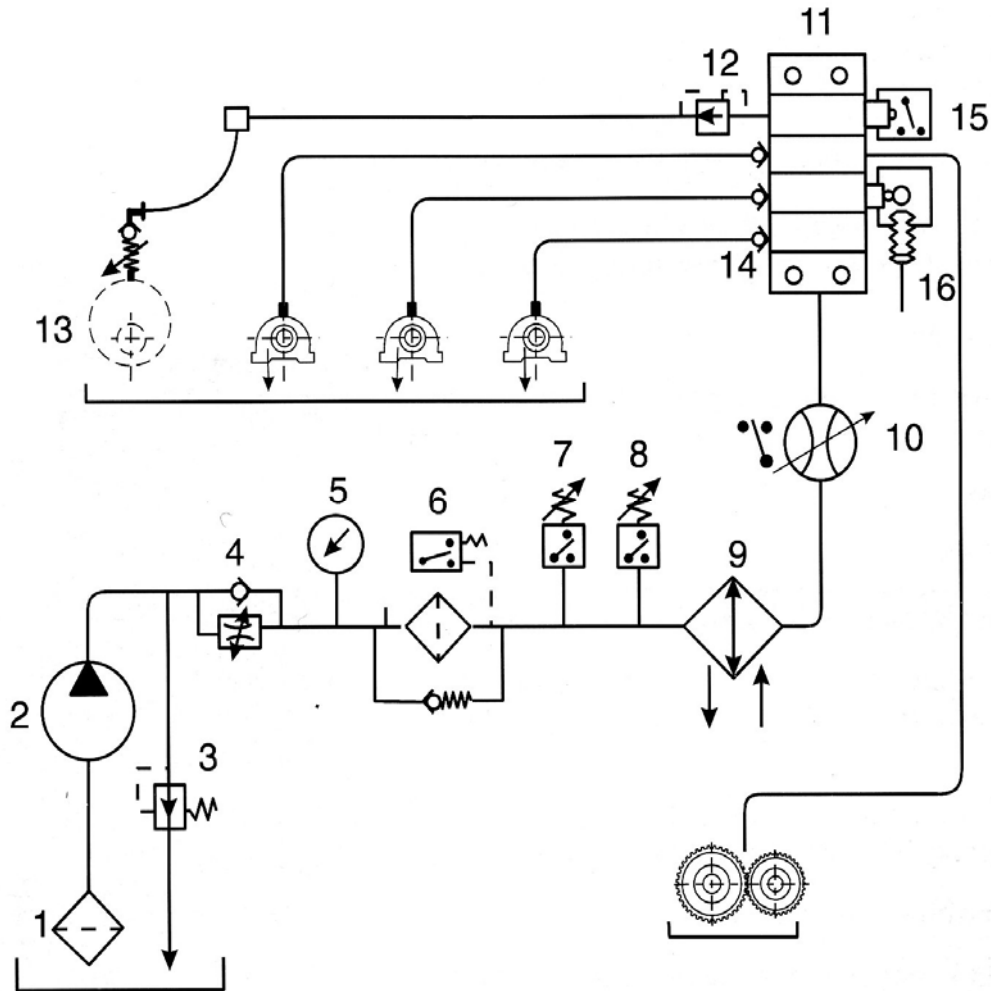
Motor	No. poles speed	Pump with reservoir Part No.		Pressure	Delivery cm ³ /min
		10kg. (22 lb.)	30kg. (66 lb.)		
THREE PHASE 220/380V 50Hz	4 poles 1500 r.p.m.	777950	777951	400 bar (5700 psi.)	130
THREE PHASE 220/380V 50Hz	2 poles 3000 r.p.m.	777952	777953	200 bar (2850 psi.)	260
SINGLE PHASE (brush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

Protection degree: IP 44

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

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 0,35 litres at 1 litres 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.

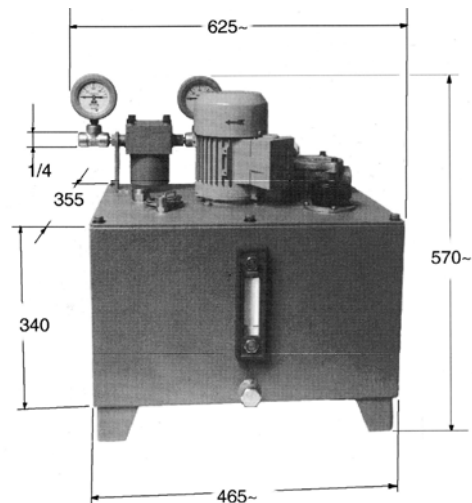
STANDARD MOTORISED PUMPS

STANDARD MOTORISED PUMPS

This pump has been designed to be used in mineral oil lubrication systems with viscosity between 15 and 1000 cSt (at operating temperature), and also in recovery system.

The assembly of this pump consists of: the pump with three phase multi-voltage motor 200/380V - 50 Hz, gear pump and suction filter 250 μ ; electric minimum level; adjustable By-pass 30 ÷ 100 bar (factory setting 70 bar); filler cap with filter; return filter 90 μ and mount of 1" BSP UNI-ISO 228/1; filter in delivery 25 μ with overload visual indicator; outlet block fitting 1/4" BSP with pressure gauge DN 63-0/160 bar.

Note: Max pressure operating temperature 70 bar intermittent service



TECHNICAL INFORMATION:

Pressure: Max. 100 bar
Regolata 70 bar

Minimum level contact

Max. power: 60VA
Max. current: 1A
Max. voltage: 200 VAC – 150 VDC

ORDERING INFORMATION:

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 type	Filtering degree		Delivery		Filtering element	
		micro n	micro n 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



STANDARD MOTORISED PUMPS

ADVANCED LUBRICATION CONTROLLER with Quick Remote Configuration

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

The setting parameters are all electronically stored in two separated 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 considerable time saving for OEM's who use the system on a production line, eliminating the need to individually configure each controller.



In order to prevent dangers of electric shock due to direct or indirect contact with live parts it is necessary that the electrical power supply line is adequately protected by a suitable differential magneto-thermal circuit breaker with an intervention threshold of 0.03 Ampere and a max. operating time of 1 second. *The breaking capacity of the circuit breaker must be = 10 kA and the nominal current $I_n = 6 A$.*

TECHNICAL INFORMATION:

INPUT CONTACTS:

Power:	110V/230V, 220V Single Phase and 380V – 50Hz. and 500V – 50Hz. Three Phase 24V DC.
Power Consumption:	20 Watts.
Operating Temperature:	-5°C to +55°C
Control Input:	12V Max. N.O Pressure Micron/Reed Switch. Proximity (NPN/PNP) Autodetection.
Impulse Counter:	Max. Switch 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:	132x132x160 mm
Fixing Dimensions:	95x95 mm
Protection Grade :	IP55.

ORDERING INFORMATION:

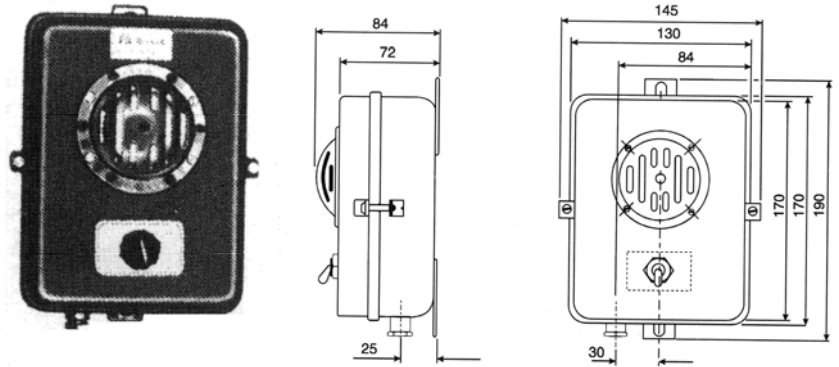
Part No.	Description
1639076	VIP Controller 24V Box version
1639077	VIP Controller 110V/230V Box version
1639080	VIP Controller 24V Panel Mounted Version
1639084	VIP Controller 110V/230V Panel Mounted Version
1639081	VIP Controller 220V Single Phase in Steel Enclosure
1639087	VIP Controller 380V Three Phase in Steel Enclosure
1639088	Remote Transmit Module
1639089	VIP Controller 500V Three Phase in Steel Enclosure
1639094	VIP Controller 12V Box version
1639097	VIP Controller 230V Single Phase/ Three Phase
1639101	VIP Controller 24V Box version
3056205	VIP 115/230V – 50/60 Hz with 50 W power and 24 V transformer
1639127	VIP Controller 380V 50-60 HZ
1639163	VIP Controller 24V Alarm N.C.
1639164	VIP Controller 110V/220V Alarm N.C.

AUDIBLE ALARMS

With cut-off switch. Used with electronic 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

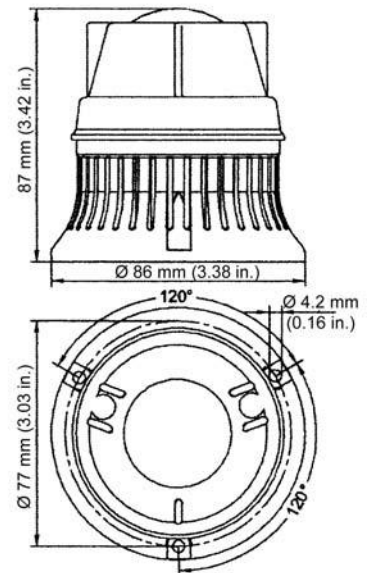
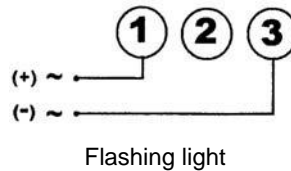
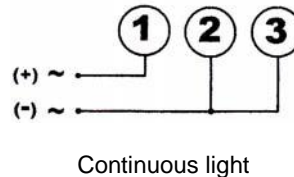


INDICATOR LAMP

Flashing warning and emergency devices or with continuous light.

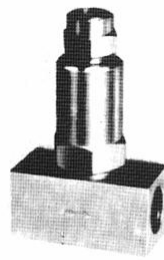


Part No.	Description
38520	Indicator Device Base Unit. Supplied without lamp. Red.
38521	Lamp 24V
38522	Lamp 110V
38523	Lamp 220V
38524	Indicator Device Base Unit. Supplied without lamp. Green.
38525	Indicator Device Base Unit. Supplied without lamp. Yellow.

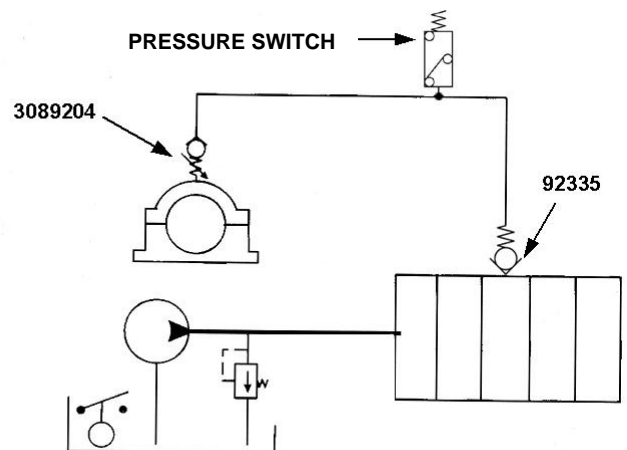


CONTROL AND CHECK VALVES

For added security or in special applications, it is possible to detect a broken secondary pipe by using a check valve (**Part No. 92335**) on the outlet of progressive block and by installing a control valve (**Part No. 3089204**) on the lubrication point. With this device the broken pipe causes a rise in pressure in the secondary line, the pressure switch, inserted in the main line will indicate the fault.

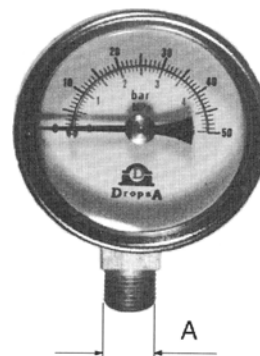


3089204



PRESSURE GAUGES

Gauge Part No.		A BSP- NPT	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
20566	-	1/8	43	1.7	16	235	-	-
3292099	-	1/4	63	2.48	400	5700	-	-
3292055	-	1/4	63	2.48	600	8820	-	-
3292142	-	1/8	43	1.7	25	367	-	-
20554	-	3/8	100	3.9	300	4410	-	-
20550	-	3/8	100	3.9	1000	14700	-	-
20549	-	3/8	80	3.1	500	7350	-	-

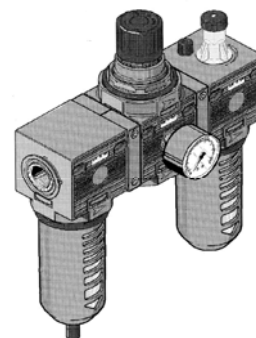


FILTER REGULATOR LUBRICATOR UNITS

CHARACTERISTICS

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

Assembly: filter regulator and lubricator.



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"	20677	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	
840-1680	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	

SOLENOID VALVES

FOR PNEUMATIC CONTROLS

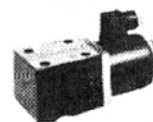
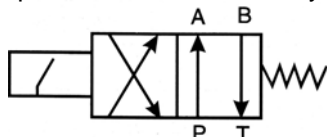
3 and 4 way solenoid valves, normally closed.



Elettrovalvola		Tensione e frequenza	Pressione max.	Potenza assorbita	Foro di fissaggio	Attacco	Bobina ricambio	Peso
3 vie	4 vie							
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	
45297		24V DC					37944	
-	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.)
	44304	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 systems.



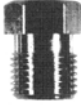
Solenoid valves 4 way	Voltage and frequency	Pressure max.	Delivery	Connection	Spare coil	Weight
44306	24V 50Hz	14Mpa (140 bar) (2000 psi.)	20 Lt./min. 42.2 pints/min.	CETOP PLATE	38002	1,2 kg. (2.6 lb.)
44348	24V 60Hz				3150002	
44307	110V 50Hz				38003	
44484	110V 60Hz				37933	
44450	220V 50Hz				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 50Hz				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"-24NF	-
	92041	4	1/8" BSP	-
	92052	6	1/8" BSP	-
	92014	6	1/4" BSP	-
	3084248	6	M10x1	-
	92053	8	1/4" BSP	-
	3084249	8	M14x1,5	-
92010	10	3/8" BSP	-	


	Part No.	Tube Ø	Thread	
COMPRESSION CONE				
	93004	4	-	-
	93006	6	-	-
	93008	8	-	-
	93010	10	-	-
	93015	12	-	-


	Part No.	Tube Ø	Thread	
FEMALE CONNECTORS				
	92287	4	M8x1,25 cyl. M.	5/16"-24NF F.
	3085110	4	M10x1 taper M.	M8x1 F.
	910005	4	1/8" BSP taper M.	5/16"-24NF F.
	92068	4	1/4" BSP taper M.	5/16"-24NF F.
	3085109	6	M10x1 taper M.	M10x1 F.
	910051	6	1/8" BSP taper M.	1/8" BSP cyl. F.
	910011	6	1/8" BSP taper M.	1/4" BSP cyl. F.
	910007	6	1/4" BSP taper M.	1/4" BSP cyl. F.
	910052	6	1/4" BSP taper M.	1/8" BSP cyl. F.
	910013	6	3/8" BSP taper M.	1/4" BSP cyl. F.
	910083	6	1/2" BSP taper M.	1/4" BSP cyl. F.
	910012	8	1/8" BSP taper M.	1/4" BSP cyl. F.
	910008	8	1/4" BSP taper M.	1/4" BSP cyl. F.
	910014	8	3/8" BSP taper M.	1/4" BSP cyl. F.
	910084	8	1/2" BSP taper M.	1/4" BSP cyl. F.
	92138	10	1/4" BSP taper M.	3/8" BSP cyl. F.
	92141	10	3/8" BSP taper M.	3/8" BSP cyl. F.
	910085	10	1/2" BSP taper M.	3/8" BSP cyl. F.
	92248	6	1/4" BSP cyl. M.	1/4" BSP cyl. F.
	92250	6	3/8" BSP cyl. M.	1/4" BSP cyl. F.
92255	8	1/4" BSP cyl. M.	1/4" BSP cyl. F.	
92257	8	3/8" BSP cyl. M.	1/4" BSP cyl. F.	
92260	10	1/4" BSP cyl. M.	3/8" BSP cyl. F.	
92261	10	3/8" BSP cyl. M.	3/8" BSP cyl. F.	


	Part No.	Tube Ø	Thread	
WITH CHECK VALVE				
	94390	4	M8x1,25 M.	5/16"-24NF F.
	94370	4	1/8" BSP taper M.	5/16"-24NF F.
	94450	6	1/8" BSP taper M.	1/4" BSP cyl. F.
	94470	6	1/4" BSP taper M.	1/4" BSP cyl. F.
	94550	8	1/8" BSP taper M.	1/4" BSP cyl. F.
	94570	8	1/4" BSP taper M.	1/4" BSP cyl. F.
	94650	10	3/8" BSP taper M.	3/8" BSP cyl. F.


	Part No.	Tube Ø	Thread	
MALE CONNECTORS				
	3085008	4	M8x1,25 taper M.	M8x1 cyl.
	3085111	4	M10x1 taper M.	M8x1 cyl.
	3085010	4	1/8" BSP taper M.	M8x1 cyl.
	3085012	4	1/4" BSP taper M.	M8x1 cyl.
	3085112	6	M10x1 taper M.	M10x1 cyl.
	3085014	6	1/8" BSP taper M.	M10x1 cyl.
	3085016	6	1/4" BSP taper M.	M10x1 cyl.
	3085018	8	M10x1 taper M.	M12x1 cyl.
	3085020	8	M12x1 taper M.	M12x1 cyl.
	3085022	8	1/8" BSP taper M.	M12x1 cyl.
	3085024	8	1/4" BSP taper M.	M12x1 cyl.
	3085026	10	1/4" BSP taper M.	M18x1,5 cyl.
	3085028	10	3/8" BSP taper M.	M18x1,5 cyl.

	Part No.	Tube Ø	Thread	
NUTS FOR COMPRESSION CONE				
	3235125	4	-	M8x1
	91354	4	-	5/16"-24NF
	91358	6	-	1/8" BSP
	91359	6	-	M10x1
	91366	8	-	1/4" BSP
	91370	8	-	M12x1
	91375	10	-	M18x1,5
91378	12	-	M20x1,5	

	Part No.	Tube Ø	Thread	
PLUGS				
	3232111	-	M10x1 cyl.	-
	3232113	-	1/8" BSP cyl.	-
	622006	-	M12x1 cyl.	-
	91124	-	M16x1 cyl.	-
	3232117	-	1/4" BSP cyl.	-


	Part No.	Tube Ø	Thread	
FEMALE CONNECTORS				
	92288	4	M8x1,25 cyl.	-
	3085118	4	M10x1 taper	-
	92069	4	1/8" BSP taper	-
	92067	4	1/4" BSP taper	-
	3085119	6	M10x1 taper	-
	92080	6	1/8" BSP taper	-
	92079	6	1/8" BSP taper	-
	92088	6	1/8" BSP taper	-
	92083	6	1/4" BSP taper	-
	92090	6	3/8" BSP taper	-
	92097	6	1/2" BSP taper	-
	92112	8	1/8" BSP taper	-
	92115	8	1/4" BSP taper	-
	92118	8	3/8" BSP taper	-
	92120	8	1/2" BSP taper	-
	92139	10	1/4" BSP taper	-
	92142	10	3/8" BSP cyl.	-
	92143	10	1/2" BSP cyl.	-
	92246	6	1/4" BSP cyl.	-
	92251	6	3/8" BSP cyl.	-
92256	8	1/4" BSP cyl.	-	
92258	8	3/8" BSP cyl.	-	
92263	10	1/4" BSP cyl.	-	
92262	10	3/8" BSP cyl.	-	



	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





	Part No.	Tube Ø	Thread	
MALE CONNECTORS				
	3085009	4	M8x1,25 taper	-
	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 taper	-
	3085027	10	1/4" BSP taper	-
	3085029	10	3/8" BSP taper	-


M.= Male F.= Female

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

	Part No.	Tube Ø	Thread	
PUSH-IN STRAIGHT				
	910101	4	-	M5x0,8
	910103	6	-	M6x1
	3084567	6	-	M12x1,5
	3084579	4	-	M6x1
	3084631	4	-	M6x0,75
	3084554	6	-	1/8" BSP
	3084608	12	-	1/4" BSP
	3084565	6	-	1/8" BSP
	33VIP4	4	-	1/8" BSP
	3084577	4	-	1/8" BSP
	3084578	6	-	1/8" BSP
	3084609	6	-	1/4" BSP
	3084586	4	-	1/8" BSP
	3084587	6	-	1/8" BSP
	3084612	4	-	5/16"-24NF
3084640	4	-	5/16"-24NF	
PUSH-IN 90°				
	911095	4	-	M5x0,8
	3084630	4	-	M6x0,75
	3084566	6	-	1/8" BSP
	3084610	6	-	1/4" BSP
	3084580	4	-	1/8" BSP
	3084588	4	-	1/8" BSP
	3084589	6	-	1/8" BSP
	PUSH-IN 90° SWIVEL			
	3084613	4		
	911096	4		
	3084611	4		
	3084620	4		
PUSH-IN BULK HEAD				
	3084562	-		tube Ø 6
	3084573	-		tube Ø 4
PUSH-IN TEE UNIONS				
	3084641	-		tube Ø 4
	3084593	-		tube Ø 6
	3084642	-		tube Ø 8


TAPER REDUCERS				
	94885	4	5/16"-24NF	5/16"-24NF
	94891	6	5/16"-24NF	M10x1 cyl.
	3077142	6	M14x1,5	M10x1 cyl.
	94896	8	5/16"-24NF	1/4" BSP cyl.
VARIOUS REDUCERS				
	141695	-	1/8" BSP cyl. M.	M12x1 cyl. F.
	92354	-	M12x1 cyl. M.	1/8" BSP cyl. F.
	3077132	-	M10x1 cyl. M.	M12x1 cyl. F.
	3077100	-	1/4" BSP cyl. M.	1/8" BSP taper F.
	1112005	-	1/4" BSP taper M.	1/8" BSP taper F.
	3077106	-	1/2" BSP taper M.	1/4" BSP taper F.
	3077019	-	M16x1 cyl. M.	M12x1 cyl. F.


	Part No.	Tube Ø	Thread	
90° ELBOWS				
	95137	4	M8x1	-
	95139	6	M10x1	-
	95144	8	M12x1	-
	95149	10	M18x1,5	-
	95160	12	M20x1,5	-
TEEN 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 cil.	-
	3077146	4	M12x1 cil.	-
	98717	4	M12x1 cil.	-
	3077147	4	M16x1,5 cil.	-
	98715	4	M16x1 cil.	-
	3077148	6	M10x1 cil.	-
	98721	6	M12x1 cil.	-
	3077149	6	M16x1,5 cil.	-
	98726	6	M16x1 cil.	-
	98731	8	M16x1 cil.	-
	98733	8	M16x1,5 cil.	-


TAPER REDUCERS				
	94886	4	5/16"-24NF	-
	94892	6	5/16"-24NF	-
	94893	6	M14x1,5	-
	94898	8	5/16"-24NF	-
STRAIGHT UNIONS				
	96053	4	M8x1	-
	96055	6	M10x1	-
	96059	8	M12x1	-
	96061	10	M18x1,5	-
	96079	12	M20x1,5	-
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		
	3130178	For M16x1,5 copper fitting		


ACCESSORIES: FITTINGS


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


	Part No.	Tube Ø	Thread	
NUTS FOR RINGS				
	91396	6	M12x1,5	-
	91401	8	M14x1,5	-
	91402	8	M16x1,5	-
	91406	10	M18x1,5	-
	91411	12	M20x1,5	-
	91416	16	M24x1,5	-
	91424	20	M30x2	-


	Part No.	Tube Ø	Thread	
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 cyl.	M12x1,5
	92208	6	1/4" BSP cyl.	M12x1,5
	92212	8	1/4" BSP cyl.	M14x1,5
	92399	8	M16x1 cyl.	M14x1,5
	92220	12	3/8" BSP cyl.	M20x1,5
	92224	16	3/8" BSP cyl.	M24x1,5
	92228	20	3/4 BSP cyl.	M30x2
	92235	30	1.1/4" BSP cyl.	M42x2


	Part No.	Tube Ø	Thread	
MALE CONNECTORS WITH GASKET-LESS SEAL				
	92266	8	1/4" BSP cyl.	M16x1,5
	92242	10	1/4" BSP cyl.	M18x1,5
	92269	10	3/8" BSP cyl.	M18x1,5
	92198	12	1/4" BSP cyl.	M20x1,5
	92240	12	3/8" BSP cyl.	M20x1,5
	92241	16	3/8" BSP cyl.	M24x1,5


	Part No.	Tube Ø	Thread	
MALE CONNECTORS WITH HEAD FOR TAPER SEALING				
	96915	6	1/4" BSP cyl.	M12x1,5
	92245	8	1/4" BSP cyl.	M14x1,5
	3084128	8	3/8" BSP cyl.	M14x1,5
	3084134	10	1/4" BSP cyl.	M18x1,5
	3084130	10	3/8" BSP cyl.	M18x1,5
	3084106	12	3/8" BSP cyl.	M20x1,5


	Part No.	Tube Ø	Thread	
90° MALE ELBOWS				
	93184	6	1/8" BSP taper	M12x1,5
	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" BSP taper	M24x1,5
	93221	20	3/4" BSP cyl.	M30x2
	93220	30	1.1/4" BSP cyl.	M42x2


	Part No.	Tube Ø	Thread	
TEEN UNIONS				
	93697	6	1/4" BSP taper	M12x1,5
	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 cyl.	M30x2
	93734	30	1.1/4" BSP cyl.	M42x2


	Part No.	Tube Ø	Thread	
RINGS				
	91590		o.d. 6 tube	
	91596		o.d. 8 tube	
	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	

	Part No.	Tube Ø	Thread	
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	M12x1 cyl.	-
	92209	6	1/4" BSP cyl.	-
	92213	8	1/4" BSP cyl.	-
	92398	8	M16x1 cyl.	-
	92217	10	3/8" BSP cyl.	-
	92221	12	3/8" BSP cyl.	-
	92225	16	3/8" BSP cyl.	-
	92229	20	3/4 BSP cyl.	-
92234	30	1.1/4" BSP cyl.	-	









	Part No.	Tube Ø	Thread	
MALE CONNECTORS WITH GASKET-LESS SEAL				
	92267	8	1/4" BSP cyl.	-
	92243	10	1/4" BSP cyl.	-
	92270	10	3/8" BSP cyl.	-
	92199	12	1/4" BSP cyl.	-
	92254	12	3/8" BSP cyl.	-
	92210	16	3/8" BSP cyl.	-








	Part No.	Tube Ø	Thread	
MALE CONNECTORS WITH HEAD FOR TAPER SEALING				
	96916	6	1/4" BSP cyl.	-
	3084131	8	1/4" BSP cyl.	-
	3084127	8	3/8" BSP cyl.	-
	3084133	10	1/4" BSP cyl.	-
	3084129	10	3/8" BSP cyl.	-
	3084145	12	3/8" BSP cyl.	-

	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 cyl.	-
	93219	30	1.1/4" BSP cyl.	-

	Part No.	Tube Ø	Thread	
TEEN UNIONS				
	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 cyl.	-
	93733	30	1.1/4" BSP cyl.	-




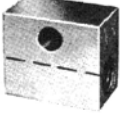
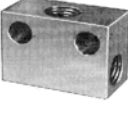



COMPRESSION FITTINGS, MAX. PRESSURE 40Mpa (400 BAR) (5700 PSI)



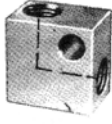
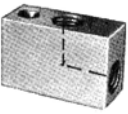



	Part No.	Tube Ø	Thread	
STRAIGHT UNIONS				
	96097	6	M12x1,5	-
	96102	8	M14,1,5	-
	96107	10	M18x1,5	-
	96111	12	M20x1,5	-
	96115	16	M24x1,5	-
	96132	20	M30x2	-
	96134	30	M42x2	-
90° ELBOWS				
	95096	6	M12x1,5	-
	95101	8	M14,1,5	-
	95106	10	M18x1,5	-
	95111	12	M20x1,5	-
	95116	16	M24x1,5	-
	3074112	20	M30x2	-
	95123	30	M42x2	-
TEEN UNIONS				
	95685	6	M12x1,5	-
	95689	8	M14,1,5	-
	95693	10	M18x1,5	-
	95698	12	M20x1,5	-
	95703	16	M24x1,5	-
	95728	20	M30x2	-
	95730	30	M42x2	-
CROSS UNIONS				
	95925	6	M12x1,5	-
	95932	8	M14,1,5	-
	95928	10	M18x1,5	-
	95930	12	M20x1,5	-
	95969	16	M24x1,5	-
	95982	20	M30x2	-
	95984	30	M42x2	-
REDUCING UNIONS				
	96717	8-6	M14,1,5	M12x1,5
	96722	10-8	M18x1,5	M14,1,5
	96727	12-10	M20x1,5	M18x1,5
REDUCING 90° ELBOWS				
	96838	8-6	M18x1,5	M12x1,5
	96841	10-8	M24x1,5	M14,1,5
	96843	12-10	M24x1,5	M18x1,5
REDUCING TEE				
	96596	M14x1,5-M12x1,5-M14 x1,5		
	96600	M18 x1,5-M14x1,5-M18x1,5		
	96603	M24 x1,5-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	
STRAIGHT UNIONS				
	96098	-	tube Ø 6	
	96103	-	tube Ø 8	
	96108	-	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	
TEEN 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	
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	-	tube Ø 8-6	
	96723	-	tube Ø 10-8	
	96728	-	tube Ø 12-10	
REDUCING 90° ELBOWS				
	96837	-	tube Ø 10-8	
	96842	-	tube Ø 16-8	
	96844	-	tube Ø 16-10	
REDUCING TEE				
	96595	-	tube Ø 8-6-8	
	96602	-	tube Ø 10-8-10	
	96603	-	tube Ø 16-8-16	
	96604	-	tube Ø 16-10-16	

ALL THE FITTINGS SUPPLIED WITH NUT ARE COMPLETE WITH RINGS OR CONE.

FITTINGS

	Part No.	Tube Ø	Thread
REDUCERS			
	3077017	tube Ø 12-10	
	3077015	tube Ø 16-12	
	3077005	tube Ø 20-10	
	3077006	tube Ø 20-12	
	3077007	tube Ø 20-16	
	3077008	tube Ø 30-20	
	3077009	tube Ø 30-16	
	3077010	tube Ø 30-10	
	3077011	tube Ø 30-12	
PLUGS			
	91001	-	5/16"-24NF -
	91002	-	1/8" BSP -
	3234045	-	M10x1 -
	91006	-	1/4" BSP -
	3234095	-	M14x1,5 -
	91003	-	3/8" BSP -
PLUGS			
	91005	-	5/16"-24NF -
	640553	-	1/8" BSP -
	3234094	-	M10x1 -
	91011	-	1/4" BSP -
STRAIGHT ANCHOR BLOCK FOR FLEX			
	3071012	-	M8x1 tube Ø 4 fiss. 4,2
	118060	-	5/16"-24NF tube Ø 4 fiss. 4,5
	118067	-	1/8" BSP tube Ø 6 fiss. 4,5
	118074	-	1/4" BSP tube Ø 6 fiss. 8,5
	3071013	-	M10x1 tube Ø 6 fiss. 4,2
	118080	-	1/4" BSP tube Ø 8 fiss. 8,5
118085	-	3/8" BSP tube Ø 10 fiss. 8,5	
3-WAY ANCHOR BLOCK			
	118205	-	1/8" BSP tube Ø 6 fiss. 5,5
	118203	-	1/4" BSP tube Ø 6 fiss. 8,5
	118210	-	1/4" BSP tube Ø 8 fiss. 8,5
	118216	-	3/8" BSP tube Ø 10 fiss. 8,5
CROOS ANCHOR BLOCK			
	118445	-	1/8" BSP tube Ø 6 fiss. 4,5
	118446	-	1/4" BSP tube Ø 8 fiss. 5,2
3-WAY ANCHOR BLOCK-TWO-LINE-SYSTEM			
	118315	-	1/4" BSP fiss. Ø 6,5
	118320	-	3/8" BSP fiss. Ø 8,5
ANCHOR BLOCK FOR FLEX TWO-LINE-SYSTEM			
	118393	-	1/4" BSP tube Ø 6 fiss. 6,5
	118394	-	1/4" BSP tube Ø 8 fiss. 6,5
	118399	-	3/8" BSP tube Ø 10 fiss. 6,5

	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	-	M8x1 tube Ø 4 fiss. 4,5
	118110	-	5/16"-24NF tube Ø 4 fiss. 4,5
	118117	-	1/8" BSP tube Ø 6 fiss. 4,5
	118124	-	1/4" BSP tube Ø 6 fiss. 8,5
	3071002	-	M10x1 tube Ø 6 fiss. 4,5
	118130	-	1/4" BSP tube Ø 8 fiss. 8,5
	118269	-	3/8" BSP tube Ø 10 fiss. 8,5
90° SINGLE ANCHOR BLOCK FRONT CONNECTION FOR FLEX			
	118150	-	5/16"-24NF tube Ø 4 fiss. 4,5
	118157	-	1/8" BSP tube Ø 6 fiss. 5,5
	118164	-	1/4" BSP tube Ø 6 fiss. 8,5
	118170	-	1/4" BSP tube Ø 8 fiss. 8,5
	118173	-	3/8" BSP tube Ø 10 fiss. 8,5
CROOS ANCHOR BLOCK-TWO-LINE-SYSTEM			
	118355	-	1/4" BSP fiss. Ø 6,5
	118360	-	3/8" BSP fiss. Ø 8,5
ANCHOR BLOCK-TWO-LINE-SYSTEM			
	118316	-	1/4" BSP fiss. Ø 6,5
	118321	-	3/8" BSP fiss. Ø 8,5
90° SINGLE ANCHOR BLOCK TWO-LINE-SYSTEM			
	118318	-	1/4" BSP fiss. Ø 6,5
	118319	-	3/8" BSP fiss. Ø 6,5

SPRAY VALVE FOR GREASE AND OIL - Part No. 1132300

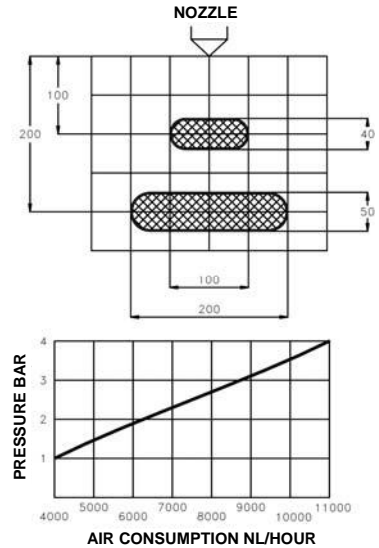
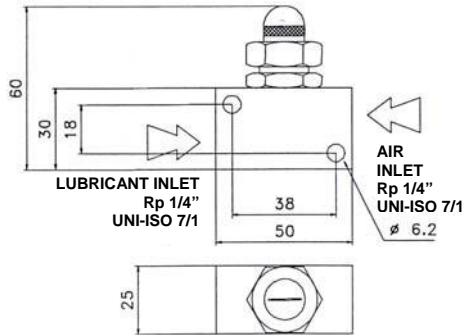
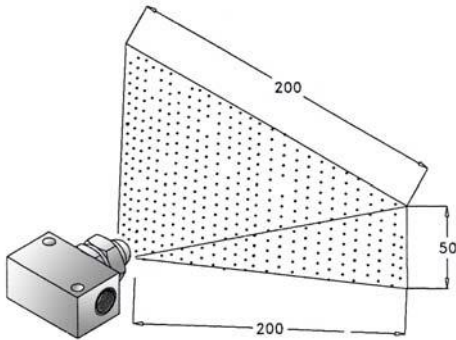


The spray valve is suitable for delivering lubricant by means of an air spray to a lubrication point. Typical applications may include open gears or rack lubrication. The air spray is automatically activated when lubricant is injected into the lubricant inlet port and de-activated when the flow stops. It is important to have a sufficient and rapid lubricant flow in order to open the air flow correctly.

Air inlet and lubricant inlet: 1/4" BSP

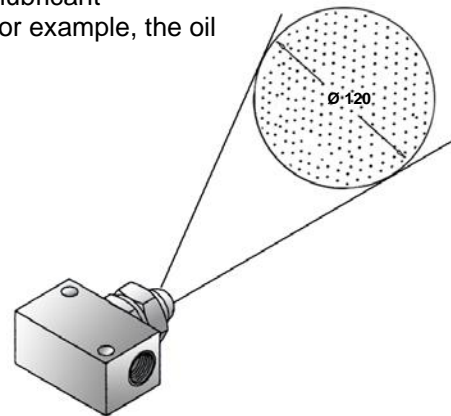
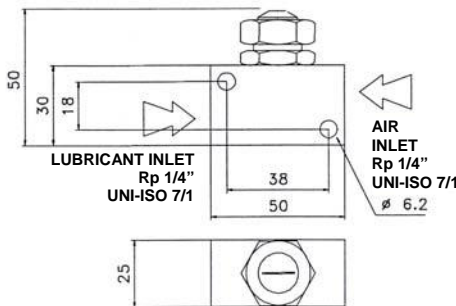
BLADE SHAPE SPRAY VALVE - Part No. 1132140

Valve for internal mixing, suitable for gear pinion applications where it is required the distribution of the grease on parts in contact. The peculiar shape of the mixing nozzle directs the lubricant only on parts in contact, avoiding – in this way – lubricant dispersion and reducing the consumption. Typical applications are, for example, the oil or grease lubrication of slides surfaces, chains and steel cables.



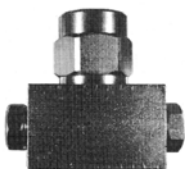
CONE SHAPE SPRAY VALVE - Part No. 1132100

Valve for internal mixing suitable for gear pinion applications where it is required the distribution of the grease on parts in contact. The peculiar shape of the mixing nozzle directs the lubricant only on parts in contact, avoiding – in this way – lubricant dispersion and reducing the consumption. Typical applications are, for example, the oil or grease lubrication of slides surfaces, chains and steel cables.



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

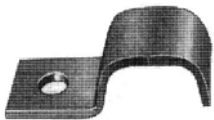


PIPE CLIPS WITH ONE FIXING HOLE

Part No.	Description
0111151	Tube Ø 4 - Mount Ø 4.5
0111201	Tube Ø 6 - Mount Ø 5
0111251	Tube Ø 8 - Mount Ø 5
0111301	Tube Ø 10 - Mount Ø 5
0111350	Tube Ø 12 - Mount Ø 8,5
0111370	Tube Ø 16 - Mount Ø 10,5



Part No.	Description
0111152	2 Tubes Ø 4 – Mount Ø 4.5
0111153	3 Tubes Ø 4 – Mount Ø 4.5

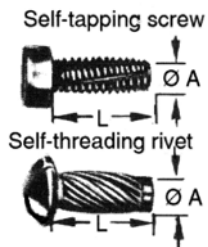


PIPE CLIPS WITH TWO FIXING HOLES

Part No.	Description
0111154	4 Tubes Ø 4 – Mount Ø 4.5
0111155	5 Tubes Ø 4 – Mount Ø 4.5
0111156	6 Tubes Ø 4 – Mount Ø 4.5
0111158	8 Tubes Ø 4 – Mount Ø 5
0111202	2 Tubes Ø 6 – Mount Ø 5
0111203	3 Tubes Ø 6 – Mount Ø 5
0111204	4 Tubes Ø 6 – Mount Ø 5
0111205	5 Tubes Ø 6 – Mount Ø 5
0111252	2 Tubes Ø 8 – Mount Ø 5
0111253	3 Tubes Ø 8 – Mount Ø 5
0111254	4 Tubes Ø 8 – Mount Ø 5
0111255	5 Tubes Ø 8 – Mount Ø 5
0111302	2 Tubes Ø 10 – Mount Ø 5
0111306	3 Tubes Ø 10 – Mount Ø 5
0111307	4 Tubes Ø 10 – Mount Ø 5
0111308	5 Tubes Ø 10 – Mount Ø 5



FIXING SCREWS



For pipe clip Ø	Part No.	Ø A mm.	L	Ø 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

SHUT OFF VALVES



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

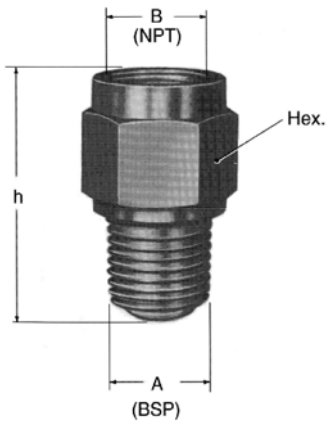
RELIEF VALVES



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.)

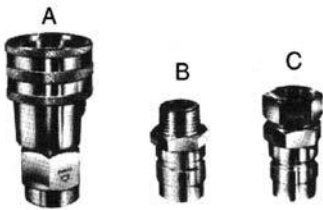
1112000-1/8" BSP (1/8" NPT) taper
1112010-1/4" BSP (1/4" NPT) taper
 Discharge pressure: 0,30 to 0,55 MPa (3 to 5,5 bar) (45 to 80 psi.)
1112008-1/8"

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

SNAP-ON CONNECTORS



Ø taper thread	1 seal male-female assembly Fig. A+B	2 seal male-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	-	-	-

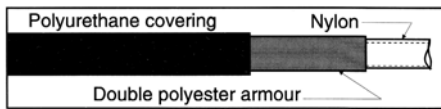
• Max. operating pressure 15Mpa (150 bar) (2150 psi.)
* Max. operating pressure 40Mpa (400 bar) (5700 psi.)

ROTARY CONNECTORS



Part No.	BSP Taper (male)	BSP (female)	Description
936000	1/2	1/4	For speed up to 500 r.p.m. max.
936100	3/8	1/4	
936200	1/4	1/4	
936300	3/8	1/8	
936400	1/4	1/8	
936500	1/8	1/8	
1168000	1/8	1/8	For speeds up to 100 r.p.m. max.
2712000	1/4	1/8	
936035	1/8	1/8	Oscillating only
936040	M10x1	-	

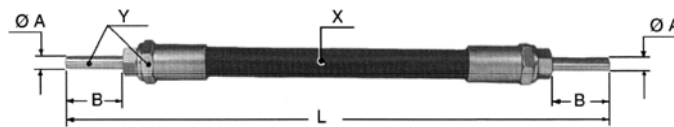
NYLON HOSES WITH REUSABLE FITTINGS



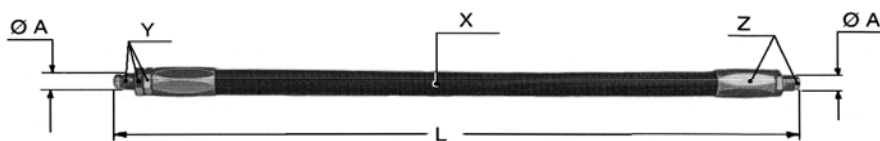
Tube only Part No.	Ø Tube		Min. bend radius	Working pressure		Weight	
	Ext. mm.	Int. mm.		bar	psi.	Kg.	lb.
3362026	8	3,18	38	200	2900	,050	.110
3362023	12,7	6,2	51	250	3600	,107	.335

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 cylindrical 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"	- -
Stainless Steel	3084463	8	-	6					

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.	Ø '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.

TUBING AND TOOLS

Material	Sizes	Part No.	Weight		Pressure		Bushes for tube
			Kg/ml	lb/ml	bar	psi.	
Drawn steel tube	ø 6x1 in bars	5119812	0.120	.26	400	5700	-
	ø 8x1 in bars	5119813	0.170	.37	400	5700	-
	ø 10x1 in bars	5119808	0.220	.48	400	5700	-
	ø 12x1,5 in bars	5119809	0.390	.86	400	5700	-
	ø 16x2 in bars	5119801	0.690	1.52	400	5700	-
	ø 20x2 in bars	5119810	0.890	1.95	400	5700	-
	ø 30x3 in bars	5119811	2.000	4.4	400	5700	-
Copper plated steel pipe	ø 4x.71 in bars	5118000	0.060	.13	500	7120	-
	ø 6x.71 in bars	5118001	0.097	.21	310	4400	-
	ø 8x.71 in bars	5118002	0.134	.29	220	3130	-
	ø 10x.71 in bars	5118003	0.171	.37	180	2550	308118
	ø 12x.71 in bars	5118004	0.196	.43	150	2130	-
Annealed copper tube	ø 4x.5 in coils	5501201	0.049	.10	133	1900	-
	ø 6x1 in coils	5501203	0.140	.30	200	2850	-
	ø 8x1 in coils	5501204	0.196	.43	130	1850	-
	ø 10x1 in coils	5501205	0.252	.55	100	1400	-
	ø 12x1 in coils	5501206	0.308	.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 tube
			Kg/ml	lb/ml	bar	psi.		
Nylon tube (L.P.)	ø 4x3 in coils	5717300	0,006	.013	30	420	-70°C to +100°C (-94°F to +230°F)	3008117
Nylon tube (L.P.)	ø 6x4,5 in coils	5717301	0,014	.030	30	420		3008116
Nylon tube (L.P.)	ø 8x6 in coils	5717302	0,025	.055	30	420		3008114
Nylon tube (L.P.)	ø 10x8 in coils	5717303	0,032	.070	30	420		3008115
Nylon tube (H.P.)	ø 4x2,5 in coils	5717202	0,008	.017	80	1150		201359
Nylon tube (H.P.)	ø 6x4 in coils	5717203	0,017	.037	80	1150		201360
Nylon tube (H.P.)	ø 8x5 in coils	5717204	0,034	.074	80	1150		201361
Nylon tube (H.P.)	ø 10x6 in coils	5717205	0,057	.125	80	1150		-

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

TUBE BENDER

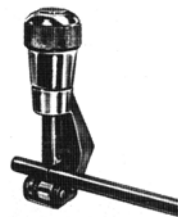
For copper and steel tubes



- 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

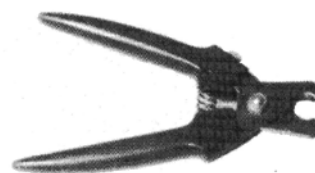
TUBE CUTTER

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.

DIAMETERS		LENGTHS																		
		mm.	12	19	25	38	51	57	76	82	102	110	127	140	152	165	178	204	230	250
12	16	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	4560	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 NLG-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 'SM0'.

TEMPERATURE: -20°C to +100°C (-4°F to +212°F)
OIL VISCOSITY: 15 cST Minimum
GREASES: Max. 220 – 250 ASTM
PRESSURES: 2Mpa (20 bar) min.
 40Mpa (400 bar) max.

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

TABLE 2 - CS

Rotation or alternate movement Intermittent: Continuous:	CS = 0,5 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 Normal Abundant Very Abundant	LR = 0,5 LR = 1 LR = 2 LR = 3
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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

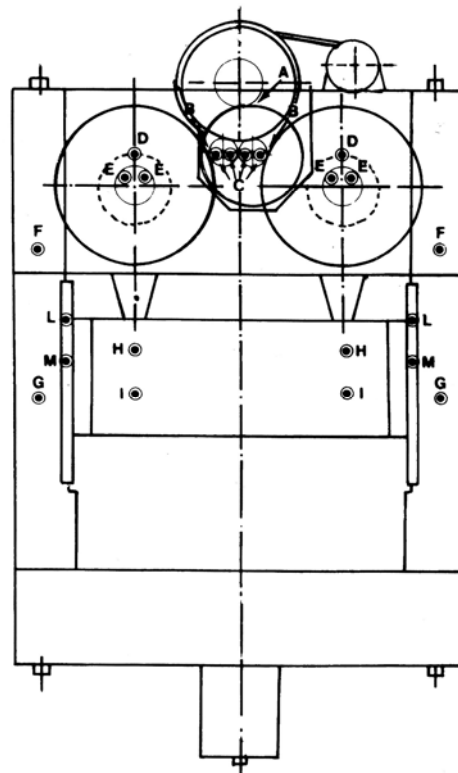
The lubrication interval for a machine can't be fixed in a direct way by means of formulae or tables and due to this, in the beginning it will be necessary to reduce the intervals in order to feed an amount of lubricant greater than that required. Afterwards it will be possible to widen the intervals 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 0,05 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

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



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

- 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

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 Average range 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

NGLI: 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	932.90	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